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Exploring Darwin's Correspondence: Some Important but Lesser Known Correspondents and Projects

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ABSTRACT: This paper explores Darwin's 14,000 plus letters and suggests that in spite of the enormous amount of published material on Darwin and his work, there remains much untapped information in his correspondence. A quantitative analysis of his correspondence reveals that many of Darwin's most important sources and projects have not been researched. I provide examples in two of his correspondents, William B. Tegetmeier and John Scott, who were extremely important to Darwin's work in domestic animal breeding and plant hybrid studies, respectively. In addition, Darwin's work on seed viability and distribution are discussed to illustrate both the extent of his correspondence network and the complexity of his many sub-projects. The appendices suggest avenues for the further research of Darwin's correspondence by correlating the amount of correspondence with the amount of published material on the correspondents.

KEY WORDS: Charles Darwin – William B. Tegetmeier – John Scott – seed distribution – seed viability – correspondence.

INTRODUCTION

Volume **11** of *The correspondence of Charles Darwin* (Burkhardt *et alii*, 2001) was published recently. Correspondence covering the years 1821 through 1864 is now in print. Darwin scholars continue to rave about the research prospects that these volumes hold. In his survey of the Darwin "industry" Ruse (1996: 219) claimed that in comparison to *The correspondence of Charles Darwin* "all other items of Darwin material come across as a bit anti-climactical". In one of the first reviews of the project, Moore (1985: 578) stated that "the *Calendar* [Burkhardt *et alii*, 1985] is, in short, a monumental achievement – one of the most important books to be published in the twentieth century on the culture of science, technology, and medicine ... the opportunities for microdarwinian investigation have redoubled at a stroke". Undoubtedly, there is a phenomenal amount of information contained in these volumes with more to come. Darwin corresponded voluminously until his death in 1882. However, there remains the question of how to approach such an enormous amount of information.

To this end, I offer a quantitative analysis of the more than 14,000 extant letters.[1] Moore (1985) included a graph of the annual quantities of letters to and from Darwin, and discussed some of the research possibilities revealed by his analysis. Montgomery (1987) performed a more in-depth quantitative analysis of Darwin's correspondence, and Garber (1994) gave a thorough analysis of Darwin's network of Pacific correspondents. My approach builds on these works, but also attempts to correlate Darwin's correspondence with his research projects. Such an analysis reveals that there is a large number of lesser-known figures who Darwin relied heavily on for information. Setting the "big names" aside (for example, Joseph Dalton Hooker, Charles Lyell, Asa Gray, Thomas Henry Huxley), there remain more than 50 correspondents with whom Darwin exchanged 30 or more letters. As Moore (1985: 576) suggested, a closer examination of these important, but lesser known, figures seems an

appropriate next step for Darwin scholarship.

Another avenue of research made available through the *Correspondence* is the examination of Darwin's research projects. Secord's (1985) and Bartley's (1992) works on Darwin and domestic animal breeding are two such examples. In so doing, it becomes possible, as Garber (1994) demonstrated, to map out Darwin's network of correspondents and the various projects that he was investigating. A host of research questions can be asked. Who did Darwin rely on and for what kind of information? Where were his correspondents located geographically? What was the education and social status of his correspondents, and did this make a difference in the type and legitimacy of responses he received?[2] To what extent, if at all, were Darwin's queries simply rhetorical attempts to enroll others into his projects?[3]

METHODS

Using the same resources as Garber (1994), a list of correspondents (Appendix 1) was established by the following method. First, *A calendar of the correspondence of Charles Darwin 1821–1882* (Burkhardt and Smith, 1994) was used to determine correspondents with whom Darwin had more than five exchanges. There is no objective basis for making the cut-off at five; however, it seems reasonable to assume that any significant correspondence that Darwin engaged in would necessitate more that a "few" letters. Secondly, correspondents with whom Darwin's communication was primarily personal in nature were eliminated. This was determined by examining the brief biographies in the *Calendar*. For example, scientists, breeders, foreign correspondents and queries to journals were included, whereas family and friends were not unless Darwin clearly drew on them for his projects.[4] Admittedly, it is difficult to make a decision about the nature of Darwin's correspondence from this limited information; nevertheless, the biographies in conjunction with the author's tacit knowledge from working on the Darwin Correspondence Project provide a fairly sound basis for making these decisions.[5] If there was any doubt, the correspondent was included in the list.

After paring down the list by the above methods, *Isis* cumulative bibliographies over a 20 year period (1978–1998) were examined to determine the extent of existing research on the correspondents. Those individuals with more than three entries in the *Isis* bibliographies were eliminated. The intention here was to develop a list of Darwin's correspondents who have received little attention from researchers. Finally, to provide some idea of the significance of the correspondents, the *Dictionary of British and Irish botanists and horticulturists* (Desmond and Ellwood, 1994) was consulted (Appendix 1).

A more difficult task was determining date ranges during which Darwin worked on his various projects. As any Darwin scholar knows, Darwin had a number of ongoing projects at any one time. Some of his investigations spanned the majority of his working life. For example, although Darwin's theory of the transmutation of species was largely formulated by 1842, it can reasonably be argued that the bulk of Darwin's post-1842 projects (possibly with the exception of some of his geological research) were efforts to bolster this theory. Hence, any attempt to narrow a date range on a project as far reaching as the transmutation of species is difficult, to say the least. I have, however, chosen to include the period between Darwin's return from the *Beagle* voyage in 1836 to 1842 when he wrote the first draft of his species theory. During this period Darwin openly discussed his thoughts on transmutation with a number of correspondents: William D. Fox, Charles Lyell, John S. Henslow, Leonard Jenyns and George Waterhouse (Porter, 1993). The years immediately after his voyage were

Table 1. Date ranges for Darwin's projects.

Project	**began**	**ended**
entomology	1827	1831
zoology of the *Beagle* voyage	1837	1843
transmutation of species	1837	1844
Cirripedia	1846	1854
breeding domestic animals	1855	1861
seed dispersal and viability	1855	1867
insectivorous plants	1860	1875
climbing plants	1863	1865
pangenesis	1865	1881
expressions	1867	1872
man and sexual selection	1867	1871
movement in plants	1873	1880
worms	1876	1881

also significant in that during this time Darwin began to establish a network of correspondents for his questions relating to artificial selection (plant and animal breeders), which would ultimately play an important role in his theory of natural selection (Burkhardt and Smith, 1986: xvii–xviii).

Darwin's work on geology and botany (for example, pollination and fertilization, and related research on forms of flowers) is also impossible to demarcate. Darwin's interest in geology began prior to the *Beagle* voyage (Desmond and Moore, 1992), was intensified by his voyage around the world, and culminated in the publication of a number of major works on geology in the 1840s (Darwin, 1842, 1844, 1846). However, Darwin continued to discuss relevant issues in geology with leading figures in the field (for example with Charles Lyell, Thomas F. Jamieson, Andrew C. Ramsay, Joseph B. Jukes, and the noted physicist, John Tyndall) into the 1860s and 1870s (Burkhardt *et alii*, 1994: xviii–xix).

Darwin began investigating variation in cultivated plants, which included crossing and pollination experiments, in the early 1840s. His fascination with plant variation as a mechanism for supporting his theory of transmutation continued off and on throughout his life and resulted in major publications in the 1860s and 1870s (Darwin, 1862, 1876, 1877).

For the purposes of the present analysis, date ranges have been established for those projects that can be fairly clearly demarcated and which are temporally limited to some extent (Table 1). This was accomplished primarily through examination of Darwin's journal (de Beer, 1959), and the introductions to the *Correspondence* volumes (Burkhardt and Smith, 1985, 1986, 1987, 1988, 1989, 1990, 1991; Burkhardt *et alii*, 1993, 1994, 1997).

These date ranges were correlated with the date ranges of Darwin's correspondents in an effort to determine which correspondents Darwin may have drawn on for particular projects (Appendix 1). Obviously, an overlap between the project date ranges and the range of correspondence does not necessarily establish a connection; Appendix 1 is merely a starting point for further research. In order to demonstrate the value of taking a closer look

at Darwin's correspondence, a brief discussion of two of his lesser known correspondents (William. B. Tegetmeier and John Scott), and one of his research projects (seed dissemination and viability) are included.

In regard to Tegetmeier and Scott, both played important roles in Darwin's investigations in the transmutation of species; however, little is known about them. There are no entries pertaining to either Tegetmeier or Scott in the past 20 years of *Isis* cumulative bibliographies. There is only one significant work on Tegetmeier, written by his son-in-law (Richardson, 1916), which is dated and largely anecdotal. Of the four most recent biographies on Darwin (Bowler, 1990; Bowlby, 1991; Desmond and Moore, 1992; Browne, 1996), only Browne (1996: 525) mentioned Tegetmeier, but she did not elaborate on his relationship with Darwin. Even less has been written on Scott. Bowlby (1991: 375) briefly mentioned his significance to Darwin's work.

WILLIAM B. TEGETMEIER (1816–1912)

Tegetmeier began his long career as a naturalist when a youth. Initially, he lived in Colnbrook, Buckinghamshire, where he spent a great deal of time exploring natural history (Richardson, 1916: 2). When he was 12, Tegetmeier's family moved to London, where he maintained his natural history inclinations by raising pigeons – a pursuit that remained with him throughout his life (Richardson, 1916: 6).

Tegetmeier was apprenticed to his father to become a doctor and apothecary, and enrolled at University College London in 1833 at age 17. He was an excellent student and received many honors and medals (Richardson, 1916: 10–11). But after ten years of study and apprenticeship, Tegetmeier forsook medicine for a life as a "Bohemian journalist" (Richardson, 1916: 27). This move was no doubt partly a result of receiving an inheritance from his father; however, he was by no means wealthy and had to work hard most of his life.

In 1859 Tegetmeier began contributing articles to *The field*, a journal devoted to "the farm, the garden, the country gentleman's newspaper". Shortly thereafter Tegetmeier was appointed head of the Poultry and Pigeon Department at *The field*, where he contributed weekly articles for more than 50 years (Richardson, 1916: 140). In addition to his career as a journalist, Tegetmeier also lectured and wrote textbooks on subjects ranging from botany to domestic economy. His *Manual of domestic economy* (1858), which was oriented toward women's education, went through 14 editions (Richardson, 1916: 37). He became widely recognized as one of the leading authorities on domestic fowls, the breeding of domestic animals and bee-keeping in England. However, it was primarily his expertise on fowls that initially drew Darwin to Tegetmeier.

Darwin and Tegetmeier met in 1855 through William Yarrell[6], a mutual friend. Darwin immediately tapped into Tegetmeier's wealth of knowledge on animal breeding and bees. Most importantly, he was a vital link to the pigeon and poultry fancying community (Burkhardt and Smith, 1989: xix). Bartley (1992) points out that Darwin's work on domesticates, while important to his theory of natural selection, was equally important to his interest in inheritance and variability. In this regard, Tegetmeier played a substantial role by performing a variety of sexual selection and inheritance experiments with birds in the 1850s and 1860s (Bartley, 1992).

Darwin (1859: 250, 254) cited Tegetmeier twice in *Origin*, which was admittedly a reference-sparse "abstract" of his theory; and eight times in *The descent of man, and*

selection in relation to sex (Darwin, 1871). However, in *Variation of plants and animals under domestication* (Darwin, 1868), Tegetmeier was cited 33 times on such far reaching topics as "a cat with monstrous teeth", "the length of the middle toe in Cochin fowl" and "intercrossing in bees".

Because Darwin relied so heavily on domestic breeding (artificial selection) as a correlate for natural selection in nature, he was anxious to gather data on the types and extent of variation possible in domestic animals. Tegetmeier assisted Darwin in this endeavor by supplying specimens (particularly pigeons), identifying and describing specimens that Darwin had procured from his extensive network of correspondents[7], and by answering queries about the breeding of domestic animals, or directing Darwin to others who could assist him (see Appendix 2 for a complete list of topics discussed).

JOHN SCOTT (1836–1880)

John Scott was born in Denholm, Scotland, in 1836. His father and mother died when he was quite young and he was brought up by his grandmother. Scott attended parish school, but left at the age of 14 to work as a gardener. In 1859, after serving in several gardening positions, Scott became foreman of the propagating department at the Royal Botanic Garden, Edinburgh (Kennedy, 1908). It was in this position that Scott began corresponding with Darwin in 1862.

Ironically, Scott first wrote to Darwin to point out an error that Darwin had made in the first edition of his orchid book (Darwin, 1862). In a letter to Darwin dated 11 November 1862 (Burkhardt *et alii*, 1997: 516), Scott claimed that Darwin was mistaken about his identification of a particular genus of orchids. Darwin responded appreciatively, and somewhat demurely, stating that "Botany is a new subject to me" (Burkhardt *et alii*, 1997: 522).

Although their most active period of correspondence only lasted a few years (1862–1864), they both benefited immensely. Darwin was instrumental in obtaining a position for Scott as the head of the herbarium department at the Calcutta Botanic Garden, and in encouraging him to publish his work (See Appendix 2 for a list of letters on these subjects). In terms of Scott's assistance to Darwin, he is referenced twice in *Origin* (Darwin, 1859), six times in *On the various contrivances by which British and foreign orchids are fertilised by insects* (Darwin, 1862), nine times in *The variation of animals and plants under domestication* (Darwin, 1868), once in *The descent of man, and selection in relation to sex* (Darwin, 1871), five times in *The effects of cross and self-fertilisation in the vegetable kingdom* (Darwin, 1876), and 19 times in *The different forms of flowers on plants of the same species* (Darwin, 1877). The majority of their correspondence centered around cross-pollination studies of hybrids to determine the effects on sterility/fertility. However, like many of his correspondents, Darwin gleaned a variety of information from Scott. For example, when Darwin was doing research for *The descent of man* in the late 1860s, he requested information on human variation from Scott (See Appendix 2).

Aside from Joseph D. Hooker and Daniel Oliver, Scott is likely the most important correspondent in regard to Darwin's studies on plant sterility and plant varieties. These studies were of great importance to Darwin because he believed that they were the clearest evidence of evolutionary gradation from varieties to species. Huxley had made the issue of cross-sterility of paramount importance in his assertion that species were delineated by mutual sterility (Burkhardt *et alii*, 1997: 700). Darwin disagreed: "Sterility ... has been

acquired ... to favour intercrossing. Sterility may ... have been slowly acquired for a distinct object, namely, to prevent two forms ... becoming blended by marriage" (Burkhardt *et alii*, 1997: 702). In an attempt to counter Huxley, Darwin drew on Scott's extensive knowledge and experience in plant propagating. Most significantly, Darwin persuaded Scott to replicate Karl Friedrich von Gärtner's cross-sterility experiments on *Verbascum* (Scott, 1867). The importance of Gärtner's (1849) experiments cannot be overemphasized, as Darwin stated in a letter to Hooker: "I do not think any experiment can be more important on Origin of species; for if [Gärtner] is correct, we certainly have what Huxley calls new physiological species arising" (Burkhardt *et alii*, 1994: 284).

SEED DISPERSAL AND VIABILITY

Nelson (2000) demonstrated that seed distribution and viability were significant projects of Darwin throughout his working life. Similar plant species were observed to be widely dispersed, but the question was how to explain this phenomenon. Darwin was motivated by the fact that island floras were known to be highly endemic (Murray, 1986: 76–77) and by the observations of his widely traveled botanist friend, Joseph D. Hooker (1847a, 1847b).

Although Darwin's interest in plant dispersal was not unique (Nelson, 2000: 34), his motivations were. Browne (1983: 196) summed up the importance of this project to Darwin: "the crux of Darwin's system was the proposition that species could spread virtually all over the world, given plenty of time and no physical barriers on the way". Since Darwin rejected independent creation, he sought an alternative explanation for the geographical distribution of plant species. Much of the impetus for Darwin's research was fueled by a desire to refute one of the prevailing hypotheses of his time: that distribution occurred via continental land-bridges, a position espoused by noted geologists such as Edward Forbes, and botanists including Joseph D. Hooker (Burkhardt and Smith, 1989: 331, 349). Darwin knew that if the idea of land-bridges could be refuted, creationists would be forced into the unsavory position of espousing "multiple creations" (Browne, 1983: 199–200).[8]

Although Darwin investigated seed viability as early as 1837 (Burkhardt and Smith, 1986: 13), his research began in earnest in 1855 (Darwin, 1855a, 1855b, 1855c, 1855d, 1855e, 1855f), initiated by a comment by Hooker (Burkhardt and Smith, 1989: 299, note 4; 321). Darwin believed that if he could demonstrate that seeds remain viable in salt water long enough to be transported by ocean currents, a plausible mechanism for plant distribution could be established. The manner in which Darwin conducted these experiments is only one instance among many where he was clearly attempting to buttress his projects by using empirical scientific methods.

Darwin had "sea water" artificially mixed by a local chemist. Then, following Hooker's advice on which seeds to test (Burkhardt and Smith, 1989: 304), Darwin placed a number of seeds of each species in small bottles containing 2–4 fluid ounces of sea water. The bottles containing salt water and seeds were then exposed to two different temperature ranges (at 44º–48ºF, and at 32ºF) to determine if temperature had any effect on germination. The higher temperature range was accomplished simply by keeping the bottles outside in the shade; however, to maintain 32ºF, Darwin was forced continually to pack the bottles in snow. He was, in fact, able to find a number of different species that could endure immersion in salt water for a significant period of time (Table 2). Darwin discussed and summarized these experiments in a series of letters to the *Gardeners' chronicle* (Darwin, 1855a, 1855b, 1855c,

Table 2. Summary of Darwin's seed salting experiments; ordered by length of immersion.

Botanical name	**common name**	**length of immersion**	**germination success**[9]
Allium cepa	onion	42 days	a few
Apium graveolens var. *dulce*	celery	42 days	Well
Daucus carota	carrot	42 days	Well
Lactuca sativa	lettuce	42 days	All
Lepidium sativum	common cress	42 days	All
Raphanus sativus	radishes	42 days	less well
Phaseolus vulgaris	kidney beans	30 days	None
Atriplex hortensis	orache, or Atriplex	28 days	Well
Avena sativa	oats	28 days	Well
Beta vulgaris	beet	28 days	Well
Borago officinalis	borage	28 days	Well
Capsicum	peppers (chili, red, or sweet)	28 days	Well
Cucurbita ovifera	gourd	28 days	Well
Hordeum vulgare	barley	28 days	Well
Phalaris canariensis	canary grass	28 days	Well
Rheum × *hybridum*	rhubarb	28 days	Well
Satureja hortensis	savory, or Satureja	28 days	less well
Brassica oleracea	cabbage	14 days	only one
Linum usitatissimum	flax	14 days	only one
Phaseolus species	beans	14 days	a few
Pisum sativum	peas	14 days	None
Ulex europaeus	furze, or Ulex	14 days	a few
Trifolium incarnatum	crimson clover	7 days	None

1855d, 1855e, 1855f, 1856).

From the results of this experiment Darwin determined that the majority of the seeds that he tested could survive long enough to travel 1,300 to 1,400 nautical miles[10] in the ocean, a number that he arrived at by multiplying the average ocean current speed (33 nautical miles per day) by the number of days that the majority of seeds survived (42 days) (Darwin, 1855e). Land-bridges were no longer necessary to explain the observed plant distribution patterns.

In addition to his seed-salting experiments, Darwin performed a number of investigations to determine mechanisms of plant dispersal – driftwood, birds, icebergs and fish (see Appendix 3). For example, he obtained clumps of mud from the legs and feet of various types of birds (ducks, pigeons and partridges). The mud frequently contained seeds which Darwin planted and found viable. In a letter to Joseph Hooker on 5 December 1863, Darwin discussed how he had obtained 32 seeds from mud attached to a partridge's foot (Burkhardt *et alii*, 1999: 687).

Another experiment involved birds of prey. Darwin had sparrows with full crops feed to hawks and owls at the Zoological Society gardens (Burkhardt and Smith, 1990: 248, note

2). Darwin extracted the seeds from the boluses that had been expelled 12 to 18 hours later by the hawks and owls, planted them, and determined that the seeds were indeed viable. From this, Darwin (1859: 357) hypothesized yet another means of transporting seeds, this time up to 500 miles (Burkhardt and Smith, 1990: 249).

It is also interesting to examine the diversity of correspondents (Appendix 4) with whom Darwin discussed his seed experiments. These correspondents were spread throughout the world: France, South Africa, United States, Azores, Jamaica and Norway; and they were equally diverse professionally: geologists, botanists, ornithologists, and conchologists. In addition to these "professional" scientists, Darwin also consulted a number of amateur naturalists and gardeners: his cousin William D. Fox; his sister Susan Darwin; his son William E. Darwin; and Miss Holland, the daughter of Henry Holland.[11]

From this analysis one can easily see the lengths undertaken by Darwin for this one, apparently minor, research project which amounted to only five pages of summary in *Origin* (Darwin, 1859: 355–360). However, the results played a crucial role in Darwin's argument for the geographical distribution of plant species (Darwin, 1859: chapter 12). It was in fact no small accomplishment. The results of these experiments were instrumental in convincing Joseph Hooker (at the time the world's foremost authority on the geographic distribution of plants) that mechanisms for distribution existed. From his extensive travels and research, Hooker had long been convinced of the widespread distributions of many plant species; however, aside from the idea of continental extensions, for which there was then little evidence, the means of distribution were virtually unknown. Persuading Hooker encouraged him to speak openly on behalf of Darwin's theory, which he did in his introduction to *Flora Tasmania* (Hooker, 1860). More importantly, Darwin's experiments "proved highly significant for the theory of evolution, because the results established beyond doubt that species were capable of spreading far more widely than had hitherto been supposed" (Browne, 1983: 199).

DISCUSSION

The primary intent of this paper is to offer fresh research possibilities for Darwin's correspondence. In this regard, several points should be obvious: First, Darwin's over-arching project – a meta-theory of the unity of nature – was composed of numerous sub-projects which were frequently complex and scientific in nature (as defined by Darwin's context). Although Darwin is more frequently thought of as a grand theorizer, a close examination of his sub-projects reveals the extent to which he was a "practicing" scientist in every sense of the word. Darwin's correspondence is, therefore, invaluable because it reveals the intricacies of his work that cannot be found elsewhere. This may appear to some historians of science to be overly "internalistic" but it must also be noted that this science is being articulated via correspondence *between* individuals – a fact that significantly broadens the historical context.

Secondly, the present analysis demonstrates how important relatively unknown figures were to Darwin's work. William B. Tegetmeier and John Scott are just two of numerous examples (see Appendix 1). This does not negate the originality of Darwin's discovery; however, it goes a long way toward supporting the idea that science was, at least in Darwin's context, a highly communal enterprise. A more thorough examination of the networks created by Darwin would be enlightening from a variety of scholarly perspectives.

Lastly, the publication of Darwin's correspondence is opening vast new research opportunities in nineteenth-century natural history. While Darwin remains a significant figure in this research, his correspondence opens doors for viewing numerous other "actors" and "sub-plots" on this particular stage of history.

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NOTES

[1] This immense quantity does not include the majority of his pre-1862 incoming correspondence, which Darwin did not retain (Montgomery, 1987: 15).

[2] Secord (1985: 537) claimed that Darwin distinguished between naturalists and breeders of domestic animal in terms of reliability of data. He did, however, make exceptions (Tegetmeier, for example).

[3] Darwin was keenly aware that the scientific community had to be won over, and that this process was not entirely a matter of "evidence". For example, Darwin's effort to publish Asa Gray's *Atlantic monthly* articles, which argued for a theistic evolution, was clearly a rhetorical device (Dupree, 1968).

[4] William Darwin Fox (1805–1880), Darwin's cousin, is one such example of a relative from whom Darwin solicited information.

[5] In addition, Dr Duncan M. Porter, Director of the Darwin Correspondence Project, was also consulted.

[6] Yarrell (1784–1856) was a zoologist who "engaged in business as newspaper agent and bookseller in London. An original member of the Zoological Society, 1826. Wrote standard works on British birds and fishes" (Burkhardt and Smith, 1989: 657).

[7] For a list of these correspondents, see Darwin's memorandum dated [December] 1855 (Burkhardt and Smith, 1989: 510).

[8] For Darwin's discussion of continental extensions see *Origin* (Darwin, 1859: 353–354).

[9] This was Darwin's terminology.

[10] In his discussion of these experiments in *Origin* Darwin (1859: 355) used the more conservative estimate of 28 days immersion to calculate the number of possible miles traveled (the result being 924 miles).

[11] "Physician. Distant cousin of Darwins and Wedgwoods" (Burkhardt and Smith, 1994: 614).

[12] URL (accessed 15 November 2002): http://www.lib.cam.ac.uk/Departments/Darwin/calintro.html (1999 Online Calendar of the Correspondence of Charles Darwin. The Darwin Correspondence Project. Cambridge University Library).

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APPENDIX 1. Correlation between date ranges of Darwin's correspondence and date ranges of Darwin's projects (see Table 1, p. 120): × indicates an overlap.

* These correspondents are noted in *Dictionary of British and Irish botanists and horticulturists* (Desmond and Ellwood, 1994).

Columns
A — entomology
B — zoology of the *Beagle* voyage
C — transmutation of species
D — Cirripedia
E — domestic animal breeding
F — seed dispersal and transport
G — insectivorous plants
H— climbing plants
I — pangenesis
J — expressions
K — man and sexual selection
L — movement in plants
M — worms

Correspondent	Dates of correspondence	Number of letters	A	B	C	D	E	F	G	H	I	J	K	L	M
Abbott, Francis	1871–1880	16							×		×	×	×	×	×
Agassi, Alexander*	1869–1881	12							×		×	×	×	×	×
Airy, Hubert	1871–1876	27							×		×	×	×	×	×
Alglave, Emile	1869–1877	8							×		×	×	×	×	×
Allen, Charles G.*	1878–1882	13									×			×	×
Anderson-Henry, Issaac*	1863–1867	17						×	×	×	×	×	×		
Arruda Furtado, Francisco d'	1881	10									×				×
Asher, George	1877–1879	7									×			×	×
Aubertin, Joshua	1863–1872	7						×	×	×	×	×	×		
Aveling, Edward*	1878–1881	7									×			×	×
Babington, Charles*	1837–1877	20		×	×	×	×	×	×	×	×	×	×	×	×
Balfour, Francis	1873–1881	17							×		×			×	×
Bartlett, Abraham	1861–1872	14					×	×	×	×	×	×	×		
Bartlett, Edward*	1871	6							×		×	×	×		
Bate, Charles S.	1850–1871	20				×	×	×	×	×	×	×	×		
Baxter, William*	1855–1882	31					×	×	×	×	×	×	×	×	×
Becker, Lydia*	1863–1877	15						×	×	×	×	×	×	×	×
Belt, Thomas*	1867–1877	15						×	×		×	×	×	×	×
Bennett, Alfred*	1869–1876	18							×		×	×	×	×	×
Bentham, George*	1856–1880	66					×	×	×	×	×	×	×	×	×
Berkeley, Miles*	1840–1875	11		×	×	×	×	×	×	×	×	×	×	×	
Blackley, Charles	1873–1879	7							×		×			×	×
Blair, Rueben	1877–1881	7									×			×	×
Bonn, Heinrich	1860–1862	18					×	×	×						

Correspondent	Dates of correspondence	Number of letters	A	B	C	D	E	F	G	H	I	J	K	L	M
Bosquet, Joseph	1852–1856	11				×	×	×							
Bowerbank, James*	1847–1864	14				×	×	×	×	×					
Bowman, William*	1865–1878	30						×	×	×	×	×	×	×	×
Breitenbach, Wilhelm	1876–1882	12									×			×	×
Brent, Bernard	1857–1864	9					×	×	×	×					
Browne, Walter	1880–1881	6									×			×	×
Brunton, Thomas	1873–1882	38							×		×			×	×
Buckland, Francis	1863–1870	14						×	×	×	×	×	×		
Buckley, Arabella	1868–1881	21							×		×	×	×	×	×
Bunbury, Charles*	1855–1860	10					×	×	×						
Busk, George	1858–1873	18					×	×	×	×	×	×	×	×	
Butler, Arthur	1870–1879	15							×		×	×	×	×	×
Caird, James	1878–1881	9									×			×	×
Canestrini, Giovanni	1868–1880	9							×		×	×	×	×	×
Carus, Julius	1866–1881	179						×	×		×	×	×	×	×
Caspary, Johann*	1866–1876	11						×	×		×	×	×	×	×
Caton, John	1868–1877	9							×		×	×	×	×	×
Child, Gilbert	1868–1869	6							×		×	×	×		
Clarke, Richard T.*	1862–1877	7						×	×	×	×	×	×	×	×
Claus, Carl	1869–1877	8							×		×	×	×	×	×
Cobbe, Frances	1870–1872	7							×		×	×			
Coe, Henry	1857–1858	6					×	×							
Cohn, Ferdinand	1874–1882	22							×		×			×	×
Conway, Moncure	1863–1878	8						×	×	×	×	×	×	×	×
Covington, Sims	1843–1859	10		×	×	×	×	×							
Cresy, Edward	1845–1860	45				×	×	×	×						
Crichton-Browne, James	1869–1875	41							×		×	×	×	×	
Crick, Walter D.	1879–1882	11									×			×	×
Crocker, Charles*	1862–1863	9						×	×	×					
Croll, James	1968–1881	14							×		×	×	×	×	×
Crüger, Hermann*	1863–1864	6						×	×	×					
Cupples, George	1868–1878	61							×		×	×	×	×	×
Dallas, William	1867–1880	55						×	×		×	×	×	×	×
Dareste, Gabriel	1863–1870	9						×	×	×	×	×	×		
Darwin, Francis*	1857–1882	194					×	×	×	×	×	×	×	×	×
Darwin, George H.	1856–1882	263					×	×	×	×	×	×	×	×	×
Darwin, Horace	1859–1881	17					×	×	×	×	×	×	×	×	×
Darwin, Leonard	1859–1881	27					×	×	×	×	×	×	×	×	×
Darwin, Reginald	1879	19									×			×	×

Correspondent	Dates of correspondence	Number of letters	A	B	C	D	E	F	G	H	I	J	K	L	M
Darwin, William E.*	1851–1882	219				×	×	×	×	×	×	×	×	×	×
Davidson, Thomas	1856–1873	7					×	×	×	×	×	×	×	×	
Dawkins, William	1867–1875	20						×	×		×	×	×	×	
De Chaumont, Francis	1871–1875	10							×		×	×	×	×	
Delpino, G.G. Federico	1867–1880	26						×	×		×	×	×	×	×
Denny, Henry*	1844–1865	8			×	×	×	×	×	×	×				
Denny, John*	1872–1879	6							×		×	×		×	×
Dieffenbach, Ernest*	1843–1847	13		×	×	×									
Dobell, Horace	1863–1871	11						×	×	×	×	×	×		
Dodel-Port, Arnold	1874–1880	13							×		×			×	×
Donders, Francis	1869–1874	29							×		×	×	×	×	
Doubleday, Henry*	1857–1868	11					×	×	×	×	×	×	×		
Elliot, Walter	1856–1869	6					×	×	×	×	×	×	×		
Ernst, Adolf	1878–1882	9									×			×	×
Errera, Leo	1877–1879	10									×			×	×
Eyton, Thomas*	1833–1876	39		×	×	×	×	×	×	×	×	×	×	×	×
Falconer, Hugh*	1855–1865	52					×	×	×	×	×				
Farrer, Thomas*	1868–1882	134							×		×	×	×	×	×
Fayner, Joseph	1874–1882	12							×		×			×	×
Fiske, John	1871–1880	14							×		×	×	×	×	×
Fitch, Robert	1849–1851	17				×									
Fitzgerald, Robert D.*	1875–1881	7							×		×			×	×
Flower, William	1863–1880	29						×	×	×	×	×	×	×	×
Forbes, David	1860–1872	12					×	×	×	×	×	×	×		
Forel, August	1874–1876	7							×		×			×	×
Foster, Michael*	1871–1882	14							×		×	×	×	×	×
Fox, William D.	1828–1879	206	×	×	×	×	×	×	×	×	×	×	×	×	×
Geikie, James	1876–1881	13									×			×	×
Gilbert, Joseph*	1869–1882	13							×		×	×	×	×	×
Gladstone, William	1872–1881	11							×		×	×		×	×
Goodacre, Francis	1873–1880	18							×		×			×	×
Gould, August	1848–1859	9				×	×	×							
Gray, George R.*	1838–1869	11		×	×	×	×	×	×	×	×	×	×		
Gray, John E.*	1847–1873	37				×	×	×	×	×	×	×	×	×	
Günther, Albert C.	1860–1881	66					×	×	×	×	×	×	×	×	×
Haast, Sir Johann*	1862–1879	22						×	×	×	×	×	×	×	×
Hancock, Albany*	1849–1869	24				×	×	×	×	×	×	×	×		
Hartogh, Heijs	1870–1874	14							×		×	×	×	×	
Heckel, Edouard M.	1876–1881	7									×			×	×

Correspondent	Dates of correspondence	Number of letters	A	B	C	D	E	F	G	H	I	J	K	L	M
Heer, Oswald	1860–1877	7					×	×	×	×	×	×	×	×	×
Henslow, George*	1865–1879	35						×	×	×	×	×	×	×	×
Henslow, John S.*	1831–1860	144	×	×	×	×	×	×	×						
Hildebrand, Friedrich	1862–1880	29						×	×	×	×	×	×	×	×
Hoffmann, Hermann	1870–1877	6							×		×	×	×	×	×
Hooker, William J.*	1843–1858	9		×	×	×	×	×							
Horner, Leonard	1838–1862	13		×	×	×	×	×	×						
Hunt, Robert	1855–1880	6					×	×	×	×	×	×	×	×	×
Hyatt, Alpheus	1872–1881	11							×		×	×		×	×
Jamieson, Thomas*	1861–1866	7					×	×	×	×	×				
Jenyns, Leonard*	1837–1877	42		×	×	×	×	×	×	×	×	×	×	×	×
Jesse, George	1871–1881	6							×		×	×	×	×	×
Judd, John	1876–1882	12									×			×	×
Jukes, Joseph B.	1838–1864	9		×	×	×	×	×	×	×					
Kindt, Hermann	1864–1865	10						×	×	×	×				
King, George*	1871–1881	14							×		×	×	×	×	×
Kingsley, Charles*	1859–1869	17					×	×	×	×	×	×	×		
Kippist, Richard*	1857–1877	12					×	×	×	×	×	×	×	×	×
Krause, Ernst	1877–1881	108									×			×	×
Krefft, Johann	1872–1876	16							×		×	×		×	×
Lankester, Edwin*	1850–1853	13				×									
Lankester, Edwin R.	1869–1881	8							×		×	×	×	×	×
Leighton, William*	1840–1865	6		×	×	×	×	×	×	×	×				
Lindley, John*	1843–1862	13		×	×	×	×	×	×						
Lonsdale, William	1837–1868	9		×	×	×	×	×	×	×	×	×	×		
Lynch, Richard*	1877–1878	11									×			×	×
MacKintosh, David	1867–1882	12						×	×		×	×	×	×	×
Marsh, O.C.	1875–1880	6							×		×			×	×
Master, Max	1860–1880	44					×	×	×	×	×	×	×	×	×
Matthew, Patrick	1862–1871	6						×	×	×	×	×	×		
Maw, George*	1861–1880	29					×	×	×	×	×	×	×	×	×
McLennan, John*	1871–1880	12							×		×	×	×	×	×
Meehan, Thomas*	1871–1880	12							×		×	×	×	×	×
Meldola, Raphael	1871–1882	88							×		×	×	×	×	×
Mengozzi, Giovanni	1880–1881	6									×			×	×
Miller, William H.*	1839–1859	10		×	×	×	×	×							
Moggridge, John T.*	1864–1874	43						×	×	×	×	×	×	×	
More, Alexander*	1860–1881	24					×	×	×	×	×	×	×	×	×
Moschkan, Alfred	1873–1878	6							×		×			×	×

Correspondent	Dates of correspondence	Number of letters	A	B	C	D	E	F	G	H	I	J	K	L	M
Moseley, Henry*	1876–1882	21									×			×	×
Moulinie, Jean	1867–1872	31						×	×		×	×	×		
Müller, Heinrich L.	1867–1880	52						×	×		×	×	×	×	×
Müller, Johann F.	1865–1882	107						×	×	×	×	×	×	×	×
Murie, James*	1868–1880	6							×		×	×	×	×	×
Murray, Andrew*	1860–1872	16					×	×	×	×	×	×	×		
Naudin, Charles V.	1862–1882	9						×	×	×	×	×	×	×	×
Neumayr, Melchior	1877–1882	6									×			×	×
Nevill, Lady Dorothy F.*	1861–1881	30					×	×	×	×	×	×	×	×	×
Newington, Samuel*	1875–1880	6							×		×			×	×
Newton, Alfred	1863–1881	34						×	×	×	×	×	×	×	×
Nicols, Arthur	1871–1880	14							×		×	×	×	×	×
Norton, Charles	1871–1881	9							×		×	×	×	×	×
Ogle, William*	1867–1882	38						×	×		×	×	×	×	×
Oliver, Daniel*	1860–1877	120					×	×	×	×	×	×	×	×	×
Orton, James	1869–1870	6							×		×	×	×		
Oxenden, George	1862–1872	22						×	×	×	×	×	×		
Paget, James*	1859–1881	30					×	×	×	×	×	×	×	×	×
Palaeontographical Society	1850–1859	6				×	×	×							
Patterson, Robert	1847–1860	8				×	×	×	×						
Playfair, Lyon	1875	8							×		×			×	
Preston, Samuel	1880	7									×			×	×
Preyer, Thierry	1868–1881	18									×				×
Price, John*	1826–1881	22									×				×
Quatrefages, Jean	1857–1877	25					×	×	×	×	×	×	×	×	×
Ralston, William	1875–1881	6							×		×			×	×
Ramsay, Andew C.	1846–1881	37				×	×	×	×	×	×	×	×	×	×
Ransome, Frederick	1864–1866	7						×	×	×	×				
Reade, Thomas	1874–1881	16							×		×			×	×
Reade, William*	1868–1875	50							×		×	×	×	×	
Reeks, Henry*	1871–1879	9							×		×	×	×	×	×
Reuter, Adolf	1869–1873	10							×		×	×	×	×	
Rich, Anthony	1878–1882	27									×			×	×
Rivers, Thomas*	1862–1872	31						×	×	×	×	×	×		
Riviere, Briton	1871–1872	14							×		×	×	×		
Robertson, George	1875–1882	8							×		×			×	×
Rolle, Friedrich	1862–1868	13						×	×	×	×	×	×		
Rolleston, George	1861–1878	18					×	×	×	×	×	×	×	×	×

Correspondent	Dates of correspondence	Number of letters	A	B	C	D	E	F	G	H	I	J	K	L	M
Romanes, George*	1874–1882	136							×		×			×	×
Royle, John*	1838–1847	7		×	×	×									
Rütimeyer, Karl	1861–1874	7					×	×	×	×	×	×	×	×	
Sabine, Edward*	1854–1864	7				×	×	×	×	×					
Salvin, Osbert*	1863–1875	20						×	×	×	×	×	×	×	
Sanderson, John S.*	1873–1880	63							×		×			×	×
Saporta, Louis	1868–1881	21							×		×	×	×	×	×
Scherzer, Karl von	1867–1878	9						×	×		×	×	×	×	×
Sclater, Philip	1860–1882	29					×	×	×	×	×	×	×	×	×
Scott, John*	1862–1877	91						×	×	×	×	×	×	×	×
Semper, Carl G.	1874–1881	17							×		×			×	×
Sharpe, Daniel*	1846–1854	7				×									
Shaw, James*	1865–1868	10						×	×	×	×	×	×		
Simpson, J.F.	1881–1882	6									×				×
Skertchly, Sydney*	1878–1881	6									×			×	×
Smith, Andrew	1839–1871	7		×	×	×	×	×	×	×	×	×	×		
Smith, Frederick	1857–1878	20					×	×	×	×	×	×	×	×	×
Sowerby, George*	1844–1846	12			×	×									
Stainton, Henry	1855–1881	14					×	×	×	×	×	×	×	×	×
Steenstrup, Japetus	1849–1881	16				×	×	×	×	×	×	×	×	×	×
Stephen, Leslie	1879–1882	8									×			×	×
Strickland, Hugh*	1842–1849	11		×	×	×									
Sulivan, Bartholomew*	1832–1881	72		×	×	×	×	×	×	×	×	×	×	×	×
Swinhoe, Robert*	1862–1874	18						×	×	×	×	×	×	×	
Tait, Robert	1871–1882	76							×		×	×	×	×	×
Tait, William*	1869	18							×		×	×	×		
Tegetmeier, William	1855–1881	188					×	×	×	×	×	×	×	×	×
Thiselton-Dyer, William*	1868–1881	148							×		×	×	×	×	×
Thomas, Charles	1870–1878	6							×		×	×	×	×	×
Thwaites, George*	1855–1877	30					×	×	×	×	×	×	×	×	×
Torbitt, James	1876–1882	93									×			×	×
Treat, Mary	1871–1876	15							×		×	×	×	×	×
Trimen, Roland*	1863–1877	39						×	×	×	×	×	×	×	×
Voysey, Charles*	1869–1876	6							×		×	×	×	×	×
Walker, Francis	1838–1876	6		×	×	×	×	×	×	×	×	×	×	×	×
Wallich, George*	1860–1882	7					×	×	×	×	×	×	×	×	×
Walsh, Benjamin D.	1864–1868	34						×	×	×	×	×	×		
Waterhouse, George R.	1838–1868	45		×	×	×	×	×	×	×	×	×	×		
Watson, Hewett*	1847–1864	45				×	×	×	×	×					

Correspondent	Dates of correspondence	Number of letters	A	B	C	D	E	F	G	H	I	J	K	L	M
Weale, John	1865–1874	14						×	×	×	×	×	×	×	
Weir, John J.*	1868–1881	72							×		×	×	×	×	×
Westwood, John	1856–1864	9					×	×	×	×					
Whitelegge, Thomas*	1878	7									×			×	×
Williamson, William C.*	1846–1880	16				×	×	×	×	×	×	×	×	×	×
Wilson, Alexander S.*	1878–1881	22									×			×	×
Wollaston, Thomas*	1855–1860	10					×	×	×						
Woodward, Samuel P.*	1842–1863	25		×	×	×	×	×	×	×					
Wright, Chaucey	1871–1875	20							×		×	×	×	×	
Würtenberger, Leopold	1879–1881	7									×			×	×
Yarrell, William	1838–1856	6		×	×	×	×	×							
Zacharias, Otto	1875–1877	10							×		×			×	×
Zincke, Foster	1876–1881	7									×			×	×

APPENDIX 2. William B. Tegetmeier and John Scott: correspondence topics with lists of letters (numbers correspond to letter in Burkhardt and Smith, 1994[12]).

William B. Tegetmeier															
Bees	2270	2271	2280	2281	2289	2325	2332	2384	2762	2883					
Crossing/breeding experiments	2051	2090	2093	2362	2375	2491	2656	2712	3103	4238	4798	4849	4977	5431	8322
Egg incubation time	2790	2872	2883	6808	6811										
General on birds/animals	2068	3055	3108	4233	4314	4785	4796	5211	7274	7822	10111				
Help in identification	1981	2004	2011	2260											
Queries on domestic animals	2762	3118	3139	3869	3944	3949	5176								
Request for particular breeds	2407	2417	2790	3095											
Request to read manuscript	3095	4533	4787	4806	5507	10118									
Sex ratios	5859	5878	5879	5882	5906	5934	6000	6356	6441	6600	6633	6698	6700	9266	9298
Sexual selection	3164	3166	5473	5475	6017	7822									
Sterility/fertility	1947	3869	3877	3998	4233	4687	4720	4761	4785						
Variation	1751	1754	1788	1791	1947	2048	3070	3075	1820	2090	2108	2479	2790	5171	6188
	6199	6208	6210	6347	6356	6600	6633	6698	6702	6837	6839	6870	6920	8322	

John Scott																					
Assistance with manuscript	3814	3847	3853	4197	4206	4213	4301	4386	4402	4485	4498	4526	4751	4876							
Crossing/pollination experiments	3400	3805	3808	3844	3865	3868	3904	3921	3932	3934	4021	4031	4055	4060	4073	4084	4086	4114	4229	4252	
	4332	4343	4432	4498	4526	10555	10864	10928													
Expression/emotion in humans	6160	6815	7030	8045																	
Ferns	3853	3847	3808	3991	3997																
Help in finding position	4177	4183	4187	4206	4212	4123	4463	4513	4524	4527	4528	4541	4578	4582	4751	4810	4876				
Linum and *Lythrum*	3844	4087	4385	4810																	
Miscellaneous on plants	4190	4232	4252	4332	4343	4382	4386	4432	4438	4526	4541	5344	5633a	10864	10928						
Natural selection	3815	3847	3853	4021	4031	4382	4383	4810													
Orchids	3800	3844	3934	4060	4073	4084	4087	4137	4174	4190	4260										
Plant sterility and fertility	3814	3815	3904	3934	4021	4055	4073	4087	4114	4137	4174	4175	4190	4197	4229	4252	4260	4438	4498	4541	
Primula	3814	3844	3932	3991	4003	4021	4086	4185	4175	4229	4252	4332	4382	4751	4252	4253	4260	4498	4031	4084	
Worms	8249	8534																			

APPENDIX 3. Darwin's work on seeds and dispersal with list of letters by topics discussed (numbers correspond to letter in Burkhardt and Smith, 1994[12]).

Dispersal by birds	1608	1816	1866	1948	1948	1978	2328	2338	2343	2395	2722	3587	4054	4351	4353
	4435	4440	4446	4453	4456	5287	5300	6780	10340	10341	12435				
Dispersal by fish	1948	2042	2064	2069	2081										
Dispersal by ice	1636														
Dispersal by insects	5649	5659	5714												
Floating plants	1950														
General on dispersal	849	1948	1956	2075	2315	3667	4269	5007	5305	5364	5373	5659	7848	10370	
General on vitality	353	390	579	668	669	690	691	696	699	701	705	706	707	708	711
	712	713	716	720	799	10802	13331								
Request for seeds	1708	1777													
Salting experiment	1660	1661	1667	1669	1671	1680	1681	1684	1704	1708	1710	1711	1733	1742	1763
	1783	1787	1834	1911	1985	1994	2074	2075	2117						

APPENDIX 4. Darwin's work on seeds and dispersal; list of correspondence, their profession, location and list of letters (numbers correspond to letter in Burkhardt and Smith, 1994[12]). ** indicates individuals who are known to have traveled extensively.

Correspondent	**Profession**	**Location**											
Arruda Furtado, F.	naturalist	Azores	13331										
Babington, Charles.C.	botanist	England	708										
Belt, Thomas	geologist	Central America	5364										
Berkeley, Miles J.	botanist	England	1710	1834									
Crowe, John R.	diplomat	Norway	1777										
Darwin, Susan		England	390										
Darwin, William E.	banker	England	1660										
Dixon, Charles	ornithologist	England	12435										
Eyton, Thomas C.	ornithologist	England	1948	2338	2343								
Fox, William D.	clergyman	England	1704	1733	1978	2049	2057	2328					
Gardeners' chronicle	journal	England	1666	1684	1783	1787	4269						
Garrett, James R.	botanist	Ireland	1608										
Gray, Asa	botanist	United States	3667	5649	10370								
Henslow, John S.	botanist	England	1708	1816	353	579	701	705	707	712			
Hill, Richard	naturalist	Jamaica	2064										
Holland, Miss		England	2395										
Hooker, Joseph D.	botanist	England**	799	1661	1667	1669	1671	1680	1681	1711	1742	1763	1911	1950
			2042	2075	2117	2315	4351	4353	5300	5305	5373	7848	10802	
Kemp, William	unknown	Scotland	699	706	711	713	716	720						
Lamont, James	geologist	England**	2722											
Lindley, John	botanist	England	668	669	690	691								
Lyell, Charles	geologist	England	899	1866	2050	5007	5659	696						
Newton, Alfred	ornithologist	England	4054	4435	4440	4446	4453	4456						
Norman, Herbert G.	unknown	England	5287											
Oliver, Daniel	botanist	England	3587											
Rae, John	explorer	England**	1636											
Robillard, V. de	zoologist	Mauritius	1956											
Swaysland, George	unknown	England	6780											
Tenant, James	unknown	England	2069	2081										
Thistleton-Dyer, William	botanist	England	10340	10341										
Watson, Hewett C.	botanist	England	1985	1994										
Weale, John P.	Naturalist	South Africa	5714											