Detecting Darwin

Activity 2: Piecing things together

http://www.darwinproject.ac.uk/learning/7-11/detecting-darwin

Suggested preparation

Presentation: Detecting Charles Darwin
http://www.darwinproject.ac.uk/learning/7-11/detecting-darwin

Film: What was Darwin like and why is he important?
Professor Jim Secord, Director of the Darwin Correspondence Project explains
http://www.darwinproject.ac.uk/learning/7-11/detecting-darwin

How long will activity take?

- 35 mins

What do I need?

- Pens
- A timer or bell
- Presentation slides to go through answers at the end of the session
- A £10 note or replica (with Darwin on)

Per group:

- A set of resources from each phase of Darwin's life (numbered Stops 1-3)
- Question sheet
- Clipboard

Using clues from different stages of Darwin's life, try to assemble facts about who he was and what he did.

What do I do?

1. In small groups, examine the different resources from the three phases of Darwin's life and try to answer the questions.

2. When the bell rings, move on to the next set of sources. It doesn't matter which order you study them in.

Detecting Darwin

Activity 2: Piecing things together question sheet

http://www.darwinproject.ac.uk/learning/7-11/detecting-darwin

Stop 1: Darwin as a young man and his great adventure

1. Which Cambridge College did Darwin attend?
2. Which creatures fascinated him as a student?
3. What was the name of the ship that Darwin sailed on? Where was his cabin?
4. What made him ill on the voyage and what did he enjoy?
5. Name 3 places he visited on the voyage.
6. Name something that he sent back home.

Stop 2: Family life and working from home

1. Name 2 reasons why Darwin considered not marrying and 2 reasons why he thought he should. What did he decide in the end?
2. How many children did he have and how many survived to adulthood? (check the dates)
3. Darwin carried out his scientific experiments at home. Name 2 places where he worked.
4. How did Darwin communicate with other scientists around the world?
5. Who was Joseph Hooker and what was his connection to Darwin?

Stop 3: Darwin's work and legacy

1. What is the name of Darwin's most famous book? When was it published?
2. What did Ernest Haeckel think of it?
3. How many scientific books or 'volumes' did he write?
4. When did he die? Where is he buried?
5. What is shown on the £10 note and why do you think Darwin is featured?

Stop: 1

Darwin's diary: 13 February 1832

This has been the first day that the heat has annoyed us, & in proportion all have enjoyed the delicious coolness of the moonlight evenings: but when in bed, it is I am sure just like what one would feel if stewed in very warm melted butter. —

This morning a glorious fresh trade wind is driving us along; I call it glorious because others do; it is however bitter cruelty to call anything glorious that gives my stomach so much uneasiness. —

Oh a ship is a true pandemonium, & the cawkers who are hammering away above my head veritable devils. —

Stop: 1

Stop: 1

Stop: 1

Letter 158

From Charles Darwin

To Robert Waring Darwin

February 1832

Transcribed extracts

www.darwinproject.ac.uk/entry-158

Image sy7804. Shrewsbury Museums Service

Bahia or St Salvador, Brazil
Feb. 1832

My dear Father

We sailed as you know on the 27th. of December & have been fortunate enough to have had from that time to the present a fair & moderate breeze: In the Bay of Biscay there was a long & continued swell & the misery I endured from sea-sickness is far far beyond what I ever guessed at…

From Teneriffe to St. Jago, the voyage was extremely pleasant.— I had a net astern the vessel, which caught great numbers of curious animals, & fully occupied my time in my cabin, & on deck the weather was so delightful, & clear, that the sky & water together made a picture.

I already have got to look at going to sea as a regular quiet place, like going back to home after staying away from it.— In short I find a ship a very comfortable house, with everything you want, & if it was not for sea-sickness the whole world would be sailors…

Believe me, my dear Father
Your most affectionate son

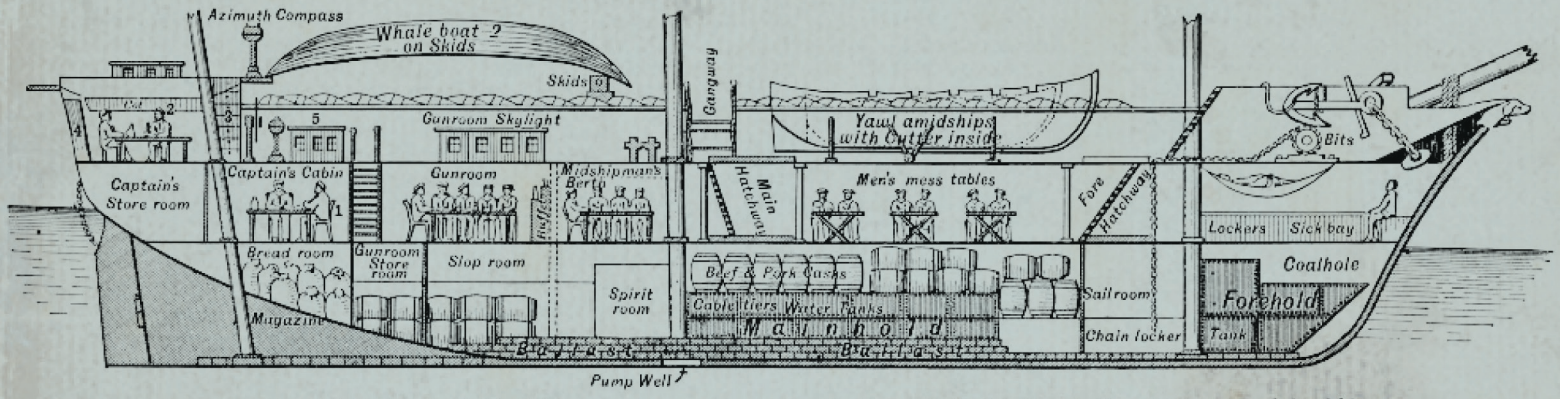
Charles Darwin

Stop: 1

H.M.S. BEAGLE

MIDDLE SECTION FORE AND AFT

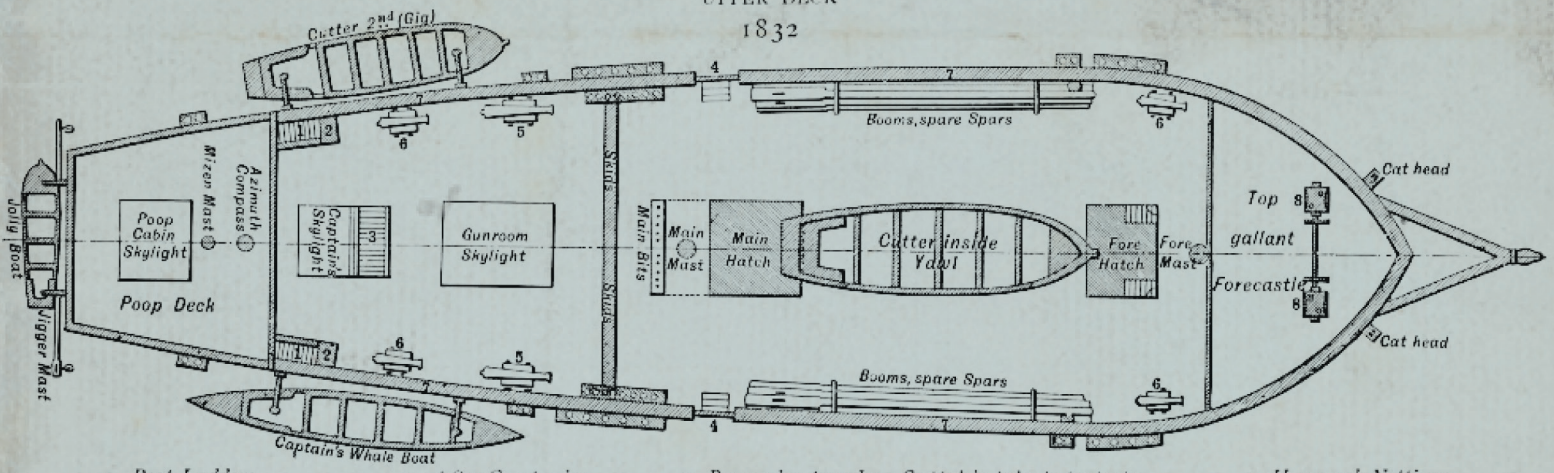
1832



1. *Mr. Darwin's Seat in Captain's Cabin*
2. *Mr. Darwin's Seat in Poop Cabin with Cot slung behind him*
3. *Mr. Darwin's Chest of Drawers*
4. *Bookcase*
5. *Captain's Skylight*

UPPER DECK

1832



1. *Poop Ladders*
2. *Signal Flag Lockers*
3. *After Companion*
4. *Gangways*
5. *Brass nine pounders, Captain's private property*
6. *Six pounders*
7. *Hammock Nettings*
8. *Patent Windlass*

The Poop Cabin

Image courtesy of Simon Keynes

Poop Cabin
1. Bookcase
2. My Bunk
3. Chest of Drawers
4. My Cabinet
5. My seat
6. Microscope

Stop: 1

The Beagle Voyage

Plymouth

Cape Verde

Galapagos Islands

Ascension Island

Salvador

Callao

Rio de Janeiro

Valparaiso

Montevideo

Chiloe

Falkland Islands

Cape of Good Hope

King George Sound

Sydney

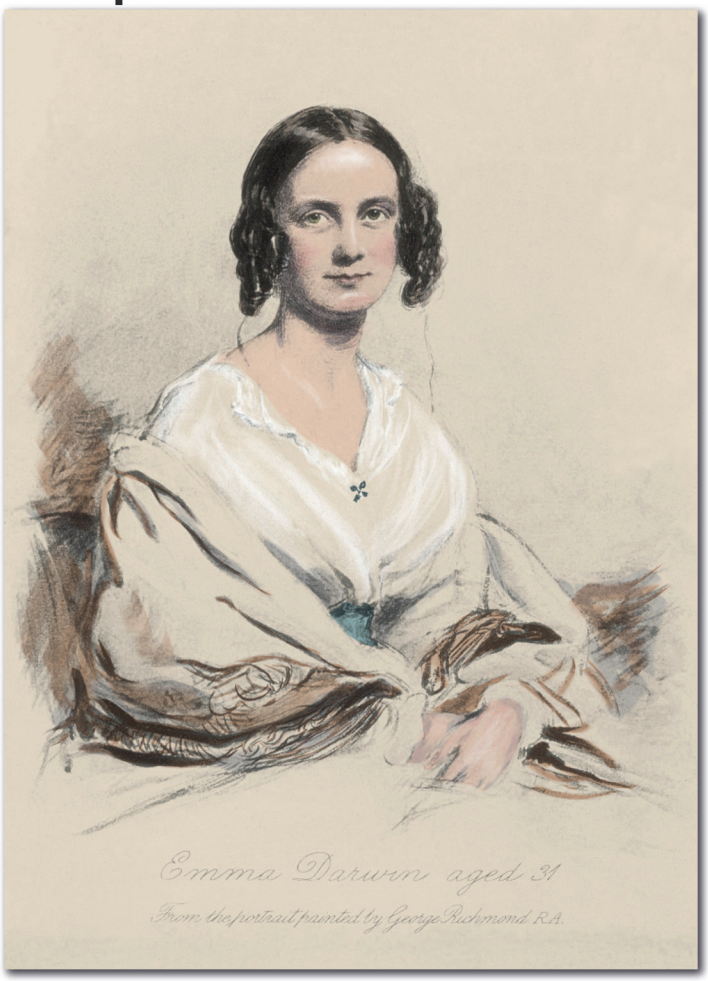
Hobart

Straits of Magellan

W E S

Stop: 1
Some things that Darwin collected

Stop: 2



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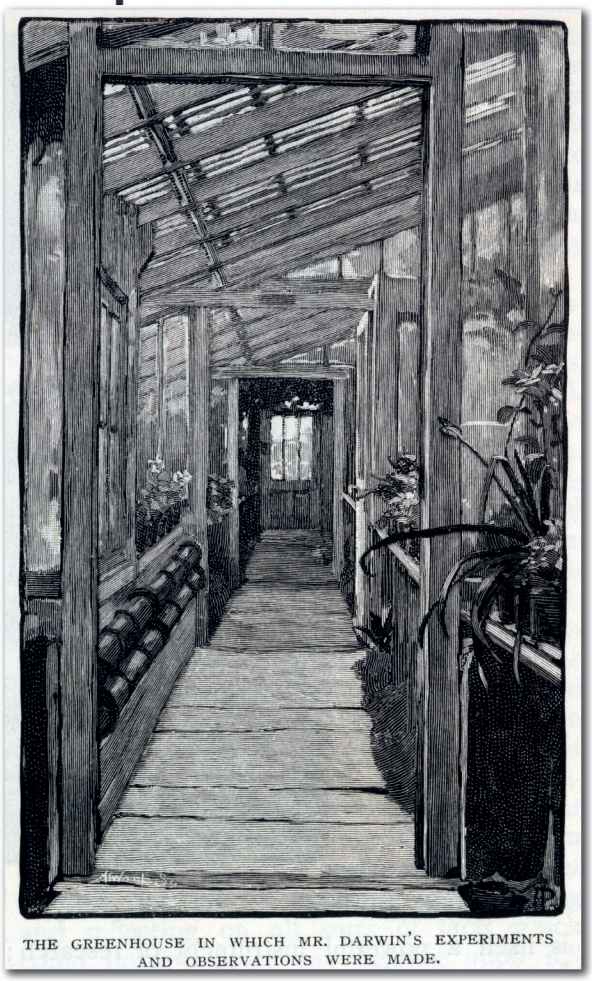


THE GREENHOUSE IN WHICH MR. DARWIN'S EXPERIMENTS AND OBSERVATIONS WERE MADE.

Darwin Correspondence Project/Cambridge University Library (CC BY-ND 2.0)

Stop: 2

Darwin Correspondence Project/Cambridge University Library (CC BY-ND 2.0)

Stop: 2

The Wedgwood and Darwin Families

Robert Waring Darwin (1766–1848) = Susannah Wedgwood (1765–1817)

Josiah Wedgwood II (1769–1843) = Elizabeth (Bessy) Allen (1764–1846)

- Marianne 1798–1858
- Caroline Sarah 1800–88 = Josiah III (Jos) 1795–1880
  - Sarah Elizabeth (Elizabeth) 1793–1880
  - Mary Anne 1796–8
  - Charlotte 1797–1862
  - Henry Allen (Harry) 1799–1885
  - Francis (Frank) 1800–88
  - Hensleigh 1803–91
  - Frances (Fanny) 1806–32
- Susan Elizabeth 1803–66
- Erasmus Alvey 1804–81
- Charles Robert 1809–82 = Emma 1808–96
  - William Erasmus 1839–1914
  - Anne Elizabeth 1841–51
  - Mary Eleanor Sept.–Oct. 1842
  - Henrietta Emma (Etty) 1843–1927
  - George Howard 1845–1912
  - Elizabeth (Bessy) 1847–1926
  - Francis (Frank) 1848–1925
  - Leonard 1850–1943
  - Horace 1851–1928
  - Charles Waring 1856–8
- Emily Catherine 1810–66

Stop: 2

Joseph Hooker

Joseph Hooker was a botanist, plant hunter and he became director of the Botanical Gardens at Kew. He went on many expeditions including to the Himalayas and even a trip to Antarctica – looking for plants!

When Darwin returned from his round the world voyage he sent some of the plants that he had brought back to Joseph Hooker to help him indentify them.

They became lifelong friends. Darwin exchanged 1,400 letters with Joseph Hooker. They helped each other carry out research by sending letters about experiments that they had done and new information that they had found.

They shared personal stories and sadness too, as both men experienced the death of a young daughter.

Stop: 2

Letter 456

From John Stephens Henslow

To Charles Darwin

16 December 1838

Transcribed extracts

www.darwinproject.ac.uk/entry-456

Cambridge
16 Decr 1838

My dear Darwin,

...— All I can wish you is, that you may experience as great content in the marriage state as I have done myself—& all the advice, which I need not give you, is, to remember that as you take your wife for better for worse, be careful to value the better & care nothing for the worse— Of course it is impossible for a lover to suppose for an instant that there can be any worse in the matter, but it is the prudent part of a husband, to provide that there shall be none—...

But I am afraid you will think I am writing a sermon— Only take it in good part, & believe that I most heartily wish you all joy & prosperity— Is there a chance of your coming here this Xmas Mrs H is anxious to know & bids me ask you—

Yrs ever affectly
J. S. Henslow

Stop: 2

Letter 456

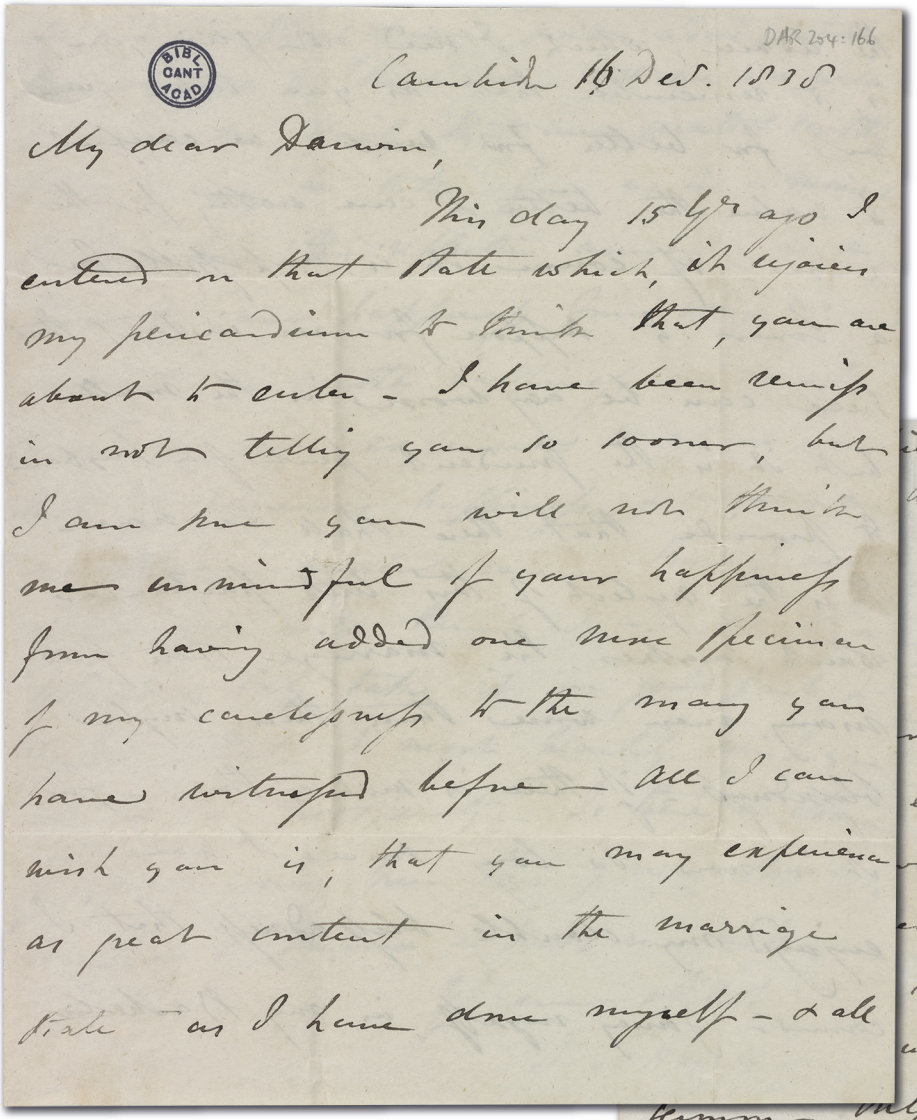
From John Stephens Henslow

To Charles Darwin

16 December 1838

Pages 1 & 3 of original letter (reduced in size)

www.darwinproject.ac.uk/entry-456

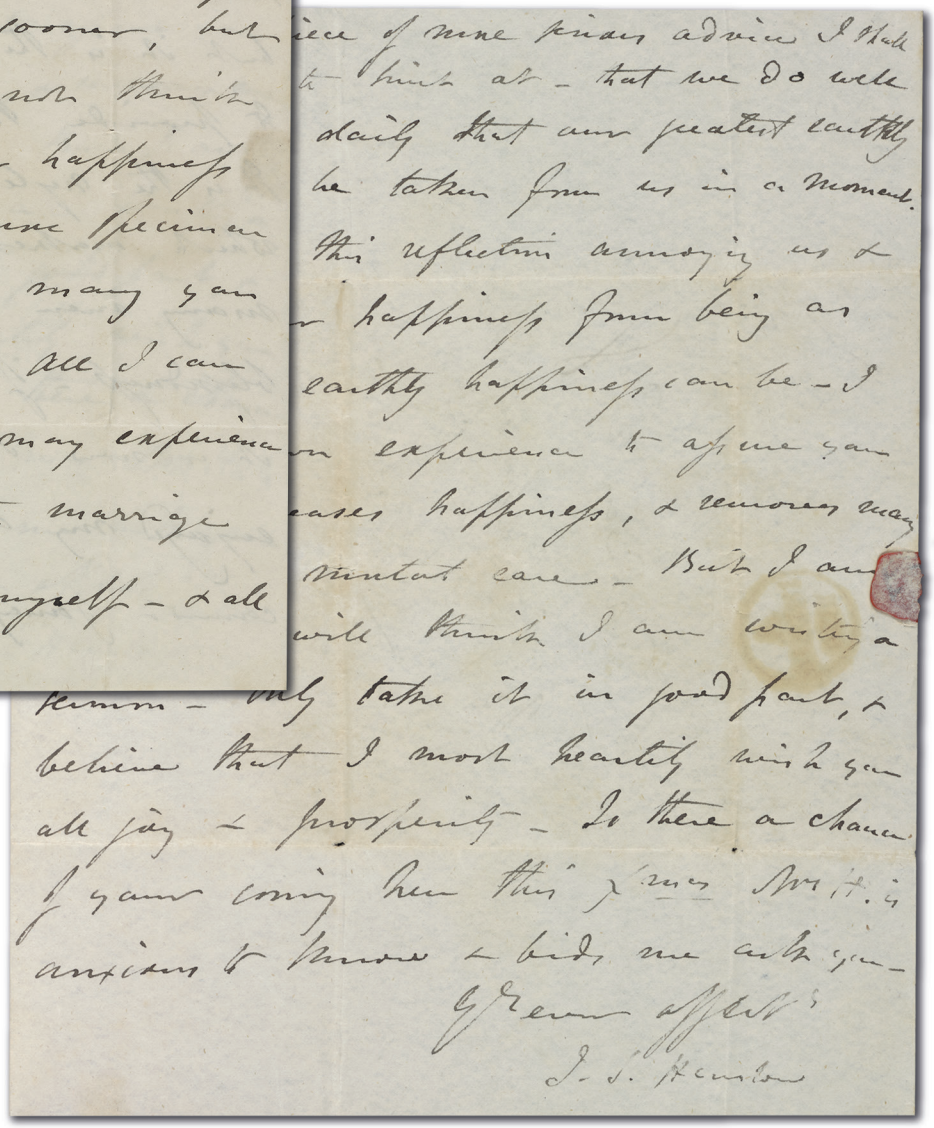


DAR 254: 166

Cambridge 16 Dec. 1838

My dear Darwin,

This day 15 yrs ago I entered on that Path which, it appears my peculiarism to think that, you are about to enter – I have been remiss in not telling you so sooner, but I am sure you will not think me unmindful of your happiness from having added one more specimen of my carelessness to the many you have witnessed before – All I can wish you is, that you may experience as great content in the marriage state – as I have done myself – & all



piece of mine [illegible] advice I think at – that we do well daily that our greatest earthly be taken from us in a moment. this reflection annoying us & happiness from being as earthly happiness can be – I experience to assure you eases happiness, & removes many unnatural care – But I am will think I am writing a sermon – only take it in good part, & believe that I most heartily wish you all joy & prosperity – Is there a chance of your coming here this year? Mrs H. is anxious to know & bids me ask you –

Yours affectly

J. S. Henslow

Stop: 2

Letter 1012

From Charles Darwin

To Joseph Hooker

[26 October 1846]

Transcribed extracts

www.darwinproject.ac.uk/entry-1012

Down Farnborough Kent
Monday Morning

My dear Hooker

Your drawing is quite beautiful; I cannot thank you enough, & I feel, as I before said guilty—your good nature is as wonderful as mesmerism.— I have been reading heaps of papers on Cirripedia, & your drawing is clearer than almost any of them.

The more I read, the more singular does our little fellow appear, & as you say, looking at its natural size, a microscope is a most wonderful instrument. How different would the drawing have been, if I had employed an artist! not to mention the invaluable assistance of having my loose observations confirmed, & the several points observed only by you.— I shall of course state this in the beginning of my paper, & when I have not seen the thing, give it on your authority...

Ever yours
My dear Hooker,
C. Darwin

Stop: 2

Letter 1012

From Charles Darwin

To Joseph Hooker

[26 October 1846]

Pages 1 & 4 of original letter (reduced in size)

www.darwinproject.ac.uk/entry-1012

Down Farnborough Kent

Monday Morning

My dear Hooker

Your drawing is quite beautiful; I cannot thank you enough, & I feel, as I before said guilty — your good nature is as wonderful as mesmerism. — I have been reading heaps of papers on Cirripedia, & your drawing is clearer than almost any of them. The more I read, the more singular does our little fellow appear, & as you say, looking at it in natural size a microscope is a most wonderful instrument. How different would the drawing have been, if I had employed an artist! not to mention its invaluable existence of my having my loose observations confirmed, & the several points pared off of you. — I shall of course state this is the beginning of my paper, & when I have not seen the thing, size-

[illegible]-shaped, & twice as long as (see fig. 21) that is in the last pedunculated state, & the two projections: I send of your two figures & for the I see I state that the two shell organs in the state of fig 21. are longer than in fig 20.

knowledge enough to discuss the limbs in this larva; & indeed whether any one has, for its to various very distinct families.

lens, with very many thanks, & with ditto for being written to Adie — My lens have been altered (for 3. 6. only!) & a great comfort it is. You really are the most good natured man I ever knew, — too good natured for so to your own science, — a zealot and I thank you cordially — Ever yours My dear Hooker, C. Darwin

Stop: 2

Marry, Not Marry ?

Transcription

This is the Question

Marry

Children—(if it Please God) — Constant companion, (& friend in old age) who will feel interested in one, — object to be beloved & played with. — better than a dog anyhow. — Home, & someone to take care of house — Charms of music & female chit-chat. — These things good for one's health. — but terrible loss of time. —

My God, it is intolerable to think of spending ones whole life, like a neuter bee, working, working, & nothing after all. — No, no won't do. — Imagine living all one's day solitarily in smoky dirty London House. — Only picture to yourself a nice soft wife on a sofa With good fire, & books & music perhaps — Compare this vision with the dingy reality of Grt. Marlbro' St.

Marry—Mary—Marry Q.E.D.

Not Marry

Freedom to go where one liked — choice of Society & little of it. — Conversation of clever men at clubs —

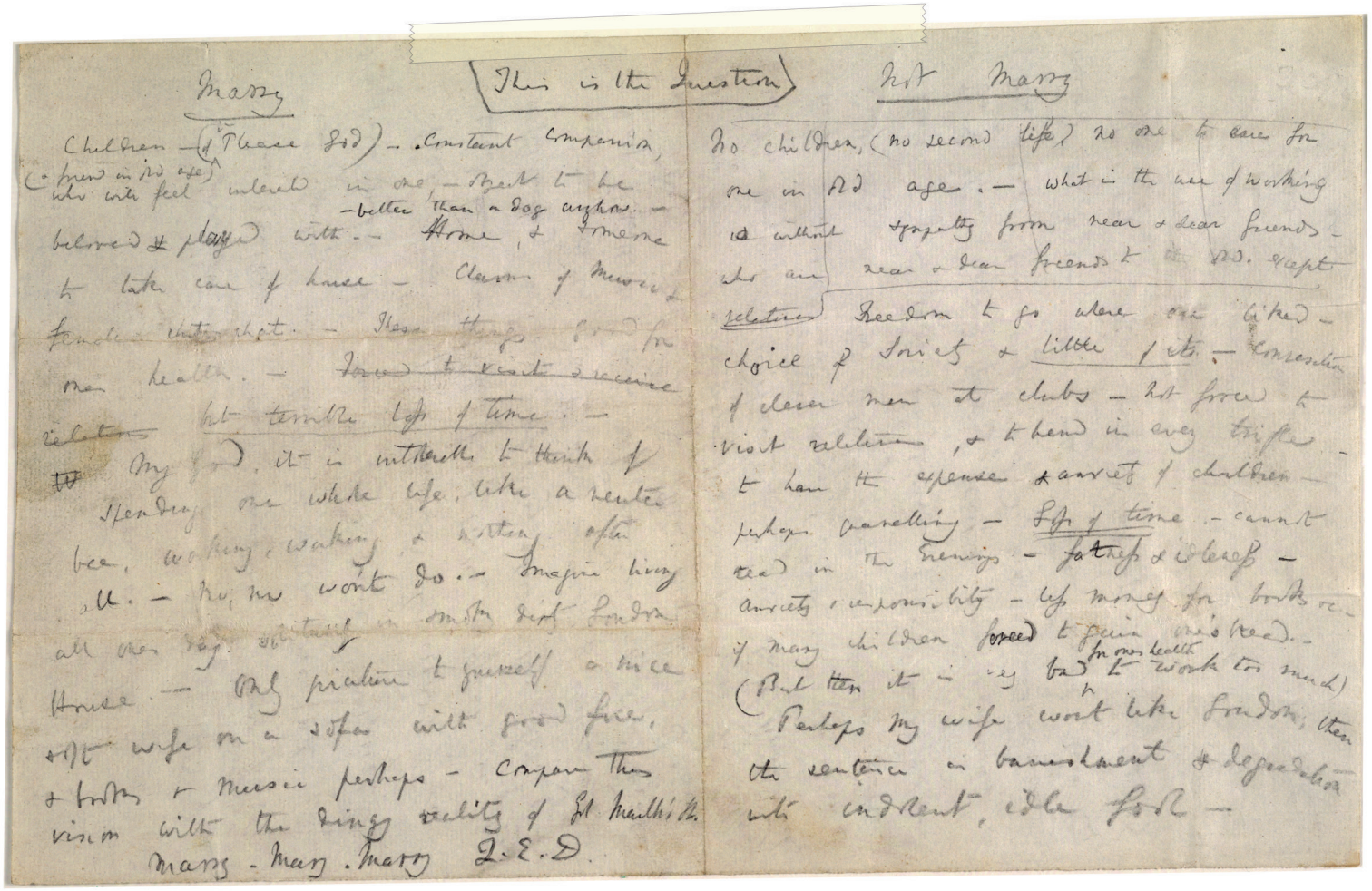
Not forced to visit relatives, & to bend in every trifle. — to have the expense & anxiety of children — perhaps quarelling —

Loss of time. — cannot read in the Evenings — fatness & idleness —

Anxiety & responsibility — less money for books &c — if many children forced to gain one's bread. — (But then it is very bad for ones health to work too much)

Perhaps my wife wont like London; then the sentence is banishment & degradation into indolent, idle fool —

Image of original



Stop: 3

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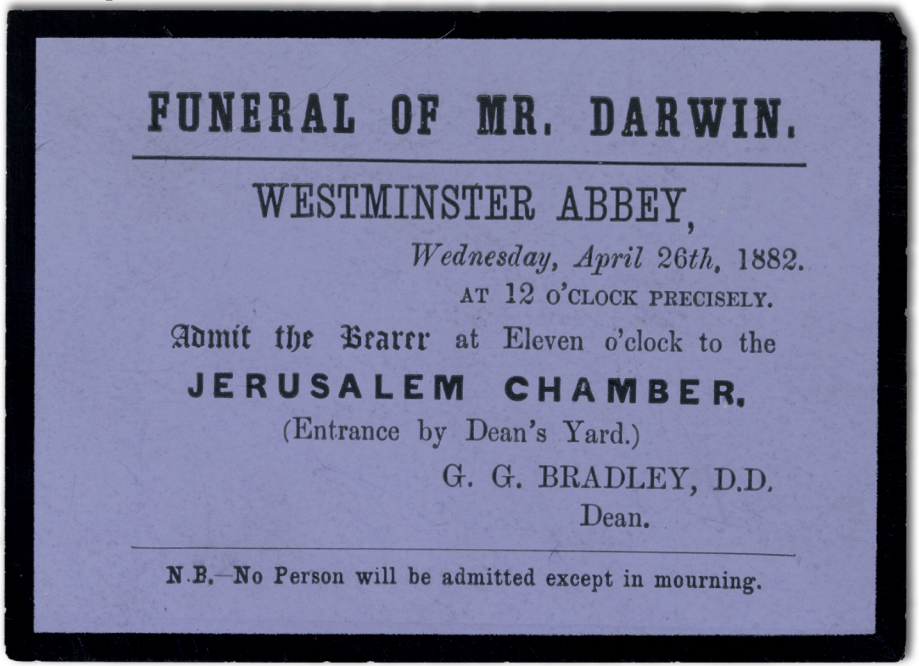

FUNERAL OF MR. DARWIN.

WESTMINSTER ABBEY,

Wednesday, April 26th, 1882.

AT 12 O'CLOCK PRECISELY.

Admit the Bearer at Eleven o'clock to the

JERUSALEM CHAMBER.

(Entrance by Dean's Yard.)

G. G. BRADLEY, D.D.
Dean.

N.B.—No Person will be admitted except in mourning.

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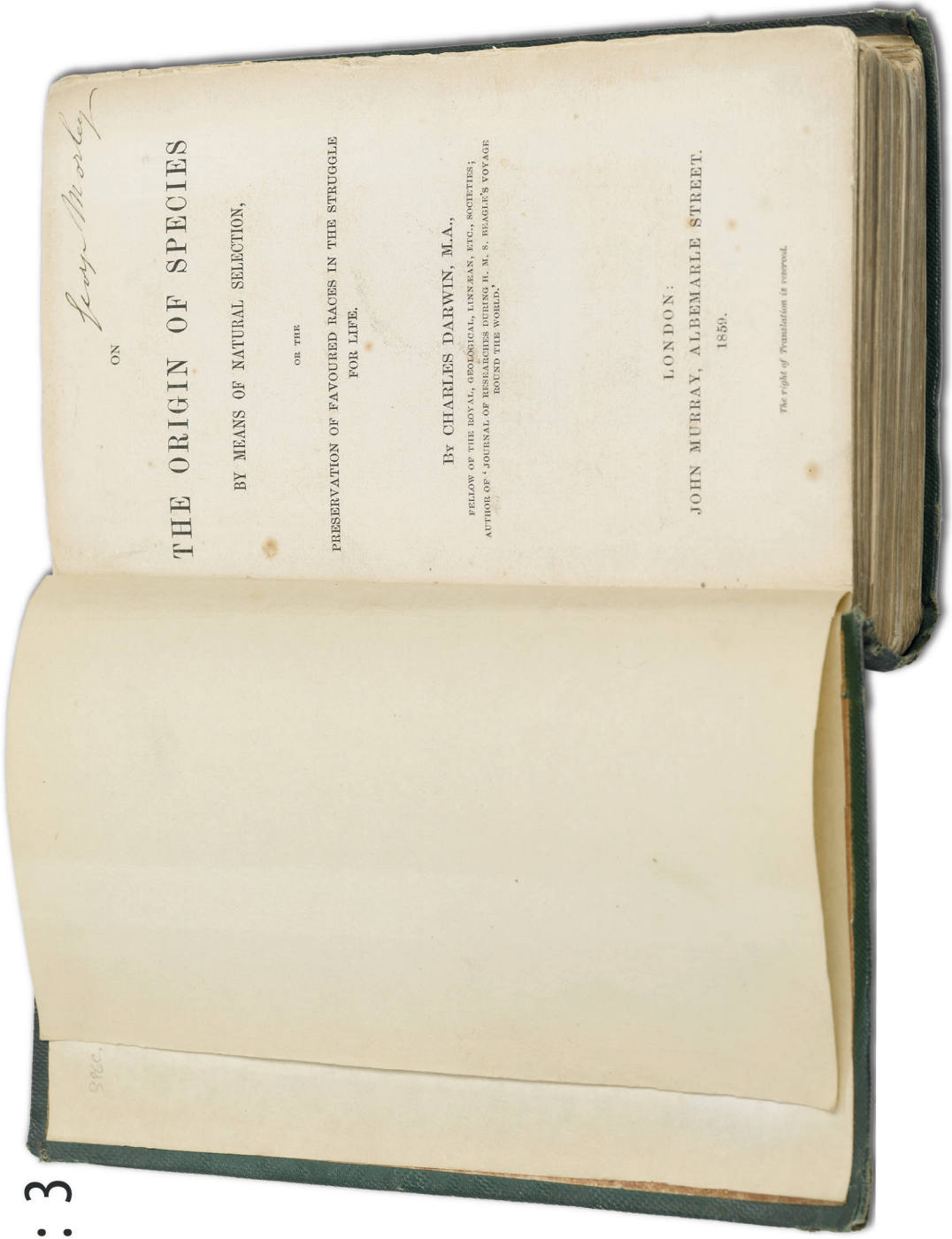

ON

THE ORIGIN OF SPECIES

BY MEANS OF NATURAL SELECTION,

OR THE

PRESERVATION OF FAVOURED RACES IN THE STRUGGLE FOR LIFE.

By CHARLES DARWIN, M.A.,

FELLOW OF THE ROYAL, GEOLOGICAL, LINNEAN, ETC., SOCIETIES;
AUTHOR OF 'JOURNAL OF RESEARCHES DURING H. M. S. BEAGLE'S VOYAGE ROUND THE WORLD.'

LONDON:
JOHN MURRAY, ALBEMARLE STREET.
1859.

The right of Translation is reserved.

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Stop: 3

Letter 4555

From Ernst Haeckel

To Charles Darwin

9 July, 1864

Translated and Transcribed extracts

http://www.darwinproject.ac.uk/entry-4555

Jena (Saxony & Weimar)
9 July 1864

Most honoured Sir

…Of all the books I have ever read, not a single one has come even close to making such an overpowering and lasting impression on me, as your theory of the evolution of species. In your book I found all at once the harmonious solution of all the fundamental problems that I had continually tried to solve ever since I had come to know nature as she really is. Since then your theory—I can say so without exaggerating—has occupied my mind every day most pressingly, and whatever I investigate in the life of humans, animals or plants, your theory of descent always offers me a harmonious solution to all problems, however knotty…

Hoping, dear Sir, that your health will improve and that it will allow you for many years yet to continue the battle for truth and against human prejudice, I remain with the most sincere esteem,

Yours truly devoted
Ernst Haeckel

Stop: 3

Letter 4555

From Ernst Haeckel

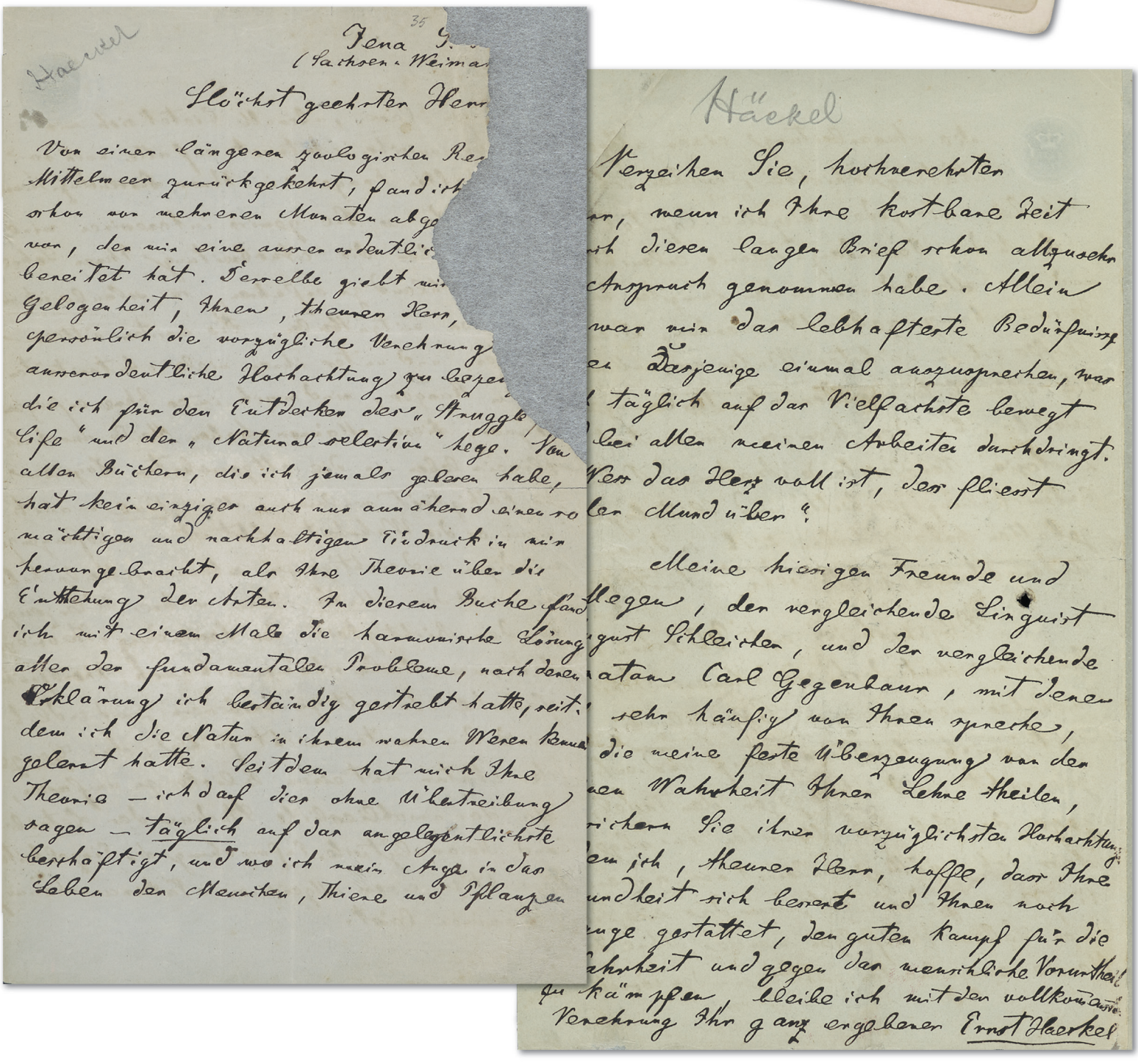
To Charles Darwin

9 July, 1864

Pages 1 & 8 of original letter, in German

(reduced in size)

http://www.darwinproject.ac.uk/entry-4555



Haeckel

Jena G.
(Sachsen-Weima

Höchst geehrter Herr

Von einer längeren zoologischen Re
Mittelmeer zurückgekehrt, fand ich
schon vor mehreren Monaten abge
von, den mir eine ausser ordentlic
bereitet hat. Derselbe giebt mir
Gelegenheit, Ihnen, theuren Herr,
persönlich die vorzügliche Verehrung
ausserordentliche Hochachtung zu bezeu
die ich für den Entdecker des „Struggle
life" und der „Natural selection" hege. Von
allen Büchern, die ich jemals gelesen habe,
hat kein einziger auch nur annähernd einen so
mächtigen und nachhaltigen Eindruck in mir
hervorgebracht, als Ihre Theorie über die
Entstehung der Arten. In diesem Buche fand
ich mit einem Male die harmonische Lösung
aller der fundamentalen Probleme, nach deren
Erklärung ich beständig gestrebt hatte, seit
dem ich die Natur in ihrem wahren Wesen kennen
gelernt hatte. Seitdem hat mich Ihre
Theorie — ich darf dies ohne Übertreibung
sagen — täglich auf das angelegentlichste
beschäftigt, und wo ich mein Auge in das
Leben der Menschen, Thiere und Pflanzen

Häckel

Verzeihen Sie, hochverehrter
er, wenn ich Ihre kostbare Zeit
ich diesen langen Brief schon allzusehr
Anspruch genommen habe. Allein
war mir das lebhafteste Bedürfniss
es Dasjenige einmal auszusprechen, was
täglich auf das Vielfachste bewegt
bei allen meinen Arbeiten durchdringt.
Wes das Herz voll ist, des fliesst
der Mund über.

Meine hiesigen Freunde und
llegen, der vergleichende Linguist
gust Schleicher, und der vergleichende
atom Carl Gegenbaur, mit denen
sehr häufig von Ihnen spreche,
die meine feste Überzeugung von der
en Wahrheit Ihrer Lehre theilen,
ichern Sie ihrer vorzüglichsten Hochachtung
en ich, theuren Herr, hoffe, dass Ihre
undheit sich bessert und Ihnen noch
uge gestattet, den guten Kampf für die
ahrheit und gegen das menschliche Vorurtheil
zu kämpfen, bleibe ich mit der vollkommensten
Verehrung Ihr ganz ergebener Ernst Haeckel

Stop: 3

Extracts (highlighted red opposite) from The Times Obituary for Charles Robert Darwin

The Times, Friday, Apr 21, 1882

…The announcement of the death of Charles Darwin flashes over the face of the earth whose secrets he has done more than any other to reveal…

Fifteen volumes lie before us and nearly as many memoirs large and small, the product of 45 years' work—a product which, in quantity, would do credit to the most robust constitution. But when we consider Mr. Darwin's always feeble health and his deliberately slow method of work, never hasting but rarely resting, the result seems marvellous…

The Beagle sailed from England December 27, 1831, and returned October 28, 1836, having thus been absent nearly five years. In more ways than one these five years were the most eventful of Mr. Darwin's life. During these five years the Beagle circumnavigated the world, and it's not too much to say that singlehanded, Mr. Darwin during the voyage did more for natural history in all its varied departments than any expedition has done since; much more when we consider the momentous results that followed…

His personal influence on young scientific men can with difficulty be calculated; his simple readiness to listen and suggest and help has won the gratitude of many an aspiring observer.

Since he took up his residence in at Down, Mr. Darwin's life has been marked mainly by the successive publication of those works which have revolutionized modern thought. In 1859 was published what may be regarded as the most momentous of all his works, "The Origin of Species by means of Natural Selection."

No one, we are sure, would be more surprised than the author himself at the results which followed. But all this has long passed. The work, slowly at first, but with increasing rapidity made its way to general acceptance,..

It goes without saying that the honours and medals were showered upon Mr. Darwin by learned societies all the world over…

CHARLES ROBERT DARWIN.

Exactly a year to a day has separated the deaths of two of the most powerful men of this century, some have said of any century; and those who care for the task will find some very curious analogies between the progress and the ultimate results of the work of the two men, totally different as were the spheres in which they exorcised their remarkable powers. On April 19, 1881, all the civilized world held its breath at the news of the death of Lord Beaconsfield; not less must be the effect upon the most civilized part of the civilized world when the announcement of the death of Charles Darwin flashes over the face of that earth whose secrets he has done more than any other to reveal. All who knew anything of Mr. Darwin know that, massive as he seemed, it was only by the greatest care and the simplest habits that he was able to maintain a moderate amount of health and strength. Mr. Darwin had been suffering for some time past from weakness of the heart, but had continued to do a slight amount of experimental work up to the last. He was taken ill on the night of Tuesday last, when he had an attack of pain in the chest with faintness and nausea. The latter lasted with more or less intermission during Wednesday and culminated in his death, which took place at about 4 o'clock on Wednesday afternoon. He remained fully conscious to within a quarter of an hour of his death. His wife and several of his children were present at the closing scene. During his illness he had been attended by Dr. Norman Moore, Dr. Andrew Clarke, Dr. Buxton, and Dr. Allfrey, of St. Mary Cray. Mr. Darwin leaves besides his widow a family of five sons and two daughters. It has not yet been decided when his remains will be interred, but the place of burial will be in the quiet churchyard of the village of Down, near which place Mr. Darwin spent the last forty years of his life.

Fifteen volumes lie before us and nearly as many memoirs large and small, the product of 45 years' work—a product which, in quantity, would do credit to the most robust constitution. But when we consider Mr. Darwin's always feeble health and his deliberately slow method of work, never hasting but rarely resting, the result seems marvellous. But wonderful as this is under the circumstances, it is not by mere quantity that Mr. Darwin's work will be judged; the quantity is of chief importance in respect of the multifarious channels through which his influence has spread.

On the great principle of hereditament, of which he himself was the prophet and expounder, Mr. Darwin could not help being a remarkable man. Through his father descended from Erasmus Darwin, one of the most remarkable and original men of his age, and through his mother from Josiah Wedgwood, a man in his own line of scarcely less originality, Mr. Darwin was bound, under favourable surroundings, to develop powers far beyond the average. Charles Robert Darwin (he seldom used the second name) was the son of Robert Waring Darwin, the third son by his first marriage of Erasmus Darwin, best known as a general reader by his scientifico-poetic work "The Botanic Garden." The late Mr. Darwin's father was a physician at Shrewsbury, who, although a man of considerable originality, devoted his powers almost entirely to his profession; his mother, as we have said, was a daughter of Josiah Wedgwood. He was born at Shrewsbury on February 12, 1809, so that he has died in his 74th year. Mr. Darwin was educated at Shrewsbury School under Dr. Butler, afterwards Bishop of Lichfield. In 1825, he went to Edinburgh University, therein following the example of his grandfather, where he spent two sessions. Here, among other subjects, he studied marine zoology, and at the close of 1826 read before the Plinian Society of the University two short papers, probably his first, one of them on the Ova of Flustra. From Edinburgh Mr. Darwin went to Christ's College, Cambridge, where he took his Bachelor's degree in 1831, proceeding to M.A. in 1837. The interval was of epoch-making importance. We believe that Darwin, like Murchison, was a keen fox-hunter in his youth, and that it was in the field that his great habits of observation were first awakened. In the autumn of 1831, Captain Fitzroy having offered to give up part of his own cabin to any naturalist who would accompany Her Majesty's ship Beagle in her surveying voyage round the world, Mr. Darwin volunteered his services without salary, but on condition that he should have the entire disposal of his collections, all of which he ultimately deposited in various public institutions. The Beagle sailed from England December 27, 1831, and returned October 28, 1836, having thus been absent nearly five years. In more ways than one these five years were the most eventful of Mr. Darwin's life. During these five years the Beagle circumnavigated the world, and it is not too much to say that singlehanded, Mr. Darwin during the voyage did more for natural history in all its varied departments than any expedition has done since; much more when we consider the momentous results that followed. No one can read the simple, yet intensely interesting "Naturalist's Voyage Round the World," without tracing in it the germs of all that Mr. Darwin has subsequently done in natural science. Simplicity and freedom from technicality have been the leading characteristics of all Mr. Darwin's best known and most influential works; and in this volume on the Voyage of the Beagle there is scarcely a page that will not interest any ordinarily intelligent man, and many pages that must claim the attention of the mere reader of stories of adventure. Full of incident it is, especially during the author's long sojourn in South America and in the vicinity of Magellan's Straits. Mr. Darwin's phenomenal genius as a scientific observer is seen throughout—when watching the method of catching and taming the wild horses of the Pampas, as when investigating the structure of the coral reefs of the Pacific. The first edition was published early in 1845, and the second was dedicated to Sir Charles Lyell, who, with his usual acuteness, early perceived the remarkable originality of the young naturalist, and to whom the latter was indebted for much wise counsel and help, as is evident from the recently published Life and Letters of the great geologist. That was not the only immediate result of that great voyage; under the superintendence of Mr. Darwin, and with abundant description and annotation by him, the Zoology of the expedition was published before the narrative, in 1840, with Professor Owen, Mr. Waterhouse, the Rev. L. Jenyns, and Mr. Bell as contributing specialists. Not only so, but still also before the general narrative, Mr. Darwin published his first original contribution to science in his "Structure and Distribution of Coral Reefs" (1842). This work for the first time shed clear light upon the method of work of the tiny creatures whose exquisite fabrics are spread over the face of the Pacific. True, quite recently Mr. Murray has broached a new theory, or rather modification of Darwin's theory, which is beginning to find acceptance; but even if universally accepted it will not detract from the original estimate of the work of the Beagle naturalist. Still further, we have as direct result of the voyage in a volume, published in 1844, on the "Volcanic Islands visited during the Voyage of the Beagle," and in 1846, "Geological Observations in South America." Both these works are even now referred to by geologists as classical, and as having suggested lines of research of the highest fertility. In the Transactions of the Geological Society, moreover, other memoirs suggested by the results of the voyage will be found, one as early as 1838. But even that is not the earliest important paper of the great observer. Just a year after his return, in November, 1837, he read to the Geological Society a paper, to be found in its Transactions, "On the Formation of Vegetable Mould." This paper gave the result of observations begun some time before, observations only completed in his latest published work, that on "Earthworms," reviewed in these columns only a few months ago. Experiments were arranged for, we then pointed out, which took 40 years to ripen. Such far-seeing deliberation can only be the attribute of the greatest minds, which can see the end from the beginning. Other results of the voyage in botany and entomology we could refer to were it needful.

But the greatest result of all was probably that on the mind of the naturalist himself. Passing over a generation, the spirit of his grandfather seems to have re-appeared in Charles Darwin with intensified power and precision. We need not here enter into the delicate distinctions which exist between the developmental theories of Erasmus, which were prematurely sown in unfruitful and unprepared soil, and those of his greater grandson, which have revolutionized research and thought in every department of human activity. The inherited germ was doubtless rapidly and fully developed during the splendid opportunities presented by the voyage of the Beagle. Throughout all his subsequent work the influence of this voyage is apparent, and continued reference is made to the stores of observation laid up during those eventful five years. Mr. Darwin's subsequent life was totally uneventful. Three years after his return, in the beginning of 1839, he married his cousin, Emma Wedgwood, and in 1842 he took up his residence at Down, Beckenham, Kent, of which county he was a magistrate. There he has lived since, and there on Wednesday he died. It is known to his friends that Mr. Darwin never quite recovered from the evil effects of his long voyage. He himself tells us that during nearly the whole time he suffered from sea-sickness, an affliction which no constitution could altogether withstand. As we have said, it has only been by the quietest living and the greatest carefulness that Mr. Darwin was able to keep himself in moderate health and working order. His habits and manners were of childlike simplicity, his bearing of the most winning gentility, and his modesty and evident unconsciousness of his own greatness almost phenomenal. In sending a letter or contribution to a journal, he asked for its insertion with a doubting hesitancy rare even in a tiro. His personal influence on young scientific men can with difficulty be calculated; his simple readiness to listen and suggest and help has won the gratitude of many an aspiring observer.

Since he took up his residence at Down, Mr. Darwin's life has been marked mainly by the successive publication of those works which have revolutionized modern thought. In 1859 was published what may be regarded as the most momentous of all his works, "The Origin of Species by means of Natural Selection."

No one who has not reached manhood at the time can have any idea of the consternation caused by the publication of this work. We need not repeat the anathemas that were hurled at the head of the simple-minded observer, and the prophecies of ruin to religion and morality as Mr. Darwin's doctrines were canvassed. No one, we are sure, would be more surprised than the author himself at the results which followed. But all this has long passed. The work, slowly at first, but with increasing rapidity made its way to general acceptance, and the anathematisers have been now content to find a *modus vivendi* between their creeds and the theories propounded in the "Origin of Species." The revolution in scientific doctrine and scientific method brought about by the publication of this work was ably pointed out by Professor Huxley two years ago in his lecture on "The Coming of Age of the Origin of Species." Mr. Huxley says:—"It is true, those who have watched the progress of science within the last ten years will bear me out in the full when I assert that there is no field of biological inquiry in which the influence of the 'Origin of Species' is not traceable; the foremost men of science in every country are either avowed champions of its leading doctrines, or at any rate abstain from opposing them; a host of young and ardent investigators seek for encouragement and guidance in Mr. Darwin's great work; and the general doctrine of Evolution, to one side of which it gives expression, finds in the phenomena of biology a firm base of operations whence it may conduct its conquest of the whole realm of nature."

But it is not only in physical and natural science that the revolutionary influence of the "Origin of Species" is seen. It is not too much to say that the doctrines propounded in this volume, on "The Descent of Man," and other subsequent works, have influenced thought and research in every direction. It has been said, perhaps prematurely, that one must seek back to Newton or even Copernicus, to find a man whose influence on human thought and methods of looking at the universe has been so radical as that of the naturalist who has just died. Of course Mr. Darwin's originality has been assailed. Kant, Laplace, Buffon, Erasmus Darwin, and others, and of course Lucretius, have been brought forward as the real originators of the fertile idea which has taken its name from Mr. Charles Darwin. Give these old-world worthies all the credit which is justly their due, and it is not little; let it be granted that Darwin received the first initiative in his fertile career of research from a study of what they had done by his predecessors; and yet how comes it that these old theories fell comparatively dead and bore no substantial fruit? One reason must be that, as propounded by Mr. Darwin, the theory of evolution had a mature vitality which compelled acceptance, and the phenomenal vigour of which is seen in the results. Mr. Darwin's great theory, in some of its parts, may require modification; he himself latterly, we believe, did not seek to maintain it in all its original integrity. As has been suggested, some greater law may yet be found which will cover Darwinism and take a wider sweep; but, whatever developments science may assume, Mr. Darwin will in all the future stand out as one of the giants in scientific thought and scientific investigation.

All Mr. Darwin's subsequent works were developments in different directions of the great principles applied in the "Origin of Species." Between 1844 and 1854 he published through the Ray and other societies various monographs, which even his greatest admirers admit do not do him the highest credit as a minute anatomist. His next great work, published in 1862, was that on the "Fertilization of Orchids;" this, with the work on "Cross and Self-Fertilization of Plants" (1876), and that on the "Forms of Flowers" (1878), and various papers in scientific publications on the agency of insects in fertilization, opened up a new field which in his own hands and the hands of his numerous disciples have led to results of the greatest interest and the greatest influence on a knowledge of the ways of plants. Other works belonging to this category are those "On the Movements and Habits of Climbing Plants," "Insectivorous Plants," and "The Movements of Plants" (1881), all of which opened up perfectly fresh fields of investigation, and shed light on the most intimate workings of nature. Mr. Darwin's influence in these, as in others of his works, has acted like an inspiration, leading men to follow methods and attain results which a quarter of a century ago were beyond the scope of the most fantastic dream. But, perhaps, the works with which the name of Mr. Darwin is most intimately associated in popular estimation, and indeed the world which have had the deepest influence on the tendencies of modern thought and research in those departments in which humanity is most deeply interested, are those bearing on the natural history of man. Nine years after the publication of the "Origin of Species," appeared (1868), in two volumes, the great collection of instances and experiments bearing on the "Variation of Plants and Animals under Domestication." We have called this a collection of facts, and the same term might be applied, with greater or less exactness, to all the other works of Mr. Darwin. This is the characteristic Darwinian method. Years and years are spent in the accumulation of facts with open-minded watchfulness as to the tendency of the facts. The expressed inferences in Mr. Darwin's works are few; he piles instance on instance and experiment on experiment, and almost invariably the conclusion to which he comes seems but the expression of the careful and unbiassed reader's own thought. Nowhere is this more signally evident than in the work on Domesticated Animals and Plants. The results which were brought out in those volumes were full of significance, while at the same time they afforded abundant occasion for the opponents of Darwinism to scoff and pour harmless contempt on the whole line of inquiry; forgetting or wilfully shutting their eyes to the fact that the results which Mr. Darwin showed were possible in petto bore no proportion to the gigantic efforts of nature through untold ages. The chapters on Inheritance in this work were full of significance, and seemed a natural transition to the work which followed three years later (1871)—"The Descent of Man and Selection in relation to Sex." Even greater consternation was caused in many circles by the publication of this work than by "The Origin of Species." And the reason of this is obvious. Not only did it seem directly to assail the *amour propre* of humanity, but to imperil some of its most deeply cherished beliefs. With wonderful rapidity, however, did men of all shades of belief manage to reconcile themselves to the new and disturbing factor introduced into the sphere of scientific and philosophical speculation. All sorts of halfway refuges were sought for and found by those whose mental comfort was threatened, and, again, as before, there was little difficulty in finding a *modus vivendi* between two sets of doctrines that at first sight seemed totally irreconcilable. After all, what have the highest aspirations of mankind to fear from the investigations and speculations of a man who is capable of writing as Mr. Darwin does in the concluding pages of his "Descent of Man." "Important as the struggle for existence has been, and even still is, yet as far as the highest part of man's nature is concerned, there are other agencies more important. For the moral qualities are advanced either directly or indirectly, much more through the effects of habit, the reasoning powers, instruction, religion, &c., than through natural selection; through to this latter agency may be safely attributed the social instincts which afforded the basis for the development of the moral sense. . . . For my own part I would as soon be descended from that heroic little monkey who braved his dreaded enemy to save the life of his keeper, or from that old baboon who, descending from the mountains, carried away in triumph his young comrade from a crowd of astonished dogs—as from a savage who delights to torture his enemies, offers up bloody sacrifices, practices infanticide without remorse, treats his wives like slaves, knows no decency, and is haunted by the grossest superstition. Man may be excused for feeling some pride at having risen, though not through his own exertions, to the very summit of the organic scale; and the fact of his having thus risen instead of having been aboriginally placed there may give him hope for a still higher destiny in the distant future. But we are not here concerned with hopes or fears, only with the truth as far as our reason permits us to discern it; and I have given the evidence to the best of my ability. We must, however, acknowledge, as it seems to me that man with all his noble qualities, with sympathy which feels for the most debased, with benevolence which extends not only to other men, but to the humblest living creature, with his godlike intellect which has penetrated into the movements and constitution of the solar system—with all these exalted powers, man still bears in his bodily frame the indelible stamp of his low origin." Among scientific men themselves, among those who welcomed the Darwinian method and the distinctive doctrines of Darwinism, none of the master's works have probably met with more criticism than that on the Descent of Man. Not that the naturalists of the highest standing have any hesitation in accepting the general principles illustrated in the "Descent of Man;" the ablest and most candid biologists admit that in that direction the truth seems to lie; but that the various stages are so incomplete, the record is so imperfect, that before stereotyping their beliefs it would be wise to wait for more light. The general conclusion is not doubted, but how it has been reached by nature is by no means evident. And in this connexion we cannot do better than quote the words of Professor Huxley in the lecture already alluded to, and which, we are sure, Mr. Darwin himself would have endorsed with all his strength.

"History warns us, however, that it is the customary fate of new truths to begin as heresies and to end as superstitions; and, as matters now stand, it is hardly rash to anticipate that in another 20 years, the new generation educated under the influences of the present day, will be in danger of accepting the main doctrines of the Origin of Species with as little reflection, and it may be with as little justification, as so many of our contemporaries 20 years ago rejected them. Against such a consummation let us all devoutly pray; for the scientific spirit is of more value than its products, and irrationally-held truths may be more harmful than reasoned errors. Now, the essence of the scientific spirit is criticism. It tells us that to whatever doctrine claiming our assent we should reply, 'Take it if you can compel it. The struggle for existence holds as much in the intellectual as in the physical world. A theory is a species of thinking, and its rights to exist is co-extensive with its power of resisting extinction by its rivals."

As a sort of side issue of the "Descent of Man," and as throwing light upon the doctrines developed therein, with much more of independent interest and suggestiveness, is the Expression of the Emotions in Man and Animals" was published in 1872. This is, perhaps, the most amusing of Mr. Darwin's works, while at the same time it is one which evidently involved observation and research of the most minute and exacting kind. It is one, moreover, which shows how continually and instinctively the author was on the watch for instances that were likely to have any bearing on the varied lines of his researches.

To attempt to reckon up the influence which Mr. Darwin's multifarious work has had upon modern thought and modern life in all its phases seems as difficult a task as it would be to count the number and trace the extent of the sound-waves from a park of artillery. The impetus he has given to science, not only in his own, but in other departments, can only find a parallel in Newton. Through his influence the whole method of seeking after knowledge has been changed, and the increasing rapidity with which facts are every day developed becomes more and more bewildering. To what remote corners in religion, in legislation, in education, in every-day life, from Imperial Assemblies and venerable Universities to humble board schools and remote mission-halls, the impetus initiated on board the Beagle and developed at the quiet and comfortable homeat Beckenham, has reached, those who are in the whirl and sweep of it are not in a position to say. Under the immediate influence of the sea he was only made aware of a few obvious facts and make a few quite as obvious reflections; in time we may be able to realize how great a man now belongs to the past. That Mr. Darwin's work was not done nor his capacity for work exhausted was well enough seen in his recently-published work on Worms; and with the help of his able and congenial sons, Mr. George and Mr. Francis Darwin, we might have hoped for one or two more of the familiar green-covered volumes.

Mr. Darwin's elder brother, the faithful friend of Mrs. Carlyle, died about a year ago, leaving his younger brother his principal heir; the latter, how ever, has all along been in comfortable circumstances. It goes without saying that honours and medals were showered upon Mr. Darwin by learned societies all the world over. From Germany, where his disciples led by Häckel, have out-Darwined Darwin, he received a Knighthood of the Prussian Order of Merit.

From respect to the memory of Mr. Darwin, the Linnean Society yesterday adjourned after transacting formal business only. Sir John Lubbock, the president, addressing the evening meeting, said they would, no doubt have heard the sad news of the irreparable loss which science, the country, and their society had experienced in the death of Mr. Darwin. Only a few days ago they had the pleasure of hearing a paper of his—unhappily, his last—which showed no sign of any abatement of vigour. That was not the occasion to speak of the value of his scientific work, but he might say that while the originality and profound character of his researches had revolutionized natural history, he had also added enormously to its interest, and given, if he might so say, new life to biological science. Many of them, and no one more than himself, had also to mourn one of the kindest and best of friends. He begged to propose, as a small mark of respect to the memory of their late illustrious countryman, the greatest—alas, that he could no longer say of living naturalists, that, after the formal business was concluded, the society should adjourn.