

A rough draft of A. R. Wallace’s “Sarawak law” paper

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ABSTRACT: A rough draft of Alfred Russel Wallace’s famous “Sarawak law” paper (1855) has been discovered. A full transcript is provided comparing it to the published text. The implications for Wallace’s scientific writing practices for this and, by implication, his historic Ternate essay (1858) are discussed.

KEY WORDS: Charles Darwin – Malay Archipelago – Borneo – evolution – Ternate essay – natural selection.

The story of the joint proposal of evolution by natural selection by Charles Darwin and Alfred Russel Wallace has been told countless times by popular writers, biographers, scientists and historians over the last 150 years. Wallace’s 1855 paper, the so-called “Sarawak law” paper, usually forms an important part of the story. Wallace’s manuscripts at the Natural History Museum, London, contain most of the documents that survive from his 1854–1862 expedition in the Malay Archipelago. One of the surviving manuscripts, written in faded brown ink and headed “Aspects of Nature”¹, is a single folio folded in half to make four pages. It is about 900 words long with two sub-headings, “Malay Peninsula” and “N. W. Coast of Borneo”. The heading “Aspects of Nature” was presumably derived from the title of the work by the famous German explorer-naturalist Alexander von Humboldt (1808, 1849) which Wallace (1853: 442) cited in his *Narrative of travels on the Amazon and Rio Negro*.

The text of this manuscript does not match that of any Wallace publication so it seems these notes remained uncompleted (van Wyhe 2012). Indeed, the fact that this document did not go into a publication is probably why Wallace retained it. His other unbound manuscripts that went into his publications were almost always discarded which is why no drafts of his many articles written during his voyage exist.

It is not entirely clear when this particular document was written. It was certainly sometime after February 1855 as will be shown below. Wallace cited the presence of the orchid genus *Coelogyne* which he otherwise only mentioned while at the Si Munjon collecting site in North West Borneo, at that time not yet part of Sarawak, hence his wording for the locale (Wallace 1869: I: 55). Wallace stayed there from March to November 1855. There is no textual evidence to indicate that the document was written after Wallace left Borneo on 10 February 1856 (van Wyhe 2013: 137) suggesting that it was written during Wallace’s stay at Si Munjon.

THE "SARAWAK LAW" DRAFT

On the face of it, this manuscript is of little interest. However, on three sides there is another, earlier, text written in pencil beneath the ink notes. The pencil text is largely obscured by the text written over it in ink. Probably for this reason it has, until now, remained overlooked and unrecognized. Nevertheless, this earlier pencil text is of great interest because it is nothing less than a fragment of a rough draft, possibly even the first draft, of Wallace's famous "Sarawak law" article (Wallace 1855).

Because no rough drafts of any of Wallace's articles from his years in the Malay Archipelago were thought to survive, we have only been able to consult the final published text, with no insight into the process of composition and revision his writings might have undergone. It has often been remarked that Wallace wrote clearly and eloquently. Did this come effortlessly from his pen? Did he draft ready copy? This fragment of the "Sarawak law" draft provides a glimpse into how carefully and extensively Wallace crafted his scientific writings. In his autobiography, Wallace (1905: 1: 354) recalled writing the "Sarawak law" essay:

It was written during the wet season, while I was staying in a little house at the mouth of the Sarawak river, at the foot of the Santubong mountain. I was quite alone, with one Malay boy as cook, and during the evenings and wet days I had nothing to do but to look over my books and ponder over the problem which was rarely absent from my thoughts. . . .

I accordingly put my facts and ideas on paper, and the result seeming to me to be of some importance, I sent it to *The Annals and Magazine of Natural History*, in which it appeared in the following September (1855). Its title was "On the Law which has regulated the Introduction of New Species," which law was briefly stated (at the end) as follows: "Every species has come into existence coincident both in space and time with a pre-existing closely-allied species.

The draft fragment is 670 words long and corresponds to parts of pages 193–195, near the end of his 6,000-word printed paper of 1855. The fragment therefore represents only about a tenth of the final work. But the draft reveals how carefully Wallace re-worked his writing before settling on the final version. Not only did he polish his style but almost every sentence was thoroughly revised and rewritten. He also increased or decreased the emphasis or confidence of some of his statements. For example, in the first line he changed "With great diffidence I would also venture to suggest" to "I would also venture to suggest". New sentences and sections were added at a later stage of drafting or to the fair copy sent for publication.

This draft reveals at least three stages of composition. In addition to the first layer of pencil writing, later corrections and insertions were made in pencil and on another occasion, corrections to the text were made in ink. He may have followed this document with a further draft or immediately with his fair copy sent for publication. At any rate there were at least four series of revisions to the text before it was published. Considering the substantial differences between the draft and the final text, a further intermediary draft is certainly possible.

A line-by-line transcription of the draft follows with the published version of the text below it. As the faint pencil writing is largely obscured by the darker writing in ink over it, the text has been particularly difficult to decipher and some words may be open to other interpretations; some words have remained illegible. Additions in the second and third revisions are given as superscript at the place where they were added

by Wallace. Deleted text is given as struck through. Conjectural readings are in square brackets.

With great diffidence I would also venture to suggest some ~~reasons~~ reasons
I would also venture to suggest some reasons

against the very nature of the theory of Prof. Forbes. Our knowledge
against the very nature of the theory of Professor Forbes. Our knowledge

of the inhabitants of the earth during ^{any} geological period is necessarily
of the organic world during any geological epoch is necessarily

very imperfect. Looking at the vast numbers of forms or species that have
very imperfect. Looking at the vast numbers of species and groups that have

been brought to light this may be ~~doubted~~ ^{disputed} but we should compare
been discovered by geologists, this may be doubted; but we should compare

them not merely with the numbers at present existing on the Earth
their numbers not merely with those that now exist upon the earth,

but with a far greater number, for we have no reason for believing
but with a far larger amount. We have no reason for believing

the organic ~~whole~~ world at any early period to have been much less
that the number of species on the earth at any former period was much less

[numerous] & varied than at present, & [we believe] that there have been
than at present; at all events the aquatic portion, with which geologists have most
acquaintance, was probably often as great or greater.

many complete changes, new sets of organic formation as it were so

Now we know that there have been many complete changes of species; new sets of organisms have many times
been introduced in place of old ones which have become extinct, so

that the total amount from the earliest period must have been as
that the total amount which have existed on the earth from the earliest geological period must have
borne about

much greater than those now existing, as the ~~total number of~~ ^{whole human race}
the same proportion to those now living, as the whole human race

which have lived & died upon earth would exceed in number those
who have lived and died upon the earth, to the population at the present time.

now living. Again, at each geological epoch, the whole earth was
Again, at each epoch, the whole earth was

no doubt the theatre of life, as it is now and as geological changes
no doubt, as now, more or less the theatre of life, and as the successive generations of each

took place the exuvi & preservable parts † would be buried more or less
species died, their exuvi and preservable parts would be deposited

over every part of the then existing seas and oceans, which we have
over every portion of the then existing seas and oceans, which we have

no reason for considering less but rather more extensive than was there
reason for supposing to have been more, rather than less, extensive than

at present. In order then to understand the amount of our
at present. In order then to understand our

possible knowledge of the early world & its inhabitants, we must compare,
 possible knowledge of the early world and its inhabitants, we must compare,

not the area of the whole field of our geological investigations with
 not the area of the whole field of our geological researches with

the earth's surface, but the area of the examined portions of
 the earth's surface, but the area of the examined portion of

each formation. *For instance during the Silurian period, animals*
 each formation separately with the whole earth. For example, during the Silurian period all the earth
 was Silurian, and animals

were living and dying, more or less over the whole earth, they might have been
 were living and dying, and depositing their remains more or less over the whole area of the globe, and
 they were probably (the species at least)

nearly as varied in different latitudes as now. *What proportion*
 nearly as varied in different latitudes and longitudes as at present. What proportion

does the examined Silurian districts bear to the surface of the globe?
 do the Silurian districts bear to the whole surface of the globe, land and sea (for far more extensive
 Silurian districts probably exist beneath the ocean than above it), and what portion of the known
 Silurian districts has been actually examined for fossils? Would the area of rock actually laid

Probably not one thousandth part. For the greater part of the [Silurian]
 open to the eye be the thousandth or the ten-thousandth part of the earth's surface?

or any other strata may still be in the bed of the ocean
Any other formation will offer us similar results – But still
 Ask the same question with regard to the Oolite or the Chalk, or even to particular beds of these when
 they differ considerably in their fossils, and you may then get some notion of how small a portion of the
 whole we know. But yet

more important is the probability that whole formations, representing
 more important is the probability, nay, almost the certainty, that whole formations containing the records of

vast geological periods are entirely hidden beneath the seas &
 vast geological periods are entirely buried beneath the ocean, and for

quite beyond our reach. Most if not all of the gaps of the
 ever beyond our reach. Most of the gaps in the

geological series may thus be filled up, & whole families of animals, of which we
 geological series may thus be filled up, and vast numbers of unknown and unimaginable animals,

can have no conception may be thus hidden from us. The
 which might help to elucidate the affinities of the numerous isolated groups which are a perpetual puzzle to
 the zoologist, may there be buried, till future revolutions may raise them in their turn above the waters, to
 afford materials for the study of whatever race of intelligent beings may then have succeeded us.

~~result~~ *conclusion we must arrive at is that our knowledge of*
 These considerations must lead us to the conclusion, that our knowledge of

the whole series of the former inhabitants of the earth is
 the whole series of the former inhabitants of the earth is

necessarily most fragmentary & limited, imperfect² as much so
 necessarily most imperfect and fragmentary, – as much so

as ~~th~~ our knowledge of the present organic world would be were
 as our knowledge of the present organic world would be, were

we limited¹ forced to make our collections & excavations only³
 we ~~limited~~¹ forced to make our collections and observations only

in ~~the~~ spots equally limited in space & number with
in spots equally limited in area and in number with

those which have been examined geologically – Now, the
those actually laid open for the collection of fossils. Now, the

hypothesis of Prof. Forbes is ^{essentially} one that assumes to some extent
hypothesis of Professor Forbes is essentially one that assumes to a great extent

the completeness of our knowledge of the whole series of
the completeness of our knowledge of the whole series of

organic beings which have existed on the earth. This
organic beings which have existed on the earth. This

appears a fatal objection to it, independent of all other
appears to be a fatal objection to it, independently of all other

considerations. It may be said that the same objections exist
considerations. It may be said that the same objections exist

against any theory on such subjects – But this is not
against every theory on such a subject, but this is not

necessarily the case. The hypothesis I have in the paper
necessarily the case. The hypothesis

put forward depends in no degree upon the completeness ~~of our~~
put forward in this paper depends in no degree upon the completeness

~~knowledge.~~ ^{knowledge} ~~It is in fact founded upon the~~ but rather ^{simply of our knowledge of the former state of the earth, but takes}
~~facts we have~~

of our knowledge of the former condition of the organic world, but takes what facts we have

~~upon the fragmentary~~ & imperfect ~~nature of our knowledge~~

arrived at [as] fragments of a vast whole, which its object is to enable us
as fragments of a vast whole, and deduces from them something of the nature

better to conceive & appreciate.⁴
and proportions of that whole which we can never know in detail.

the former organic world. [It is] founded upon [isolated]
It is founded upon isolated

& ^{isolated} groups of facts, recognises their isolation & [~~helps~~] [~~illig~~]
groups of facts, recognizes their isolation, and

~~the~~ ^{its} [~~nature~~] & amount of what we have ~~which is not less~~ when [evident at first]

endeavours to deduce from them something of the nature of
endeavours to deduce from them the nature of

the intervening portions.
the intervening portions.

RUDIMENTARY ORGANS

The draft ends here with room left on the page. In the published paper, however, the last sentence of this draft is followed by a paragraph starting with "Another important series of facts . . ." in which Wallace discussed "rudimentary organs." Wallace argued that these structures appeared *de novo* and largely or wholly functionless. They were

certainly not a reaction to environmental influences. However, future species, created according to the "antitype" or "model" of those with rudimentary parts, might have modified functional versions, such as wings for flight in a future species based on the penguin's rudimentary wings. Rudiments, he declared, "must be the necessary results of some great natural law." This unnamed "great natural law" entailed gradualism in the scheme of nature, in that species created later would have intermediates before them. The law was also purported to explain otherwise inexplicable aspects of beauty and harmony in the natural world as elaborated in his 1856 paper "On the habits of the Orang-utan" (Wallace 1856). We might call it Wallace's higher law (van Wyhe 2013: 108–109). It might have been inspired by *Vestiges of creation* (Chambers 1844). Wallace later repudiated this explanation of rudimentary organs in a footnote he added to a later reprint of the "Sarawak law" paper: "The theory of Natural Selection has now taught us that these are not the steps by which limbs have been formed; and that most rudimentary organs have been produced by abortion, owing to disease, as explained by Mr. Darwin" (Wallace 1856). Now that we can see that the discussion of rudimentary organs was not in the early draft, it seems likely that the higher law was not integral to the paper and was added at a later stage.

IMPLICATIONS OF THE DRAFT

This new evidence of Wallace's careful process of scientific composition and revision suggests that his famous 1858 Ternate essay on the tendency of varieties to depart from parent species might also have been carefully drafted and re-worked. Wallace's fair copy was later sent to Darwin in April 1858 which, as is well known, led to the joint reading of Darwin's and Wallace's documents at the Linnean Society of London on 1 July 1858 and their later publication in the *Journal of the proceedings of the Linnean Society* (Darwin and Wallace 1858). This ultimately led to the publication of Darwin's *On the origin of species* the following year and thus ushered in one of the greatest transformations in the history of science (van Wyhe and Rookmaaker 2012; van Wyhe 2013).

Because of a paucity of contemporary evidence, scholars and other commentators have relied on Wallace's later recollections of the writing of this famous essay. All of his accounts refer to thinking of a new idea during a fit of tropical fever while lying in bed in his house on the island of Ternate in the Moluccas or Spice Islands near New Guinea. In some of these recollections Wallace explicitly mentioned writing first a draft: "the moment I got up [I] began to write it down, and I believe finished the first draft the next day"⁵: "the same evening I sketched the draft of my paper, and in the two succeeding evenings wrote it out in full" (Wallace 1895: 20–21; almost the same wording was repeated in Wallace 1898: 217).

As usual, these recollections many decades later are not entirely consistent and should not be considered as completely reliable evidence of what actually happened in February 1858. None of the drafts mentioned survive. But there must have been one or more drafts. Considering how extensively Wallace re-wrote and revised the "Sarawak law" paper, it seems likely that a few days, at the least, were needed to draft and complete his Ternate essay.

It is even possible, although we have no evidence for it, that Wallace may have further revised his draft or prepared his fair copy after receiving Darwin's fateful letter on 9 March 1858. It was Darwin's mention in that letter that Sir Charles Lyell had been impressed by the "Sarawak law" paper that prompted Wallace to send the Ternate essay to Darwin, with the request that it might be forwarded to Lyell. Wallace would not have presumed to communicate his paper to Lyell without such a prompting. Wallace posted his essay to Darwin on the subsequent monthly mail steamer. The mail schedules demonstrate that a letter posted that day arrived exactly on the day Darwin indicated to Lyell, 18 June 1858 (van Wyhe and Rookmaaker 2012; van Wyhe 2013: 225–226, 358 note 692).

According to a later recollection, Wallace had originally intended to work on the Ternate essay or its subject matter when he returned home.⁶ This recollection from two decades later is consistent with two near contemporary letters to Darwin and Bates in which Wallace stated that he would prepare a work on species after he returned home.⁷

We know that it was Darwin's letter that prompted Wallace to send the Ternate essay to him both from the fact that Wallace asked for it to be sent to Lyell, a gentleman with whom he had never corresponded and because when Darwin wrote to Lyell to do so, he first explained why the essay was being sent to him, a stranger to Wallace⁸:

My dear Lyell

Some year or so ago, you recommended me to read a paper by Wallace in the *Annals*, which had interested you & as I was writing to him, I knew this would please him much, so I told him. He has to day sent me the enclosed & asked me to forward it to you.

Might Wallace have revised his initial draft further with the intention of impressing or persuading Lyell? It is impossible to know. Wallace's private notes on transmutation, the "Sarawak law" paper and the Ternate essay were directed more towards the work and arguments of Lyell than another other author, as first shown by McKinney (1972).

Did Wallace retain the draft or drafts of the Ternate essay after he had completed and despatched his fair copy? Or did he discard them only after he learned that his essay had been read at the Linnean Society, or when printed thereafter? We will probably never know. He had written over this "Sarawak law" draft before he heard that his fair copy had safely reached Britain. It would have taken about 51 days for his essay to arrive in London. It would have taken longer for a reply to reach him at Si Munjon. But he may also have retained a more polished intermediate draft for that purpose. Considering his practice of discarding notes and drafts once his finished work was published, it is possible that he did the same with the Ternate drafts in or after October 1858.

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The portions of the Sarawak law draft which were not published in 1855, and that I have transcribed correctly, are required by the Wallace Literary Estate to carry the following declaration: "Copyright: Alfred Russel Wallace Literary Estate. This work is licensed under Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported. To view a copy of this visit <http://creativecommons.org/licenses/by-nc-sa/3.0/legalcode>".

NOTES

¹ NHM WP6/1/4. The ink "Aspects of Nature" part of the document has been transcribed by the Wallace Correspondence Project at the Natural History Museum (London) and images of the manuscript are also provided at <http://www.nhm.ac.uk/research-curation/scientific-resources/collections/library-collections/wallace-letters-online/4905/5312/B/details.html> (accessed 2013).

² This addition is in ink.

³ Deletion and "forced" in ink.

⁴ Second layer of pencil annotation here.

⁵ A. R. Wallace to Alfred Newton, 3 December 1887 (Darwin 1892: 189–190).

⁶ A. R. Wallace to Alfred Newton, 3 December 1887: "I *had* the idea of working it out, so far as I was able, when I returned home" (Darwin 1892: 190). Italics in the original. See van Wyhe (2013: 217).

⁷ A. R. Wallace to C. Darwin, [27 September 1857] (Burkhardt and Smith 1990: 457). A. R. Wallace to H. Bates, 4 January 1858 (van Wyhe and Rookmaaker 2013: 143).

⁸ C. Darwin to C. Lyell, 18 [June 1858] (Burkhardt and Smith 1991: 107). The same point is confirmed in Wallace (1905: 363). See also Porter (2012).

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