

The definitive work on a sordid affair

Haeckel's Embryos: Images, Evolution, and Fraud

Nick Hopwood

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Professor Ernst Haeckel (1834–1919) is most well known for his drawings that supported his ‘biogenetic law’, the idea that embryos and fetuses of higher-level organisms passed through the evolutionary stages when developing in the mother’s womb.¹ Later, the drawings were used to argue for an evolutionary phylotypic stage, where embryos of different vertebrate classes supposedly resemble one another very closely at a certain stage of development, supposedly supporting common ancestry. Consequently, the development of the child in the womb was seen as proof of the evolution of humans from a single-celled organism to modern humans. Haeckel also played an important role in supporting biological racism, a topic that Hopwood also covered.

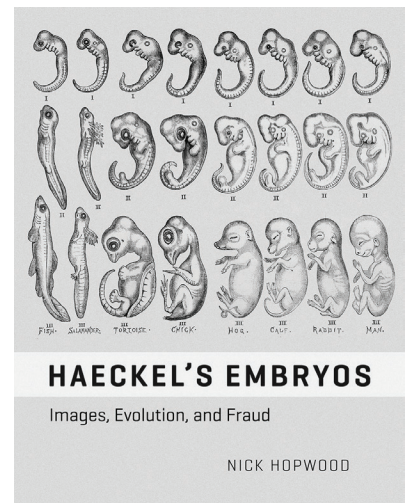
This new study by science historian Nick Hopwood, Reader² in History of Science and Medicine at the University of Cambridge, promises to be the definitive work in the history of a set of drawings of embryos that have survived as evidence for Darwin’s theory for over 100 years, even though the drawings were known to be problematic almost from their inception. The inaccurate embryo illustrations, which were often not credited to Haeckel, were almost universally reproduced in biology textbooks even though, as early as

1900, “no competent scientist had defended them for decades” (p. 262). One common source of the biogenetic law drawings, including the illustration on the cover of Hopwood’s book, was Romanes, which was credited to ‘Häkel’ on pages 152–153.³

Hopwood examined both how and why Haeckel made his drawings, and their exploitation to prove Darwinism true for over a century after they were first published. His detailed detective work even included researching the Haeckel archives in Jena, evaluating the original drawings, as well as the woodblocks that were used to print his embryo illustrations and other pictures. The result was, according to a book review by Matthew Cobb, Professor⁴ of Zoology at the University of Manchester, UK, that it is “embarrassing but true: some of the most influential drawings in the history of biology are wrong, exaggerated to fit a thesis”.⁵ Cobb continues:

“Haeckel wanted to convince his readers that all vertebrates share a common ancestor, and that, as he put it, ‘ontogeny recapitulates phylogeny’—our embryonic development repeats our evolutionary past. This aphorism was soon disproved, but the use of Haeckel’s drawings persisted, particularly in education. There were waves of criticism, from the 1870s when the drawings were published, up to 1997 as Haeckel’s ‘fraud’ was rediscovered and exploited by creationists.”

The author documented the fact that a set of pictures printed in a German book in the 1870s have been reprinted, either the original or copies, thousands of times in hundreds of books, even in a major paleontology college textbook as



late as 1997.⁶ A fuzzy illustration of the embryo drawings even made the cover of the 9 December 2010 issue of *Nature* magazine⁷ (p. 297) without acknowledging any of their problems, even though, as a review of Hopwood’s book published in *New Scientist* proclaimed, they were “drawn-out lies”.⁸ Another example which used the illustrations without noting any of their major problems was the 1997 textbook by Gerhard and Kirchner.⁹

The embryo illustrations managed to survive the early controversy mostly “... because scrutiny never became concerted enough. Among scientists only hostile experts had faulted comparisons that vividly, if approximately, conveyed what many accepted as an established fact. So when the first phases of production and debate ended in the late 1870s, the pictures and the charges still had most of their lives before them. ... the embryos gained influence as ever more people saw them, in Haeckel’s books and as copies with greater reach. This eventually prepared the ground for the larger contest that followed the rearming of the accusations for an expanded audience around 1900. Haeckel delivered the *casus belli* by drawing ever more ambitious grids” (p. 143).

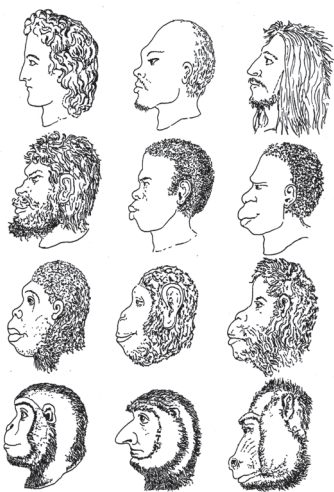


Figure 1. Ernst Haeckel's drawing of the primate hierarchy, from an ape, pictured in the lower right hand of the illustration, to a Caucasian, shown in the upper left corner. The most evolved human is actually taken from a statue of a Roman god. (From the frontispiece in Haeckel¹⁶.)

Although his embryo forgeries are most well known,¹⁰ other examples of forgeries exist, all of which were created in an effort to support Darwinism, two of which are noted below. Haeckel was a very talented artist and Hopwood has reprinted scores of his nature illustrations. Especially notable are his drawing of radiolarians, single-celled creatures with elaborate mineral skeletons, which are far smaller than the embryos he 'drew'.¹¹ His artistic talent argues for the conclusion that he deliberately distorted his embryo and other drawings to support his theory and that the distortions were not due to a lack of talent or due to sloppiness (as has been argued by one defender of Haeckel, Robert Richards in his book *The Tragic Sense of Life: Ernst Haeckel and the Struggle over Evolutionary Thought*, University of Chicago). An excellent critique of Richards is Richard Weikart's review of this book.¹² Furthermore, several other examples of the same behaviour exist. My one complaint, since I own most of Haeckel's original books published in English, is that the colour

reproduction is not always as accurate as is ideal.

Hopwood covers not just the life and science of Haeckel but also the history behind his many books and the many controversies that they have caused, not only over his embryo drawings but also on other topics, such as his outspoken racism. All of Haeckel's books had an underlying theme consisting of empirical science, mixed in with anticlerical arguments, Christian myths, and Monist philosophy that taught the material world is all that exists, and that Darwinism explained its existence.

Haeckel's racism

Hopwood covers not only the embryo problem, but Haeckel's blatant white supremacist bias in his books, especially in his grossly distorted illustrations that inferred 'blacks' were significantly closer to the higher apes than were 'whites'. Some of his most infamous racist examples, published

first in 1868, show a progression of the highest to the lowest type of humans followed by six examples of apes (p. 86, see figure 1). The lowest human is deliberately drawn to look very similar to the highest ape type.

Indeed, creationists have observed that Haeckel condemned the Bible for its *anti-racism*:

"All these five [speaking of an earlier classification than Haeckel's own] races of men, according to the Jewish legend of creation, are said to have descended from 'a single pair'—Adam and Eve, and *in accordance with this are said to be varieties of one kind or species.* ... The excellent paleontologist Quenstedt is right in maintaining that, if Negroes and Caucasians were snails, zoologists would universally agree that they represented two very distinct species, which could never have originated from one pair by gradual divergence [emphasis added]."^{13,14}

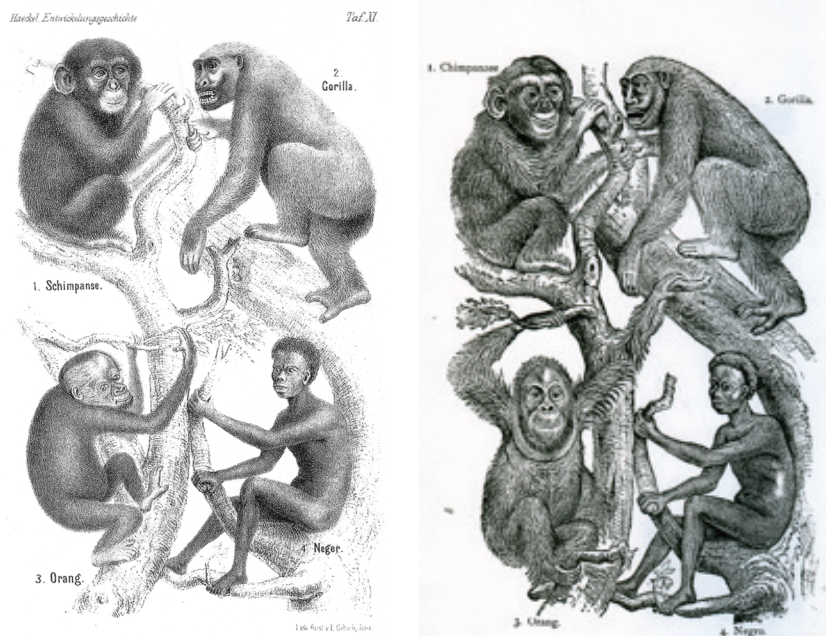


Figure 2. The negro shown in the illustration on the left of the drawing titled Our Family Tree. From Haeckel's 3rd edn of *Anthropogenie*.¹⁷ The earlier edition, shown on the right, from Haeckel's 2nd edn of *Anthropogenie*.¹⁸ As noted in earlier editions, the orang looked far more human in an attempt to show the evolution of humans from apes compared to the revised drawing shown on the right. This is another example of a forgery.

His racism was most pronounced in his two-volume set titled *Anthropogonie oder Entwicklungsgeschichte des Menschen* (1907), “Anthropogenesis or the evolutionary history of Mankind”; English title: *The Evolution of Man*. The fifth edition, published in 1903, showed a human fetus above an ape on the cover, again illustrating the impact of illustrations to convey and convince (p. 148). The fifth edition of this book ran to almost 900 pages, 20 plates, 440 woodcuts and 52 genetic tables (p. 146). The German edition sold 400,000 copies and translations that were completed in 30 languages sold even more copies documenting Haeckel’s worldwide influence (p. 148).

Another example is the illustration in figure 2 of three apes and a negro, all pictured on one tree to show their biological relationship (p. 111). His illustrations were also distorted to prove human evolution, so much so that by the third edition of *Anthropogonie* he was pressured to revise the three pictures of apes, especially the orang which looked very human-like in the first two editions (compare the two drawings in figure 2). Yet another example is provided by Joseph Assmuth (1871–1954), Professor of Biology at Xavier College, Bombay, showing that Haeckel drew the feet of apes like those of a man, straightened the back posture and changed the features of the skull to be more human-like.¹⁵ Hopwood even includes copies of some pages from the articles that exposed Haeckel’s work, such as the 1997 article in *Science* (p. 287). In short, although Haeckel’s

“... diagrams are profoundly wrong ... Hopwood’s excellent, thought-provoking book makes us ponder how these erroneous illustrations acquired their iconic status, and, above all, it shines a spotlight on

the power of drawings to influence our thinking.”¹⁵

They illustrate that Haeckel believed the ends justified the means, and the ends include proving both Darwinism and racism. His influence was so great that the university where Haeckel was a professor for most of his

career became the centre for the science of racial biology in Nazi Germany (p. 257). Leading Nazi *Rassenhygieniker* (‘racial hygienist’) and eugenicist, Karl Astel (1989–1945), Rector of the University of Jena where Haeckel taught, even wrote that Haeckel was

PLATE II. SKELETONS OF APES AND OF MAN.

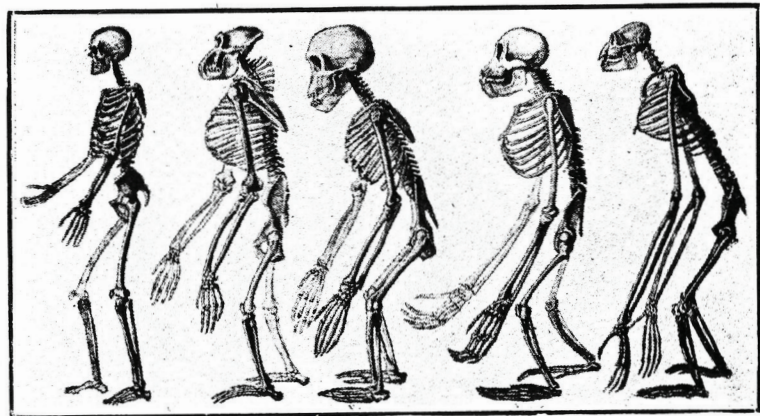
(See Page 85.)

I. HUXLEY’S ORIGINAL PLATE (REVERSED.)
Man. Gorilla. Chimpanzee. Orang. Gibbon.



Huxley’s plate displays many differences between man and the apes: e. g., the bent posture of the apes, the turned-up position of their feet, etc.

II. HAECKEL’S MODIFICATION OF THE ABOVE.



Haeckel substitutes two new figures, makes the feet of the apes flat like those of man, straightens up their backs, cuts off the neckbones of the gorilla, and creates an impression of sequence altogether untrue to nature, so as to support his theory of descent.

Figure. 4 The distortion in the line drawing of apes to a human skeleton set. Note the many differences in the top illustration compared to the redrawn illustration shown at the bottom. The skeletons in the forgery are shown standing more upright, several are taller, and the skulls are far more human, especially the third and fourth drawings from the left. (From the frontispiece in Assmuth and Hull.¹⁵)

“... one of the most courageous and most significant pioneers of a state concept based on natural law ... and the most brilliant German biologist to date.’ The ideas of this ‘Aryan scientist’ underlay such policies as ridding Germany of Jews [emphasis in original]” (p. 257).

After World War II, communist East Germany’s key architect, Walter Ulbricht, “ensured the institutionalization of the Schaxel–Haeckel tradition of free thinking science as a worldview” (p. 257), ‘free thinking’ referring to atheistic science.

Opposition to Haeckel

Although Haeckel’s work and ideas were widely supported in many books by leading biologists, he was not without opposition. For example, “Christian groups invoked Heberer’s Göttingen colleague Erich Blechschmidt, who as a human embryologist, ... antiabortionist, and antievolutionist attacked Haeckel on all fronts” (p. 259). Even many non-creationists had problems with Haeckel’s work, resulting in many people viewing “the German Darwin as a forger” (p. 143).

Haeckel’s “Striking designs, provocative rhetoric, and dual audience of scientists and laypeople all courted controversy” for him (p. 143). As a result, Haeckel attempted to avoid using or correcting the more controversial pictures, especially those illustrations that were attacked as forgeries. The ape tree illustrations (figure 2) “were generally criticized only as speculative and dogmatic” and an early apology by Haeckel

“... might have defused the issue, but Haeckel goaded his critics and then intensified the struggle just as concern mounted over his approach. By 1875 his character was so contested that a host of enemies took even the most honest error as a sign of bad faith. The

flawed hero of German Darwinism lived to fight another day, though as a man better at lighting fires than putting them out he never shook the charges off” (p. 143).

Haeckel gave in only in cases where far too many people judged them as grossly inaccurate. Hopwood also reviews the exploitation of Haeckel’s forgeries by Darwinism opposers, discussing both the Dover Intelligent Design trial and the Discovery Institute (pp. 293–294) and several creation science organizations that use them (pp. 275–289).

Summary

Only three examples of forgery were noted in this review, but others exist. Haeckel clearly believed that the ends justify the means and continued to distort images in his drawings in an attempt to prove Darwinism. He was spectacularly successful and some of his forgeries lasted for over 100 years. Hopwood has done his homework on this sordid affair and highlighted an embarrassing event in history that many evolutionists wish had never happened. It is a must read for all of those interested in the history of science and evolution. This well-illustrated coffee table-sized book of 388 pages, including 28 pages of notes (pp. 309–337), has carefully documented this history.

References

1. In later years, biologists used these drawings to argue that embryos go through a phylotypic stage, where they resemble each other very closely. These textbook writers would typically say that the biogenetic law is not as valid as once thought, but that a phylotypic stage is clearly visible, and that it still supports common ancestry. These authors would typically use Haeckel’s embryo drawings, or derivatives thereof, and credit the law to Karl Ernst von Baer. The phylotypic stage idea is also debunked by an earlier paper by Richardson; see: Richardson, M.K., Heterochrony and the phylotypic period, *Developmental Biology* 172: 412–421, 1995.
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8. *New Scientist*, 17 January 2015, p. 41.
9. Gerhard, J. and Kirchner, M., *Cells, Embryos and Evolution: Toward a cellular and developmental understanding of phenotypic variation and evolutionary adaptability*, Blackwell Science, Oxford, figures 7–16, p. 329, 1997.
10. See for example van Niekerk, E., Countering revisionism—part 1: Ernst Haeckel, fraud is proven; part 2: Ernst Haeckel and his triple-woodcut print, *J. Creation* 25(3):89–95, 2011; 27(1):78–84, 2013.
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18. Haeckel, E. *Anthropogenie*, 2nd edn, W. Engelmann, Leipzig, p. 488, 1874.