

[Friedrich Tiedemann \(1781-1861\)](#) ^[1]

By: LaTourelle, Jonathon Keywords: [recapitulation](#) ^[2]

Friedrich Tiedemann studied the anatomy of [humans](#) ^[3] and animals in the nineteenth century in Germany. He published on zoological subjects, on the heart of [fish](#) ^[4], the anatomy of [amphibians](#) ^[5] and echinoderms, and the lymphatic and respiratory system in [birds](#) ^[6]. In addition to his zoological anatomy, Tiedemann, working with the chemist Leopold Gmelin, published about how the digestive system functioned. Towards the end of his career Tiedemann published a comparative anatomy of the brains of white Europeans, black Africans, and Orangutans, in which he argued that there were no appreciable differences between the structure of the brains of black Africans, women, and white European men that would suggest they were intellectually different. Tiedemann also researched the embryonic development of the brain and circulatory systems of human fetuses.

The eldest son of Sophie Rothhausen and the philosopher and classicist Dietrich Tiedemann, Friedrich was born in Kassel, Germany, on 23 August 1781. Tiedemann's early education was attended to by his father and by the private protestant Marburg Gymnasium in Marburg, Germany. The Marburg Gymnasium at the time was connected to the University of Marburg, and in 1798 Tiedemann began medical studies at the university. In 1802 Tiedemann travelled to Bamberg and Würzburg, both in confederated Germany, to study theoretical medicine and physiology. Biographers of Tiedemann also report that the death of his father from a contagious disease in 1803 pushed him further away from practical medicine and towards theory.

Tiedemann earned his Medical Doctorate from the University at Marburg in 1804 and then, over the next three years, he studied with several European intellectuals. He remained in Marburg for a short while to study cerebral anatomy with Franz Joseph Gall. Tiedemann then traveled to Göttingen, Germany, to learn anthropology from Johann Friedrich Blumenbach. Next he traveled to Würzburg to study philosophy with Friedrich Wilhelm Joseph Schelling, one of the founders of the German idealist tradition called *Romantische Naturphilosophie* ^[7]. Schelling and his followers argued that the study of nature should not be overly focused on empirical evidence, but instead that it should try to use reason to come to necessarily true claims about how nature must be, given some basic premises. Stating that he wasn't impressed by the anti-experimental character of the romantic German philosophy, Tiedemann went to Paris, France, to learn from Jean Leopold Nicolas Frederic [Georges Cuvier](#) ^[8]. On his travels he met anatomist Samuel Thomas von Soemmerring, who recommended him to the Landshut medical faculty at the University of Landshut in Landshut, Germany. In 1807 Tiedemann accepted his first academic appointment as professor of anatomy and zoology at Landshut. That year Tiedemann also married Jenna Rosa Barbara von Holzing, with whom he had seven children.

Over the next ten years at Landshut, Tiedemann published on topics in anatomy and [morphology](#) ^[9], as well as a three-volume compendium of zoological information and a series of zoological and anatomical monographs. During this time Tiedemann also studied the embryological development of the human [fetus](#) ^[10], especially the brain and the circulatory system. In 1816 he published the details of these studies in *Anatomie und Bildungsgeschichte des Gehirns im Fötus der Menschen* (Anatomy of the Fetal Brain). Like his teacher Gall, Tiedemann suggested two methods for approaching neural anatomy. The first was the comparative approach, in which the structures of the human brain were compared to other human and nonhuman animal brains. He extended Gall's comparative work, detailing the differences in brain convolution patterns between human and nonhuman animals. The second was a developmental approach, in which he described the structures of the developing brain in each of its stages. Tiedemann argued that Gall and others had made significant progress on the first approach, while neglecting the developmental perspective.

Tiedemann divided *Anatomie und Bildungsgeschichte des Gehirns im Fötus der Menschen* into two major sections, the first detailed the developing brain during each month of [gestation](#) ^[11], from first to the ninth. The second section compared human brain structures, for example the [corpus callosum](#) ^[12], optic chamber, and pineal gland, against similar structures in nonhuman animals. Tiedemann argued that this method of synthesizing the developmental and comparative approaches would allow for brain anatomy, and comparative anatomy more generally, to become a full science that was deductive and descriptive.

Tiedemann argued for a [recapitulation theory](#) ^[13]. Tiedemann argued that the stages of animal embryonic development recapitulated the adult forms of some animals that Tiedemann called less complex. Some biologists contended that nonhuman animals took the forms they did because their development stopped at specific stages. On this theory, [humans](#) ^[3] represented the fully developed form of an animal. Tiedemann claimed that his research on the development of the human fetal brain provided evidence for his [recapitulation theory](#) ^[13].

After the publication of this work, Tiedemann moved to the [University of Heidelberg](#) ^[14] in Heidelberg, Germany, where he worked

and taught for the next three decades. Here he teamed up with the chemist Leopold Gmelin and together they published about the digestive system. Tiedemann and Gmelin argued that digestion did not occur exclusively in the stomach, and they attempted a chemical and physiological account of how nutrients were absorbed and passed into the bloodstream. Tiedemann and Gmelin also experimented with digestive juices and argued that, in addition to the dissolving powers of hydrochloric acid, the digestive system involved chemical transformations, such as the process of converting starch into glucose. In an 1820 publication, they described taurine, a compound later used in many early twenty-first century energy drinks, its effects on the development of the nervous system, its anti-inflammatory properties, and its role in the [regulation](#) ^[15] of blood pressure.

While at Heidelberg, Tiedemann published two articles of political and social significance. The first of these, published in 1829, was "Aufruf an die Humanität der Höheren Behörden der Gerechtigkeits-Pflege" (Call to the Humanity of the Higher authorities of Justice in Germany), in which he argued against the execution of criminals by means of a sword. Fifteen years after this paper was published, the city of Heidelberg ended the practice. In 1837, three years after the UK had passed full manumission for its black denizens, who became citizens, and after the abolition of the Atlantic slave trade, Tiedemann published "On the Brain of the Negro, Compared with That of the European and the Orang-Outang." In that paper he argued against several of his teachers, notably Cuvier and Soemmerring, who had argued that the brains of black Africans were more similar to that of apes and monkeys than to white Europeans. The article details Tiedemann's experimental work on the subject, in which he weighed a variety of brains and compared them to the body sizes they came from. His data showed that the ranges of brain size significantly overlap for all [humans](#) ^[3] and that there were no noticeable anatomical differences in the brains of people from other races. He argued against what he called the evils and injustice of slavery and the view that blacks were less beautiful, moral, and sociable by nature than whites. Tiedemann then contended that there was no biological justification for the subjugation of black people.

As Tiedemann's biographers noted, although he argued for racial equality, he denounced other liberal politics. He publicly opposed the liberal democratic uprisings of 1848 across the confederated German states. His three sons were military officers and one of them was executed under the martial law that the revolutionaries imposed during their time in power. After this incident, Tiedemann retired from Heidelberg. In 1854 Tiedemann published his last book, titled *Geschichte des Tabaks und anderer ähnlichen Genussmittel* (A History of Tobacco and Other Similar Means of Enjoyment). Also that year, Tiedemann's colleagues and students celebrated the fiftieth anniversary of his doctorate. In 1856 he settled in Munich, Germany, where he spent the rest of his life. Among other awards Tiedemann received the Knight of the Order of Merit of the Bavarian Crown from the King of Bavaria. He died 22 January 1861.

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Arizona State University. School of Life Sciences. Center for Biology and Society. Embryo Project Encyclopedia.

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Last Modified

Wednesday, July 4, 2018 - 04:40

DC Date Accessioned

Tuesday, July 7, 2015 - 19:54

DC Date Available

Tuesday, July 7, 2015 - 19:54

DC Date Created

2015-07-07

DC Date Created Standard

Tuesday, July 7, 2015 - 07:00

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