

[Franz Julius Keibel \(1861-1929\)](#) ^[1]

By: Barnes, M. Elizabeth Keywords: [biogenetic law](#) ^[2] [normal stages](#) ^[3] [normal plates](#) ^[4]

[Franz Keibel](#) ^[5] studied the embryos of [humans](#) ^[6] and other animals in Europe at the turn of the twentieth century. He lived and worked in several different parts of Germany and France. Keibel drew illustrations of embryos in many stages of development. Keibel used these illustrations, which he and others in the scientific community called normal plates, to describe the development of organisms in several species of [vertebrates](#) ^[7]. His illustrations are published in the sixteen-volume text *Normentafeln zur Entwicklungsgeschichte der Wirbelthiere* (Normal Plates of the Developmental history of [Vertebrates](#) ^[8]), published in 1895, and in the *Manual of Human Embryology*, which he edited with [Franklin Paine Mall](#) ^[9] of the US, published in 1912. Keibel's plates showed human embryos in different stages of development between the twelfth day and the second month after [fertilization](#) ^[10].

Keibel was born 6 July 1861 in Adelig Dombrowken, Poland. His parents were landowners Anna Scharlock and Hermann Keibel, and he had one sister, Sophie. Keibel went to three different secondary schools for his early education in Gdańsk and Grudziadz, Poland, and in Berlin, Germany. He then went to the [University of Freiburg](#) ^[11] in Freiberg im Breisgau, Germany, to study law for a semester. Afterwards, he instead pursued medicine, first at the [University of Berlin](#) ^[12] in Berlin, and then at the University of Strasbourg in Strasbourg, France. On 25 September 1887 he married Susanna Wehrenpfennig in Berlin. They had four children: three sons and one daughter. He finished his dissertation in 1887 on skulls with the anatomist and anthropologist [Gustav Schwalbe](#) ^[13]. He became a prosecutor at the [University of Freiburg](#) ^[11] in 1889 and in 1892 he became professor at University of Strasbourg.

Keibel started to work with [Wilhelm His](#) ^[14] in the 1880's at Strasbourg and they collaborated until 1904 when His died. His was attempting to complete a chronological map of the typical stages of human embryological development. Keibel already had experience in creating normal plates of [pig](#) ^[15] development in the mid 1880s. Normal plates are detailed drawings of embryos lined up at different stages of development. Embryologists used these tools to compare the normal developmental processes of embryos from different species within a taxon to ascertain the typical developmental history of a member of that taxon. Keibel's plates were accompanied with tables that included descriptions of the inner anatomy of the developing animal. Keibel employed his plates and tables to distinguish normal variations in the course of development from developmental abnormalities. Keibel's plates contributed to [Wilhelm His](#) ^[14]'s work on the normal progression of human development.

By the early 1900's Keibel had focused on [embryology](#) ^[16]. He used his plates to test the [biogenetic law](#) ^[17] proposed by [Ernst Haeckel](#) ^[18], at the [University of Jena](#) ^[19] in Jena, Germany. According to the [biogenetic law](#) ^[17], each stage in the embryological development of an animal corresponds to the adult form of one of that animal's evolutionary ancestors. For example, as dogs descended from [fish](#) ^[20] at some point in their evolutionary history ([phylogeny](#) ^[21]), then according to the [biogenetic law](#) ^[17], [dog](#) ^[22] embryos would resemble adult fishes at some point during the [dog](#) ^[22] embryos' development ([ontogeny](#) ^[23]). The [biogenetic law](#) ^[17] held that [ontogeny](#) ^[23], the developmental pathway of some organism, recapitulates [phylogeny](#) ^[21], the evolutionary history of that organism's species. Keibel, after he detailed the process of [pig](#) ^[15] development in 1897, inferred from his results that the [biogenetic law](#) ^[17] must be false because when he attempted to identify a [fish](#) ^[20] stage in the [ontogeny](#) ^[23] of the [pig](#) ^[15], he didn't succeed.

Keibel's publication *Normentafeln zur Entwicklungsgeschichte der Wirbelthiere* (Normal Plates of the Development of the [Vertebrates](#) ^[8]) filled 16 volumes from 1897 to 1938 and mapped, in an encyclopedic style, the development of different species of vertebrates, such as [humans](#) ^[24], [pigs](#) ^[25], [fowls](#) ^[26], [lungfishes](#) ^[27], [rabbits](#) ^[28], and [tarsiers](#) ^[29]. Keibel created this publication in collaboration with some other contemporary anatomists, for example Karl Peter and Ambrosius Hubrecht, and he edited the volumes from 1897 to 1909.

In 1900 Keibel received the title of Extraordinat Professor at Strasbourg, which meant that he was a professor without an official chair, and then in 1912 he became an honorary professor. However, with the title of honorary professor he still was not officially appointed a chair. From 1910 through 1912 Keibel collaborated with one of [Wilhelm His](#) ^[14]'s other students, [Franklin Paine Mall](#) ^[9], at [Johns Hopkins University](#) ^[30] in Baltimore, Maryland. Together, they edited two volumes of *Manual of Human Embryology*. In 1914 Keibel and Mall were funded by the [Carnegie Institution of Washington](#) ^[31] to establish a department of human [embryology](#) ^[16] in Baltimore, Maryland. Keibel and Mall's The [Carnegie Institution of Washington](#) ^[31] Department of Embryology eventually became a center of embryological research that remained active into the twenty-first century.

In 1914 Keibel's youngest son fought in the Alsace-Lorraine battle of [World War I](#) ^[32] and was reported missing in August of that

year, presumably killed in combat. Keibel's wife Susanna became ill around this time. In 1917 Keibel secured a full academic chair at the University of Strasbourg, but when the French occupied the city, they forced Keibel to leave Strasbourg and the university. The French army allowed him only a small briefcase and confiscated all of his other belongings and scientific works. Keibel left Strasbourg in 1918 with his family and moved first to Munich, and then Heidelberg, Germany, where Susanna died. Keibel's scientific work slowed. Furthermore, many of the anatomists with whom Keibel collaborated lost their lives or their works during the war.

Johannes Rückert, at the [University of Munich](#)^[33], invited Keibel to use his dissecting room until Keibel could find more suitable accommodations. A scientist and friend of Keibel's, Dorpat Adolphi, told Keibel that he had found accommodations at the University of Königsberg, Germany, after experiencing similar war-time displacement. Keibel followed Adolphi's advice and moved to Königsberg in 1919. While in Königsberg, Keibel's second son committed suicide. Keibel wrote that he was unhappy with the laboratory conditions at the University of Königsberg, so he pursued academic opportunities in Berlin. In 1922, Keibel relocated again to become the director of the [Anatomical Institute](#)^[34] of the [University of Berlin](#)^[12], Germany. He remained there until his death in 1929.

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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

Sunday, June 22, 2014 - 12:19

DC Date Available

Sunday, June 22, 2014 - 12:19

DC Date Created

2014-06-21

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