Carl Friedrich Gauss Papers

Cammie G. Henry Research Center
## Northwestern State University of Louisiana

The Cammie G. Henry Research Center holds what is believed to be one of the largest collections of personal and scientific papers from Carl Friedrich Gauss (1777-1855) in the world. The Research Center holdings include a substantial amount of primary source material. Letters to contemporary 19th Century scientists, notebooks, journals, photographs and clippings make this an important research resource for anyone seeking an insight into the personal and scientific life of Gauss, considered one of the greatest mathematical geniuses of all time.

G. Waldo Dunnington, who taught German at Northwestern State University from 1946 until his retirement in 1969, collected these resources over a thirty year period. Dunnington wrote **Carl Friedrich Gauss, Titan of Science**, the first complete biography on the scientific genius in 1955. Dunnington also wrote an **Encyclopedia Britannica** article on Gauss. He bequeathed his entire collection to the Cammie Henry Research Center at Northwestern.

Titan of Science has recently been republished with additional material by Jeremy Gray and is available at the Mathematical Society of America

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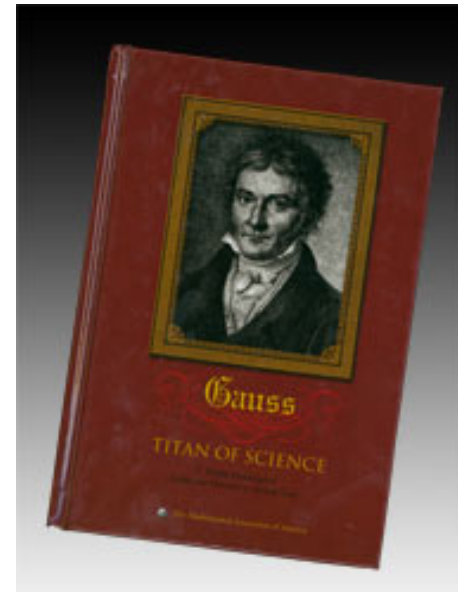
Gauss was appointed director of the University of Göttingen observatory and Professor. Among his other scientific triumphs, Gauss devised a method for the complete determination of the elements of a planet's orbit from three observations.

Gauss and Physicist Wilhelm Weber collaborated in 1833 to produce the electro-magnetic telegraph. They devised an alphabet and could transmit accurate messages of up to eight words a minute. The two men formulated fundamental laws and theories of magnetism.

Gauss and his achievements are commemorated in currency, stamps and monuments across Germany. The Research Center holds many examples of these.

After his death, a study of Gauss' brain revealed the weight to be 1492 grams with a cerebral area equal to 219,588 square centimeters, a size that could account for his genius

Göttingen, the home of Gauss, and site of much of his research.

Links to more material on Gauss:

Dunnington's Encyclopedia Article

Description of Dunnington Collection at the Research Center

Gauss-Society, Göttingen

Gauss, a Biography

Gauß site (German)

References for Gauss

Nelly Cung's compilation of Gauss material

http://www.gausschildren.org This web site gathers together information about the descendants of Carl Friedrich Gauss

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(JOHANN) CARL FRIEDRICH GAUSS (1777-1855)

from Encyclopaedia Britannica

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by G. WALDO DUNNINGTON

German mathematician and scientist, to whom history has accorded a place with Archimedes and Newton as one of the three greatest mathematicians of all time, is frequently called the founder of modern mathematics. The importance of his work in astronomy and physics is scarcely less than that in mathematics. His full stature became known only in the 20th century since many of his discoveries were published long after his death. Dur-ing his lifetime he published 155 titles.

He was born at Brunswick, April 30, 1777, and died at Göttingen, Feb. 23, 1855. Gauss was of Nether-Saxon peasant origin. Many anecdotes refer to his prodigious precocity, particularly in mental computation. As an old man he said facetiously that he could count before he could talk. In elementary school he soon impressed his teacher, who is said to have convinced Gauss's father that the son should not learn a trade, but follow a learned profession. in secondary school, after 1788, he rapidly

distinguished himself in ancient languages and mathematics.

At the age of 14 Gauss was presented to the Duke of Brunswick at court, where he was permitted to exhibit his computing skill. On this occasion he was given several mathematical textbooks. Until his death in 1806 the duke generously supported Gauss. Gauss conceived almost all his fundamental mathematical dis-coveries between the ages of 14 and 17.

In 1791 he gave attention to the arithmetico-geometric mean. Gauss now manifested his outstanding trait of critical analysis and thus began to do creative work. He called this acuteness the rigor antiquus. In 1792, the year that he entered the three-year Collegium Carolinum in Bruns-wick, his interests led him to question the foundations of geometry.

Gauss shunned controversy, and though a pioneer he published nothing on non-Euclidean geometry. In 1793—94 he did intensive research in number theory, especially on the frequency of primes. He made this study his life's passion and is regarded as its modern founder. Gauss obtained a copy of Newton's Principia in 1794 in that year he discovered the method of least squares.

In 1795 he completed important research on quadratic residues. Gauss studied at the University of Göttingen from 1795 to 1798; there he had access to the works of Fermat, Euler, Lagrange and Legendre, the masters in his field. He soon realized that he too was a master and decided to write a book on the theory of numbers. It appeared in 1801 under the title Disquisitiones arithmeticae; this classic work, establishing the theories of cyclotomy and arithmetical forms, usually is held to be Gauss's greatest accom-plishment.

In studying the roots of the equation xp= I, Gauss discovered on March 30, 1796. that the regular heptadecagon (polygon with 17 sides) is inscriptible in a circle, using only compasses and straightedge—the first such discovery in Euclidean construc-tion in over 2,000 years. Gauss had been undecided whether to make mathematics or philology his life work; he now resolved to devote his life to the former.

In late 1796 Gauss was busy with research in infinitesimal calculus and algebra and began an investigation of the lemniscate functions; he found a proof of Lagrange's theorem (reversion formula) and discovered the connection between the elliptic quadrant and the arithmetico-geometric mean, as well as its con-nection with the power series whose exponents are squares. The theories of elliptic functions and of linear differential equations were rediscovered some decades after Gauss had developed them for himself; he discovered double periodicity and operated with the general theta functions.

His interest then turned to astronomy as he developed formulas for the calculation of parallax in April 1799. He went to Helm-stedt in Dec. 1799 to live in the home of the mathematician J. F. Pfaff and to use the university library. That month he found the relation of the arithmetico-geometric mean to the elliptic integral of the first order. He returned to Brunswick at Easter in 1800; in May he developed his formula for determining the date of Easter and promptly published it.


The discovery of Ceres, the first planetoid, by Giuseppe Piazzi in Palermo on Jan. 1, 1801, gave Gauss the opportunity of reveal-ing, in a spectacular way, his remarkable mathematical superiority over all his contemporaries. His calculations of the orbit of Ceres began in Nov. 1801; on this problem he succeeded where others had failed. Gauss set up a speedy method for the complete deter-mination of the elements of a planet's orbit from three observa-tions; he elaborated it in his second major work, a classic in astronomy, published in 1809. He said that had it not been for Newton's

Principia he could not have devised the new method.

Astronomy occupied Gauss's attention the remainder of his life. In 1807 he was appointed director of the University of Göttingen observatory and professor of mathematics, a position he never left in spite of many efforts to lure him away. He trained a considerable number of students who later distinguished themselves and always regarded him as a great teacher. The years 1816-17 marked the close of his work in theoretical astronomy; later he worked in spherical and observational astronomy. In 1812 Gauss published the first rigorous treatment of the hypergeometric series.

He was a pioneer in topology and contributed much to crystallography, optics, biostatistics, mechanics and the study of capillarity and fluids in a state of equilibrium. Gauss was commissioned in 1818 to make a geodetic survey of the kingdom of Hanover; this triangulation occupied him for many years, leading to his invention of the heliotrope and his brilliant work in the theory of surfaces. There he found full application for his method of least squares in solving the problem of determin-ing the earth's figure.

After 1831, Gauss collaborated with Wilhelm Weber in basic research in electricity and magnetism. In 1833 they devised an electromagnetic telegraph. They stimulated others in many lands to make magnetic observations and founded the Magnetic union in 1836, the year that Gauss invented the bifilar magnetometer.
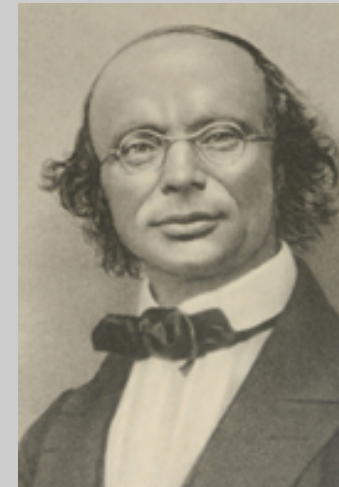
Wilhelm Weber

Gauss married twice and became the father of six children; two of his sons emigrated to Missouri in the 183os. His private life was simple and harmonious although he had his share of grief and trouble. He did not like to travel. Gauss left an estate of 152,892

thalers. His personal and scientific correspondence was voluminous.

As a celebrity, he had numerous visitors from abroad. Newton was his ideal. Frequently he meditated on religion and philosophy but was reluctant to talk on these subjects and pub-lished nothing on them. His Collected Works were published over a long period, from 1863 to 1933; they exhibit the elegant and concise form on which he insisted.

He was well versed in the Greek and Roman classics, studied Sanskrit and read extensively in European literature, particularly English and Russian. His li-brary contained 11,424 items. In later years he was showered with honours from scientific bodies and governments everywhere. He was extremely patriotic and politically conservative, though never active beyond watching current events. He served several terms as a dean at the University of Göttingen and always partici-pated wholeheartedly in its affairs.

Gauss enjoyed social life but usually limited this in favour of his research. He loved music, especially singing. His unusually strong character prevented others from trifling with him. Gauss enjoyed good health until the last year of his life. Death came as the result of arteriosclerotic congestive heart failure. His fame lives even more strongly than ever, for rarely has the mind of a commanding world figure been so richly furnished.

Bibliography.—Heinrich Mack, C. F. Gauss und die Seinen (1927); G. Waldo Dunnington, Carl Friedrich Gauss: Titan of Science (1955) W. Grossmann et al., Gauss und die Landesvermessung in Niedersachsen (1955) E. Worbs, Carl Friedrich, Gauss: ein Lebensbild (1955) W. Klingenberg, H. Salié et al., Gaussgedenkband (1957). (G. W. DN.)

This partially describes the materials held in the G. Waldo Dunnington Collection at the Cammie G. Henry Research Center. The collection is currently being processed, and we will add detail as it becomes available. In the meantime, if you have questions, contact the Archivist, Mary Linn Wernet

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The G. Waldo Dunnington Collection contains correspondence, photographs, clippings, pamphlets, publications, oversized materials and three-dimensional items. The bulk of this material deals with Dunnington's lifelong research into Carl Friedrich Gauss. There are also items that document the personal life, professional life and ancestry of Dunnington himself.

 Items related to Gauss include a substantial amount of correspondence between Dunnington and Gauss' relatives in both Germany and America during the 1940's to 1960's. Of particular interest are several original letters from Gauss, most of which are written to his second wife. Many of these letters have been translated into English. Also present are photographs, sketches and lithographs of Gauss and other contemporary German scientists, scholars and writers. The bulk of the pamphlets and publications present, many of which are authored by Dunnington, deal with similar subjects. Many drafts of Dunnington's most extensive work on Gauss, his biography of Gauss, are also included. Other publications in the collection concern math and science research, literature studies and German culture and history. Clippings and other news items on Dunnington's Gauss research can also be found. Oversized and three-dimensional items include a plaster bust and framed portrait of Gauss, various prints relating to German history and culture and two mathematical models owned by

Dunnington.

Materials on Dunnington's personal life include correspondence, printed material and photographs concerning genealogy research, education career, religion and the town of Bowling Green, Missouri, his birthplace. Offering a glimpse into Dunnington's professional life are materials in similar format relating to his military and teaching career, as well as his work as a translator in the Nuremberg War Trials. Of particular interest among these items is a certified copy of Adolph Hitler's will, which was acquired by Dunnington during his work at the war trials.

The Collection:

Letters (originals, transcriptions, and photo reproductions in German and English) from Carl Fredrick Gauss, family members, and close associates (1794-1916)

Typescript and notes on the Gauss book by C. Waldo Dunnington (ca. 1950s)

Research correspondence between G. Waldo Dunnington and the Gauss family (1940s-1960s);

Pamphlets pertaining to Germany, Mathematics, and Gauss (1940s-1960s);

Articles by Dunnington concerning Gauss and his work (1940s-1960s);

2 plaster busts of Gauss;

1 framed portrait of Gauss;

1 framed print of Gauss;

1 framed portrait of Dunnington.

Some details of the above:

Notes about Gauss

Two letters from Helen dated 1 August 1911

List and unsigned letter

Fragmentary recent writings, manuscript

Four page typed translation and 1 label

One page typed translation of an 1802 item

Two page transcription of a letter from Chantel to Pernety, 27 Nov 1806

1807 C.F. Gauss letter Letter (signed)

1807 Perthes letter

Three ms transcriptions of letters Reinhart to Gauss, n.d.

Photostat C.F. Gauss letter, transcription, translation,

Transcription & translation of 1811 C.F. Gauss letter

Transcription & translation of 1815 C.F. Gauss letter

Four C.F. Gauss 1816 transcriptions & translations

Translation of an 1818 C.F. Gauss letter to Minna

Transcription & translation of an 1821 C.F. Gauss letter Date

Transcription of an 1822 Edward Everett letter

Transcription of an 1823 C.F. Gauss letter

Typed transcription of an 1824 C.F. Gauss letter

Transcription of an 1825 Gauss letter to Pfaff

Transcriptions & two translations, misc. letters

Transcription of an 1833 C.F. Gauss letter

Transcription of an 1835 Eugene Gauss letter

Transcription of a C.W. Gauss letter dated 24 March 1835

Transcription, translation 1836, 1837 letters Richard Parish to Winfield Scott

Typed transcription of 1840 C.F. Gauss letter

Transcription of 1841 letter of Chas. W. Gauss

Transcription of an 1842 letter from C. F. Gauss

Transcription of 1842 letter Gauss to Fries & note

Photostat, translation, 1844 letter of C.F. Gauss

Transcription & translation 1845 letter Theresa Gauss to Eugene Gauss

Transcription & translation 1846 letter C.F. Gauss to son Eugene

Transcription & translation 1850 Theresa Gauss to Eugene Gauss

Transcription & translation 1851 letter of C.F. Gauss

Transcription of 1852 letter M. Moarevieff to C.F. Gauss

Transcription, 1852 letter from C.F. Gauss

Letter (signed) C.F. Gauss 7 April 1853

Photostat, transcriptions, translations, Asa Grey & Gould letters

Translation 1856 letter from J. Liouville

Transcription, C.W. Gauss letter, 18 Oct. 1859

Transcription, 1892 letter from Ernst Schering to Herr Gauss

1901 typed letter Robert Gauss to Win. T. Gauss

Letter (signed) R. Gauss 1912 & other correspondence. with Florian Cajori.

1912 Robert Gauss to Felix Klein letter carbon copy

Listings on cards

Seems to be an original 1794 mathematical item

A list

Letter (signed) n.d. C.F. Gauss to Frau Waldeck & translation

Letter (signed) c. 1810 C.F. Gauss to Minna & translation

Letter (signed) from C.F. Gauss to Minna 1816 & translation

Letter (signed) .C.F. Gauss to Minna & typed translation 1815

Letter (signed) C.F. Gauss to Minna & typed translation 1811

Letter (signed) C.F. Gauss to Minna & typed translation 1816

Letter (signed) C.F. Gauss to Minna & typed translation 1816

Letter (signed) C.F. Gauss to Minna & typed translation 1818

Letter (signed) C.F. Gauss to Minna & typed translation & commentary 1816

Letter (signed) Theresa Gauss to Eugene (2 letters) & translation 1855

Letter (signed) C.W. Gauss 1835

Letter (signed) Charles Wm. Gauss 1841

Letter (signed) C.W. Gauss 1859

Handwritten booklet 1831

List covering years 1815—1846

2 lists covering years 1808—1822

Handwritten list covering years 1812—1854

Dunnington's correspondence with various colleges

1902 correspondence

1903 correspondence

Handwritten copy of 1856 obituary of C.F. Gauss

Bibliography and other material written in German

Catalog of Gauss library, manuscript book