

# SCIENCE

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FRIDAY, MAY 19, 1899.

CARL FRIEDRICH GAUSS AND HIS CHILDREN.

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MSS. intended for publication and books, etc., intended for review should be sent to the responsible editor, Professor J. McKeen Cattell, Garrison-on-Hudson N. Y.

THE life of Carl Friedrich Gauss has been sketched repeatedly, yet, in view of the interest attached to every bit of new information concerning men of genius, we venture to touch upon a few events of his later life and to speak of his descendants.

The 16th of July, 1899, will be the 100th anniversary of Gauss's graduation with the degree of Doctor of Philosophy. The 50th anniversary was a day of celebration at Göttingen. Gauss was still in full possession of his powers and was greatly admired and beloved. His daughter Theresa describes the memorable day in a letter, dated December 5, 1850, and written to her brother Eugene in St. Charles, Mo. In translation the passage is as follows:

"I cannot tell you much of our quiet life; one day and one year is always very much like every other. But they are contented days and years, as father even now in his advanced age still possesses unimpaired health and an always cheerful disposition. A year and a half ago, in July, '49, he celebrated his '50-jähriges Doctorjubiläum'—or rather the University and the city celebrated it for him with general love and sympathy. He himself was very much opposed to having this day noticed, but, without his knowledge, everything had been prepared for it. From near and far the University had invited strangers; father's friends and eminent scholars came, many delegations from other cities, who brought him congratulations, honorary doctor's diplomas and three new orders. From Braunschweig and Göttingen he received honorary citizenship; from the King, con-

gratulations in his own handwriting and a higher order (erhöhten Ordensgrad). There was no end of letters and communications. In the morning festive processions began to congratulate him, all the authorities of the city, of the University, of the school, strangers, acquaintances—probably about fifty persons. Then father himself delivered a lecture in the hall of the University, which was overcrowded with spectators and listeners and had been decorated with garlands and flowers like a fairy hall. Even the houses in the streets were decorated with flowers; in the city there were waves of people in festive attire (wogte es von geputzten Menschen), as on a holiday. When, at last, in the evening at seven, father came home from the great banquet, he was, indeed, quite exhausted, and it was well that the torchlight procession that the students had intended for him was abandoned upon his wish, but the love and sympathy which had been shown him from all sides had, in spite of all fatigue, pleased him indescribably. How sad was it though that, where so many strangers had congregated on his day of honor, not one of his beloved sons could be with him!! Even Joseph had been compelled to decline, as his position as railway director did not, at that time, make his absence from Hannover possible."

Gauss was married twice. By his first wife he had two sons (Joseph and Louis) and one daughter (Minna). Louis died in childhood. By his second wife he had two sons (Eugene and Wilhelm) and one daughter (Theresa). Eugene and Wilhelm settled in the United States. In Germany Gauss has only one grandchild, Carl Gauss, now living at Hameln, in Hannover. He is a son of Joseph. He was only six years old when his grandfather died, in 1855. He still remembers how his celebrated grandfather tried to show him a star through the great telescope; how he stood full of expectation near the ocular, while his grandfather, wearing a velvet cap, was turning the crank which moved the shutter on the dome of the observatory. Another time the child was playing in the garden of the observatory when his grandfather met him and asked: "What do you expect to make of yourself?" whereupon young Carl replied: "Well, what do you expect to make of yourself?" Then the old man patted the

child's shoulder and said smilingly: "My boy, I am already somebody."

In a letter addressed to the writer, Carl Gauss speaks also of his father, Joseph, who, after completing the gymnasium in Göttingen, went into the German army, but subsequently got leave to assist his father in the triangulation of the Kingdom of Hannover. When the construction of railways was first begun in that part of Germany officers of the army were selected, along with some foreign experts, to superintend the work. So it happened that Joseph Gauss left the army and served as an engineer. In 1836 and '37 he was sent by his government to the United States to study the more advanced methods of railway construction in the New World. Later he became 'Oberbaurath' and director of railroads and telegraphs in Hannover. Finally he was assigned to the superintendence of the special department of telegraphs, which position he kept until the outbreak of the war of 1866. It is of interest to think of him in connection with the telegraph—the instrument in the invention of which his father had played so important a rôle. It is well known that as early as 1833 C. F. Gauss and W. Weber had a telegraphic line between the observatory and the physical cabinet in Göttingen.

Some biographers assert that Gauss's favorite child was Joseph, but there is reason to believe that the father at first built high hopes on what Eugene would do. In a letter to Bessel (November 21, 1811), after writing about hypergeometric and logarithmic series, he says: "Wenn eines meiner Kinder des Vaters Liebe zu den exacten Wissenschaften erben sollte, so ist es wahrscheinlich eher dieser Eugen als sein leichtblütiger Bruder Joseph." As the infant reached boyhood he displayed far more than ordinary ability, especially in languages. His father once took a French

book, examined him in the knowledge of French, and then said that he knew that language well enough and need not study it any further. Another time Gauss took the boy from Göttingen to a little town called Celle, to place him at a school. While stopping at an inn Eugene stated to his father his delight in having solved some little problem in grammar. His father, with eyes brightened with pleasure, replied: "Yes my son, the pleasure one gets from the solution of such problems is very great, but it is not to be compared with the similar pleasure one derives from the solution of mathematical problems."

But the high hopes were followed by bitter disappointment. In a letter to Bessel (Dec. 31, 1831) Gauss says of himself: "Aber Ihr armer Freund ist seit andert-halb Jahren das Opfer der schwersten häus-lichen Leiden gewesen: den Ausgang des einen ahnen Sie leicht aus der seit vier Monaten gebrauchten Farbe des Siegels; von einem andern, wo möglich noch härtern sehe ich kaum ein Ende ab als meines. Lassen Sie mich davonschweigen. Lähmend haben solche Verhältnisse auf alle meine wissenschaftlichen Beschäftigungen, fast ganz aufhebend auf meine Correspondenz eingewirkt." The first sorrow alluded to was clearly the death of his second wife; the cause of the second sorrow he leaves unexplained, but the facts which we have been able to gather concerning the relation between him and his son Eugene throw light on this point. At this time, when Eugene reached adolescence, it seems that Gauss did not want him or his brothers to attempt mathematics, for the father did not think any of them would surpass him, and he did not wish the name lowered. Apparently he felt the same way about any other line of scientific work, for, while Eugene, after completing the gymnasium, desired to make the study of philology his life-work, the father wanted him to take up

law. At this time Eugene was disposed to indulge in the wild life of a Göttingen student. A scar on his face bore witness of his participation in a duel. What that life was we may judge also from the accounts of Bismarck's stormy career at Göttingen, which began about a year after Eugene left the University. An incident happened which resulted in a serious disagreement between father and son. Eugene gave an elaborate supper to his fellow-students and sent the bill to his father. When the latter reproached his son for this, Eugene suddenly concluded that he would leave Germany and come to America. He started off without bidding the family good-bye or making any preparation for his journey. When Gauss learned of his son's intention he followed and urged him to return, at the same time telling him that he had brought his trunk and if he was determined to seek his fortune in America he would furnish funds for the journey. The son refused to return home, and the two parted. The young man of nineteen left the land of learning and culture, to expose himself to the dangers and temptations of a new world. Need we marvel if, in sorrow and humiliation, Gauss wrote to Bessel: 'Lassen Sie mich davon schweigen.'

Eugene landed in New York and, after spending what money he had, enlisted as a private in the U. S. army. He was taken to Fort Snelling, near St. Paul, Minn. The post was in charge of General Taylor, and Jefferson Davis was a young officer there. By accident the officers found out that Eugene Gauss was an educated man, and he was put in charge of the post library. About the close of his term of enlistment (five years) his brother Joseph came to this country, as we have seen, to study rail-way construction. Joseph brought letters to General Winfield Scott and thought he could obtain for Eugene a commission in the regular army, if he desired it. But

Eugene had other plans; he entered the employ of the American Fur Company, on the head waters of the Mississippi and Missouri Rivers. There he learned to speak the Sioux language with ease, and assisted a missionary named Pond in preparing a Sioux alphabet. While there Eugene wrote to his father that he had met the French astronomer Nicollet. The latter was attracted to young Gauss by hearing someone pronounce his name and, upon inquiry, discovered that he was the son of the mathematician. Nicollet formed a plan to conduct an expedition across the continent to the Pacific, where he expected to take ship and go by water to Europe. Eugene was to go with him, but the enterprise was defeated by Nicollet's death. In the first letter printed below, Gauss refers to Nicollet and attributes to him a sensational article on moon hoax, which appeared in 1835 in the *New York Sun*. It purported to be written by Richard Adams Locke, but De Morgan, in his 'Budget of Paradoxes,' holds, as does Gauss, that its real author was J. N. Nicollet.

About 1840 Eugene settled at St. Charles, Mo., where he resided until about 1885, when he removed to a farm in Boone County, Mo., near Columbia. He died in 1896. In St. Charles Eugene engaged in mercantile pursuits. In 1844 he married Henrietta Fawcett, who is still living, being now in her 82d year. They had seven children, two of whom have died. Of interest is the following letter written by the mathematician Gauss, to his son, just before the latter's marriage:

"MEIN LIEBER SOHN:

Die in Deinen beiden Briefen an mich und Theresen enthaltene Anzeige von Deiner beschlossenen und nahe bevorstehenden Verheirathung habe ich in mehreren Beziehungen mit Vergnügen aufgenommen. Bei der Unmöglichkeit, über Verhältnisse und Personen aus eigener Kenntniss ein Urtheil zu bilden, überlasse ich mich gerne dem Vertrauen, dass Dein Alter und Deine Erfahrungen, Dich vor solchen Täuschungen, in

welche wohl unbesonnene und unerfahrene Jünglinge verfallen, bewahren. Ich wünsche und hoffe daher herzlich, dass alle die schönen Tugenden, welche Du von Deiner künftigen Lebensgefährtin rühmst, und die den Mangel äusserer Glücksgüter für einen verständigen und auf eigenen Füßen feststehend sich fühlenden Mann wohl aufwiegen, sich stets als ächt bewähren werden, zugleich aber auch, dass Du Dich des Besitzes eines solchen Schatzes immer würdig beweisen werdest, und dass so die Verbindung zu Euer beider wahrem Glück gereiche.

Auch Deine beiden Brüder haben sich Lebensgefährtinnen ohne Vermögen gewählt. Dass Du darüber, auch mit so vieler Leichtmüthigkeit hinwegsetzest ist mir auch in sofern angenehm, als ich darin eine Bestätigung von dem voraussetze, was Herr Eggers vor einigen Monaten hier äusserte, nemlich, dass Deine Umstände und Handelsgeschäfte in einem prosperirenden Zustande sind. Hrn. Eggers Besuch war übrigens so kurz, dass ich über so vieles was ich gerne näher wüsste, nur sehr unvollkommene oder gar keine Kenntniss erhalten habe. So weiss ich namentlich von Deinem Geschäfte bloss im Allgemeinen, dass es ein Kaufmännisches sei, und dass Du mit einem Compagnon associirt seiest; näheres aber z. B. welcher Art jene Geschäfte, ob der Compagnon ein Deutscher oder ein Amerikaner sei &c. habe ich nicht erfahren.

In einem Deiner früheren Briefe erwähntest Du einmal eines jungen Franzosen Namens Nicollet, mit dem Du in Bekanntschaft gekommen seiest. Derselbe war vor Zeiten Gehülfe an der Pariser Sternwarte und hat einige nicht verdienstlose Arbeiten geliefert. Aus welchem Grunde er Frankreich hat verlassen müssen, habe ich nicht erfahren.\* Später (etwa vor 7 oder 8 Jahren) hat er (ich weiss nicht mehr ob anonym oder mit Nennung des Namens) in einer Amerikanischen Zeitung oder Journal einen posse-reisenden Artikel über angebliche wahrhaft unsinnige Entdeckungen, die Herschel auf dem Vorgebirge der guten Hoffnung gemacht haben sollte, geliefert. Dieser Artikel wurde sogar seiner Zeit ins Deutsche übersetzt, und gab einen merkwürdigen Beweis, wie sehr plump eine Mystification sein kann, ohne die Kraft zu verlieren, viele Leute zu Narren zu haben. Dieser Nicollet nun soll vor Kurzem in Amerika gestorben sein. Ich möchte wohl wünschen, über seinen dortigen Lebenslauf etwas mehr zu erfahren. Auch ein anderer Astronom, aus der Schweiz gebürtig, aber seit fast 50

\* Laplace once recommended Nicollet for membership in the French Academy, but he failed of election because of Arago's opposition. "A short time afterwards M. Nicollet had run away to America, and the Bureau of Longitude had a warrant passed to expel him ignominiously from its bosom."—From *Arago's Autobiography*.

Jahren, in Amerika einheimisch geworden, mit dem ich wohl von Zeit zu Zeit einige Korrespondenz gepflogen habe, nemlich Rudolf Hassler, Chef der Amerikanischen Messungen, ist, wie ich aus öffentlichen Nachrichten erfahre, vor kurzem gestorben.

Unter den herzlichsten Wünschen für das dauernde Glück Eurer Verbindung

Dein treuer Vater

C. F. GAUSS.

GÖTTINGEN, 15 Februar, 1848.

P. S. Briefe über Liverpool gehen weder sicherer noch schneller als über Havre, kosten aber hier jedesmal ein enormes Porto, etwa 3 mal so viel wie über Havre. Schicke daher künftig keine Briefe über England sondern immer via Havre.

The correspondence between Gauss and Hassler, the organizer and first superintendent of the U. S. Coast Survey, would be of interest, no doubt, but none of the letters are in possession either of the U. S. Coast Survey or of Mrs. Simon Newcomb, who is a grandchild of Hassler.

The original of Gauss's letter, given above, is now in the Lick Observatory. The present writer has a photograph of it. A strange thing in connection with it is the fact that Gauss, who possessed such wonderful power over numbers as to create a new Theory of Numbers, should make a mistake in so simple a matter as a date. The number '1848' should be '1844.' This is evident from the postmark on the back of the letter as well as from Theresa's letters and from the record of the marriage of Eugene, contained in the office of the Recorder of St. Charles County, where the marriage took place.

Another letter from Gauss to Eugene is now in the possession of a grandchild, Charles Henry Gauss, of Columbia, Mo. It is as follows:

LIEBER EUGEN:

Ich kann nicht unterlassen, Deinen vom 16 Mai datirten und am 30 Junius hier eingegangenen Brief wenigstens mit einigen Zeilen zu erwiedern, obwohl ich aus zwei Ursachen zur Kürze gezwungen werde, nemlich, erstlich, weil Therese wegen Absendung des Pakets pressirt ist, und zweitens, weil ich ziemlich unwohl bin, und den grössern Theil des Tages auf

dem Sofa liegend zubringen muss. Grossentheils mag dies die Folge der unerträglichen Hitze sein, bei der ich immer sehr leide, und die in diesem Sommer grösser ist, als ich je in meinem ganzen Leben erduldet zu haben mich erinnere. Nach den öffentlichen Blättern scheint diese Hitze in Europa ganz allgemein zu sein.

Dass ich nun auch von Deiner Seite in der Neuen Welt einen Enkel habe, ist mir sehr erfreulich; in der Alten Welt wird mein Name wohl aussterben, da Josephs Ehe schon ins siebente Jahr kinderlos geblieben ist. Aller Wahrscheinlichkeit wird Joseph nun mit Nächstem in eine veränderte Lage kommen, ihm selbst mehr zusagend, als eine Lieutenantsstelle in Friedenszeit, und mir selbst auch aus dem Grunde lieb, weil er räumlich mir näher kommt. Er ist nemlich bestimmt, mit in unser Eisenbahn-Directorium einzutreten, wobei er seinen Abschied aus dem Militär und sein gewöhnliches Domicilium in Hannover wird nehmen müssen, obwohl er dabei während eines grossen Theils des Jahres auf Reisen zuzubringen haben wird. Er ist in diesem Augenblick in Stade, um seine Frau nach Hannover abzuholen.

Dass Deine Geschäfte gut prosperiren freut mich sehr, aber in einem neulich von Deiner Grossmutter erhaltenen Briefe ist eine etwas unverständliche Andeutung, als ob Du gewillet seiest, jene aufzugeben auf das Land zu ziehen, und von da aus bloss Grosshandel zu treiben. Da in Deinem Briefe an mich darüber gar Nichts vorkommt, so vermute ich, dass jene Äusserung wenigstens zum Theil auf einem Misverständnisse beruhet. Übrigens haben wir vor Kurzem ein tangibles Zeichen Deiner Geschäftsthätigkeit erhalten, da Herr Westhof uns ein Fässchen Mehl aus der Mühle Gauss & Weidner geschickt hat, welches Therese sehr lobt, als besser, wie alles hiesige.

Zufällig hatten wir gleichzeitig einen Topf Butter aus dem Altenlande von Josephs Frau erhalten, und es fehlten also zu einer Omelette abseiten meiner Kinder aus fremden Landen nur noch die Eier aus Wilhelms Hühnerställe.

Ueber das Daguerrebild, welches Deine liebe Frau Theresen geschickt hat, haben wir uns sehr gefreut; die Arbeit ist feiner, als ich sie an einem in Europa gemachten Daguerrebilde sonst gesehen habe. Therese erwiedert es mit ihrem Daguerrebild, welches in zwei Exemplaren, eines für Dich, eines für Wilhelm Herr Angetrodt mitbringt. Ausserdem und zu gleicher Distribution bringt er zwei Lithographien von meinem Portrait mit; sie sind im vorigen Winter von einem Oelgemälde abgenommen, welches vor 6-Jahren hier gemacht ist. (Das Original dieses Oelgemäldes von einem Kopenhagner Künstler kam nac

Petersburg, und eine Copie für Herrn Sartorius blieb hier, wonach jene Lithographie gemacht ist. Man fand das Gemälde damahls sehr ähnlich ; jetzt werde ich ihm wohl unähnlich geworden sein.

Auch für die Karte von Missouri und Arkansas, welche mit jenem Bilde zugleich ankam, habe ich Dir noch zu danken.

Dass Ewald noch im vorigen Jahre sich wieder verheirathet hat, wird Dir wahrscheinlich die Grossmutter geschrieben haben. Mit herzlichen Wünschen für Dein Wohlergehen

Dein treuer Vater,  
C. F. GAUSS.  
GÖTTINGEN,  
den 9ten August, 1846.

An account of Gauss's children is interesting from the standpoint of heredity. None inherited Gauss's mathematical power. Eugene resembled his father mentally more than the others. Like his father, he possessed great linguistic powers. Before his death he expressed it as his opinion—and from all I can gather it is probable—that had he continued his philological studies in Germany he would have secured a chair in a University. He spoke French so well that he was taken for a Frenchman. The English and the Sioux language he spoke to perfection. He read the New Testament in the original. At the age of forty he had become deeply interested in religion, and thereafter he gave much attention to Biblical and theological reading. His deep religious convictions were shown by his expression of satisfaction with his coming to America, because if he had not done so he might never have been led to profess the religion of Christ.

Eugene was not the person to push himself to the front. He lived over ten years near the seat of the University of Missouri, without seeking the acquaintance of any member of the Faculty. Milton Updegraff, the professor of astronomy, accidentally heard of him through one of his students and visited him (about 1890). He told Professor Updegraff that his father first thought of the heliotrope while walking with him and noticing the light of the

setting sun reflected from a window of a distant house.\* Eugene possessed mathematical ability, but he never studied the higher branches. When he was over eighty years old and had become blind, he used to entertain himself by making long arithmetical calculations in his head. For instance, he computed the amount to which one dollar would grow, if compounded annually at the rate of 4% interest from the time of Adam to the present, assuming this to be 6,000 years. This, if in gold, would make a cubic mass so large that it would require light quadrillions of years to pass along one side of it.† This mental computation is so startling as to be almost beyond belief. The only assistance he had was from his son Theodore (now deceased), who was asked to write down, at intervals during the several days he was so occupied, the results that marked the different stages of his work. Eugene arrived at his result by ordinary arithmetic. His son preserved the paper on which were written the long lines of figures which he thought he might not be able to retain in his memory. On the sheet are several memoranda that are interesting. For instance, Eugene directed his son to write down the figures :

123456789057182178039	
3680824926969613857	
123456789060863002965969613857	
X	

The second line of figures was written down several days after the first and added to the upper one by Theodore. His father had directed him to begin the second line of figures by placing the figure 3 under the second 7 of the upper line. In reading off the result of this addition Theodore read 7 in place of the 8 marked with an X. Eugene detected the error and his son made the

\* See also Bessel's letter to Gauss, Oct. 18, 1821.

† The answer exceeds *five quadrillions* of years, French numeration.

correction, showing that the blind and aged man was able to retain in his mind the long line of thirty figures. This wonderful computation, if it does not demonstrate great mathematical ability, certainly shows an extraordinary memory. We involuntarily ask: What might Eugene not have achieved, had his experiences in life been such as to draw out his faculties to the fullest extent?

Eugene's younger brother Wilhelm came to this country in 1837, immediately after his marriage to a niece on the mother's side to the astronomer Bessel. Wilhelm wished to make farming his vocation and he believed the opportunities were better in the United States than in Germany. For twenty years he was almost continually engaged in farming in Missouri; then he entered the wholesale shoe business in St. Louis, in which he continued until his death, in 1879. Of his eight children six are now living; some are in business; two are Presbyterian clergymen.

Near the beginning of this article we quoted from a letter, written by Theresa to her brother Eugene. I have seen another of her letters (dated May 16, 1855), in which she gives an account of the last illness of her illustrious father. From the long letter we translate the following:

"The last year of suffering—full of sickness demanding constant attendance—has bound me still more closely to him. During the last weeks there was hardly a moment, day or night, when he permitted me to be away from him, and he expressed the desire that we might not be separated even by death, for only a few days before he died he said to me: 'The best and greatest that God could grant us would be this one favor, that we two on the same day might die together.' \* \* \*

"My last letter to you, dated, I believe, April 30, '53, is two years old, and if at that time I wrote that father's health was no longer quite robust, it nevertheless did not cause any unusual anxiety. But in the course of the summer following he began to complain to such an extent as to cause alarm. Part of the time he suffered much, and, his strength failing rapidly, I, full of apprehension, besought him in vain

to call in a physician. Not till January, 1854, as the disease in a few weeks had made rapid progress, did he consent. The physician, who has since with unremitting love, care and sympathy attended him, lessened his suffering where cure was impossible, and doubtless somewhat prolonged his life, declared to me positively, after the first visit, that his condition was dangerous and hopeless. He recognized the disease at once as a heart trouble, which probably had been coming on for years, in course of which there had been an accumulation of water about the heart, which in a few weeks also extended to other parts of the body. At that time the disease advanced rapidly and left little hope, but under the careful treatment of our loving physician, Dr. Baum, some improvement followed like a miracle. Some symptoms of the disease disappeared entirely, and father was able to go out for short distances, though only slowly and with immediate exhaustion. \* \* \* But suddenly in November the old trouble returned in more decisive form, increased from day to day, and at the beginning of the present year the physician said to me the life of our beloved one would be of only short duration. The last weeks of suffering were terrible, as the disease of dropsy in general is terrible, because it visibly approaches death inch by inch. But father has borne all his suffering to the end with unvarying, touching serenity, friendliness and patience. Entirely hopeless he never was; he always believed in the possibility of recovery so long as one spoke encouragingly to him. Ah! how difficult this has often been, when I, hopeless, knew the nearness of death! He never lost complete consciousness. Four hours before his death he still knew me, when, for the last time, he took a drink from my hand, drew my hand toward him and, kissing it, looked lovingly at me. He then closed his eyes and seemed to sleep, but I believe he did not sleep, but that his spirit, clear and conscious as ever, had freed itself from its earthly shell and had gone to its heavenly home."

We close with a letter written to Eugene Gauss by Professor Ernst Schering, C. F. Gauss's successor at the observatory in Göttingen, who himself has since joined the ranks of the departed:

STERNWARTE, GÖTTINGEN, 1892, Nov. 21.  
SEHR GEEHRTER HERR GAUSS:

Wie Sie aus beifolgendem Correcturbogen ersehen werden, sind wir hier in Göttingen im Begriffe ein Denkmal für Ihren berühmten Vater zu errichten. In der Meinung, dass Sie wünschen werden, Ihren Namen in der Aufforderung der Mathematiker, As-

tronomer und Physiker gedruckt zu sehen, habe ich, als Nachfolger Ihres Vaters, jetzt in seiner Dienstwohnung befindlich, und als Herausgeber seiner grossen Werke, mir erlaubt Ihren Namen mit in die Liste einsetzen zu lassen. Es war nicht mehr Zeit Sie um Ihre Erlaubnis dazu zu fragen, aber es kann bei mir kein Zweifel sein über Ihre Genehmigung. Gerne werde ich mir erlauben, Ihnen weiteren Bericht über die Denkmalsfrage abzustatten, so bald etwas definitives feststeht.

Der Prinz Albrecht von Preussen, Prinz Regent vom Herzogthum Braunschweig, Rector Magnificientissimus von der Universität Göttingen, hat sich bereit finden lassen, das Protectorat der Commission für das Denkmal zu übernehmen. Er hat befohlen, dass aus Landesmitteln des Herzogthums Braunschweig 3000 Mk. für das Denkmal gegeben werden. Das ist ja ein sehr guter Anfang. In den Zeitungen habe ich die Notiz gelesen :

Gauss, E. F. L. erster Assistent von Frederik H. Hild dem Librarian of the Chicago Public Library. Gehört dieser Gauss auch zu der berühmten Familie?\*

Da das Deutsche Reich sich auch amtlich an der grossen Ausstellung in Chicago theilnimmt, so wird wahrscheinlich das Post- und Telegraphen-Museum in Berlin unter dem Reichssekretair von Stephan auch die Hauptstücke seiner geschichtlichen Sammlung dorthin senden. Darunter findet sich ein Gemälde von dem grossen Gauss und eine Reproduktion seines ersten Telegraphen. Jenes Gemälde ist Gauss sehr ähnlich, aber noch schöner finde ich das Gemälde, welches sich hier in seinem Erdmagnetischen Observatorium unter meinem Gewahrsam befindet. Es ist von der Preussischen Regierung zum 150 jährigen Jubiläum der Universität Göttingen 1887 dem Institute geschenkt worden. Ueberhaupt war dieses Jubiläum ein grossartiges Fest zur Verherrlichung von Gauss. Keine der vielen Tischreden, keine Festrede, keine Predigt wurde gehalten, ohne dass sein Name genannt und seine Erfindung des Electricischen Telegraphen erwähnt worden wäre. Seit jener Zeit befindet sich auch seine Marmortafel an der Sternwarte, Abtheilung des Erdmagnetischen Observatorium, mit der Aufschrift

Erster electricischer Telegraph  
GAUSS—WEBER  
Ostern, 1833

\* Mr. Robert Gauss, a son of Eugene Gauss and now managing editor of the *Denver Republican*, informs me that the E. F. L. Gauss in question is not a descendant of Gauss the mathematician. Schering's letter is in the possession of Robert Gauss, through whose kindness the writer was permitted to make a copy of it.

Mit den ergebensten Empfehlungen zeichne ich mich Ihr  
ERNST SCHERING,  
Herausgeber der Gauss'schen Werke. Gemeinrath u. Professor.

FLORIAN CAJORI.  
COLORADO COLLEGE, COLORADO SPRINGS.

## THE AGE OF THE EARTH AS AN ABODE FITTED FOR LIFE.

### II.

#### PROBABLE ORIGIN OF GRANITE.

§ 26. UPON the suppositions we have hitherto made we have, at the stage now reached, all round the earth at the same time a red-hot or white-hot surface of solid granules or crystals with interstices filled by the mother liquor still liquid, but ready to freeze with the slightest cooling. The thermal conductivity of this heterogeneous mass, even before the freezing of the liquid part, is probably nearly the same as that of ordinary solid granite or basalt at a red heat, which is almost certainly\* somewhat less than the thermal conductivity of igneous rocks at ordinary temperatures. If you wish to see for yourselves how quickly it would cool when wholly solidified take a large macadamizing stone, and heat it red hot in an ordinary coal fire. Take it out with a pair of tongs and leave it on the hearth, or on a stone slab at a distance from the fire, and you will see that in a minute or two, or perhaps in less than a minute, it cools to below red heat.

§ 27. Half an hour† after solidification reached up to the surface in any part of the earth, the mother liquor among the granules must have frozen to a depth of several centimeters below the surface and must have cemented together the granules and crystals, and so formed a crust of primeval granite, comparatively cool at its upper surface, and red hot to white hot, but still

\* Proc. R. S., May 30, 1895.

† Witness the rapid cooling of lava running red hot or white hot from a volcano, and after a few days or weeks presenting a black, hard crust strong enough and cool enough to be walked over with impunity.