Empiricism as Anti-Creativity

by Peter Martinson

Carl Friedrich Gauss's explosion onto the stage of history in 1801 shocked the world. His emergence causes one to ask the old question, *where do geniuses come from?* Can genius be taught, or must they be born that way? Since the mission of the LaRouche Youth Movement is to create a society which will produce an increasing density of geniuses, these are important questions. Part of the challenge with Gauss, though, is that he wouldn't release a scientific work unless it was scrubbed free of evidence of how he made the breakthrough. But, we have two keys with which to unlock the mind of Gauss: Abraham Kästner (1719-1800) and Johannes Kepler (1571-1630).

What follows is a look at the scientific environment at the time Gauss made his famous determination of the orbit of the asteroid Ceres. Of course, that means we'll have to take an excursion into the murky underworld of the British Royal Society, and how they created their golem, Sir Isaac Newton. We will also have to look at what happened to the works of Kepler, and how Europe responded to his launching of modern experimental astrophysics. Europeans during Gauss's time were living in a world dominated by the British East India Company. While this empire tried to exert its dominance over Europe, especially after 1763, the American conspiracy to create a republic had cast its challenge, with a revolution inspired by the great statesman and scientist Gottfried Wilhelm Leibniz (1646-1716). The optimism unleashed by this worldwide, was crushed in Europe when the French Revolution, run by the British top-down, turned into a nightmare.[1]

People don't know much about the 18th Century, because the true history has been obscured by the misnamed "Enlightenment." This Enlightenment was not the product of the so-called "scientific revolution" from Copernicus to Newton,[2] but a response *against* a true revolution launched by Nicholas of Cusa (1401-64),[3] and his followers Kepler and Leibniz. Attempting to replace true scientific advance by the occult beliefs of the Newtonians, is hardly enlightening. Moreover, it doesn't last, unless the target population is either brainwashed, or beaten down under police-state conditions. The non-science qualities of Newtonianism, along with other empirical cult beliefs, are regularly challenged by phenomena from above.

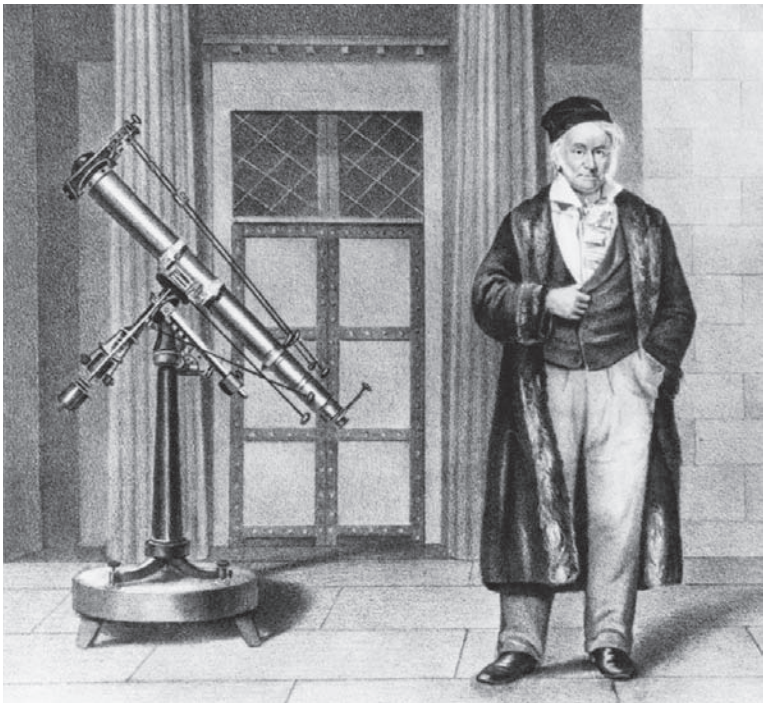
Gauss and Kästner

As soon as the 18-year-old hotshot Carl Gauss arrived at Göttingen University in 1795, he headed to the library and used his new library privileges. Among the books checked out, were the *Transactions of the Imperial Academy of Sci-*

1. See Tarrajna Dorsey, "The Orbit of Gauss," http://www.wlym.com/~animations/ ceres/interim_tarrajna.html .

2. Alexandre Koyré was a student of Husserl and Hilbert at Göttingen, and later worked with Alexandre Kojève in Paris, lecturing on Hegel. His theory of the astronomical revolution established between Copernicus and Newton was a predecessor of Thomas Kuhn's *Structure of Scientific Revolutions*, which argues that science goes through phases separated by paradigm shifts. These guys were crooks, squatting outside the universe, trying to push the existential idea that the willful, passionate act of discovery by man really doesn't exist—that it is just an effect of the passing of history. To disprove this, just relive the discoveries of Kepler and Gauss!

3. See Michael Kirsch "A Scientific Problem: Reclaiming the Soul of Gauss," in the June 2007 issue of *Dynamis*, Vol. 1, No. 4. http://www.wlym.com/%7eseattle/dynamis.



AIP Niels Bohr Library

Carl F. Gauss kept secret the methods by which he made his discoveries, in an age in which creative geniuses like himself were under attack by the Venetians and empiricists of the self-proclaimed Enlightenment. But there do exist keys to unlock the mind of Gauss.

ences in St. Petersburg. As he told his former teacher, Eberhard August Wilhelm von Zimmermann (1743-1815), it made him somewhat unhappy to read these papers, since he found that almost all of his personal discoveries in mathematics had already been made by others. But, "What consoles me is this. All of *Euler's* discoveries that I have so far found, I have made also, and still more so. I have found a more general, and, I think, more natural viewpoint."[4] Leonhard Euler (1707-83), then chairman of the Mathematics Department at the St. Petersburg Academy, was the world champion of Newtonian mechanics and mathematics.

One of Gauss's teachers, Abraham Gotthelf Kästner, was at this time nearing the end of his life, and was preparing to produce the first-ever complete history of mathematics. This was not intended as an academic exercise, but as a sharp political intervention. Kästner was a sworn enemy not just of Euler, but of the entire imperial apparatus that had been used to uproot the legacy of Leibniz and J.S. Bach, and rewrite European history from the standpoint of Newtonianism. In this capacity, he launched the German Renaissance with Gotthold Lessing and Moses Mendelssohn, and led Göttingen University to become the scientific counterpole to the Newtonian nest that had taken over Leibniz's Berlin Academy. He was also the leader of the pro-American conspiracy in Germany, and had hosted the visit by Benjamin Franklin to Göttingen.[5] Kästner's mission was to prepare the German people for an American-style revolution, instead of the British countergang operation known as the "French Revolution."

Soon, Gauss had the opportunity to tell Kästner that he had proven the constructibility of the regular heptadecagon (17-sided polygon), which he would hold until the end of his life to be his most important discovery. At first, Kästner was unimpressed, much distracted by his other projects. But then, after Gauss showed him how the construction worked, Kästner became suddenly shocked, peered at Gauss, and told him that he himself had already discussed the issue in his *Anfangsgründe*.[6] But, he said, if Gauss could develop the theory of the general case, he should write an essay and submit it to him.

The first summary of the general theory of the equal divisions of the circle was presented by Johannes Kepler, in the first book of his *Harmonices Mundi*, where the excited reader can follow his constructions of all possible regular figures. Here, Kepler proved that the only constructible figures are the triangle, square, pentagon, hexagon, pentakaedecagon, and all of their doubles (including all polygons derived by doubling the number of sides of constructible polygons), because everything else has sides whose lengths are unknowable by a human mind. This included the 17-sided figure, which Gauss had just shown to be constructible! Gauss had just proven Kepler wrong, and had expanded the realm of knowability into what Gauss would later call the Complex Domain. Kepler would have been excited, and Gauss's general development of the theory formed the basis of his *Disquisitiones Arithmeticae*. Gauss had discovered that the underpinnings of everything he had yet discovered in numbers and algebra, lie in the domain of geometry, as had been known and demonstrated previously by Kepler and Leibniz. Gauss issued his discovery publicly in his 1799 doctoral dissertation, as an attack on Euler, Lagrange, d'Alembert, and the rest of the Newtonian priesthood of the time.

Kästner had brought Gauss into the conspiracy. During his time at Göttingen, Gauss would discover the hidden legacy of true European science. As Gauss would find out, science had become so polluted through the promotion of Newtonianism and related reductionist confinements, that many of the top scientists were either aiding the promotion, or felt obli-

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4. "Letter from Gauss to Zimmermann" October, 19 1795, found in the *Gauss Werke*, Vol. 10, Part 2 in Ludwig Schlesinger, *Über Gauss' Arbeiten zur Funktionentheorie*, p. 19.

5. This visit was reported in the Sept. 13, 1766 issue of the *Göttingen Gelehrte Anzeigen*, p. 873.

6. Abraham Gotthelf Kästner, *Anfangsgründe der Mathematik* (*Elements of Mathematics*) (Göttingen 1758-69, 4 volumes; 6. Aufl. 1800). This was the standard mathematics textbook at Göttingen University.

gated to bow to the pressure of the scientific priesthood. True scientific progress was being suppressed. Only a small group of revolutionaries was fighting to keep alive the spirit of scientific discovery in the tradition of Johannes Kepler and Gottfried Wilhelm Leibniz.

What Was Kästner's Beef?

Elsewhere in Kästner's *Anfangsgründe*, he launches a direct attack on Newtonian mechanics. In section 237, he says, "Kepler found from the observations, that the planets go in ellipses around the Sun, which lies at the focus of these ellipses. Regarding this, Newton showed that this would happen if the planet were driven or pulled around the Sun by a force which varied inversely as the square of the distance. I consider his proof of this to be inadequate." He proceeds to derive Newton's "inverse square law" from the principle of elliptical motion. He then says that Newton had assumed a conic section, and derived his law from that (as Kästner had just done), but he had not shown that an inverse square "force" would produce conic section motion.[7]

Kästner goes on: "This criticism was justly made by Johann Bernoulli, who gave the first general solution to the problem . . . [this] latter was not accomplished until Bernoulli, by means of his discoveries, had considerably expanded the integral calculus. . . . *[John] Keill translated this discovery into the expressions of the fluxion calculus, and, here also, Newton was not defended more successfully against Bernoulli's criticisms than before"* (emphasis added).

To the layman, this might seem like just some academic disagreement. Hey, we all have disagreements, right? Wrong. In the late 18th Century, these were politically explosive words, because Isaac Newton (1642-1727) was held by the dominant world empire as the high priest of science. It was generally known, that Newton had claimed that he could derive all of the discoveries of Kepler with his principle of gravitational attraction. Newton claimed further, that the primary cause of all motion in the universe, was this force of attraction between two bodies along the straight line between them. Newton's first book, *Philosophiae Naturalis Principia Mathematica*, began by proving that this law of attraction, combined with his "Axioms of Motion," caused planets to move in conic sections around the Sun.

When Newton was asked how he had discovered such a remarkable law, that things fall towards the Earth, he gave the story that an apple fell and hit him on the head while he was staying at home with his mum in Woolsthorpe in 1666. He might have been joking, but he could never explain how he made not only this discovery, but any of his discoveries. Many theories have been developed, even that the discovery came out of Newton's occult beliefs. But, Newton would never speak publicly about it. It was as if Newton did not know how he'd made them. Perhaps it was he, himself, that had been dropped on his head.

Abraham Kästner, Gauss's teacher, was an outspoken proponent of Kepler, who had the courage to attack Newton.

Likely unknown to Newton at the time, England was in the process of becoming the new home of the Venetian oligarchy. The Dutch King William of Orange invaded in 1689, and installed himself and his wife, Mary, as joint monarchs. Holland had been the cockpit of Venetian finance up to this time. This "Glorious Revolution," as it was called, resulted in the immediate creation of the Bank of England and the launching of a huge financial swindle called the South Sea Bubble.[8] But, the reborn empire had to stupefy the population, in order to make this work; therefore a key part of the Glorious Revolution, was the pumping up of the Royal Society's Isaac Newton, as the champion of science.[9]

One of Newton's handlers, was a notorious plagiarist named Edmund Halley (1656-1742), who believed the Earth was hollow. Halley had already gotten in a huge dispute with the Royal Astronomer, John Flamsteed (1646-1719), over the trajectory of a comet. Flamsteed demonstrated that the comet of 1682 was the same that had appeared in 1680, having travelled in an orbit around the Sun. Halley and his cronies didn't believe him, but when Flamsteed intimated that it was the same comet that had been observed by Kepler in 1607, Halley publicly claimed the hypothesis for his own, and predicted a return of the comet in 1757.

Two years later, according to an account by Abraham de Moivre (1667-1754), Halley met one night in 1684 at a London bar with two of his Royal Society cohorts, Robert Hooke (1635-1703) and the president of the Royal Society, Christopher Wren (1632-1723), and told them he was searching for someone who could prove that a planetary elliptical orbit was created by an inverse square force. Both said they could, but neither would produce the proof. Later that year, Halley reportedly asked Newton if he could produce a proof. Newton said he could, and Halley pushed him to publish a book on it, to be promoted widely. Newton was reluctant to publish this, as his "discovery" had been made while in the heat of alchemy experiments.[10]

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7. From Kästner's *Anfangsgründe*, section 237.

8. Newton actually made a bunch of money in this financial swindle.

9. The British Royal Society was originally set up by a network of freemasonic groups, such as the Scottish Rite, to study alchemy and the occult. Jonathan Swift picks the society apart in his *Gulliver's Travels*.

10. John Maynard Keynes, who became notorious for his addiction to Newton memorabilia, declared Newton "the last of the Babylonians" after purchasing the chest of Newton's undergraduate notes from his time at Trinity College. Expecting to find the roots of development of Newton's theories of

The "law" of attraction had excited many academics in England, including David Gregory (1659-1708), who wrote a textbook on astronomy, completely couched in terms of Newton's inverse square law and his fluxion "calculus." Gregory's uncle, James (1638-75), who ceded the University of Edinburgh's Chair of Mathematics to his nephew upon his death, had been in correspondence with Newton, and had done much of the number series work that later appeared in Newton's fluxion "calculus." The younger Gregory, after inheriting his uncle's Newton material, read Newton's *Principia* in 1687, and moved down to Oxford to become the Savillian chair of Astronomy. He brought his student John Keill (1671-1720) with him, who became so enthralled, that he wrote his own "Newtonian" astronomy textbook.

Isaac Newton's dog burns his alchemy writings in 1693.

Isaac Newton did not discover the calculus. Newton actually wrote very little on the calculus. Leibniz wrote several letters to him, each more skeptical than the last, asking for more than just a mathematical derivation of Newton's formulas, but only got two unsatisfactory replies.[11] The first public references to his "fluxions" were in a book by John Wallis (1616-1703), who printed the two letters Newton had sent to Leibniz, as an appendix to his own algebra textbook. Additionally, there is no evidence of any work done leading up to any discovery by Newton, previous to 1684, besides his extensive writings on alchemy and black magic. Either Newton did not know how he "made his discovery," or he didn't want to reveal the true story—that he was a raving priest of the occult!

Newton retired from science after his friends pushed him to a nervous breakdown in 1693. As an attempt to put him back to work, Lord Halifax and Chancellor of the Exchequer Charles Montagu gave him a new job as Warden of the Mint in 1698. Montagu would later become the president of the Royal Society, the Prime Minister, and then the British ambassador to Venice. Interestingly, Halley and Gregory both also became Wardens of the Mint for both Chester and Scotland, respectively, in the Glorious Revolution's project to cut the circulating currency in half. During this period, the great high priest of science Newton would tell his admirers that he no longer wanted to be bothered by pesky stuff like mathematics, because it always made his head hurt. He then wrote a book calculating the precise date of the Armageddon based on the prophecies in the Book of Daniel and the Revelation of John.

In 1708, John Keill submitted a paper to the British Royal Society, publicly accusing Leibniz of plagiarizing Newton's calculus. When Leibniz saw this attack, he wrote to the Royal Society demanding a formal apology, but Keill just upped the attack. At this point, Leibniz most likely recognized that this was an institutional attack, coming from the Venetian entity that had taken over the English government. Newton might not have understood the operation, as he was quite busy in his new "Alan Greenspan" role as chief magician, but he was pushed into the conflict by Keill, Montagu, Locke, and the others. They told him that his calculus was being paraded in Europe under Leibniz's name, and that Leibniz was saying that Newton was guilty of plagiarism. Since Newton couldn't tell one way or the other, the Royal Society set up a committee, with Newton at its head, to investigate the matter. They put out their report in 1715, called the *Commercium epistolicum*,[12] which appears to have been written in the hand of Newton himself. Written like a little kid's tantrum, it claims that the efforts of Leibniz to reveal Newton's method of discovery, were actually done so that Leibniz could write a calculus under his own name. It was published anonymously, since everybody on the committee, including Halley and de Moivre, thought it was such an obvious hoax.[13]

Abbé Antonio Schinella Conti, another one of the "New-

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gravitation and the calculus, what Keynes found instead were thousands of pages of writings on alchemy, Armageddon, and various kinds of black magic. In fact, Keynes was so good as to point out that Newton was not unique in his study of the occult, as the most frequently checked out genre of books at his *alma mater*, Trinity College, were on alchemy.

11. David Eugene Smith, *A Sourcebook in Mathematics* (New York: Dover, 1959), pp. 224-228.

12. Isaac Newton, "An Account of the Book Entitled Commercium Epistolicum Collinii et Aliorum, de Analysi Promota," *Philosophical Transaction of the Royal Society of London*, No. 342 (1714-15), pp. 173-224.

13. Hundreds of pages of drafts for follow-up reports were found among Newton's papers, each one with different formulations of personal slanders of Leibniz.

ton handlers," appeared at around this time. He had contacted Leibniz in 1715, claiming to be one of Leibniz's followers, and offered to ferry letters between him and Newton, personally, to smooth the waters between them. Conti's more immediate project, though, was to help Newton's doctor, Samuel Clarke, brainwash Caroline of Ansbach, Leibniz's former student and wife of the future King George II, to believe in Newton. Leibniz's letters back and forth with her form the body of the *Leibniz-Clarke Correspondence*, and begin with Leibniz illustrating the effects of the Venetian psy-war on the English academics. At one point, Caroline complained to Leibniz that Conti had "lost" key sections of Leibniz's letters.[14]

After Leibniz died, Conti would lead the charge to set up "Newton salons" all around Europe, in cahoots with Voltaire and other agents, in order to attempt an erasure of Leibniz's legacy. This operation was at issue when Kästner issued his counterattack, which demolished the main accomplishment of Newton's *Principia*. Kästner's counterattack was just one of many that made up the standard mathematics textbook at Göttingen University.

Johannes Kepler

This Newton operation was not a scientific issue, but a continuation of a Venetian policy launched at the end of the 16th Century to finally crush the nation-state, and to return the population to a mental condition of herded cattle. Some in Venice were unhappy that the scientific legacy of the 15th-Century Renaissance had not been eliminated by the horrors of religious warfare intentionally unleashed by the Spanish Inquisition. Science was still moving forward, as exemplified by the work of John Napier (1550-1617), William Gilbert (1544-1603), and especially Kepler. So, a new policy—empiricism—was designed by the Venetian teacher of Galileo Galilei (1564-1642), and also the organizer of the Thirty Years' War, Paolo Sarpi (1552-1623). In Lyndon LaRouche's words:

Johannes Kepler has been the target of nearly 400 years of efforts by the Venetians and their successors to steal, distort, or obliterate his phenomenal discoveries.

> [T]he military-strategic and related changes in the order of modern military and related affairs persuaded Sarpi's new party of Venice to loosen the barriers to acceptance of some degree of scientific-technological progress. Sarpi house-lackey Galileo's awkward plagiarizing of the work of Kepler, on the issue of the motion of the planets about the Sun, was typical of the new spirit of empiricism unleashed by Sarpi's revival of the precedents of the medieval William of Ockham. In effect, in Sarpi's bedroom, the Olympian Zeus unbuttoned himself.[15]

Kepler had sent copies of his work to Galileo at the University of Padua, and had asked him to publicly support the Copernican view. Galileo not only did not do this, but failed to mention Kepler even once in his 1632 *Dialogue on the Two Sciences*, a "non-biased" comparison of Ptolemy's and Copernicus's models of the Solar System, which was printed two decades after Kepler communicated his discoveries to Galileo. Perhaps Galileo was too frightened by his persecution by the Inquisition to respond to Kepler adequately,[16] but many of the "discoveries" reported in his later works are to be found in the books Kepler had sent to him. Galileo's job, as given to him by Sarpi, was to come up with axioms of physics, from which Kepler's results could appear to follow, as if deductively.

A later follower of this policy, the Dutch-trained René Descartes (1596-1650), designed more axioms of physics.[17] He was infamous for his battles against Pierre de Fermat (1601-65) over the speed of light in a medium. Descartes said that light speeds up when passing into water; Fermat said it slowed down; and Descartes then attacked him. As part of his work, Descartes formulated what is today called "analytic geometry," which attempted to represent various curves as the products of algebraic formulas. He claimed that all phenomena of physics were created by mathematical equations, and could thus be investigated by those equations. He plagiarized Fermat's method of graphic representation, poorly, to look at the effects of the equations. He ran into a problem, though, with a class of curves he called "mechanical curves," such as the cycloids, logarithmic curves, and logarithmic spirals. These curves all represented relationships between incommensurable magnitudes, such as the relationship between the

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14. H.G. Alexander, ed., *The Leibniz-Clarke Correspondence* (New York: Manchester University Press: 1956).

15. Lyndon H. LaRouche, Jr., "The Principle of 'Power,'" *EIR*, Dec. 23, 2005, p. 41.

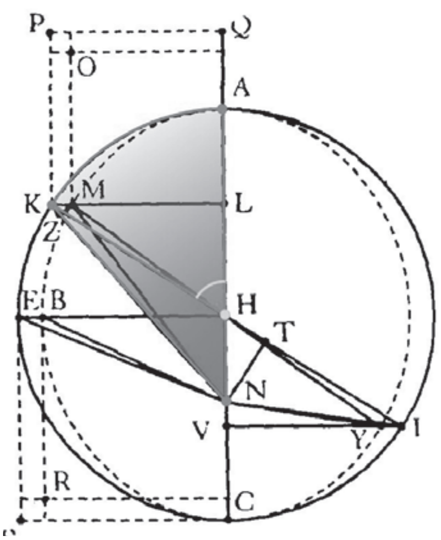
16. Many historians give this explanation, such as Arthur Koestler in his book *The Sleepwalkers: A History of Man's Changing Vision of the Universe* (Harmondsworth: Penguin, 1964). Koestler offers a much referenced slander of Kepler as a "mystic" in a chapter from this book titled "Watershed." In fact, Koestler was himself a mystic. He willed money to the University of Edinburgh to set up the Koestler Parapsychology Unit. The university offers PhDs in the study of paranormal activity. Check out their webpage: http://moebius.psy.ed.ac.uk/Koestler .

17. Leibniz wrote a scathing refutation of all of Descartes' laws of motion, in his "Critical Thoughts on the General Part of the Principles of Descartes," (1692) as found in *Gottfried Wilhelm Leibniz: Philosophical Papers and Letters*, Leroy Loemker, ed., pp. 383-412. For example, he shows that, contrary to what Descartes says, when a smaller ball impacts a larger, stationary ball, the smaller one does not rebound with equal and opposite speed, while the larger one stays put.

circle and its diameter, as studied by Nicholas of Cusa. Since these curves couldn't be represented by algebra, Descartes banned them from the universe.

But, this was just the type of problem Kepler had left for the future, after his death. Among Kepler's breakthroughs in his *Astronomia Nova*, was the demonstration that the *equant* doesn't exist. There is no fixed point in the universe.[18] On the other hand, there are principles of the universe. One effect of these principles, as discovered by Kepler, was that a planet will speed up and slow down, such that the area swept out by a line connecting it with the Sun is proportional to the time in which it is swept out. As overjoyed as Kepler was when he discovered this, he also showed how the area cannot be found directly.

> [Given] the mean anomaly, there is no geometrical method of proceeding to the equated, that is, to the eccentric anomaly. For the mean anomaly is composed of two areas, a sector and a triangle. And while the former is numbered by the arc of the eccentric, the latter is numbered by the sine of that area multiplied by the value of the maximum triangle, omitting the last digits. *And the ratios between the arcs and their sines are infinite in number*. So, when we begin with the sum of the two, we cannot say how great the arc is, and how great its sine, corresponding to this sum, unless we were previously to investigate the area resulting from a given arc; that is, unless you were to have constructed tables and to have worked from them subsequently [emphasis added].



Kepler calls the area KNA the *Mean Anomaly*. The area of the circular section (KHA) is just equal to the angle KHA, called the *Eccentric Anomaly*. The area of the triangle (KHN), is one half the product of its base, HN, times its height, KL, which is the Sine of arc KHA.

We can write this simply as follows

$$E + 1/2\ e \sin E = M$$

where *E* is the *Eccentric Anomaly*, *M* is the *Mean Anomaly*, and *e* is the eccentricity HN.

18. Leibniz would later reformulate this principle, in his correspondence with Samuel Clarke, by showing that absolute space is a fantasy.

All that could be found was an approximation! Kepler later would tell one of his collaborators how best to do this approximation, which would remain the best method up to 1801. But, to Kepler, this problem was never about finding some way to approximate a number. Reformulated, this is now known as *Kepler's Problem*:

> *Given the area of part of a semicircle and a point on the diameter, to find the arc and the angle at that point, the sides of which angle, and which arc, encloses the given area*.[19]

This problem is of the same class studied by Cusa, and Kepler's friend John Napier, and was later called *Transcendental* by Leibniz. In Cusa's mind, the relationship between the circle and its diameter was a reflection of the relationship between the mind of the Creator to the mind of Man. Mathematics was thus no more than an inadequate metaphor. All mathematics could do, was provide a rough mnemonic device by which to remember the relationship, because there was a domain of the universe which was above that which could be calculated. Kepler later applied Cusa's method, and showed how the created universe represents itself to Man in the motions of the heavenly bodies, and demanded a new mathematics that was better suited to the investigation.

This is what Galileo and then Descartes were invented to prevent. Humans could have no knowledge, that they could seek and know how God's universe worked! Some less famous people did different things to dodge the problem. Newton's promoter John Keill gave some examples of this in his posthumously published lectures on astronomy at Oxford. Keill said that, since Kepler had been unable to provide a geometrical solution to his problem, his successors said he was "so fond of physical Causes, that he had departed from *Geometry*; and they blamed his *Astronomy*, as not being geometrical, since it was founded on such a Theory."[20] Keill pointed out that astronomers of the mid to late 17th Century used ellipses, but they still *placed an equant at the focus opposite the*

19. Johannes Kepler, *New Astronomy*, p. 600, Book 6, Ch. 60. See the New Astronomy webpage at http://wlym.com/~animations/newastronomy.html .

20. John Keill, *An Introduction to the True Astronomy: or, Astronomical Lectures, read in the Astronomical School of the University of Oxford* (London: 1739) p. 288.

Sun! Keill then proceeded to give several approximate solutions to the problem, as determined by his collaborators Halley, Seth Ward (1617-89), and Newton himself.

Instead of dodging the question, Leibniz posed a problem for all European scientists to solve: *If two points are given in a vertical plane, to assign to a mobile particle the path along which, descending under its own weight, it traverses the space between the points in the briefest time.*[21] He had already solved the problem, and knew it dealt with the same transcendental problem posed by Kepler, and the solution was one of the curves banned by Descartes. He and his collaborators went on to discover the mathematics that Kepler had asked for, while refuting Descartes for entertainment.

Keill left this discussion out. He and his collaborators and "intellectual" ancestors, instead, had busied themselves with trying to bury Kepler's harmonic challenge. First, they invented "gravity," so nobody had to deal with the "God stuff" anymore. Then, they invented Newton's "calculus," so they could appear to have a solution to the problem. This calculus, as opposed to Leibniz's, was little more than an excursion into infinite number series. David Gregory's uncle James, who had been trained at the Venetian University of Padua, apparently gave Newton his first "series expansions" of the transcendental trigonometric functions. For example, the Sine function can be numerically approximated with the series

$$\sin x = x - \frac{x^3}{1\cdot2\cdot3} + \frac{x^5}{1\cdot2\cdot3\cdot4\cdot5} - \frac{x^7}{1\cdot2\cdot3\cdot4\cdot5\cdot6\cdot7} + \text{etc.}$$

As Keill proceeded to show in his astronomy lecture, the trigonometric function in *Kepler's Problem* could just be replaced by the first two terms of this series. That's close enough.

Leibniz also looked at infinite series like this, but with a different idea. While the Newtonians were very pleased with themselves, that they could treat transcendental functions as deviations from the real laws of the universe, and could reduce everything to algebra problems again, Leibniz saw these series as an important reflection of a higher principle. In his account of how he discovered the calculus, Leibniz laid the real issue on the table:

> [T]he new discoveries that were made by the help of [Leibniz's] differential calculus were hidden from the followers of Newton's method, nor could they produce anything of real value nor even avoid inaccuracies until they learned the calculus of Leibniz, as is found in the investigation of the catenary as made by David Gregory [emphasis added].[22]

No infinite algebra equation can equal a transcendental function, and this prevented Newton's followers from making any substantial advances. This consideration would lead later into Gauss's study of the hypergeometric series.

A century later, as Gauss would comment in his book *Theoria Motus* on the *Kepler Problem*:

> Astronomers are in the habit of putting the equation of the centre in the form of an infinite series proceeding according to the sines of the angles . . . each one of the coefficients of these sines being a series extending to infinity according to the powers of the eccentricity. We have considered it the less necessary to dwell upon this formula for the equation of the center, which several authors have developed, because in our opinion, *it is by no means so well suited to practical use*, especially should the eccentricity not be very small, as the indirect method, which, therefore, we will explain somewhat more at length in that form which appears to us most convenient [emphasis added].[23]

The method Gauss presents afterwards was the first improvement on what Kepler did, and remains to this day the most accurate solution for the problem.

Kepler's Works

Cusa had shown that, in order to have a nation of people who can govern themselves and prosper, it were necessary for those people to be educated, and to see that the prosperity were caused by the development of their minds. On the other hand, the Venetian oligarchy knew that, were they to crush Cusa's nation-state policy, they would have to crush the optimism of science. Since that didn't exactly work, the Venetians adopted Sarpi's policy of empiricism during the Thirty Years' War, which meant the adoption of the scientific discoveries, but the burial of the discoverers.

Thus, at the end of Leibniz's life, he became the target of the attack by the Venetian apparatus which had been set up in London since the 1689 Glorious Revolution. This manifested itself in the public propaganda operation to push Newtonianism in Europe and to demoralize the population through emphasizing degrading entertainment,[24] and by turning public

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21. See the development of this in the dialogue by Michael Kirsch and Aaron Yule, "Experimental Metaphysics: On the Subject of Leibniz's Captive," *Dynamis*, Vol. 1, No. 1 (2006).

22. Gottfried Wilhelm Leibniz, *Historia et Origo Calculi Differentialis*, as found in *The Early Mathematical Manuscripts of Leibniz*, translated by J.M. Child (London: Open Court Publ. Co., 1920), p. 27. The translator littered this translation with footnotes, some of which are helpful, but he obviously hates Leibniz. Child wrote another book, claiming to prove that both Leibniz and Newton had gotten everything from another, lesser known mathematician, Isaac Barrow (1630-1677), who resigned his position as the Lucasian chair to make way for Newton.

23. Gauss, *Theoria*, sec. 11, p. 12.

24. One might notice the extremes of entertainment in popular culture today. The common entertainment for an everyday high school boy today, is graphically killing thousands of people in first person shooter videogames, like Microsoft's "Counter-Strike." LaRouche points out that these games break

opinion against those people who threatened to awaken the scientific spirit of human civilization. The result of this was shown in the fight to publish Kepler's collected works.

Kepler's collection of writings and letters was taken to Königsberg by his son Ludwig after his death. Ludwig was not much of a scientist, and did not see the significance of his father's works, and thus died before making them public. Four decades passed before Johannes Hevelius (1611-87) made the effort to procure the works for himself. Hevelius lived in Danzig, Poland, and had produced naked-eye star maps that rivaled Tycho Brahe's in precision. He became embroiled in an argument with the British Royal Society's Robert Hooke in the late 1670s, who criticized his maps because he hadn't used a telescope. Edmund Halley was sent to Danzig to confront the astronomer in 1679, but Halley returned with the news that Hevelius's method of measuring positions was more accurate than any Englishman had done with a telescope. Later that year, Hevelius's house, library, and observatory were burned to the ground.[25] Among the few things that survived, by the grace of God, were the Kepler manuscripts.[26]

Hevelius also died before his planned publication, and the manuscripts were again dispersed. They fell into the hands of Gottfried Kirch (1639-1710), a student of Hevelius; Ernst Lange, the son-in-law of Hevelius; and, later, Ulrich Junius (1670-1726), a mathematician and calendar-maker at the Berlin Academy. Both Kirch and Junius were interested in getting a look at the original version of Kepler's *Rudolphine Tables*, so they could make it big in the ferment around calendar reform. Junius succeeded in printing up one volume of Kepler's work, but this only contained what Junius thought was pertinent to the furthering of mathematics. This publication caught the attention of a scientist in Leipzig, Michael Gottlieb Hansch (1683-1749), who thought Junius had marred Kepler's works through his selective editing.

Hansch obtained the works for himself, through the aid of Leibniz. Leibniz was then in the employ of the Kingdom of Hanover, researching the history of the royal family, and had succeeded in demonstrating the right of succession of the Hanoverian monarch to the throne of England after the death of Queen Anne. His dream was a planet of nation-states, cooperating for scientific and technological development, and the ennoblement and education of the growing populations. He initiated the building of a network of scientific academies in the major capitals of Europe, and became a top advisor of several monarchs. A wonderful part of his dream would have been the publishing and distributing of the ideas of Kepler, who had informed much of his conceptions of the universe.

Gottfried Wilhelm Leibniz: statesman, scientist, philosopher, and revolutionary. He helped to preserve Kepler's legacy from destruction, and paved the way for Gauss.

Hansch succeeded in binding the set of manuscripts in 20 volumes, labelled "Manusc. Kepplerianorum," plus two smaller books. Leibniz advised him to take the work slowly and thoroughly, so that he wouldn't make any mistakes. Inspired by this, Hansch excitedly asked the Elector of Saxony, August the Strong, for permission to voyage to England, France, and Italy, so he could study astronomy and mathematics at the top universities. August granted his permission, and even promised his special pass, but then revoked it when the University of Leipzig, where young Hansch was studying, requested that Hansch stick around to finish his Doctor of Theology program.

In 1713, Leibniz went to Vienna as the Imperial Privy Counselor to the Holy Roman Emperor, Charles VI, and succeeded in securing permission for Hansch to go with him, in order to further the printing project. Here, although Leibniz got the Emperor interested in the Kepler project, it was slow going. Leibniz was dedicated to his real reason for being in Vienna—to set up a link in his academy network—and the financial and material support Hansch found there were not wholly adequate. By late 1714, Leibniz left Vienna, returning to Hanover, expecting to be taken with the new King of England, George I, whose right to the crown had been won by Leibniz. To alleviate some of the slowness of the massive editing process, Leibniz advised Hansch to focus on the unpublished letters, and Kepler's last work, the *Hipparchus*, to generate interest and, thus, more opportunities for funding.

Hansch received his last stipend from the Emperor just before Leibniz died. While still editing the letters, he went immediately to Württemberg, to research Kepler's life for a biographical sketch. As soon as he got back to Vienna, he got the first edition of Kepler's letters printed. This was the last thing he ever printed, as the interest in the work, and thus the assistance he got from the royal court, collapsed. The romance of the Enlightenment was taking over Europe. As soon as Leibniz died, that chameleon, Conti, showed up at the court of Hanover, which had been deserted, except for Leibniz, when King George I moved to England. Conti sifted through Leib-

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down the barriers in young people towards killing others, at the same time that they teach kids to aim accurately at the head and shoulders. These games were designed with this intention, and are being promoted to create a new Roman-style army of heartless killers, fit to shoot often and accurately for an empire. The effects can be seen in the recent Virginia Tech mass murder, by a young man who had trained on "Counter-Strike." Lets ban these things!

25. A British hand might be surmised in this tragedy, but the culprit was actually one of Hevelius's disgruntled servants. It wouldn't have been the first time that the British had hired a hit man, though!

26. Information on Hevelius can be found on the website of the Students for the Exploration and Development of Space http://seds.lpl.arizona.edu/messier/xtra/Bios/hevelius.htm .

niz's works, plucking out "anything that had to do with the Calculus controversy," and then left just before the King confiscated everything.

Hansch believed that the loss of support for his Kepler project, was due to the loss of interest in real science by the royalty. In fact, the project to set up a scientific academy in Vienna, for which Leibniz had full support from the Emperor, came to a halt, and was not restarted for over 130 years. Hansch found that the philosophy of his former teacher was also being twisted, by a former "friend," Christian Wolff (1679-1754). Hansch sent a series of furious letters to Wolff, over the publication of Wolff's watered down interpretation of Leibniz. Hansch became demoralized, and bankrupt, in defending and promoting Leibniz and Kepler. In 1721, he sold off 20 volumes of his bound manuscripts, and sold the other two to the Royal Library in Vienna. He spent the rest of his life trying to get the manuscripts back, as he feared they would fall into the hands of someone who did not understand the importance of Kepler for humanity. He found no support for his efforts, and died in 1749.

Hansch's bound collection of manuscripts popped up again in 1765, when Christoph Gottlieb von Murr found them in the trunk of the Nuremberg Warden of the Mint, who would part with them only for a high price. Von Murr wrote letters to every academic society in Europe to find someone who would purchase the works of Europe's greatest astronomer. Johann Heinrich Lambert (1728-77), a worshipper of Newton at the Berlin Academy, said he'd be surprised if anybody bought the manuscripts, as they were only fit to be museum pieces. In 1773, Catherine II of Russia was advised by Leonhard Euler to finally purchase them, with jewels, in order to donate them to the St. Petersburg Academy.[27]

The scientific environment of Europe had changed drastically during this period. The scientific tradition of Leibniz and Kepler had been severely tarnished, and people were becoming scientifically demoralized, except for the resistance and scientific luminosity of a small group of conspirators centered at Göttingen University, around Abraham Kästner, and, in what would soon be the United States, around Benjamin Franklin.

The State of Astronomy

Since Leibniz's death, an avalanche of textbooks on astronomy and physics had been written, all interpreted according to Newton's laws. For example, Joseph Louis Lagrange (1736-1813), whom Napoleon would later call the "Great Volcano of the Mathematical Sciences," produced a physics textbook called *Mécanique Analytique*, in 1788. He bragged that, in it, he had reduced physics to a branch of pure mathematics, and was especially proud that it contained no diagrams. Similarly, Pierre-Simon LaPlace (1749-1827) wrote his *Mécanique Céleste*, which was yet another Newtonian astronomy textbook. LaPlace was seen as quite strange, and put forth the theory that, if the position and momentum of every particle in the universe were known at any one time, then every event in the past and future could be calculated with Newton's Laws.

The Newton dogma was finding difficulty holding its ground against experimental evidence. There were some holdouts, such as at the Berlin Academy. But, scientific optimism further grew upon the news of the successful American Revolution, whose Constitution would be based on the ideas of Leibniz. It was quite obvious to people like Kästner and Franklin, that Newtonianism was not science. Since Newton had died in 1727, a whole new generation of scientists had emerged. Many of these youth attended Kästner's classes on astronomy, or played with Franklin's electricity experiments.

One of Kästner's students was Heinrich Wilhelm Olbers (1758-1840), who made his career as a physician, and worked on astronomy at night. Olbers made a breakthrough in the determination of comet orbits in 1797. In astronomy, new observations were piling up. One popular activity at the time was comet hunting, and whenever a new comet was discovered, there was a race to determine its trajectory. Charles Messier (1730-1817) blazed the path for telescopic comet hunting, locating 45 different comets between 1758 and 1801. Early on, Messier kept finding other fuzzy things besides comets, since he was using a telescope, and finally produced a catalog of these "nebulae" to help other comet hunters.[28]

One night in 1781, while producing a very accurate star map, the astronomer and organist William Herschel (1738-1822)[29] spotted what he believed to be a slow-moving comet without a tail. He reported it to the Royal Society, and a half-dozen astronomers across Europe attempted to determine its orbit. Usually, the astronomer would curve-fit a parabola to the data points, since the only variable with a parabola is the perihelion distance of the object. After fitting a rough parabola, the orbital approximation was further improved by tweaking the parabola and adding new observations. Hershel's comet, however, didn't work with a parabola, so an astronomer named Anders Johann Lexell (1740-84), at the St. Petersburg Academy, tried a circle. When this worked, Lexell announced that this was not a comet, but a new planet, which was later named Uranus.

Another astronomer who spent much of his time producing star maps was Baron Franz von Zach (1754-1832), the director of the Seeberg observatory of Gotha. He was much

27. *Göttinger Gelehrte Anzeigen*, Aug. 27, 1774.

28. Today, this is known as the Messier Catalog, and includes the Crab Nebula and the Andromeda Galaxy.

29. William Herschel and his sister, Caroline, moved to England from Hanover, and lived in the tradition of Kepler and Bach. He supported himself as an organist while developing his career as an astronomer, and wrote several symphonies. Herschel went full-time into astronomy after his discovery of Uranus, and built more than 400 telescopes, one of which had a focal length of 12 meters and a diameter of 1.2 meters. He also discovered infrared radiation.

better known around Europe for his astronomical journals than his maps, though. His journal, the *Monatliche Correspondenz zur Beförderung der Erd- und Himmelskunde*, became one of the main clearing houses for new astronomical work in Europe, and von Zach himself thus became a convergence point for astronomical dialogue of the time. One thing that he'd picked up along the way, was what he took to be an old German legend of a missing planet between Mars and Jupiter. In the wake of the discovery of Uranus, he thought it might be worth searching for this planet. In 1798, he convened the first international conference of astronomers in Gotha, and among the astronomers there, he found five who would help track down this planet. These included Olbers. They would begin by dividing up the zodiac into six parts, and produce the most accurate star maps of this region ever.

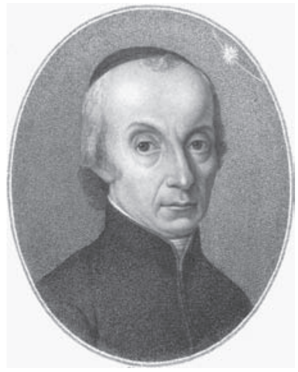
As he related in a column in the July 1801 issue of his *Monatliche Correspondenz*, von Zach first heard of the idea of a missing planet from his friend Johann Elert Bode (1747-1826) of the Berlin Academy, who had produced a number series that gave the distances between the orbits, but included an orbit between Mars and Jupiter. Another reference to it was in a Newtonian textbook on astronomy by Lambert, who claimed it hadn't yet been found, because it had been sucked up by Saturn and Jupiter.[30]

Whence had Bode gotten his numerical progression? In the November 1802 issue of *Monatliche Correspondenz*, Johann Friedrich Wurm (1760-1833) laments the use of Bode's series. He says it explains nothing, since people could come up with many different numerical laws that give the same series of numbers, or any series of numbers for that matter. He goes on to point out that Bode had originally gotten it from Johann Daniel Titius (1729-96), who traced it back to the same Christian Wolff who had tried to replace Leibniz's sublime philosophy with his own interpretation. Wolff put the following quote in a book he had written on astronomy: "The planets, which move about the Sun, stand very distant from one another. If one divides the distance of the Earth from the Sun in ten parts, the distance of Mercury from it thus comes to be 4; of Venus 7; of Mars 15; of Jupiter 52; of Saturn 95. . . ." Wurm then points out that Wolff hadn't said where he'd gotten this from, and stops his detective work there.[31]

But, this exact passage from Wolff appeared earlier, on page 2 of David Gregory's 1715 textbook on Newtonian mechanics, *The Elements of Astronomy*.[32] Is this a direct lineage of a hack job on Kepler and Leibniz? The original idea of an exploded planet was from Kepler, whose hypothesis came, not from some number series, but from considerations of the harmonic ordering of the Solar System! First, Kepler placed a planet in this gap in his *Mysterium Cosmographicum*. Next, he investigated its anomalous harmonic characteristics in his *Harmonices Mundi*. Finally, the very same numbering in David Gregory's book appears in Kepler's *Epitome Astronomiae Copernicanae* (*The Epitome of Copernican Astronomy*). Kepler saw series of numbers like this as merely the effect of the harmonies expressed in the motions of the planets. But, these astronomers were infected by the Newton swindle.

Ceres

When, in 1801, Giuseppe Piazzi (1746-1826) observed what he believed to be a comet, the astronomy world was caught with its pants down. Piazzi gathered observations between Jan. 1 and Feb. 11, and then ceased, upon falling ill. He sent a few of his observations to Bode and Jérôme LaLande (1732-1807),[33] who then told von Zach in June. From those few observations, von Zach's former student Johann Karl Burckhardt (1773-1825), who worked for LaLande at the Paris Observatory at that time, calculated a rough parabola, and von Zach's collaborator Olbers calculated a circle. In August, LaPlace claimed that the object was the comet discovered by Lexell in 1770, but its orbit had been perturbed by a close encounter with Jupiter, and hence had reappeared early. He referred to equations in his textbook to prove it. Everybody lamented the incompleteness of the observations, and the lateness of their reporting.



Giuseppe Piazzi gathered the observations of Ceres, that Gauss used to determine its orbit—to the frustration of Gauss's empiricist opponents.

Finally, the complete set of observations was published in the September *Monatliche Correspondenz*, and both Burckhardt and Olbers argued that it could not be the 1770 comet, but was a microplanet between Mars and Jupiter instead. Burckhardt tried an ellipse, assuming the object was seen during its perihelion. Olbers further argued that the observations proved that the object had been seen near its line of apsides, and thus supported Burckhardt's perihelion assumption. But, Olbers thought a perfect circle was the best approximation. LaLande then showed that, if a circular orbit were assumed for Mars, an error of up to 2.5° in the anomaly of commutation could be measured.

30. Franz von Zach, "Fortgesetzte Nachrichten über den zwischen Mars und Jupiter längst vermutheten, nun wahrscheinlich entdeckten neuen Hauptplaneten unseres Sonnen-Systems," in the June 1801 *Monatliche Correspondenz*, Vol. 4 (Gotha), pp. 592-623.

31. Franz von Zach, "Über die vermeinte harmonische Progression in den Planeten-Abständen, als Nachtrag zur M.C.," in the November 1802 *Monatliche Correspondenz*, Vol. 5 (Gotha), p. 504.

32. David Gregory, *The Elements of Astronomy, Physical and Geometrical* (London: 1715).

33. LaLande was a supporter of the American Revolution, and set up a group at the Paris Academy called Les Neuf Surs, for that purpose.

The race was on. Astronomers from London to Paris to Berlin to St. Petersburg were searching for the new object, relying on the forecasts from these hypothesized orbits. If its orbit were not calculated quickly, the chances of re-identifying it were almost zero. Yet, all discussion of the orbits and future positions hinged on various sets of assumptions. Either the object had to be near perihelion, or the eccentricity of its orbit was quite small, or some of the observations were in error. None of the calculated orbits were within an acceptable range of deviation from the data. By December, everybody was watching the skies, and the *Monatliche Correspondenz*, for signs of Piazzi's missing star, while optimism dwindled.

Then, a ray of hope appeared. The young Carl Gauss contacted von Zach with no fewer than four different attempts at calculating the orbit. His calculated orbits fit the observed data almost exactly. Gauss only needed three observations, and then checked his determination with three other observations. What is more, none of his determinations involved any assumptions whatsoever. His orbit was far different than all other hypotheses. Von Zach suggested that all those searching for the reappearance of Piazzi's star widen their search drastically, so that Gauss's forecasts could be tested. The astronomy world held its breath.

When Olbers located the planet on New Year's Day, 1802, it was precisely where Gauss said it would be. The 24-year-old astronomer had shaken the foundations of astronomy. The new object was indeed not a comet, but the first of many asteroids to be discovered, occupying the gap between Mars and Jupiter. The shooting star that had been revealed, though, was Gauss himself. Where had this genius come from? How did he come up with his hypotheses? Gauss would publish nothing on his method for determining the orbit. He proceeded to determine the orbit of the next asteroid, Pallas. Even then, when pressed by his newfound friend, Olbers, he would not make his method public. As Olbers told him, "Does it not perhaps appear otherwise (you know that I am not capable of maintaining these petty thoughts), than that you wish to keep your method private, in order to again perhaps be able to determine the orbit of a new planet discovered in the future *first and entirely independently*?"[34]

Gauss would never publish a comprehensive account of his discovery. In late 1802, he sent Olbers an extremely brief summary, and Olbers had to write several letters back, extracting explanations from Gauss, of the sections labelled, "as is easily seen." This summary was finally published in the *Monatliche Correspondenz*, in 1810. This was two years after Gauss took Kästner's position as head of the Göttingen observatory, and one year after Gauss published what would become the standard textbook on astronomy, the *Theoria Motus Corporum Coelestium in Sectionibus Conicis Solem Ambientium*, published on the 200th anniversary of Kepler's publication of his *Astronomia Nova*.

To return to the introduction, the question that must be answered is, indeed, how did Gauss discover the orbit of Ceres? Even more important, why couldn't the top astronomers of the time, the experts, determine this orbit? How did Gauss think differently than all the others? These questions will be answered in the coming period, and the answers will form a useful guide for how to understand and intervene into the present international crisis. In the meantime, have fun!

34. Olbers to Gauss, Sept. 11, 1802.

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