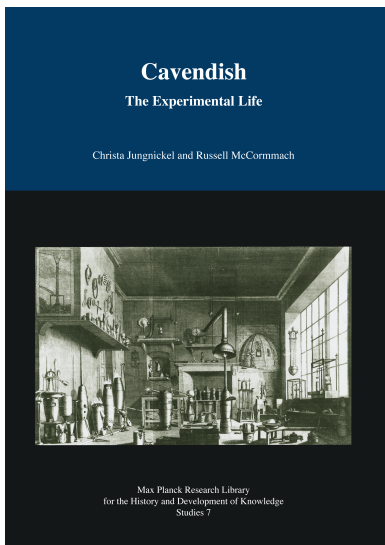


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Christa Jungnickel and Russell McCormach:

Cavendish



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Chapter 18

Cavendish

By pursuing a working life in science, Cavendish made his life an experiment of another kind. In the laboratory he adapted nature to respond to his questions, and outside the laboratory he did not accept the life course that was his birthright but adapted it to his natural interest. To practice natural science was, as he said, to settle for “tolerable certainty.” To experiment with life’s possibilities was to follow a path that has not been completely charted.

By his choices Cavendish made a life of natural philosophy. This is the central meaning of Blagden’s observation that Cavendish always knew what was right for him. A life of natural philosophy was not a complete way of life, but in Cavendish’s case it came close to that. It contained a social life which, if limited in variety, was all that he wanted. The intellectual challenge of the life was limitless, its interest was inexhaustible. Through duty of service in the public sphere of science, the life had an ethical dimension. As Cavendish understood it, at least when he was a student, it made a connection with the spiritual world. Built into it was a motivation to act, since to be a natural philosopher meant to work to improve natural philosophy. It is indicative of his life of natural philosophy that he turned his houses into places of science; he lived *inside* it. When this is recognized, his life takes on a different aspect; it is a fulfilled life for him, not a deficient life. Like the early Greek philosophies, natural philosophy offered the good life,¹ and evidence strongly suggests that it offered Cavendish the good life. In this section we will meet some different opinions on the subject.

In contemplating Cavendish, Wilson decided that a “more eventless life, according to the ordinary judgment of mankind, than that of Cavendish, could scarcely be conceived.”² Readers who have reached this point know that Cavendish’s life was not without events, only these events had almost entirely to do with his scientific interests; with that qualification, Wilson’s point is well taken. In the absence of the kind of events that make up most lives, we have organized Cavendish’s biography partly by subject rather than by strict chronology. Departing furthest from the narrative form of biography, this final chapter is devoted to an analysis of Cavendish’s personality, and as such it applies to the entirety of Part II. It could go at the beginning, but then Cavendish’s life would be unfamiliar to readers and the analysis would lack a subject; we think that it belongs where we place it, at the end.

Blagden spoke of the “temper & character of the philosophers of this country.”³ In the eighteenth century the English distinguished between character and temperament, as we do. We speak of “character” as one part of “personality,” a word they occasionally used, the other part being temperament; character is shaped by life experiences, temperament largely

¹John M. Cooper (2012b, 16; 2012a, 2–6).

²George Wilson (1851, 165).

³Charles Blagden to Joseph Priestley, 11 June 1785, draft, Blagden Letterbook, Yale.

by inheritance.⁴ After a meeting, Blagden wrote in his diary, “talk about Mr. Cavendish, & explanation of character.”⁵ Unfortunately Blagden did not say what the explanation was, as it would have been the best informed of any we have. In this chapter, we consider the question.

Early Interpretation

We can speak confidently of Cavendish the *man of science*, but can we speak of Cavendish the *complete man*? In a course on chemistry given in 1855, the lecturer gave an emphatic no to this question. He began by warning his students about Cavendish: “It may be fairly asked, why bring such a character forward for examination? ... Is it enough *not* to be a villain, a debauchee, a murderer? Or, rather, is it not our duty to be *something* that shall create and influence for *positive good* on our fellow-men? To this the answer must be made, that the character of Cavendish is not introduced as a subject of admiration, or for imitation, but rather as a warning to all men who cultivate the intellect, that they do not neglect the social portion of their nature.”⁶ This lecturer regarded Cavendish as a “calculating machine,” having read a book published four years before, George Wilson *The Life of the Hon^{ble} Henry Cavendish*. Francis Bickley, a historian of the Cavendish family, concluded from Wilson’s *Life* that “there is something pathetic about such an existence as Henry Cavendish’s, so fruitful and yet so utterly barren.”⁷ Thorpe, the general editor of Cavendish’s papers, wrote to a fellow editor that Cavendish was “not a man as other men are, but simply the personification and embodiment of a cold, unimpassioned intellectuality.”⁸ Cavendish’s recent biographer Berry, quoting Wilson, speaks of Cavendish’s “striking deficiencies as a human being.”⁹ Jonathan Norton Leonard’s *Crusaders of Chemistry*, a book I read when I was young, contains a chapter entitled “Henry Cavendish, the Measuring Machine,” citing Wilson’s biography; it concludes, “So lived and died the coldest, most unhuman mortal who ever wrote his name large in the history of science.... His sole interest was to measure the objects in the material universe.”¹⁰ W.R. Aykroyd’s *Three Philosophers (Lavoisier, Priestley and Cavendish)*, another book I read at around the same time, describes Cavendish as “a great brain, and a very small man!” It continues: a psychiatrist would find it interesting to guess what made his “full human development impossible, allowing one small part of his being to hypertrophy, and the rest to waste away”; this “dirty, semi-insane old aristocrat,”

⁴The English in the eighteenth century were likely to speak of “character” where we speak of “personality,” but we note that an eighteenth-century meaning of “personality” was a distinctive individual character, which is close to our meaning. Character and temperament have long been distinguished by psychologists: character is what people become intentionally; temperament is their inborn emotional predisposition. For the purposes of psychobiological research, the distinction is put differently, though not incompatibly. Character and temperament each have distinct brain systems and independent psychological dimensions. Temperament is the “dynamic organization of the psychobiological systems that regulate automatic responses to emotional stimuli,” and it is “moderately heritable and stable throughout life.” Character, by contrast, is “moderately influenced by family environment and only weakly heritable,” and it develops into adulthood. To temperament belong the “automatic associative responses to emotional stimuli that determine habits and moods”; to character belong “self-aware concepts that influence our voluntary intentions and attitudes.” C. Robert Cloninger (1994, 266–267).

⁵14 July 1795, Charles Blagden Diary, Royal Society 3:65(back).

⁶Introductory lecture to a course on chemistry at the National Medical College by Lewis H. Steiner (1855, 6).

⁷Francis Bickley (1911, 207).

⁸Edward Thorpe to Joseph Larmor, 7 Feb. 1920, Larmor Papers, Royal Society Library, 1972.

⁹A.J. Berry (1960, 22).

¹⁰Jonathan Norton Leonard (1930).

who “cut a pathetic and ridiculous figure” in society, of a sort “to be found in any lunatic asylum,” was a great scientist, a rare instance of so “marked a degree of maladjustment” combined with brilliance.¹¹ These are some of the ideas readers have come away with from Wilson’s biography.

Of the characterizations of Cavendish, Humphry Davy’s is the most succinct, “A great Man with extraordinary singularities.”¹² We consider first the “great Man,” and we begin by questioning it. Cavendish published no books and fewer than twenty papers, a good half of which were on minor topics, and he left much of his good work unfinished and unpublished. He founded no school, he inspired no acolytes to insist that the world pay attention.¹³ His mathematical theory of electricity drew almost no notice. His experiments on factitious air drew some notice, though Lavoisier scarcely acknowledged them. His understanding of heat was so little known that an admiring colleague thought he held the opposite theory. His experiment on the density of the Earth was thought up and planned by someone else. We might conclude that Davy misspoke, but Davy knew his subject. Cavendish raises questions about what is meaningful in a life of science.

“Greatness” implies superior abilities or accomplishments, usually both. With respect to what is great, a person is seen to hold advantages over most others. Because the judgment has a subjective element, consensus usually is not expected or attained, though there is a measure of agreement on Cavendish’s advantages (and disadvantages). Wilson, who approached his subject as a “student of chemistry,” said that Cavendish made no significant contribution to the apparatus or instruments of chemistry, in which regard he could not begin to compare with Hales and Priestley. Wilson generalized the point: “Cavendish, in truth, was not remarkable for an inventive spirit,” finding “novelty” uncongenial owing to his “great caution and love of simplicity.” He regarded Cavendish as a “discoverer,” whose merit was to set for himself a “standard of accuracy” that few fellow chemists cared to acknowledge.¹⁴ The historian of science Robert Schofield writes that “Cavendish’s analytical imagination was unequalled in Britain in the years between Newton and Maxwell, but he lacked that ingenuity which invents new problems. His researches, therefore, tended to be elaborations of the ideas of others, which he defined with a precision and developed to an extent beyond the conception of the originators.”¹⁵ These two evaluations, separated by over a century, agree that Cavendish was not inventive; in the one case he was not inventive of instruments, in the other of new problems. They also agree that Cavendish’s merit lies in his accuracy and precision. They are correct as far as they go. Cavendish, like most other notable scientists, was not exceptional in all ways, as an inventor of instruments and apparatus, as a master of analysis, and as a proposer of new problems for research.

Let us consider some other merits of Cavendish’s. He had mathematical-theoretical and experimental skills of a high order, a rare combination. Davy said, “Of all the philosophers of the present age, Mr. Cavendish was the one who combined, in the highest degree, a depth and extent of mathematical knowledge with a delicacy and precision in the methods of experimental research.”¹⁶ Other early biographers said much the same. A second merit

¹¹ W.R. Aykroyd (1935; 1970, 75–76, 78).

¹² J.C. Fullmer (1967, 133).

¹³ Blagden may be an exception, but he was paid by Cavendish.

¹⁴ Wilson (1851, 196).

¹⁵ Robert E. Schofield (1970, 254).

¹⁶ Humphry Davy, quoted from a chemical lecture he gave in 1810. John Davy (1836, 221). Similar wording: Humphry Davy (1812, 37). Humphry Davy, quoted in George Godfrey Cunningham (1837, 69).

was his understanding of which problems to take up; no colleague of his addressed the state of natural philosophy with more surety. In chemistry, he introduced methods to distinguish between gases, which held the key to understanding chemical composition and to rethinking the fundamentals of the science. He saw that for electricity to take its place alongside mechanics and the law of gravitation, the law of electric force needed to be determined and experimental consequences drawn from it. He carried out experiments to establish the basic laws of heat, the foundation of an exact theory of the field. A third merit was his conscientious service of fifty years in the work of the Royal Society and the breadth of knowledge, skills, and experience he brought to it. The scientist who engages with his fellows scientists in organized activities can affect the course of science as significantly as an author of many publications. Standards of practice, rules of communication, venues of scientific exchange, material resources of research, and much else move on as surely as does the frontier of science as recorded in publications. A fourth merit was a standard of excellence. By this measure, Davy compared Cavendish, whom he called “great,” with the greatest: “Since the death of Newton, if I may be permitted to give an opinion, England has sustained no scientific loss so great as that of Cavendish.”¹⁷ Upon learning of Cavendish’s death, John Walker described him to a colleague as “a man of wonderful mind, more nearly approaching that of Newton than perhaps any individual in this country since his time.”¹⁸ Blagden writing to a colleague after Cavendish’s death said that he was “by much the best philosopher in my opinion that we have, or have had, in my time, at the R[oyal] S[ociety].”¹⁹ Making allowance for the tendency to exaggerate the virtues of the recently deceased, these appraisals give us some notion of how Cavendish was seen by his contemporaries. The idea of the great man in history has long been out of favor, regarded as a relic of the nineteenth century. Today the truth of the past is sought in a complex of social and material forces, from which a skepticism about learning anything useful to history from biography follows. But by “great Man,” Davy clearly meant that Cavendish was a very good scientist, not that he heroically transformed science.

Cavendish’s early biographers were scientific men, who were naturally more interested in Davy’s “great Man” than in his “extraordinary singularities,” which they touched on by retelling anecdotes if at all, generally relegating the subject to what Cuvier called the “trivia of life.”²⁰ His later biographer Wilson, however, saw a connection between the great man and certain singularities, which was not trivial or accidental but evidence of a strong will. Cavendish’s attachment to inflexible routines, Wilson said, arose from his desire to replicate in his small world the invariable rhythms of the great world such as the rotations of the planets about the Sun.²¹ We agree that Cavendish had a strong will, but it unlikely took the form Wilson suggested. An alternative, if partial, explanation of his regularities is an inborn proclivity, leading to behavior analogous to periodicities observed in the physical world. The strength of his will is to be seen in his life course.

Two passages of Wilson’s have been frequently quoted, one having to do with Cavendish’s range of emotions, the other with the way his mind worked. Cavendish’s character “can be described only by a series of negations. He did not love; he did not hate; he did

¹⁷Humphry Davy, quoted in John Davy (1836, 222).

¹⁸John Walker to James Edward Smith, 16 Mar. 1810 in Lady Smith (1832, 170–171).

¹⁹Charles Blagden to B. Delessert, 20 Mar. 1810, draft, Blagden Letters, Royal Society, D.44g.

²⁰Georges Cuvier (1961, 236–238).

²¹Wilson (1851, 187).

not hope; he did not fear; he did not worship as others do. He separated himself from his fellow men, and apparently from God. There was nothing earnest, enthusiastic, heroic, or chivalrous in his nature, and as little was there anything mean, groveling, or ignoble. He was almost passionless.”²² For all of its positive qualities, its fairness, truthfulness, and insightfulness, Wilson’s biography is a vivid portrait of Victorian negations, of a man deficient in piety, poetry, friends and family bonds, of a man estranged from humanity, who cared only for science. We recognize a foreshadowing of the portrait in the judgment on men who abuse science by Cavendish’s evangelical neighbor John Venn, quoted earlier. We might agree that Cavendish cared only for science, but this did not preclude his humanity (or spirituality). It seems to us that quite the opposite was the case. Science included Cavendish in the world, for it was through science that he formed all of his meaningful connections with his fellow humans. Science is foremost a social endeavor.

Denied the everyday human qualities, Wilson’s Cavendish is allowed only those traits required for his scientific work: intelligence, good eyes, and skillful hands. His horizon was correspondingly constricted. “His Theory of the Universe seems to have been, that it consisted *solely* of a multitude of objects which could be weighed, numbered, and measured; and the vocation to which he considered himself called was, to weigh, number, and measure as many of those objects as his allotted three score years and ten would permit.”²³ From the testimonies, Wilson decided that Cavendish’s brain “seems to have been but a calculating engine.”²⁴ This characterization of Cavendish’s view of the world and of the brain that conceived it is insightful but incomplete. In the laboratory, Cavendish worked with measurements, numbers, and calculations, but he also took account of much that lies outside mechanical calculation: the selection of the phenomena to study, the handling of instruments, the registering of sense impressions and their interpretations. Most of Cavendish’s researches were both quantitative and qualitative, and some of them, for example his geological observations, were almost entirely qualitative. Wilson’s description of Cavendish’s brain as a calculating engine is furthest off the mark in his theoretical work. Although it was mathematical, it had little to do with calculation and much to do with understanding. Cavendish sought concepts that describe the physical world and he invented experiments that correspond to them. For him, numbering, weighing, and measuring were not an end in themselves but an aid to “strict reasoning,” the way to scientific truths. The expression “calculating engine” suggests the mind of a savant, not Cavendish’s.

Wilson’s likening of Cavendish’s mind to a calculating engine was timely. His biography was published in 1851, the year the first commercially successful mechanical calculating machine was manufactured, Thomas de Colmar’s “Arithmometer.” This was an adding machine with a moving carriage, which allowed for multiplication and division. Designed to meet the manufacturing capabilities of the time, it was durable and reliable, and it launched a new industry, calculating engines. Businesses, banks, insurance companies, government offices, and other operations that used a flow of calculations began to depend on it. Its use spread around the world, and for forty years it was the only mechanical calculator for sale. It had many non-commercial predecessors, however. The mathematician Charles Babbage’s

²²Ibid., 185.

²³Ibid., 186. Quantity being the distinguishing mark of Cavendish’s work in Wilson’s view, he may have looked to the bible for a passage to give it proper emphasis, though he could have found it elsewhere: “Thou hast ordered all things in measure, and number, and weight.” (Wisdom 11:21).

²⁴Wilson (1851, 185).

calculating machines, the “difference engine” begun in 1821 and the “analytical engine” begun in 1834, have been called “one of the startling intellectual achievements” of Wilson’s century. To encourage Babbage, the Astronomical Society of London awarded him a gold medal on the expectation that when his difference engine was built, it could be used to calculate astronomical and navigational tables.²⁵ Such a grand calculating machine would have been helpful to Cavendish in some of his work,²⁶ but the scientific uses he put his mind to could not have been taken over by it, no matter how ingenious. This is the weakness of Wilson’s metaphor, though given that calculating engines created a stir in his time, it is not surprising that he borrowed one to describe his unusual biographical subject.

Normality and Eccentricity

In this section and the next we consider two perspectives on Cavendish the “great Man with extraordinary singularities,” those of eccentricity and autism. Originally a technical term in geometry and astronomy, “eccentricity” acquired its figurative meaning in the late seventeenth century. In the late eighteenth century, the *London Times* called it “a departure from the general conduct of society,” the meaning we give it today. The word “eccentric” came to stand for an individual with eccentricities only in the early nineteenth century.²⁷

There has been little scientific interest in eccentricity. To make a start, the psychologist David Weeks and his colleagues undertook a psychological study of about 1000 self-professed British eccentrics. They included in their study about 150 historical figures who were thought of as eccentric in their time. Cavendish, who is one of them, they characterized as shy and introverted “to a highly eccentric degree,” whose “selective avoidance of people probably amounted to a social phobia.”²⁸

They single out five eccentric traits as most important, four of which apply to Cavendish: nonconformity, creativity, strongly motivating curiosity, and obsession with one or more hobbyhorses.²⁹ The fifth trait is idealism, or the ambition to change the world. Cavendish no doubt favored improvements, but he showed no dissatisfaction with the society in which he was fortunately placed.

In the eighteenth century certain traits of character were seen as distinctively English for which there was a word, which entered dictionaries near the end of Cavendish’s life, “Englishness.” Earlier the expression “English national character” was used, meaning the same. “National character” has fallen out of favor for its suggestion of ethnic and racial

²⁵Anon., “Mechanical Calculator” (http://en.wikipedia.org/wiki/mechanical_calculator). Anon., “Arithmometer” (<http://en.wikipedia.org/wiki/arithmometer>). Computer History Museum, “The Babbage Engine” (<http://www.computerhistory.org/babbage/engines>). Simon Schaffer (1994, 203).

²⁶The auction catalog of Cavendish’s instruments lists two calculating machines, but no description is given, item 69. *Catalogue of Sundry Very Curious and Valuable Mathematical, Philosophical, and Optical Instruments*.

²⁷Sophie Aymes-Stokes and Laurent Mellet (2012). Victoria Caroll (2008, 12–13). Anon, “Eccentricity (Behavior)” ([http://en.wikipedia.org/wiki/Eccentricity_\(behavior\)](http://en.wikipedia.org/wiki/Eccentricity_(behavior))).

²⁸David Weeks and Jamie James (1995, 10–12, 42, 49–50, 107–108).

²⁹*Ibid.*, 27–28, 32–33, 181–182. They regard eccentricity as a continuum of behaviors, which vary over time, place, and social level. Their empirical findings tell us about categories of eccentricity and about the personality traits that accompany them, but their method of selection of eccentric persons fails to identify some kinds of eccentrics. If Cavendish had been alive at the time of their studies, he would not have been included, for he would not have volunteered as a self-defined eccentric to undergo an interview with the researchers. An atypical eccentric in their sample, Cavendish was an introvert who held normal ideas, whereas most of their eccentrics were extroverts who held eccentric ideas.

personality traits, but in the eighteenth century it was thought to stand for a valid concept of social analysis.³⁰ Observations of English national character at the time were often perceptive, but their generalization to all English was fanciful; although institutions and manners in England were distinctive, they did not come about through a particular collection of national personality traits. Given this admission, the concept of English national character still has a limited use for us as a contemporary benchmark for assessing Cavendish's behavior. By informing us what was thought of as native behavior in Cavendish's day,³¹ English national character helps us recognize what was seen as eccentric about him. In this section, "national character" means behaviors that English and foreign observers often regarded as distinctively, though not uniquely, English. We are dealing with subjective perceptions.

The English had a problem with national character; for it implied uniformity, the opposite of individuality, a valued trait. Priestley said that the English were thought to have the "least of an uniform national character, on account of their liberty and independence, which enables every man to follow his own humour."³² The answer to the problem was found in the notion of "eccentricity," which implied a norm of behavior, related to the national character. Eccentric departures from the norm were understood to arise from an unrealistic view of the world; they were benign, often found engaging, occasionally troubling but definitely not disruptive of the social order. They were an excess of a good thing, individuality.

In a historical study of English national character, Paul Langford identifies six "supposed traits of Englishness": eccentricity, decency, candor, taciturnity, reserve, and energy. We make use of his list here, beginning with the first trait, eccentricity, which was seen to fit Cavendish. His colleague Thomas Young said that his "severe scientific study" alone spared him from "absolute eccentricity."³³ We take Young to mean that outside of science Cavendish was eccentric. Others at the time might have considered Young overly cautious in excluding Cavendish's severe scientific study, since a person who was obsessional was often considered eccentric.³⁴ In his biography of Cavendish, Wilson did not use the word "eccentric," but he used words that mean the same, "difficult character," "singular oddities of character," and "peculiarities of his character."³⁵

Decency, a second presumed national trait, we recognize in Cavendish's management of his farms; he restrained his steward from taking actions that could hurt delinquent tenants. Cavendish was known for his candor, or love of truth, a third presumed national trait. He had the "most amiable candor" and the "strictest integrity," Blagden said.³⁶ Traits related to candor are honesty, sincerity, directness, openness, and simplicity, all of which apply to Cavendish. Simplicity is seen in Cavendish's writing, a perfect fit with the original statutes of the Royal Society: "in all reports [...] the matter of fact shall be barely stated, without any prefaces, apologies, or rhetorical flourishes."³⁷ Davy said that Cavendish wrote with the "greatest dignity and simplicity and in the fewest possible words, without parade or

³⁰Paul Langford (2000, 1–2, 7–8, 26).

³¹Peter Mandler (2006, 2, 53, 57).

³²Before Priestley, the philosopher David Hume used almost the same words: because of the "great liberty and independency which every man enjoys," the English "of any people in the universe, have the least of a national character." Langford (2000, 22, 291–292, 300–303).

³³Thomas Young, (1816–1824, 444)

³⁴Langford (2000, 303).

³⁵Wilson (1851, 167, 170).

³⁶Charles Blagden to William Cullen, 17 June 1784, draft, Blagden Letterbook, Yale.

³⁷Quoted by Edward Thorpe (1921, 6)

apology,” stating the “simple truth.”³⁸ Likewise Young said that Cavendish’s publications were “expressed in language which affords a model of concise simplicity.”³⁹ The style of Cavendish’s handwriting was in keeping: clear, without flourishes. The library stamp in his books was simple, his name only, with no embellishments. His preference for simplicity carried over to his scientific work; his apparatus was simple, making use of plain fir, not hardwood.⁴⁰ Simplicity was a widely held value in a time when nature was coming to be opposed to artifact as the standard of behavior. Newton, the authority on the subject, wrote that “nature will be very conformable to herself and very simple,” that “truth is ever to be found in the simplicity, and not in the multiplicity and confusion of things.”⁴¹ Cavendish’s search for truths of nature was at the same time a commitment to simplicity. He wrote in a planned treatise on mechanics that Newton’s second law of motion is “the most simple & therefore the most likely to be true of any law one can invent.”⁴² Blagden said Cavendish had “a truly philosophical simplicity of manners.”⁴³ Simplicity marked his every action in the world.

Openness was valued by the English,⁴⁴ who suspected that anything that could not be said openly concealed something discreditable.⁴⁵ In the management of his farms, Cavendish told his steward that the condition of his employment was complete openness. In his scientific activity he encouraged openness. When Michell asked him to keep “secret” the principle of an astronomical method until his paper was read before the Royal Society six months from then, Cavendish said he was “sorry” he wanted him to do that, for “the surest way of securing merit to the author is to let it be known as soon as possible & those who act otherwise commonly find themselves forestalled by others.”⁴⁶ Michell agreed with Cavendish, giving him permission to show his paper to any interested persons. Cavendish asked the government not to keep “secret” Hatchett’s experiments on gold alloys for coinage carried out under his direction, and the government complied.⁴⁷ When the author of a pamphlet on the Royal Society’s dissensions wanted to remain anonymous, Cavendish advised otherwise on the grounds that the only way for it to have an effect was for the author to supply his name, and the author agreed to put his name on the pamphlet.⁴⁸ In response to Marum’s complaint that Cavendish had not provided him with the information he requested about an experiment, Cavendish published the letter he had sent to Marum three years earlier to enable readers to judge the fairness of the criticism, for he “should be sorry to be thought to have refused any necessary information.”⁴⁹ Clarity of communication is related to openness, and Cavendish prescribed methods of using scientific instruments to enable researchers to understand one another without question. Openness was a guiding principle of the Royal Society, as it was of Cavendish’s.

³⁸Humphry Davy, quoted in Thorpe, *ibid.*, 5–6.

³⁹Young (1816–1824, 436)

⁴⁰Wilson (1851, 178).

⁴¹Isaac Newton (1952, 372). Newton quoted in Frank Edward Manuel (1974, 120).

⁴²Henry Cavendish, “Plan of a Treatise on Mechanics,” Cavendish Mss., VI(b), 45:17.

⁴³Charles Blagden to William Cullen, 7 June 1784, draft, Blagden Letterbook, Yale.

⁴⁴Langford (2000, 90–92).

⁴⁵*Ibid.*, 96, 99.

⁴⁶Henry Cavendish to John Michell, 27 May 1783, draft; in Jungnickel and McCormach (1999, 567).

⁴⁷Henry Cavendish to Charles Hatchett, 15 Oct. 1802; this letter was enclosed in a letter by Charles Hatchett to Joseph Banks, 24 Oct. 1802, BL Add Mss 38424, f. 160.

⁴⁸Charles Blagden to Joseph Banks, 24 and 26 Oct. 1784, BM(NH), DTC 3:83–86.

⁴⁹Henry Cavendish to Martin van Marum, published in Cavendish (1788b, 231–232).

Foreigners who were sensitive to English inconsistencies “made an exception for taciturnity, one constant characteristic of an Englishman,” a presumed fourth national trait. To a foreigner, English clubs seemed quiet, their members respecting one another’s silences.⁵⁰ When dining at one of his dining clubs, Cavendish suddenly broke the silence. “I am told that you see the stars round, Dr. Herschel.” “Round as a button,” Herschel replied. Silence returned until nearly the end of dinner, when Cavendish asked in a doubtful voice, “Round as a button?” “Exactly, round as a button.”⁵¹ The exchange is recalled as an example of Cavendish’s silent manner and his occasional departure from it, which it is, though because Herschel said no more than Cavendish, it could equally be taken also as an example of English dinner conversation. According to Brougham, Cavendish “uttered fewer words in the course of his life than any man who ever lived to fourscore years, not at all excepting the monks of La Trappe.” Less colorfully, and more accurately, Playfair said that Cavendish “speaks with great difficulty and hesitation, and very seldom.” To a colleague, Banks referred to Cavendish “who you know is little given to talking.”⁵² But when he was familiar with a person, on occasion his “conversation was lively, and full of varied information.”⁵³ He had the manners of a silent English gentleman, who in a reassuring setting could become almost loquacious.

English gentlemen were known for their reserve, a presumed fifth national trait. Brougham, we recall, said that Cavendish had “a most reserved disposition,”⁵⁴ a behavior consistent with his taciturnity. He showed several other traits similar to reserve: preference for solitude and privacy, shyness, avoidance of women, apartness from servants, and coldness. Henry Holland, who knew Cavendish from the Royal Institution, spoke of his preference for the “*umbratilis vita*,” an ancient expression: *umbratilis*, keeping out of sight, as it were in the shade (Virgil); *umbratilis vita*, retired, contemplative life (Cicero).⁵⁵ Barrow said that Cavendish seemed “to consider himself as a solitary being in the world, and to feel himself unfit for society.”⁵⁶ Davy said that Cavendish “lived latterly the life of a solitary.” A Clapham neighbor said that Cavendish’s “desire seemed to be alone and to be left alone.”⁵⁷ “A singular love for solitariness, and the reluctance to mix with his fellows” was the “most striking” peculiarity of Cavendish, Wilson concluded from the totality of reports of his behavior.⁵⁸ An Englishman placed high value on privacy; jealous of his freedom and independence, he “could not tolerate ease of access to his home.” It was in the worst of taste for an acquaintance to arrive at his house at dinnertime and expect to be fed,⁵⁹ or for a banker to call on him unannounced and expect to do business. Cavendish’s banker made this mistake. He identified himself to Cavendish’s servant, who passed the information to his master: “Mr. Cavendish, in great agitation, desires he may be sent up, and before he entered the room, cries, ‘What do you come here for? What do you want with me?’” The banker proposed an action, and in ill humor Cavendish agreed: “Do so!

⁵⁰Langford (2000, 179).

⁵¹Constance Lubbock (1933, 102).

⁵²Joseph Banks to William Hamilton, 30 Nov. 1794, BL, Edgerton 2641, 155–156.

⁵³Davy (1836, 222).

⁵⁴Henry Brougham (1845, 258).

⁵⁵Henry Holland, in Archibald Geikie (1917, 225).

⁵⁶Barrow (1849, 144).

⁵⁷Dr. Sylvester quoted in Wilson (1851, 170).

⁵⁸Ibid., 165.

⁵⁹Langford (2000, 107, 119–120).

Do so, and don't come here to trouble me, or I will remove it [his account at the bank].”⁶⁰ Cavendish's value on privacy was firmly anchored in English social customs.

Shyness is not the same as reserve, but their behaviors are close. In accounts of Cavendish from the time, the words “shy” and “shyness” appear regularly and, if less often, related words such as “diffident,” “bashful,” and “embarrassed.” Brougham said that Cavendish had “peculiarly shy habits,” which accounted for his “singularity of manner.” He entered “diffidently into any conversation,” and then only when it was on a scientific subject that interested him.⁶¹ According to a member of his club, if someone tried to draw him into conversation, “he always fought shy.” The best way to engage him was “never to look at him, but to talk as it were into vacancy.”⁶² Banks advised visitors “to avoid speaking to him [...] [but] if he speaks to you, continue the conversation.”⁶³ Blagden wrote of his “shyness and diffidence natural to his disposition.”⁶⁴ Barrow spoke of his “extreme shyness,” as confirmed by “all his habits.”⁶⁵

Embarrassment and shyness are often confused, and they are close. Thomson said that Cavendish was “shy and bashful.”⁶⁶ Any attention to Cavendish's person caused him acute embarrassment, as shown by the following incident. Introduced to a foreign visitor as a celebrated natural philosopher, he was subjected to a flattering speech. “Mr. Cavendish answered not a word, but stood with his eyes cast down quite abashed and confounded. At last, spying an opening in the crowd, he darted through it with all the speed of which he was master; nor did he stop till he reached his carriage, which drove him directly home.”⁶⁷ In addition to drawing unwanted attention to his person, the encounter with the foreign visitor involved a stranger, who was another problem. Strangers made a mistake if they tried to become “familiar” with an Englishman, for this implied the right to intrude, an un-English liberty. According to a foreign observer, if strangers “should venture to address them [the English], they receive it with the air of an insult.”⁶⁸ Strangers were advised that unless Cavendish spoke to them first, they should not speak to him “as he would be offended.”⁶⁹ He had a “perfect horror” of a strange face, according to a former stranger: “My eye caught that of Cavendish, and he instantly became silent: he did not say a word.”⁷⁰ Having obtained permission to use Cavendish's library Alexander von Humboldt was cautioned that if he should encounter the owner “he was on no account to presume so far as to speak, or even greet” him.⁷¹ Foreign and out-of-town visitors and other strangers were invited to the Sunday conversational gatherings at Banks's house. Cavendish's arrival at Banks's house was described by a fellow of the Royal Society: “I have myself seen him stand a long time on the landing, evidently wanting courage to open the door and face the people assembled,

⁶⁰Wilson (1851, 175–176).

⁶¹Brougham (1845, 258).

⁶²A chemist, quoted in Wilson (1851, 169).

⁶³Pepys, quoted *ibid.*, 168.

⁶⁴[George Augustus Henry Cavendish and Charles Blagden], *Gentleman's Magazine* (March, 1810, 292). Family obituary of Henry Cavendish.

⁶⁵Barrow (1849, 144).

⁶⁶Thomas Thomson (1830–1831, 1:337).

⁶⁷*Ibid.*, 337–338.

⁶⁸Langford (2000, 238, 249, 255).

⁶⁹Pepys, quoted in Wilson (1851, 168).

⁷⁰Children, quoted, *ibid.*, 169.

⁷¹From K. Bruhn's *Life of Alexander von Humboldt*, quoted in James Thorne (1876, 1:111).

nor would he open the door until he heard someone coming up the stairs, and then he was forced to go in.”⁷²

English males were brought up to behave “with extreme caution where women were concerned,” and some never learned how to relate to them. With exceptions, Cavendish avoided women, whom we might think of as a variety of strangers, but this would overlook the intensity of his aversion, as Wilson described it. In his neighborhood, Cavendish was regarded as a woman hater,⁷³ and at the Royal Society Club he gave the impression that he despised men who liked female company.⁷⁴ A supposed instance of this occurred at a dinner of the Club, where members noticed a pretty girl watching them from a window across the street, and they gathered around their window to admire her. Thinking they were looking at the moon, Cavendish joined them at the window, but when he saw what they were about, he turned away in “intense disgust.”⁷⁵ Misogyny, if that describes Cavendish, was an extension of familiar English male behaviors.⁷⁶

Relations between masters and servants in English homes were characterized by an absence of human warmth.⁷⁷ When Cavendish encountered one of his maids with cleaning tools on the stairs, he immediately had a back stairs built.⁷⁸ This has been taken as evidence of his misogyny, which it may be, but it can be seen another way too. The addition of back stairs in British houses was common, the object being to remove servants as far as possible from their masters except when they were called to present themselves. It has been called a “revolutionary invention,” but by the time Cavendish built his back stairs, it was no longer revolutionary, having been around for a century.⁷⁹ To avoid encountering his female servants, Cavendish followed another plan, leaving a note at a certain hour on the hall table with instructions for his dinner.⁸⁰ If a female servant “ever showed herself she was immediately dismissed.”⁸¹ This behavior might fall under the heading of misogyny, which is where Wilson places it, but if it does, it also belongs under servant and master behavior, falling under Englishness.

Relations between masters and servants were a more rigorous instance of a general characteristic, coldness. “England is not the country of emotions,” a foreign visitor put it.⁸² One evening after Cavendish had left the company at the Monday Club, Blagden and Aubert talked about him, agreeing that he had “no affections, but always meant well.”⁸³ Blagden and Aubert considered themselves Cavendish’s friends, and he evidently gave no sign of affection in return. Cavendish sought out colleagues, but if their conversation strayed from science, he “turned aside, and all the cold indifference of his nature returned.”⁸⁴ One

⁷²Wilson (1851, 169).

⁷³Mrs. Herbert, quoted in Wilson (1851, 178).

⁷⁴Barrow (1849, 145).

⁷⁵A fellow of the Royal Society, quoted in Wilson (1851, 170). John Timbs regarded this anecdote as apocryphal, though he used it all the same. It may be apocryphal, but we have no way of knowing, and it is consistent with less colorful reports of Cavendish’s aversion to women. Timbs (1866, 1:143).

⁷⁶Langford (2000, 304).

⁷⁷Ibid., 241–244.

⁷⁸Wilson (1851, 170).

⁷⁹Patricia Meyer Spacks (2003, 6).

⁸⁰Brougham (1845, 258–259).

⁸¹Wilson (1851, 169).

⁸²Langford (2000, 250).

⁸³15 Sep. 1794, Charles Blagden Diary, Royal Society 3:16(back).

⁸⁴A fellow of the Royal Society, quoted in Wilson (1851, 182).

of Wilson's informants called Cavendish the "coldest and most indifferent of mortals."⁸⁵ By the end of Cavendish's life, the English national character was identified with stolidity, impassivity, and self-control, a source of pride for the English, evidence of rationality and disproof of superficiality.⁸⁶ Cavendish had an abundance of this English virtue.

The final presumed trait of Englishness is energy. Persons of high achievement commonly display more energy than others, but on this point we are unsure about Cavendish. He did a great deal of original work in science, much more than his publications would suggest, as we know from his manuscripts, but he also had a great deal of time in which to do it. What Blagden wrote to a colleague in 1790, "Mr. Cavendish does not seem to be very busy,"⁸⁷ we suspect could have been said of him at other times as well. In response to a correspondence begun by Priestley, Cavendish said that he would send an account of his experiments in the future, "but I am so far from possessing any of your activity that I am afraid I shall not make any very soon."⁸⁸ Compared to the tireless Priestley, any person might feel slow, but for Cavendish this description was self-characterizing. For six months Priestley's second letter went unanswered; Cavendish apologized, "as I make not a tenth part of the exper that you do & as my facility in writing falls short of yours in a still greater proportion I am afraid will think me a bad correspondent & that the advantage lies intirely on my side."⁸⁹ During the dissensions of the Royal Society, Cavendish said that his only objection to assuming leadership was "his unfitness for active exertion."⁹⁰ We can say with reasonable confidence that Cavendish was not supercharged.

Of the six traits of Englishness, in the liberal interpretation given to them here, two of them, taciturnity and shyness, contain nearly all of Cavendish's markedly eccentric behaviors. They relate to his silences, solitariness, wariness of strangers, aversion to women, and emotional coldness. As we have seen, his eccentricities were extensions of behaviors thought to be characteristically English; they were not original departures from them but confirmations of them. Other eccentric behaviors of his are not particularly English nor are they very eccentric; for example, the regularity of his daily activities and his old-fashioned dress.

Eccentric behavior can seem comical or absurd, as it should, since the judgment is made by normal people, whose normal behavior makes sense to them. Lest we leave Cavendish at the mercy of his eccentricities, we should be aware that there is another way of looking at them, which is thought to be quintessentially English. In the early nineteenth century, a genre of popular writing was invented, the eccentric biography, consisting of collections of brief biographies of persons famed for their eccentricities. An early English author of an eccentric biography John Timbs wrote in *English Eccentrics and Eccentricities*, "how often do we find eccentricity in the mind of persons of good understanding." However "outlandish, odd, queer" the eccentric appears, he "may possess claims to our notice which the man who is ever studying the fitness of things would not so readily present."⁹¹ Later in the century, the English philosopher John Stuart Mill welcomed eccentricity as an antidote to oppressive popular opinion, which he expressed as a mathematical observation: "the amount

⁸⁵Quote from one of Willson's informants, *ibid.*, 173.

⁸⁶Langford (2000, 250).

⁸⁷Charles Blagden to Richard Kirwan, 20 Mar. 1790, draft, Blagden Letters, Royal Society 7:322.

⁸⁸Henry Cavendish to Joseph Priestley, n.d. [after May 1784], draft; in Jungnickel and McCormmach (1999, 594).

⁸⁹Henry Cavendish to Joseph Priestley, 20 Dec. 1784, draft; *ibid.*, 598–599, on 599.

⁹⁰Charles Blagden to Joseph Banks, 5 Apr. 1784, BM(NH), DTC 3:20–21.

⁹¹Timbs (1866, 1:iii–iv).

of eccentricity in a society has generally been proportional to the amount of genius, mental vigour, and moral courage it contained.”⁹² In the next century, Edith Sitwell, author of *English Eccentrics*, and herself an eccentric, wrote an appreciation of eccentricity: “the man of genius and the aristocrat are frequently regarded as eccentrics because genius and aristocrat are entirely unafraid of and uninfluenced by the opinions and vagaries of the crowd.”⁹³ In his history of aristocracy, the English baron Lord Montagu of Beaulieu writes that an aristocrat did not need to make a display of his wealth or observe flawless etiquette or restrict his social life to his own stratum: “individuality and eccentricity, the product of security, were class characteristics of the British aristocracy.”⁹⁴ The psychologists of eccentricity Weeks and Kate Ward defend eccentrics: “in an era when human beings seem typecast by their culture or genes, eccentrics are a refreshing reminder of everyone’s intrinsic uniqueness. By heedlessly flouting norms of behavior that most of us never question, they remind us how much of our liberty we forfeit without thought, and how great our ability is, in fact, to forge our own identities and shape our own lives.”⁹⁵ With the positive case for eccentricity in mind, we look at Cavendish again. Mills recognized eccentricity as “strength of character,” and Wilson recognized Cavendish’s “peculiarities” as “tokens of a strongly developed will.” If we bring their thoughts together with Langford’s on eccentricity as a trait of Englishness and Sitwell’s and Montagu’s on genius and aristocracy, we have our subject, Cavendish the willful investigator of nature and an eccentric example of the complete Englishman.

From that positive perspective, which admittedly ignores much else that can be said about Cavendish’s eccentricity, we see his shyness not so much as a handicap as a useful protection of his privacy, freeing him for what he knew was best for him, scientific work. Likewise we think of his shyness as the social expression of a native circumspection, which in the laboratory took the objective form of the “error of the observer” and “corrections” for the totality of extraneous factors influencing the experiment. We think of his solitariness and taciturnity not as social withdrawal but as an indication of self-sufficiency and maturity.⁹⁶ When Cavendish *did* speak, Playfair said, it was always “exceedingly to the purpose, and either brings some excellent information, or draws some important conclusion.”⁹⁷ Davy said that when Cavendish *did* speak, his “conversation was lively, and full of varied information,” and that “upon all subjects of science he was luminous and profound; and in discussion wonderfully acute.”⁹⁸

Autism

In 2001 the eminent neuropsychologist Oliver Sacks diagnosed Henry Cavendish with Asperger’s syndrome, a less severe form of autism, in a communication to the scientific journal *Neurology*. He said that he is wary of recent claims of Asperger’s syndrome for historical figures, but he considers Cavendish an exceptional case, finding the evidence for his autism

⁹²John Stuart Mill (1859). Quoted in Carroll (2008, 11).

⁹³Edith Sitwell (1965, 145).

⁹⁴Edward Douglas-Scott, Lord Montagu of Beaulieu (1970, 142–143).

⁹⁵David Weeks and Kate Ward (1995); quoted in Clifford A. Pickover, (1998, 279).

⁹⁶Philip G. Zimbardo (1977, 2, 16, 20). Anthony Storr (1988, 29). Susan Sontag (1969, 19–20, 26).

⁹⁷John Playfair quoted in Wilson (1851, 166).

⁹⁸Humphry Davy, quoted in John Davy (1836, 2:222).

“almost overwhelming.”⁹⁹ Upon rereading Wilson’s biography of Cavendish, he wrote in his memoir *Uncle Tungsten* the same year that Cavendish was a “unique autistic genius.”¹⁰⁰

In our biography of Cavendish in 1996, we said that because of his strange behaviors he invites a psychological approach, but that it was not the approach we took, as we explained. At the end of the biography, we briefly mentioned possible psychological descriptions of his behavior such as social anxiety, shyness, and embarrassment, and we pointed out that he showed “autistic-like traits,” which we listed.¹⁰¹ As a source, we cited an earlier publication by Sacks, containing a moving account of the autistic scientist Temple Grandin.¹⁰²

We published an improved version of our biography three years later, and we again briefly brought up psychological descriptions, though this time we left out any mention of autism, since we wanted the biography to be solid. Autism is a disorder that begins in childhood, and almost nothing is known about Cavendish’s childhood, and also certain criteria for autism seemed to us a questionable fit. Since then we find in recent writings on the subject a growing acceptance of a more inclusive understanding of autism together with a trend in clinical thinking that favors an autistic continuum approach. In this section, we consider Sacks’s diagnosis of Cavendish’s autism, which was written up in *The New York Times*, “A Disorder Far beyond Eccentricity.”¹⁰³

Definitions and diagnostic criteria of autism are given in the *Diagnostic and Statistical Manual of Mental Disorders (DSM)*, published by the American Psychiatric Association, and in the *International Classification of Diseases (ICD)*, published by the World Health Organization. A fifth edition of the *DSM* was published in 2012, with changes in the classification and diagnosis of autism, but since most of the recent literature on autism refers to the fourth edition, which is not contradicted by the new edition, we use the earlier edition here. “Classic” autism is a disorder with three areas of difficulties. The first is social interaction, which includes unresponsiveness to others, lack of friends, disinterest in sharing, and atypical eye contact, facial expressions, and responses to the emotions of other people. The second is verbal communication, which includes difficulty with language and conversation and atypical intonation, pitch, and emphasis in speech. The third is repetitive behaviors, which include preoccupation with narrow interests, insistence on fixed routines, and mannerisms such as hand flapping. Other difficulties commonly found in autistic persons include intellectual disability, heightened or diminished sensitivity to sensory stimuli such as sight and sound, and perceptual problems in making sense of sensory stimuli.¹⁰⁴ Because of the range of autistic behaviors, it is meaningful to speak of an “autism spectrum disorder.” At one extreme of the spectrum are persons who are unable to speak and are otherwise severely handicapped. The autism we are interested in is at the other extreme, the

⁹⁹Oliver Sacks (2001a, 1347).

¹⁰⁰Oliver Sacks (2001b, 121).

¹⁰¹Hugo Lidbetter writes that Jungnickel and McCormmach “got very close to suggesting” that Cavendish may have had Asperger’s syndrome by emphasizing his shyness. We got closer than that, we said it: “We observe in Cavendish a number of autistic-like traits: single-mindedness, apparent inability to feel certain emotions, seclusion, rigidities of behavior, odd gait, harsh voice, strange vocalizations, panic attacks, self-acknowledged social unfitness.” Jungnickel and McCormmach (1996, 368). The author’s purpose is to make a “systematic exploration” of Sacks’s claim that Cavendish had Asperger’s syndrome. His article consists of matching Cavendish’s behaviors with the Gillberg diagnostic criteria for Asperger’s syndrome. He says Cavendish had this disorder. “Henry Cavendish and Asperger’s syndrome: A New Understanding of the Scientist” (2009, 784).

¹⁰²Oliver Sacks (1995). Temple Grandin (1995).

¹⁰³Erica Goode (2001).

¹⁰⁴Ilona Roth (2010, 3–4, 38–41).

normal- or high-IQ end, which in *DSM* and *ICD* (10th edition) enters as two separate and closely related categories: high-functioning autism and Asperger's syndrome.¹⁰⁵

Ordinarily autism is diagnosed early, the average age falling between three and four; in the case of Asperger's syndrome, it is often later, six or older.¹⁰⁶ The one reference we have to Cavendish's early years comes from Blagden, who wrote in the family obituary that his "habits had, *from early life*, been secluded."¹⁰⁷ It tells us that autism is not ruled out. The case for his autism depends on his adult behaviors, which are all we know. If we conclude that Cavendish was autistic, we think that if we knew about his childhood, we would find autistic traits there, as Blagden suggested.

To make the case, it is not enough to check off the symptoms in the diagnostic criteria as laid out in the *DSM* or *ICD*. Agreement between the symptoms and the criteria is important in making a reliable diagnosis, but so are the severity of the symptoms and their effect on the disorder. The determination normally requires clinical training. In this section, we show that a good many of Cavendish's personality traits are similar to ones commonly found in persons who are diagnosed with autism. The match is suggestive and perhaps significant, but on this basis alone we cannot conclude that Cavendish was autistic.

Autistic people "tend to be unconcerned about fashion or whether what they wear is contemporary."¹⁰⁸ They can differ from others in their way of moving, owing to poor balance and coordination.¹⁰⁹ Walking with scarcely any arm motion is an autistic trait.¹¹⁰ Clumsiness is another, according to Gillberg's criteria, an alternative to the *DSM*'s criteria, often preferred by clinical workers.¹¹¹ Cavendish's dress was always the same; he walked with one hand behind his back; he "bustled up to us in his odd way."¹¹²

Withdrawal upon eye contact, involuntary vocalizations and repetitive patterns of speech are common autistic behaviors. *DSM* criteria for Asperger's syndrome refer to "abnormalities in inflection," "talking too much" or "too little." Speech can be "unusually high-pitched" and have unusual "stress and rhythm." Autistic persons speak in facts, and without wishing to, they are often tactless. They frequently fall silent for no clear reason.¹¹³ Cavendish's speech was shrill and hesitant, and he repeated parts of speech. As we saw in the previous section, he was usually silent, but when he was seated near persons he liked, he frequently talked a "great deal."¹¹⁴ Eye contact could bring an immediate end to

¹⁰⁵"High-functioning autism" refers to autism with a normal or above-average IQ and with language delay; Asperger's syndrome is without the delay. The distinction between high-functioning autism and Asperger's syndrome may depend on the circumstances of the individual, and in practice the terms are interchangeable. There are the other sub-types of autism. "Pervasive developmental disorder—not otherwise specified" (P.D.D.N.O.S.)—is the term used when autistic features are insufficiently pronounced for a definitive diagnosis of autism or Asperger's syndrome. "Atypical autism" is used when autistic features are only partly seen. The "autism spectrum" includes all these types. Simon Baron-Cohen (2008, 14, 21–26). Roth (2010, 42).

¹⁰⁶Baron-Cohen (2008, 37). Temple Grandin (2011, 8).

¹⁰⁷Blagen's contribution to the family obituary of Henry Cavendish. Italics added.

¹⁰⁸Asperger Management (<http://www.aspergermanagement.com/personal-appearance>).

¹⁰⁹Tony Attwood (2007, 259).

¹¹⁰Ledgin (2001, 46).

¹¹¹Christopher Gillberg's diagnostic criteria are seen as closer to Hans Asperger's original descriptions. Attwood (2007, 53).

¹¹²Wilson (1851, 168, 170). In the sketch of him, his other hand is inside his coat. It is possible that the drawer invented the hand inside the coat, a common pose for formal portraits.

¹¹³Uta Frith (2011, 128–129). Attwood (2007, 37, 206, 224, 266–267). Grandin, quoted in Ledgin (2001, xiii).

¹¹⁴Wilson (1851, 167–168, 175). Barrow (1849, 144). Thomson (1830–1831, 2:337).

conversation, and when approached by a stranger, he might abruptly turn away, perhaps with a cry.

Autistic persons lack the emotional relatedness we call “affections.” As a result, they learn social skills by conscious observation and study rather than acquiring them instinctively as other persons do. As we have seen, Cavendish’s colleagues agreed that he showed “no affections, but always meant well.” If he lacked affections, he learned compensating social skills, which translated as “always meant well.”

A craving for solitude can be a sign of autism. Solitude is a powerful “emotional restorative,” above all if the autistic person is occupied with an absorbing interest.¹¹⁵ Cavendish showed “a singular love for solitariness.”¹¹⁶ Except for the servants’ wing, Cavendish’s houses were places of solitude. His laboratory was such a place, where he pursued his interest, the investigation of the physical world, and his study was another, where he read and wrote about the physical world; if he was autistic, he experienced no impairment in either place. On his deathbed he had no parting words for anyone: consistent to the end, he banished his servant so that he could experience his last moments in the “tranquility of perfect solitude.”¹¹⁷

Autistic persons can acquire encyclopedic knowledge in their fields of special interest.¹¹⁸ Their interest cannot be considered a mere hobby; on the contrary, it takes over their lives.¹¹⁹ Nature was the most common interest of the children Hans Asperger studied, some of whom showed remarkable abilities and specialized knowledge in natural science, chemistry, and mathematics. The only subjects that interested Cavendish were scientific,¹²⁰ and his knowledge of them approached encyclopedic.¹²¹

Autistic persons have a strong desire for certainty and its companions, objectivity, perfection, accuracy, and truth. Early in life they are often drawn to mathematics with its logical truths, possibly developing a skill in it.¹²² Cavendish brought a mathematical way of thinking to his interest in the physical world, with obvious success.¹²³ In her field, Temple Grandin has “a reputation for being totally objective,” her emotions playing no part,¹²⁴ and the same can be said of Cavendish. Autistic persons frequently are “perfectionists with high self-imposed standards of achievement”; each of Cavendish’s works was said to be “perfect at the moment of its production.” Autistic persons are recommended for employment for their accuracy, which they prefer to speed in accomplishing any task. Accuracy was a hallmark of Cavendish’s researches; Priestley referred to him as “that most accurate philosopher.” The quest for truth comes naturally to autistic persons, as does persistence in detecting and avoiding errors. Obsessive in identifying and dealing with errors, Cavendish was said to be motivated by disinterested “love of truth and of knowledge.”¹²⁵

¹¹⁵Attwood (2007, 55–56).

¹¹⁶Barrow (1849, 144). Wilson (1851, 165).

¹¹⁷Wilson (1851, 182–184). Young, “Cavendish,” 445–446.

¹¹⁸Attwood (2007, 179–180).

¹¹⁹Ibid., 172.

¹²⁰Wilson (1851, 182).

¹²¹Playfair (1822, 1:lxix).

¹²²Atwood (2007, 241).

¹²³Humphry Davy, quoted in John Davy (1836, 221).

¹²⁴Grandin, “Comments,” in Norm Ledgin (2000, 202).

¹²⁵Attwood (2007, 141, 238, 254, 295). Humphry Davy, quoted in John Davy (1836, 221). Joseph Priestley (1788, 327).

Autism was unknown to the medical world of the eighteenth century, but there is little doubt that there were autistic persons then, who could have included a gifted natural philosopher. Simon Baron-Cohen, an authority on autism, explains how this could come about: “People with autism, whose minds differ from what we consider typical, frequently display both disability and exceptional aptitude. Genes that contribute to autism may overlap with genes for the uniquely human ability to understand how the world works in extraordinary detail—to see beauty in patterns inherent in nature, technology, music and math.” He suggests that genes associated with autism persist over generations because they are co-inherited with genes responsible for mathematical and technical talent, which society welcomes.¹²⁶

Eccentricity, Autism, and Other Explanations

In the previous two sections, we looked at Cavendish’s life from the perspectives of eccentricity and autism. In this section we look at Sacks’s diagnosis of Asperger’s syndrome, and we also consider alternative diagnoses: shyness, introversion, and several medical disorders. We begin with the way Cavendish was seen by his contemporaries. His expression showed a “nervous irritation”,¹²⁷ his manner was “nervous.”¹²⁸ Eighteenth-century meanings of “nervous” were: characterized by an agitation or disordered state of the nerves; suffering from a disorder of the nerves; excitable, easily agitated, timid.¹²⁹ Cavendish’s speech was “excited”; he had “an air of timidity”; he had “a quickness and sensibility almost morbid,”¹³⁰ “morbid” meaning diseased; he was “shy and bashful to a degree bordering on disease.”¹³¹ The above words relate to what were called “nervous disorders.” Hypochondria, hysteria, and dyspepsia are examples, minor illnesses attended by frequent calls on physicians. What they had in common was a presumed disturbance of the nervous system, the origin of the name. Cavendish was seen to have behavior in common with persons with nervous disorders, though his colleagues stopped short of labeling him with a disorder, speaking instead of “bordering on” and “almost.” Young may have had this in mind when he attributed Cavendish’s speech mannerisms to the “constitution of his mind” rather than to a “deficiency of his organic powers.”¹³² Cavendish was an eccentric person, not a person normally considered mentally ill or physically handicapped.

From Cavendish’s time to the present, he has been regarded as eccentric. His prominent eccentricities, as we have seen, were exaggerations of generally admired traits of the English “national character”: his inordinate shyness and penchant for solitude, his coldness, possibly his special interest to the near exclusion of all other interests, and possibly some of his regularities. Just how extreme these traits appeared at the time is open to question.

Let us consider possible explanations of his eccentricity. Obvious ones are shyness and introversion, which although they do not rise to the level of disorders can be mental handicaps, often severe. We saw that among strangers, Cavendish showed embarrassment, self-consciousness, and tension; he avoided eye contact, fell silent, and on occasion fled.

¹²⁶Simon Baron-Cohen (2012, 74–75).

¹²⁷Brougham (1845, 259).

¹²⁸Humphry Davy (1839–1840, 7:139); quoted in Wilson (1851, 167).

¹²⁹“Nervous,” *Oxford Universal Dictionary*, 3d ed., 1321.

¹³⁰Pepys, quoted in Wilson (1851, 168). Young, “Cavendish,” 444.

¹³¹Thomson (1830–1831, 2:337).

¹³²Young (1816–1824, 444).

In the event that a stranger had interesting information, he showed a mix of avoidance and attraction typical of very shy people.¹³³ In other ways, Cavendish was atypical of shy people: he probably did not have low self-esteem and did not spend time thinking about his feelings and actions and how they appeared to other persons, mental states associated with shy behavior.

Introversion and reserve have different motivations than shyness. People who are introverted or reserved voluntarily limit their contact with others, since they gain no reward from it; people who are shy avoid contact because they fear it, not because they are unsociable.¹³⁴ Introverts, according to one study, are insistent on ethical standards, reliable, cautious, retiring, unemotional and have few close friends. According to another study, they are self-sufficient, serious, silent, skeptical, critical, precise, objective, rigid, and prone to sulk. They are rule-bound, limited in interests, hard workers, and retiring, especially with the opposite sex. They are drawn less to people than to impersonal objects such as mathematics, music, and science.¹³⁵ Like shyness, introversion is largely inborn. Introversion describes Cavendish, but it leaves out what shyness includes, unease and awkwardness, which he showed, and its motivation does not fit very well; he gained reward from contact with others if they had knowledge that interested him.

We pass from handicap to disorder. For a diagnosis of Asperger's syndrome, the *DSM* requires the presence of several social and behavioral impairments.¹³⁶ Under social, two or more of the following four criteria must be met:

- Impairment of nonverbal behaviors; for example, eye to eye contact, facial expression, posture, and gestures.
- Lack of relationships.
- Lack of spontaneity in seeking out and responding to persons with shared interests.
- Lack of social or emotional reciprocity.

Cavendish satisfied all four criteria. Under nonsocial behavioral criteria, at least one of the following must be met:

- Interests restricted in subject and abnormal in intensity.
- Adherence to nonfunctional routines.
- Repetitive physical mannerisms.
- Preoccupation with parts of objects.¹³⁷

Cavendish satisfied the first of the four criteria. By *DSM* criteria, then, Cavendish showed Asperger behaviors. Gillberg's twenty criteria for Asperger's syndrome are divided into six categories. One of the six, "speech and language peculiarities," contains five parts, at least three of which must be met: delay in the development of speech, superficial perfection in expressive language, pedantic language, impaired comprehension of language, and "odd prosody, peculiar voice characteristics."¹³⁸ Because only the last one of the five is known

¹³³Caroll E. Izard and Marion C. (1986, 151, 153). W. Ray Crozier (1990, 48); Crozier, "Summary of Conclusions," 54.

¹³⁴Anonym, *ibid.* "Extroversion and Introversion" (https://en.wikipedia.org/wiki/Extroversion_and_introversion). Anon. "Shyness" (<http://en.wikipedia.org/wiki/Shyness>).

¹³⁵Anthony E. Kemp (1996, 36–39, 49). Lawrence A. Pervin (1993, 283).

¹³⁶In the new revision, *DSM-V*, Asperger's syndrome is subsumed under "autism spectrum disorder" and the category "Asperger's syndrome" does not appear.

¹³⁷Attwood (2007, 41).

¹³⁸*Ibid.*, 37.

to fit Cavendish, Asperger's syndrome would seem to be ruled out. Depending on which criteria we use, Cavendish was or was not autistic, but it is unclear how much we can read into these negative or positive matches; diagnostics apply to living subjects, and diagnoses are made by professionals.

Being a professional, Sacks's diagnosis has ready credibility. He bases his diagnosis of Cavendish's Asperger's syndrome on the following seven characteristics:

1. Striking literalness and directness of mind.
2. Extreme single-mindedness.
3. Passion for calculation and quantitative exactitude.
4. Unconventionality.
5. Stubbornly held ideas.
6. Rigorously exact, rather than figurative, language.
7. Virtual incomprehension of social behaviors and human relationships.¹³⁹

Sacks's agreement with the *DSM* is not immediately obvious, since he uses different words than the manual, and he pays more attention to Cavendish's way of thinking than to his social behavior. The evidence for the working of Cavendish's mind comes mainly from his writings, which are on science, technology, and business, where we would not normally expect figurative language or non-literalness. For the same reason, characteristics 1 and 6 have a large overlap. It is not clear what "stubbornly held ideas" refers to. Cavendish was evidently the first British chemist to abandon the phlogiston theory, while Priestley and other colleagues still held to it. He probably did not invent new ideas, but he could change his mind about an idea if reason and experience called for it. "Virtual incomprehension of social behaviors" is too sweeping. He demonstrated a good understanding of human motivations during the dissensions of the Royal Society. Studies show that autistic people understand basic motivations quite well, their difficulty coming with more complex emotions and points of view.¹⁴⁰ Sacks does not say what he means by "unconventional." As we saw in the section above on eccentricity, Cavendish can be considered conventional, his eccentricities being conventional behaviors carried to excess. The main exception, which may be Sacks's meaning, is Cavendish's choice of a life of science rather than a career in politics; given his birth, this was unconventional. The *DSM* requires a match with at least two social criteria, and Sacks has only one, the seventh characteristic, but because of the generality of his wording, it could cover all of the *DSM* social criteria. With these comments in mind, Sacks's list matches the *DSM* criteria. Cavendish's work was quantitative; his language was literal and exact; he pursued science single-mindedly; and he had difficulty with social behaviors and human relationships. The same caution in the previous paragraph applies in this case: diagnostic criteria in the *DSM* being brief and general, they by themselves are an incomplete basis for a credible diagnosis. For that, experience is required,¹⁴¹ and the person making the diagnosis here is Sacks, who supplies the experience.

Before we agree that Cavendish was autistic, we should consider the adequacy of the evidence. At least five arguments call into question the diagnosis. Because the arguments have their own weaknesses, we consider counter-arguments as well. First, because the testimony about Cavendish came from people who knew him late in his life, the central developmental

¹³⁹Sacks (2001a).

¹⁴⁰Anonym, "Autism" (<http://en.Wikipedia.org/wiki/Autism>, 7).

¹⁴¹Attwood (2007, 40–41).

feature of autism goes unaddressed for lack of evidence. Second, Cavendish bore similarities to today's scientists, who often are obsessive, follow routines, exhibit social anxieties, and in general show autistic-like traits. They behave this way to do their work, about which they have strong feelings; they are rarely autistic. Third, Cavendish met frequently with many colleagues in the city, an intensity of social activity unusual for an autistic person. A counter-argument is that his interaction was highly selective, consistent with his private ways and narrow interests, his social world being a direct extension of his special interest, the physical world. Fourth, Cavendish's peculiarities did not seriously interfere with his chosen life and if anything supported it by sheltering him. By contrast, people with autism have a hard time managing their lives, requiring help with their work, daily affairs, and finances. A counter argument is that until Cavendish was past fifty, he lived at home where he could count on his father's help, and when he left home he took on an associate; and he always had servants. Fifth, Cavendish made major changes in his life, and autistic persons tend to dislike major changes, and if they make them, they are unlikely to have initiated them. In 1782 he took a house in a suburb, Hampstead, which served temporarily as a country house. In 1784, he bought a house on Bedford Square. In 1785, he bought a permanent country house on Clapham Common. In 1782 he took on an associate, Blagden, and in three summers, 1785–87, he and Blagden made long journeys. The counter-argument is that the changes may have been integral to his scientific plans, and he may have found the journeys sufficiently interesting to distract him from the break in his routines. As a general point, it is not uncommon for gifted autistic persons to do things that are atypical of autistic persons.

Two more arguments against Cavendish's autism have been raised by Fred Volkmar, a psychiatrist at the Yale Child Study Center. He thinks that autistic diagnoses of historical persons have got out of hand, becoming a cottage industry. "Certainly, Henry Cavendish sounds like a very strange person," Volkmar says, but even in Cavendish's case he remains skeptical. The reasons he gives are sensible, though not conclusive. One is that Cavendish was taciturn, whereas autistic persons talk endlessly about their special interest. An objection is that if persons approached Cavendish the right way, they could set him going. The second reason is that Cavendish was successful, whereas autistic persons usually do not accomplish much.¹⁴² An objection is that autistic persons occasionally are very accomplished. Hans Asperger followed the adult lives of several of the children he studied: one who had shown spontaneous talent in mathematics became an outstanding astronomer, another received a Nobel Prize in literature.¹⁴³ On the question of Cavendish's autism, we have a difference of opinion among authorities, not uncommon in this field.

If Cavendish had a disorder, autism is not the only conceivable one. Sacks's diagnosis implies that no other disorder can account as well for Cavendish's behavior, and we need to consider what has been ruled out; the *DSM* provides us with alternatives. Of personality disorders, perhaps the most promising fit is "schizoid personality disorder," which is characterized by lack of interest in social relationships, desire for solitude, taciturnity, unresponsiveness to social cues, and emotional coldness; all of these behaviors apply to Cavendish. However, other characteristics of the disorder such as bizarre ideas, lack of motivation, and

¹⁴²Goode (2001).

¹⁴³Roth (2010, 10).

underperformance at work effectively rule out Cavendish.¹⁴⁴ Another suggestive disorder is “social phobia,” the fear of making a fool of oneself. Persons with social phobia have a pressing concern of “how to react to the gaze of others,” and they are ever ready to take flight or to fend off attacks. They are shy, introverted, self-conscious, and prone to embarrassment; they are reticent when spoken to, and they rarely speak in groups; they do not like to be the center of attention, and they have a “terror of social interaction,” which isolates them, often resulting in depression. Social phobia and its close relative “social anxiety disorder” describe Cavendish, but they say nothing about his obsessive interests and clocklike routines. They are also accompanied by low self-esteem,¹⁴⁵ which does not describe Cavendish; having a mastery of natural philosophy, and having important relatives, Cavendish was assured an ample measure of esteem from within and without. On first glance, obsessive-compulsive disorder also looks like a possible match. Cavendish exhibited obsessive behavior in following his special interest, but there is no evidence that he tried to resist the obsession or was disturbed by it—on the contrary, his life was scientific study, which by its nature is obsessive¹⁴⁶—and resistance is required for a diagnosis of the disorder. Further, the disorder fails to account for Cavendish’s unusual eye contact and facial expressions, common to autistic persons. Michael Fitzgerald has compiled an extensive table of disorders that share some but not all of the traits of autism, noting where they agree and disagree. Few of the disorders show one of Cavendish’s most conspicuous traits, a preoccupation with a special interest, and those that do show it such as obsessive-compulsive disorder fail in other respects.¹⁴⁷ Of all potential disorders, autism fits Cavendish best. To this point, we have considered Cavendish’s personality from different perspectives. What remains is the question of which, if any, we find most compelling.

How Do We Decide?

Granted that Cavendish had autistic-like traits, were these traits the result of a neurodevelopmental disorder? If we answer yes, we agree that the evidence supports a diagnosis of a disorder, that the disorder was in all likelihood autism, and that the posthumous diagnosis of Cavendish’s autism is based on more than a superficial match of his behavior with autistic traits according to current texts on autism. We acknowledge at the same time that the dividing line between autism and normality is imprecise. If our answer to the above question is no, we have alternatives to fall back on. Either the evidence is insufficient to decide one way or the other, or the evidence is unfavorable. In either case, we can say that Cavendish showed eccentric behaviors, which were variations on a generally accepted mode of conduct, his genetic make-up and his choices accounting for the variations.

¹⁴⁴Michael Fitzgerald (2004, 37–39). The relationship between autism and schizoid personality is given in Sula Wolff (1995). Anon., “Schizoid Personality Disorder” (<http://www.mayoclinic.org/diseases-conditions/schizoid-personality-disorder/home/ovc-20214901>).

¹⁴⁵John R. Marshall (1995, xviii, 23–24, 56, 110). Anon., “Social Phobia” (<http://www.behavenet.com/social-phobia>). Anon., “Social Anxiety Disorder” (http://www.Wikipedia.org/wiki/Social_anxiety_disorder). Anon., “Social Anxiety Disorder” (<https://socialanxietyinstitute.org/>). A third to one half of persons who suffer from this disorder experience depression, and also frequently anxiety, panic, and embarrassment. Jeralyn Ross (1993, 5–7).

¹⁴⁶Lennard J. Davis (2008). Davis writes that science is itself an obsessive activity characterized by repetitive focusing on one subject. He develops this idea in many places in his book.

¹⁴⁷Fitzgerald (2004, 36–41). Rab Houston and Uta Frith (2000, 147).

There are two strong arguments in favor of Cavendish's autism. One is Oliver Sacks's opinion that the evidence for such a diagnosis is "almost overwhelming." Given who he is, his opinion carries very considerable weight. His analysis of Cavendish's behaviors is the historical counterpart of the clinical evaluation required of any reliable diagnosis meeting *DSM* standards. The other argument is the correlation between Cavendish's behaviors and autistic behaviors. His behaviors taken one or a few at a time invite alternative explanations, but there is only one explanation that agrees with most of them and excludes none, autism.¹⁴⁸ The correlation could be explained by Cavendish's choices, but it would be a remarkable coincidence.

Let us tentatively agree with Sacks that Cavendish was probably autistic, and let us also agree that any diagnosis of autism for a person living in the eighteenth century is subject to uncertainties. In light of the agreement, and given the ever unsettled state of medical definitions and diagnostic criteria of autism, it is reasonable to speak of Cavendish as having a cluster of traits rather than to make the essentialist claim that he was autistic, in the way we say a person was blind, for example. We would regard the cluster of traits known from Cavendish's adult years as sufficient for us to talk about him as a person who very likely had autistic traits, not just autistic-like traits, at the same time acknowledging that the label "autism" is problematic. We would recognize that whatever wording we adopt and whatever weight we give to the historical evidence, we cannot alter a basic reservation: any autistic diagnosis of Cavendish has an irreducible speculative element. This approach is compatible with the scientific caution of Baron-Cohen, who writes: "there are clues that Cavendish may have had some degree of Asperger's syndrome. He shows abnormalities in social relationships, communication, and some routine-bound repetitive behavior. We must assume that his scientific pursuits were strongly obsessional in nature. However, missing from the historical record are any details of his childhood."¹⁴⁹

There are "degrees of autism," Baron-Cohen writes, and "you could have a little or a lot of it."¹⁵⁰ It is hard to know how much Cavendish may have had, since he was highly intelligent, and by the time we get to know him he had had a long while to learn how to adapt to or to conceal certain difficulties. If, as we tentatively assume here, the hypothesis of autism holds the advantage, Cavendish had a sufficient degree of autism that if he were to undergo a psychological evaluation today, he would probably be diagnosed with autism. This statement is hypothetical in another way too: he would not have sought help, since he was getting along fine with his life. A diagnosis of autism does not imply a need for treatment.

According to the official terminology of the *DSM*, Cavendish's autism would have been either Asperger's syndrome or high-functioning autism, both located at one end of the "autism spectrum disorder."¹⁵¹ Baron-Cohen uses an alternative terminology because he considers it uncertain if the two high functioning classes should be called "disorders" in

¹⁴⁸Lidbetter would seem to have something like this in mind where he says that only by acknowledging that Cavendish was autistic "can we get anywhere near attempting to understand Cavendish 'the complete man.'" (2009, 786).

¹⁴⁹Baron-Cohen, quoted in James (2006, 63). Consistent with the quotation, James says that his profiles "are not to be regarded as case studies," 11. Cavendish's profile is on 63–68.

¹⁵⁰Simon Baron-Cohen (2003, 157).

¹⁵¹In the new edition, *DSM-V*, autism has three levels of severity. The one requiring the least support applies to persons who have some difficulty initiating social interaction and responding to social overtures and may have little interest in social interactions. This, if any of the three, would apply to Cavendish.

the first place. Persons diagnosed with “autism spectrum *condition*” would, by definition, have social difficulties, but they would often have above-average nonsocial skills. The term “condition” acknowledges that they have a disability arising from neurobiological factors, but it is not a “*global* disability, and may in some individuals result in talent.”¹⁵² Cavendish exercised his talent with little or no sign of disability. Baron-Cohen’s “condition” describes Cavendish’s behavior better than “disorder.”

How do we decide between the interpretations, or can we? Did Cavendish show “extraordinary singularities” because he was autistic, in which case he had no choice? Or, making allowance for factors other than autism that affect behavior, did he have a choice? Was his personality one of countless possible personalities compatible with a normal brain? It seems to me that the sources on Cavendish’s life support both interpretations about equally well, and that the sources are too incomplete to decide between them with high confidence. Coming to psychology as an outsider, I am a part of the limitation. For my part, I think it is doubtful we can ever know the answer.

Many readers will surely agree with Sacks that the evidence for Cavendish’s autism is compelling. Those who do not agree on the grounds of evidence may still have a preference: based on what they know about Cavendish and about autism, and trusting to their *intuition*, they may decide that Cavendish was or was not autistic.

With any psychological evaluation of a historical figure, a red flag comes up. The path I take through a familiar minefield of objections to psychologizing the nonliving allows me to introduce scientific literature into the sources on Cavendish’s life without giving him a label, which constantly undergoes revision. From a psychological perspective, aspects of Cavendish’s life and work are brought together through a common explanation rather than through metaphor and analogy if at all. This is clear if our preference is for an autistic diagnosis, but if we find Cavendish to be an English eccentric of his time who lacked the biological basis of autism, still his traits of shyness or possibly introversion account for a range of his behaviors and correlate them. With the benefit of clinical observations, Cavendish appears less weird, and he joins the human race. The latter would be a truism if it were not for a popular characterization of him as robot. Far from disparaging Cavendish, a psychological view endows this truth-seeker with considerable humanity. His strangeness is seen as normal behavior for a minority of persons who share his disorder or eccentric personality traits. We have a different view of him and a different feeling about him, affecting our interpretation of him.

For all of his privileges and native gifts, Cavendish had a psychological liability, whatever its origin, over which he had little if any control. Its outward expression took the form of extraordinary shyness and embarrassment, which could be viewed as indications of unconfidence, however unfounded it was. From an objective standpoint, there is no question that he felt distress in some personal encounters. We have only to recall the image of Cavendish at Banks’s door, frozen in place until new arrivals forced him to enter. What is important for his scientific work is that he had got to Banks’s threshold, and that he *did* cross it to join the guests, some of whom were likely to be discomfiting strangers. He did not allow his shyness to stand in the way of a public life and with it a successful activity in science. Day in and day out he arrived at the threshold, so to speak, and crossed it and made his entrances. Had he not been so determined, he might still have pursued science, but it would have been

¹⁵²Baron-Cohen (2008, 14).

as a reclusive hobby. To contribute to science required him to come into society and assert his presence. He did what was necessary to achieve what he desired.

In Cavendish perhaps more than in any of his contemporaries, the traits of temperament and character reinforce the traits required of a scientific researcher. We see this in the value he placed on facts, in the objectivity of all of his dealings, and in the path of truth he followed with such tenacity. The persons who knew Cavendish best were those who knew his work best. What one such person Davy saw as “great” in Cavendish is inseparable from the way of life he chose, one of natural philosophy. In this outcome, it makes no difference whether his “extraordinary singularities” were an expression of an autistic disorder or an eccentric expression of the normal behaviors he grew up around. A choice and act of will were required in either case.

Consistent with his cautious nature, Cavendish was conservative, wary of “fashion.” This was evident in his traditional dress, in the entire way he moved through the world. We remind the reader of a few instances of this behavior. In the dissensions of the Royal Society, he supported the old leadership rather than the rebels. His reaction to a new way of dividing instruments was to show that the old way could be made to work better. In electricity, his model was Newton’s *Principia*, nearly a century old. He preferred the old theory of heat to the new, and the same was true in optics. He kept his distance from the trend to base natural philosophy on imponderable fluids or the ether. He selected his scientific problems from problems others had studied rather than inventing new ones. He favored improvement in accuracy over discovery. By his way of life, however, he willy-nilly worked for great changes over which he had no control.

The historian Herbert Butterfield described the civilization that emerged from the Scientific Revolution as dissolving all traditions before it, “having eyes for nothing save a future of brave new worlds,” a civilization “exhilaratingly new perhaps, but strange as that of Nineveh and Babylon.”¹⁵³ One of its bearers, Henry Cavendish appeared strange to his contemporaries. That may have had less to do with his eccentricities than with the intensity with which he lived a life of natural philosophy. He helped build a brave, new scientific civilization, though he would not have described his work in any such terms. His contribution was a byproduct of duty of service and a love of natural truth expressed in the exacting language of science.

¹⁵³Herbert Butterfield (1965, 202).