

Keeping It in the Family: Maria Edgeworth’s Precursor to the Hedonimeter

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Abstract The conventional wisdom among economists and philosophers is that in his 1881 monograph, *Mathematical Psychics*, Francis Ysidro Edgeworth was the first to conceive of and describe a hedonimeter to measure happiness or pleasure. In this article, it is shown that his aunt, Maria Edgeworth, first described such a device in a short story called “The Mental Thermometer” that she wrote as a sixteen-year-old in 1784. A similar device, a “moral thermometer,” was also mentioned by Jeremy Bentham in the *Traité de Législation Civile et Penale* from 1802. The possible sources for Maria Edgeworth’s story and its publication history also are also considered, as is the possible inspiration for her nephew’s hedonimeter.

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A hedonimeter (sometimes spelled “hedonometer”) is a hypothetical device used to measure happiness or pleasure. The conventional wisdom among economists and philosophers is that this instrument was first conceived of and described by Francis Ysidro Edgeworth in 1881 in his classic monograph, *Mathematical Psychics* (Edgeworth, 1881, p. 100). With various degrees of explicitness, this belief has been expressed by Colander (2007), Mueller (2020), and Narens and Skyrms (2020, pp. 145–146), among others. I show that this belief is wrong. In fact, his aunt, the distinguished novelist and educational pioneer Maria Edgeworth, introduced a version of the hedonimeter in a short story called “The Mental Thermometer” that she wrote as a sixteen-year-old in 1784, almost a century before *Mathematical Psychics* was published.¹ Three versions of this story were later published (Edgeworth, 1801a, 1815a, 1824).² ME was not the only person to consider such

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¹ To distinguish between Francis Ysidro, Maria, and Richard Lovell Edgeworth (the latter was Maria’s father), henceforth, they shall be referred to by their initials. The seminal biography of ME is that by Marilyn Butler (1972). Facts about her life are primarily taken from this source. Lluís Barbé (2010) has provided a biography of FYE that extensively draws on archival sources. Good introductions to his life and works may be found in Creedy (1986) and Newman (1987). For a briefer account, see the memorial essay that John Maynard Keynes (his fellow editor at the *Economic Journal*) wrote on his death (Keynes, 1926).

² “The Mental Thermometer” is not well-known among literary scholars. I have not located any mention of FYE’s hedonimeter in anything written about this story.

an instrument before her nephew; Jeremy Bentham did so as well. In the *Traité de Législation Civile et Penale* (Dumont, 1802), whose first edition was published in 1802, Bentham comments that there is a need for a “moral thermometer” to measure happiness.³ This treatise was composed and edited by Étienne Dumont from Bentham’s manuscripts. No evidence has been found that FYE was familiar with his Aunt Maria’s story about the mental thermometer or of Bentham’s moral thermometer.⁴

Besides documenting and describing these precursors to the hedonimeter, I also discuss possible sources for ME’s story and a possible inspiration for FYE’s hedonimeter. The composition of “The Mental Thermometer” and the publication history of its three versions is also considered. While a detailed discussion of this history will be provided below, it is useful to have a brief summary of it before delving into the particulars.

Under the title “An Original Tale,” “The Mental Thermometer” was first published in 1801 in *The Juvenile Library* (Edgeworth, 1801a). According to the title page of its semi-annual volumes, *The Juvenile Library* was devoted to providing “a complete course of instruction on every useful subject” for young readers. ME’s story later appeared in two parts in the July 15th and 22nd, 1815 issues of *The Irish Farmers’ Journal and Weekly Intelligencer* (Edgeworth, 1815a). This version of the story was published anonymously, with only the letter “E” appearing at the end of the first installment (but not in the second). A prefatory paragraph that was not included in the 1801 version opens the 1815 version. *The Irish Farmers’ Journal* provided agricultural news to Irish farmers. The title page of the annual volumes that collected the weekly issues announced that it also published “essays, religious, moral, and miscellaneous.” In 1824, a revised version (also called “The Mental Thermometer”) with a new ending was published in an end-of-year holiday gift book, *The Friendship’s Offering* (Edgeworth, 1824). This version has the introductory paragraph found in the 1815 version. The 1824 version was reprinted in 1882 as an Appendix in Grace Oliver’s, *A Study of Maria Edgeworth* (Oliver, 1882, pp 541–548).

In modern times, “The Mental Thermometer” has largely been ignored. It was not included in The Pickering Masters edition of *The Novels and Selected Works of Maria Edgeworth* (Butler and Myers, 1999–2003). Marilyn Butler has only one paragraph about it in her biography of ME (Butler, 1972, pp. 146–147). Emily Hodgson Anderson discusses “The Mental Thermometer” at some length in her analysis of the didacticism in ME’s fiction (Anderson, 2009, chap. 5). She argues that ME’s story illustrates a human proclivity to scientifically quantify emotions but that the revised ending “expose[s] the shortcomings of traditional scientific methods to perform such analysis” (p. 109). She concludes that “[t]his fable defines self-

³ I know of four other references prior to the publication of *Mathematical Psychics* to devices for measuring pleasure. One is by ME’s step-sister Honora and the others are by Keats, Coleridge, and an anonymous reviewer. They are discussed below.

⁴ Susan Manly has suggested to me that FYE may have seen or heard about the story from his grandmother Frances Edgeworth (ME’s third and last step-mother) while she was compiling materials for Edgeworth (1867).

knowledge in terms of the emotions and underlines that to teach others, we must first understand our own feelings. What it does not resolve is how we are to do this” (p. 115). “The Mental Thermometer” is also briefly discussed in Christine Anderson and Ryan Twomey’s Introduction to their edition of ME’s play, “The Double Disguise” (Edgeworth, 2014, pp. xviii–xix), and by Twomey (2012, pp. 24–25) in his study of famous authors’ juvenilia.⁵ Joani Etskovitz argues that ME’s story provided her with a way of dealing with the pressures she faced from her much-loved father (Etskovitz, 2020).

“The Mental Thermometer”

In 1779, ME’s father began setting her the task of writing in different styles, including the style of the then-popular Arabian tale and of Joseph Addison’s essays in *The Spectator*, an influential periodical that he edited (Butler, 1972, p. 146). “The Mental Thermometer” from 1784 is the earliest of these writings to survive.⁶ The introductory paragraph that appears in the 1815 and 1824 versions of the story is worth reproducing in full.

THE eastern style of allegory and narrative, of which there are so many examples in the *Spectator* and *Adventurer*, was once a favorite with the public. There was too much of it—it went out of fashion, and has of late been considered as suited only to juvenile taste. Perhaps, for the sake of variety, it may now and then be again permitted in periodical publications. There appears something of oriental style and invention in the following fiction, which was intended to turn popular attention to a curious problem in the history of the human mind—a problem which has long been discussed, but which has hitherto been unsolved by metaphysicians. Whether different people feel the same positive degrees of pain or pleasure with equal intensity—whether all men have the same capacity for happiness or misery? It seems further to suggest a moral idea, that many were led to pursue what others falsely call *pleasure*, merely from their want of the power of comparing and reflecting on their own feelings, and thus of deciding for themselves in what their real happiness consists.⁷ (Edgeworth, 1824, pp. 187–188)

This prefatory statement gestures to the story’s origin as a writing task set by ME’s father. It also sets out some of the utilitarian issues that the story is meant to illustrate, issues that would later play a prominent role in FYE’s scholarly writings on utilitarianism. Specifically, ME raises two issues: (1) whether different individuals have the same capacities for happiness and (2) the need to have an accurate way—one that does not just rely on feelings—of determining what constitutes real happiness. Both of these issues concern matters of fact, but as ME notes, the latter

⁵ According to Butler (1972, p. 152), “The Double Disguise” was written by ME for a family performance in 1786. It was not published until the Anderson–Twomey edition appeared in 2014.

⁶ The date for the composition for this story is provided by ME in a letter dated January 6, 1825 to her Aunt Margaret Ruxton. This letter has been published in Edgeworth (1867, vol. 2, pp. 254–256) and reprinted in full or in part in Oliver (1882, pp. 402–403), Zimmern (1883, pp. 167–168), and Hare (1894, vol. 2, pp. 128–131).

⁷ The 1815 version does not italicize the titles of the two periodicals that are mentioned.

also raises a moral issue—if someone cannot determine their own happiness, they may be led to pursue false conceptions of happiness based on what others falsely think pleasure consists of. Here, ME alludes to her belief that many of the values and pursuits of those in the upper echelons of society are misguided.

The narrator of “The Moral Thermometer” is a youth of unspecified age but old enough to engage in serious conversation. The story revolves around the narrator’s recounting of and reflections on conversations with an elderly gentleman who was a friend of his father. Initially, the narrator’s interlocutor tells him stories that stimulate his curiosity and that convey useful knowledge and truths about morality. After the father’s death, the gentleman asks the narrator what he plans to do with his life. Being well off and in good health, he responds that he wants to enjoy life’s blessings, which leads to a dialogue about how these blessings can be achieved. The centrality of happiness to this endeavor is then considered, which raises the questions of what happiness consists in and how is it possible to determine how happy someone is. The narrator then reveals that he has long thought that the gentleman had some secret that contributed to his felicity. In response, the latter says (in part), “I wish to give you some proof of my regard, before Nature calls me from you; and I think I have it in my power to leave you a gift truly worthy of your acceptance.” The first part of the 1815 version then concludes with the narrator saying, “There he paused.” (p. 545)⁸

The story continues with the old gentleman taking the narrator into his confidence by handing him “a small instrument constructed like one of our common thermometers, and marked into a great number of divisions” (p. 545) that was in a case attached to a chain around his neck. The following dialogue then ensues:

‘But what is this liquor?’ said I, ‘or is it a liquor which seems to move up and down in the tube? and what are those small characters which I perceive at the top and bottom of the instrument?’ — ‘The bright characters which you see at the top of the crystal are Arabic,’ said he, ‘and they signify *perfect felicity*; the degrees which you perceive marked upon the crystal form a scale of happiness descending from perfect felicity to indifference, which is the boundary between pleasure and pain; and from that point commence the dark divisions of misery, which continue deepening in their shade as they descend, and increasing in distance from each other, till they touch the characters at the bottom, which signify the final bounds of human misery and despair. The liquor which you see contained in the tube,’ continued he, ‘is endued with the power of rising and falling in the crystal, in exact proportion to the pleasure felt by the person who wears it at any given period of his existence.’ (p. 546)

The narrator then asks if it is not sufficiently accurate to determine the degree of happiness by simply reflecting on one’s feelings of pleasure. In response, he is told that “[t]he want of precision in this circumstance is one of the first causes of the mistakes which mankind fall into in their pursuits” (p. 547). The gentleman continues:

when your emotions are the most complicated, when you would not or could not enter into any strict scrutiny of your own heart, this little crystal will be your monitor. Press it to your bosom, and ask yourself this question: “What degree of pleasure or of pain do I now feel?” The answer you will find distinct and decided. The liquor in the tube will instantaneously point it out upon the scale of happiness or misery. (p. 547)

⁸ Except where noted, page references to “The Mental Thermometer” are to its reprinting in Oliver (1882).

On giving the device to the narrator to keep, the gentleman adds, “May you, in the course of your life, experience its utility as much as I have done; may it facilitate your improvement in virtue and wisdom, the only genuine sources of happiness” (p. 547). The original version of the story then concludes with the narrator “resolved to begin, as soon as possible a series of observations on my *mental Thermometer*” (Edgeworth, 1801a, p. 384).

When the story was revised for publication in *Friendship’s Offering*, Edgeworth changed the ending. In this version, the story continues on after the narrator resolves to conduct experiments with the mental thermometer. The first person he tries it with is a metaphysician who, after seeing it demonstrated, wishes to use it to help him solve metaphysical questions and “perfect [his] theory of the human mind” (p. 548). With the metaphysician still pressing the device to his heart, the narrator grants the wish and the story concludes with him recounting that

at that instant the liquor rose to the point of *perfect felicity*, with such violence that the tube broke with a sudden explosion; and I, and the world, and the metaphysicians were deprived forever of our intended experiments on the Mental Thermometer. (p. 548)

Possible Sources for “The Mental Thermometer”

In the letter of January 6, 1825 to her Aunt Ruxton cited above, ME provides a brief account of how “The Mental Thermometer” ended up being published in *Friendship’s Offering* (see below), adding in passing that she had changed the original ending. However, ME does not say why she revised her story. A possible explanation is that it is because of the reaction of John Aikin many years earlier to the original version.⁹ In a letter from her step-brother Sneyd to their father dated May 26, 1807, Sneyd said that during a visit to London, “Aikin, told me that he admired the mental thermometer very much, as a fragment but that it appeared to him unfinished.” Perhaps, Edgeworth recalled Aikin’s comment when she took up the story again.¹⁰ However, if that is the case, this raises the question of why she did not revise the ending before publishing it in the *Irish Farmer’s Journal*.

Aikin began his career as a doctor but later focused on being an author and editor. He collaborated with his sister Anna on a series of children’s stories under the collective title *Evenings at Home* (Aikin and Barbauld, 1792–1796) that served as a model for ME’s own children’s tales. He also had an interest in thermometers. His *Thoughts on Hospitals* (Aikin, 1771) makes recommendations about the siting and design of hospitals that highlight the role that temperature and air circulation play in promoting the health of patients. Empirical investigations of temperatures and air circulation in prisons provided the basis for John Howard’s advocacy of

⁹ It is unknown how Aikin saw the story. Susan Manly has suggested to me that he might have learned of the story through his sister, Anna Laetitia Barbauld, who first got to know ME in London and Clifton (now a part of Bristol) in 1799 (Butler, 1972, p. 141).

¹⁰ This letter is in the Edgeworth–Beaufort Papers in the National Library of Ireland (MS 13176 (15)). Butler (1972, p. 147) comments on Aikin’s reaction but does not quote what Sneyd wrote.

prison reform. Aikin played an important role in disseminating Howard's extensive measurements of prison temperatures (Cervantes and Porter, 2016).

Butler (1972, p. 147) suggests that the choice of happiness as the subject of "The Mental Thermometer" may be related to an essay on happiness that ME wrote in 1782 at the request of a family friend, Thomas Day.¹¹ Butler also conjectures that remarks ME made in a letter written to her friend Fanny Robinson about happiness also served as source material for that story. In this letter, ME says, "there is nothing ridiculous in a girl of fifteen's attending to the feelings of her own mind & endeavoring to find out what makes her more or less happy." She asks Fanny, "[A]re you happier at a Ball than anywhere else?" In contrasting Fanny's happiness at a ball with her own misery because she does not possess the "qualifications" (skills and character traits) to be happy and at ease in such circumstances, ME comments that "I know their [i.e., the qualifications'] value, for I know the want of them; and the pain arising from that want is certainly the most exact measure of their worth."¹² It is noteworthy that ME speaks of using pain as a measure of the worth of not having what it takes to have a good time at a ball.

Butler's conjectures provide a plausible account of the possible sources for the choice of happiness as a theme for "The Mental Thermometer" but they do not explain why ME chose to write about a mental thermometer. I suggest that to do this, one needs to consider RLE's scientific interests and how the Edgeworth children were educated.

Among his many accomplishments, RLE was an inventor. The best known of his inventions is an optical telegraph, one that has adjustable arms on towers that can be read at a distance.¹³ One of RLE's earliest inventions was a carriage that was meant to improve on a design of Erasmus Darwin (Charles Darwin's grandfather). This led him to meet Darwin, who introduced him to the Lunar Society of Birmingham, whose meetings RLE participated in on occasion between 1766 and 1771. This group shared a keen interest in industrial applications of scientific advances. Aside from Darwin, its members included such luminaries as Matthew Boulton, Joesph Priestley, James Watt, and Josiah Wedgwood.¹⁴

A problem that Wedgwood encountered in his pottery business was that he could not obtain accurate measurements for the high temperatures required by his kilns

¹¹ This story has not survived. Day was a popular writer known for his advocacy of Rousseau's educational theories.

¹² Extracts from this letter may be found in Butler (1972, p. 74) and Pakenham (2018, pp. 30–32). Butler includes the first and third quotations from this letter, Pakenham the second and third. Butler says that this letter is undated but written in 1782, whereas Pakenham has it written in Autumn 1783.

¹³ RLE gives an account of his early work on the telegraph and of some of his other inventions in his *Memoirs* (Edgeworth and Edgeworth, 1820, vol. 2, chaps. 6–7). More detail about his contributions to the development of the telegraph and ME's role in his attempts to get it adopted by the Irish government are provided in Wharton (2020). Some of RLE's inventions are briefly described in Butler (1972, p. 34), Brück (1996, p. 49), Uglow (2002, pp. 126–131), and Hoiem (2024, p. 190).

¹⁴ See Uglow (2002) for a history of the Lunar Society and Butler (1972, pp. 31–35) and Uglow (2002, chap. 4) for RLE's involvement with this group. RLE describes his first meeting with Darwin in his *Memoirs* (Edgeworth and Edgeworth, 1820, vol. 2, chap. 7).

as they were outside the range achievable with mercury thermometers. Beginning in 1780, Wedgwood started doing research on pyrometry (the measurement of high temperatures) and this led to his invention of a thermometer that could measure the temperatures he encountered in his business. Wedgwood's progress on this problem was reported in a series of articles, the first of which (Wedgwood, 1782) describes his new thermometer.¹⁵ It is known (see below) that RLE was familiar with Wedgwood's research on thermometers and that he passed this knowledge on to some of his children. The fact that Wedgwood's first article about this research appeared two years before ME wrote "The Mental Thermometer" and that her father knew about Wedgwood's thermometer makes it plausible to conjecture that her interest in thermometers was at least partly inspired by her hearing about Wedgwood's forays into pyrometry.

RLE married his second wife Honora Sneyd in 1773. Together they embarked on a program of experimentation on the Edgeworth children in which Honora recorded her observations about their children's behavior and utterances.¹⁶ This practice was later continued by ME when she taught her younger siblings. The objective of these experiments was to use the observations obtained to devise more effective teaching methods for encouraging children to develop an enquiring mind in a way that they found both instructive and pleasant. Their method was conversational in nature, what Susan Manly (2007, p. 140) calls "conversation-lessons," with teacher and student both seeking answers to questions that they proposed. The Edgeworths' experiments provided a foundation for the educational practices that ME and RLE set out in their influential educational treatise, *Practical Education* (Edgeworth and Edgeworth, 1798). These practices were later given expression in ME's didactic stories for children.¹⁷ Like other pioneering educationalists of their time, the Edgeworths' experimental approach was greatly influenced by John Locke's *An Essay Concerning Human Understanding* (Locke, 1690) and *Some Thoughts Concerning Education* (Locke, 1693). *Practical Education* also applied David Hartley's idea that sensory perceptions lead to associations of ideas in the mind that are reinforced by repetition, a doctrine known as *associationism* (Hartley, 1749).¹⁸

Contrary to the standard practice of the time, the Edgeworths advocated teaching about science and mechanical devices to both girls and boys, not just to boys. On teaching science, in the Preface to *Practical Education* (Edgeworth and Edgeworth, 1798, p. 5), ME says that "[w]e have found from experience, that an early knowledge of the first principles of science may be given in conversation, and may

¹⁵ Wedgwood's contributions to pyrometry are discussed in Chang (2004, chap. 3).

¹⁶ This collaboration is briefly discussed in Butler (1972, pp. 58–65). Wharton (2018, chap. 2) provides an account of Honora Sneyd Edgeworth's life, her contributions to educational pedagogy and developmental psychology, and her notebooks.

¹⁷ See, for example, the stories in Edgeworth (1801b,c, 1804), some of which will be discussed below.

¹⁸ Wharton (2018, pp. 7–14) provides a succinct introduction to Locke's and Hartley's theories of mind. On the influence of Hartley on *Practical Education*, see Butler (1972, pp. 62–64) and Wharton (2018, chap. 2). Wharton argues that Honora did not share her husband's endorsement of associationism.

be insensibly acquired from the usual incidents of life.” In commenting on an illustration of this practice in one of ME’s children’s stories, Elizabeth Massa Hoiem (2024, p. 187) says that “[b]y tinkering with machines, or by observing and ordering objects in the world, child characters gain a new perspective that allows them to act independently of adult authority.” The linking of experimentation and observation with independent enquiry is a central tenet of the Edgeworths’ educational practices.

Some of the lessons that ME and her step-mother Honora recorded in their notebooks are reproduced in slightly edited form in *Practical Education*. The entry from April 1792 (Edgeworth and Edgeworth, 1798, pp. 742–745) is a report on a conversation that RLE held with his three eldest children (Bessy, Henry, and Charlotte) from his third wife Elizabeth Sneyd (his second wife’s sister). The subject of this lesson was the heat needed to evaporate different substances. This topic allowed RLE to explain the purpose of a thermometer and how it works. Thermometers are also the subject of lessons that are recorded in ME’s unpublished notebooks. In the entry for September 26, 1796, RLE has a conversation with his sons, Henry and Sneyd, about thermometers that focuses on Wedgwood’s thermometer. A few pages later in ME’s notes is a report of another conversation between her father and Sneyd about thermometers.¹⁹ While these lessons took place long after “The Mental Thermometer” was written, it is reasonable to conjecture that similar lessons took place in the early 1780s before ME wrote her story and that they might have stimulated her to thinking about having an instrument to measure happiness.

Terry Castle has described a number of fanciful thermometers or barometers in eighteenth-century satirical writings and engravings that purported to measure feelings (Castle, 1995, chap. 2). This kind of raillery was fairly common during this period. While no evidence has been found that ME was familiar with any of these satires either first- or second-hand, the possibility that she was cannot be ruled out. It is striking that ME’s description of her mental thermometer has some features in common with the parodist Bonnell Thornton’s description of a “female thermometer” in the February 21, 1754 and September 11, 1755 issues of the short-lived satirical periodical *The Connoisseur* (Thornton, 1826, no. 4, pp. 7–8 and no. 85, pp. 145–146). The female thermometer measures a lady’s passions. Upon this thermometer is

delineated, after the manner that the degrees of heat and cold are marked on the common sort, the whole scale of female characters, from the most inviolable modesty to the most abandoned impudence. It is of a commodious size to wear at a watch: the liquor within the tube is a chemical mixture, which being acted on by the circulation of the blood and animal spirits, will rise and fall according to the desires and affections of the wearer. (p. 8)

Both the mental and female thermometers are tubes that are meant to be worn. Moreover, both authors refer to the liquid that responds to the stimuli as a “liquor” and employ the same terminology (“rising and falling”) to describe changes in this sub-

¹⁹ These notebooks are in the Edgeworth Papers held at Oxford’s Bodleian Library (MS. Eng. misc. c.895, folios. 84–102). The first conversation is in folios 92 and 93, the second in folios 95 and 96. It is not clear if the second conversation continued on from the first or occurred sometime later.

stance. As in the 1824 version of ME's story, in Thornton's 1755 account, experiments are conducted with his female thermometer.²⁰

The History of "The Mental Thermometer"

The original holograph manuscript of "The Mental Thermometer" has not survived. As noted above, it is from ME's letter of January 6, 1825 to her Aunt Margaret Ruxton that its date of composition can be identified as being 1784.

In 1787, her thirteen-year old step-sister, Honora, wrote a four-page story in which ME's mental thermometer plays a central role. In it, a father offers to give a prize to to whichever of his two daughters, Cordelia or Clarissa, paints the best picture. After the prize is awarded to Cordelia for painting "a picture of her sisters [sic] heart which was so ingeniously contrived," the narrator then uses her crystal, a mental thermometer, to measure Cordelia's happiness, which first rises then sinks. Based on her measurement of Cordelia's happiness, the narrator suggests that because the prize was for the best picture, not the most ingenious, it should go instead to Clarissa. When the father agrees, the crystal is used again to measure Cordelia's happiness, which the crystal registers to be quite high because, as Cordelia says, she is pleased that the prize has gone to her sister. The story concludes with the narrator ruminating on the different degrees of happiness that the characters in *The Merchant of Venice* would feel if it were possible to use the crystal on them.²¹

How "The Mental Thermometer" came to be published in *The Juvenile Library* in 1801 and why it was given the title of "An Original Tale" is unknown. Butler (1972, p. 146) describes this story as being "published by an enterprising editor when she had made her name." The publisher was Richard Phillips.²² In the early 1800s, it was often the case that stories and essays were reprinted in various periodicals, so the title may have been chosen to indicate that this was its first appearance. Below the title, it is announced as having been "*Communicated by MISS EDGEWORTH*" (Edgeworth, 1801a, p. 378). The use of the phrase "Communicated by" was common in periodicals of the time but, in this case, there is some reason to question its veracity. In her letter of January 6, 1825 to her Aunt Ruxton, when recounting what led to her story appearing in *Friendship's Offering*, ME says that it had *only* previously appeared in the *Irish Farmers' Journal* (see below for the quotation). It could be that she had forgotten about the 1801 publication or that her father or her

²⁰ See Castle (1995, pp. 21–22) for further discussion of Thornton's female thermometer. The only instance of a "thermometer" to measure happiness that Castle mentions (p. 35) is the metaphorical use of such an instrument in a letter of January 30, 1818 from John Keats to John Taylor about the composition of his poem *Endymion*. Keats said that the writing process "set before me the graduation of happiness, like a kind of pleasure thermometer" (Colvin, 1925, p. 65).

²¹ The manuscript of Honora's story is in the Bodleian's Edgeworth Papers (MS. Eng. misc. c.898, folios. 1–3). The quotation is from folio 2. Honora, who was named after her mother, died as a teenager. A daughter to RLE and his next wife, Elizabeth, was also called Honora.

²² Phillips published many of the leading British radicals in the period following the French Revolution. He was briefly jailed for selling Thomas Paine's *Rights of Man*.

step-brother Lovell had submitted it as they sometimes dealt with ME's publishers at that time in her career. Also possible is that Phillips acquired the story somehow and published it without permission.²³ The truth about this matter may never be known.

In the letter of May 26, 1807 from ME's step-brother Sneyd to their father cited earlier, following his recounting that John Aikin thought that her story looked to be unfinished, Sneyd goes on to write:

He agreed with me, in thinking that the public would receive it with most avidity if it was published in the "Athenaeum" as a curiosity with Miss E's name to it — to show a specimen of her earliest writing — it seems he had not received her permission to put Maria's name to it — He will be obliged to Maria if she will let him know of her wishes on the subject. [H]e publishes monthly.

The Athenaeum: A Magazine of Literary and Miscellaneous Information was edited by Aikin. Only five volumes were published between 1807 and 1809. ME's story never appeared in it. Aikin had co-founded *The Monthly Magazine* with Richard Phillips in 1796 and served as its editor for the first ten years, so it is puzzling that he appears not to have known that Phillips had already published ME's story.²⁴

The *Irish Farmers' Journal* was published under the patronage of the Dublin Society (from 1820, the Royal Dublin Society), of which RLE was a member. In a letter to Étienne Dumont dated September 18, 1813, ME said:

My father talked of inserting extracts from *Les peines & les recompenses* [sic] in a very good well intentioned newspaper, which has lately been published in Ireland, for the middle classes "The Irish farmers Journal" [sic] — We have influence with the proprietor — They will insert whatever we recommend; & we shall do service, my father thinks, by furnishing some of these extracts in lieu of certain soporific *Sunday Readings* and a redundancy [sic] of agricultural matter with which it is now filled.²⁵

"The Mental Thermometer" was published in the *Irish Farmers' Journal* two years after this letter was written. Based on what ME said in this letter, it is possible that it was because of her father's connection with this periodical that her story was published there.

Another possibility is that ME might have had a connection with the first editor of the *Irish Farmers' Journal*, William P. Le Fanu (sometimes written as "Lefanu"), through the author Mary Leadbeater. Prior to the 1812 founding of the *Irish Farmers' Journal*, Le Fanu encouraged Leadbeater to write and publish what became her *Cottage Dialogues Among the Irish Peasantry* (Leadbeater, 1811). This volume

²³ It was common when ME was writing to circulate manuscripts to family and friends. This practice limited the ability of an author to control its circulation, with the consequence that unauthorized publication was fairly common. See Levy (2020) and St. Clair (2004, pp. 48–49).

²⁴ An intriguing possibility is that Phillips got ME's story from Aikin but never told him that he had published it.

²⁵ This extract is from a letter in the Dumont archive of the Bibliothèque de Genève (MS Dumont 33, folios 95–96). *Théories des Peines et les Récompenses* [Theories of Punishments and Rewards] is a treatise translated and edited by Dumont from Jeremy Bentham's manuscripts (Dumont, 1811). *Sunday Readings* was a regular column in the *Irish Farmers' Journal*.

consists of a series of conversations whose objectives are to instruct the Irish peasantry in moral matters and to provide useful knowledge. In response to a request from Leadbeater's friend, Jane O'Beirne (the wife of the Bishop of Meath, Thomas O'Beirne), ME wrote notes and a preface for Leadbeater's book.²⁶

The Edgeworths were featured with some frequency in the *Irish Farmers' Journal*. Earlier in the same volume as "The Mental Thermometer," ME also anonymously published an untitled essay in the *Sunday Readings* column (Edgeworth, 1815b).²⁷ Letters from her father and discussions of some of his mechanical inventions also appeared in its pages, as did reviews of some of ME's fictions.

ME's letter of January 6, 1825 to her Aunt Ruxton details how the *Friendship's Offering* publication came about.

In a few days I trust—you know I am a great truster—that you will receive a packet franked by Lord Bathurst, containing only a little pocket-book—'Friendship's Offering, for 1825,' dizeden out; I fear you will think it too fine for your taste, but there is in it, as you will find, the old Mental Thermometer, which was once a favourite of yours. You will wonder how it came there—simply thus. Last autumn came by the coach a parcel containing just such a book as this for last year, and a letter from Mr. Lupton Relfe—a foreigner settled in London—and he prayed in most polite bookseller strain that I would look over my portfolio for some trifle for this book for 1825. I might have looked over 'my portfolio' till doomsday, as I have not an unpublished scrap, except Take for Granted. But I recollected the Mental Thermometer, and that it had never been *out*, except in the Irish Farmer's [sic] Journal—not known in England. I roused in the garret under pyramids of old newspapers, with my mother's prognostics, that I never should find it, and loud prophecies that I should catch my death, which I did not, but dirty and dusty, and cobweby [sic], I came forth after two hours' grovelling, with my object in my hand! Cut it out, added a few lines of new end to it, and packed it off to Lupton Relfe, telling him that it was an old thing written when I was sixteen. (Edgeworth, 1867, pp. 255–256)²⁸

A fair copy of "The Mental Thermometer" in the hand of ME's step-sister Harriet has survived in the Bodleian's Edgeworth Papers (MS. Eng. Misc. c. 896, folios

²⁶ For brief discussions of this episode, see Butler (1972, pp. 211–212) and Ó Ciosáin (2010, pp. 161 and 173). In a letter dated July 19, 1810 to Melesina Trench, Leadbeater shared two letters: (1) One dated July 5th was from RLE written on ME's behalf to Leadbeater in which he proposes that the book be published by their London publisher, J. Johnson, with an "advertisement" (i.e., a preface) and a set of notes explaining Irish idioms and practices for English readers. In this letter, RLE also indicated that he had arranged for the purchase by subscription of 500 copies, 300 of which were for his family. (2) The second was a joint letter from RLE and ME dated July 1st to Johnson requesting that he publish *Cottage Dialogues*. This letter included ME's advertisement. In her letter to Mrs. Trench, Leadbeater says that the Edgeworth "letters were accompanied by a very kind one by the bishop's lady" (Mrs. O'Beirne). This correspondence is published in Leadbeater (1862, vol. 2, pp. 190–194). Johnson published *Cottage Dialogues* the next year. For Le Fanu's involvement with the gestation of *Cottage Dialogues*, see the letter of June 15, 1809 from Leadbeater to Mrs. Trench (Leadbeater, 1862, vol. 2, pp. 164–166).

²⁷ This essay is called "On French Oaths" in bibliographies of ME's writings

²⁸ A footnote following "Take for Granted" added to the printed version of this letter reads: "Take for Granted, was an idea which Maria never worked out into a story, though she had made many notes for it."

7–13). This manuscript is almost identical to what was published in *Friendship's Offering*.²⁹

In response to a request from the Scottish publisher, Archibald Constable, to contribute to an encyclopedia he was planning, in a letter of January 19, 1825, ME wrote:

If a pretty, elegant lady's memorandum-book, whose title is, I think, 'Friendship's Offering: or Lady's Remembrancer,' should come from London to Edinburgh, pray give it a good puff and a good push forward. The publisher, a man of a strange name, Lufton Relf, is unknown to me, but he besought me to give him a helping hand, and told me that he had expended £1500 in getting up this pretty trifle. I sent him a few pages containing an old thermometer, a *mental thermometer*, constructed when I was sixteen. He sent me in return a hundred thousand times more than it was worth,—a beautiful copy of Scott's Poetical Works, your duodecimo edition, with the frontispiece portrait of Sir Walter, and beautiful little vignettes.

I feel as if I had taken bounty-money and enlisted to serve him, and I really have no power to do so; pray help me, for you can. (Constable, 1883, vol. 1, p. 414)³⁰

From that time on, "The Mental Thermometer" largely disappeared from view until its posthumous reprinting in Oliver (1882).

Jeremy Bentham and his Moral Thermometer

It is perhaps not surprising that Jeremy Bentham saw the usefulness of having an instrument to measure pleasure and pain so as to help make his greatest happiness principle more operational. In the *Traité de Législation Civile et Pénale* [*Treatise on Civil and Criminal Legislation*] (Dumont, 1802), there is a brief mention of what Bentham called a "moral thermometer."³¹ The *Traité* was composed and edited by Étienne Dumont from Bentham's manuscripts, with English-language texts translated into French.³² According to Cyprian Blamires (2008, pp. 239–240):

Dumont states that he did not set out to make a translation but an interpretation which was from one point of view an abridgement and from another a commentary. . . . Choosing from variants, clarifying obscure bits, connecting the disconnected fragments, abridging or elaborating, filling gaps, adding ornamentation, slimming down tedious catalogues of ideas, and incorporating them in the flow of the text

²⁹ In the catalogue of the Bodleian's Edgeworth Papers compiled by Judith Priestman, Mary Clapinson, and Tim Rogers (https://www.amscholar.amdigital.co.uk/Documents/Details/Catalogue-of-the-Papers-of-Maria-Edgeworth--1768-1849-/WomenEducationAndLiterature_Part1_Reel1_Vol1), Harriet's copy is said to be c. 1815–25. As this manuscript contains ME's revisions made shortly before being printed, it is reasonable to suppose that it was actually copied in 1824.

³⁰ The complete letter appears on pp. 411–414. Substantial extracts with some commentary may be found in Oliver (1882, pp. 401–407).

³¹ The reaction of RLE and ME to this publication is discussed below.

³² The first edition of the *Traité* was published in 1802 with second and third editions following in 1820 and 1830. Some of the parts in the first edition were moved to different volumes in the later editions. See Blamires (2008, p. 255) for details about the rearrangements.

Consequently, although based on Bentham's manuscripts, the text of the *Traités* as we know it owes a great deal to Dumont.³³

When the *Traités* was published, French was the dominant language for scholarly communication. It was also a language that the well educated in Great Britain, Ireland, and continental Europe were conversant in, so the choice to publish edited versions of Bentham's manuscripts in French helped ensure that they would be accessible to their intended audience. Bentham himself wrote in both English and French.

Bentham's moral thermometer is introduced in the *Traités* in the context of a discussion of the need for a scientific approach to determining how "sensations, affections, and passions" affect human happiness.

PATHOLOGY is a term used in medicine; but it has not Application so far been employed in Morals, where, however, it is equally needed. I define pathology as the study and science of sensations, affections, and passions, and of their effects upon human happiness.

Legislation, which has hitherto been founded in great measure upon the quicksands of instinct and prejudice, ought at length to be reared on the impregnable rock of sensation and experience.

We ought to have a sort of moral thermometer which would mark every degree of happiness and suffering; and, though that is a pitch of perfection to which we cannot hope to attain, it is well to keep it ever before our eyes. I know that a minute examination of 'more or less,' on points of pain and pleasure, will appear, at the first blush, to be a useless study of insignificant detail; it will be said that, in human affairs, we can only deal with generalities, and must rest content with loose approximation. But this is the language of one who lacks either interest in the subject, or the capacity to understand it. The feelings of men vary with sufficient regularity to become the object to a science, or, shall we say, an art; and, until this is established, we shall find people simply groping their way in tentative fashion, and making efforts as ill-directed as they are half-hearted. The science of medicine is founded on the axioms of physical pathology. Morals may be deemed the medicine of the soul, and legislation, which is the practical branch of the science of Morals, ought to have for its foundation the axioms of mental pathology.³⁴

In an 1886 essay in the *Westminster Review* (which Bentham founded), Wordworth Dunisthorpe used FYE's terminology to express his reservations about the usefulness of Bentham's measuring device: "To expect the legislator to measure the million and one near effects of a proposed law with his 'hedonimeter,' to say nothing of the remote effects, is preposterous" (Dunisthorpe, 1886, p.132).³⁵

³³ Dumont was a Genevese intellectual, political figure, and writer. He is best known as an advisor to and speechwriter for Mirabeau during the French Revolution and for editing Bentham's works and proselytizing on his behalf. Blamires (2008) documents how Dumont helped promote the spread of utilitarianism and summarizes the contents of the *Traités*.

³⁴ This quotation is the English translation by Charles Milner Atkinson (Atkinson, 1914, vol. 1, pp. 133–134) of a passage from the second edition of the *Traités* (Dumont, 1820, vol. 1, pp. 162–163). Atkinson was not satisfied with how Dumont sometimes dealt with Bentham's manuscripts, so he drew on Bentham's original writings to edit Dumont's text, not just to translate it. Atkinson's Introduction (Atkinson, 1914, vol. 1, pp. iii–xii) provides an overview of the origins of the *Traités* and its renderings into English.

³⁵ Binmore (2011, p. 7) speculates that "Bentham perhaps thought that some kind of metering device might eventually be wired into a brain to measure how much pleasure or pain a person was

Bentham's concern with measuring the effects of different affective states on happiness anticipates somewhat the concerns of the psychophysicists that influenced FYE (see the next section). While noting that a perfect measuring instrument is unattainable, Bentham expresses his desire for having a way to quantitatively measure happiness (not one based on "instinct and prejudice"), a desire shared with both ME and FYE. Like ME, Bentham describes his instrument as being a kind of thermometer. He also shares with ME the idea that less rigorous ways of assessing happiness may be erroneous. It is also noteworthy that Bentham appeals to the axiomatic method of mathematics to provide a foundation for a science of legislation.

A thermometer is also mentioned in the part of the *Traité*s entitled "Vue générale de corps complet de législation" ["A general view of a complete code of laws"]. In this part, a classification of offenses in terms of who is harmed is proposed. In laying out the advantages of this system, it is said that

[a]ll other laws would be more or less imperfect. This classification is therefore to legislative science what comparative instruments, such as the barometer and the thermometer are to the physical sciences.³⁶

It is not explained in what sense Bentham's classification is analogous to the measuring instruments mentioned. Presumably, the suggestion is that Bentham's classification imparts rigor to what would otherwise be an imprecise procedure.

RLE and ME first met Étienne Dumont on a trip to Paris in 1802 (Butler, 1972, p. 192). They spent time together many times on subsequent occasions and became frequent correspondents. After reading the *Traité*s, a letter was sent on September 18, 1806 to Dumont praising what he had done. The letter is signed by RLE but is in ME's handwriting.

This letter takes the opportunity of bringing to Dumont's attention that the letter writer had already conceived of a mental thermometer in an essay written many years earlier.

Your Bentham has made an important progress in this vast subject [the happiness of nations]. You justly observe, that the grand difficulty is to fix a standard of moral weights, and measures of happiness, and we rejoiced to hear you wish for a mental thermometer as we had long ago perceived the want of that instrument for moral philosophers. In a little essay written many years past, we had imagined an adept in possession of a mental-thermometer, & leaving as an invaluable legacy to a young friend this instrument, which he deemed more advantageous to human happiness than the discovery of the philosophers stone or the elixir of long life.³⁷

Of course, the essay being referred to is "The Mental Thermometer." While this letter was signed by RLE, the use of the word "we" in this quotation may charitably

experiencing." The use of the word "perhaps" suggests that Binmore was unaware of Bentham's discussion of a moral thermometer.

³⁶ This is my translation. The original French reads: "Toutes les autres législations seroient plus ou moins imparfaites. Cette classification est donc à la science législative ce que des instrumens [sic] comparatifs, tels que le baromètre et le thermomètre sont aux sciences physiques. (Dumont, 1802, vol. 1, pp. 208–209)

³⁷ This letter is in the Dumont archive of the Bibliothèque de Genève (MS Dumont 33, folios 3–6). The quotation is from folio 4.

be interpreted to refer to both father and daughter. In any event, RLE appears to be taking some credit for ME's story.

Earlier in the same letter, it is said that

We were much gratified in finding that our miniature system of morals in Practical Education is built on the same firm basis on which your enlarged system of legislation rests — Utility, — and the greatest possible happiness of the whole.³⁸

We have here a clear statement that the Edgeworths' educational treatise had a utilitarian foundation.

Mathematical Psychics and the Hedonimeter

The first few pages of *Mathematical Psychics* are devoted to justifying the use of mathematics to make statements about qualitative relations that are quantitative but not numerical. In FYE's discussion of the use of verbal (common sense) reasoning to make inferences about qualitative relations, he says:

as to the sufficiency of common sense, the worst of such unsymbolic, at least unmethodic, calculations as we meet in popular economics is that they are apt to miss the characteristic advantages of deductive reasoning. He that will not verify his conclusions as far as possible by mathematics, as it were bringing the common sense to be assayed and coined at the mint of the sovereign science, will hardly realize the full value of what he holds, will want a measure of what it will be worth in however slightly altered circumstances, a means of conveying and making it current. (Edgeworth, 1881, p. 3)

In other words, mathematical formalism helps avoid errors in reasoning.

One of the points that ME makes in "The Mental Thermometer" is that subjective feelings of one's pleasure or happiness may be inaccurate and lead to mistaken pursuits. In Part 1 of *Early Lessons* from 1801, the glossary to the Harry and Lucy stories includes an entry for "happy":

People know when they feel happy, or unhappy. Happiness depends on feelings, and feelings cannot be exactly described by words. (Edgeworth, 1801b, p. 92)

ME is pointing to the inaccuracy of determining degrees of happiness by using imprecise descriptions of feelings. Consequently, as her story illustrates, in order to avoid mistakes in ascribing degrees of happiness, a measuring device—her mental thermometer, Bentham's moral thermometer, or FYE's hedonimeter—is needed in order to provide a methodical way of determining how happy someone is.

FYE's discussion about the need for formal analyses and MYE's discussion about the need for accurate measuring devices are making related points. While for FYE, it is faulty reasoning that may stand in need of correction, for ME, it is assessments of feelings. Whether one is concerned with inferences about a qualitative relation or with ascertaining someone's degree of happiness, unaided reasoning or feelings are unreliable and, therefore, should be replaced by more rigorous methods.

³⁸ This passage appears in folio 3.

Mathematical Psychics is now primarily known for making two contributions: (1) the analysis of barter exchange and (2) the investigation of the implications of utilitarianism for distributional issues. The latter topic was first considered in FYE's short monograph, *New and Old Methods of Ethics, or "Physical Ethics" and "Methods of Ethics"* (Edgeworth, 1877), and in his article, "The Hedonical Calculus" (Edgeworth, 1879). The 1879 article was incorporated into *Mathematical Psychics* essentially unchanged.³⁹ In these earlier publications, the hedonimeter was not considered.⁴⁰

FYE described his hedonimeter as follows:

To precise [sic] the ideas, let there be granted to the science of pleasure what is granted to the science of energy;⁴¹ to imagine an ideally perfect instrument, a psychophysical machine, continually registering the height of pleasure experienced by an individual, exactly according to the verdict of consciousness, or rather diverging therefrom according to a *law of errors*. From moment to moment the hedonimeter varies; the delicate index now flickering with the flutter of the passions, now steadied by intellectual activity, low sunk whole hours in the neighbourhood of zero, or momentarily springing up towards infinity. The continually indicated height is registered by photographic or other frictionless apparatus upon a uniformly moving vertical plane. Then the quantity of happiness between two epochs is represented by the area contained between the zero-line, perpendiculars thereto at the points corresponding to the epochs, and the curve traced by the index; or, if the correction suggested in the last paragraph be admitted, another dimension will be required for the representation. The integration must be extended from the present to the infinitely future time to constitute the end of pure egoism.⁴²(Edgeworth, 1881, p. 101)

As previously noted, no evidence has been found that FYE was familiar with his Aunt Maria's story about the mental thermometer, so whether it was one of the inspirations for this passage is unknown. Nevertheless, his description of the hedonimeter's fluctuations echoes what his aunt wrote in the revised ending to "The Mental Thermometer." After handing the mental thermometer to the metaphysician, the narrator says that "he pressed my thermometer to his heart. Instantly the liquor rose almost to the point of perfect felicity; then, fluttering, alternated between that and despair" (Edgeworth, 1824, p. 195).

FYE described his hedonimeter as being "a psychophysical machine." The psychophysicists investigated how human sensations varied in response to changes in various stimuli. The findings of these scholars had a profound influence on FYE's attempt to provide a physical basis for the feelings of pleasure and pain that individuals experience from the consumption of goods and the supply of labor, and for determining the qualitative properties of the utility functions that he used to analyze distributional issues.⁴³ In *Mathematical Psychics*, the experimental psychophysi-

³⁹ For summaries of these three publications, see Creedy (1986), Newman (1987), and Barbé (2010). For an exegesis of *Methods of Ethics*, see Yee (2024).

⁴⁰ Extensive commentaries on the hedonimeter are provided by Colander (2007) and Mueller (2020).

⁴¹ See Clerk-Maxwell [sic], *Theory of Heat*, p. 139. [Edgeworth's own footnote.]

⁴² The two dimensions being referred to are the rate of flow of pleasure and its intensity. The "law of errors" is the normal distribution.

⁴³ FYE's use of psychophysics is briefly discussed by Moscati (2019, pp. 53–54) and in more detail by Creedy (1986), Newman (1987), Colander (2007), Barbé (2010), and Mueller (2020),

cists Alexander Bain, Joseph Delboeuf, Gustav Fechner, Ernst Weber, and Wilhelm Wundt are all cited (Edgeworth, 1881, pp. 60–62). In a typical experiment by the continental psychophysicists, a subject was asked to describe their subjective response to a change in some stimuli (e.g., light intensity), such as reporting when a variation in a stimulus is barely perceptible.⁴⁴ It was Wundt's investigations into the psychophysics of pleasure (Wundt, 1874) that led FYE to use a just noticeable difference as a utility unit. While to some extent Bain (1859, pp. 49–53) used reported responses of subjects to determine their pleasurable and painful responses to stimuli, his primary focus was on physiological and behavioral responses. It was axiomatic for him that “two states of feeling must be held as identical when an identity exists between all the appearances, actions, and consequences that flow from, or accompany them” (p. 50). It is to Bain that FYE attributes his assumption that a just noticeable difference measures the same utility increment both intrapersonally and interpersonally unless there is good reason to believe otherwise.

While the psychophysicists were an important influence on FYE's ideas about utility, they did not employ instruments to quantitatively measure sensations. Consequently, we must look elsewhere for a possible source for the hedonimeter, at least if that source is not ME's story. FYE, himself, provides a clue in his reference to James Clerk Maxwell's *Theory of Heat* (Clerk Maxwell, 1871). It is Clerk Maxwell's use of a thermometer to measure heat that the hedonimeter is meant to emulate in order to measure pleasure.

Thomas Michael Mueller (2020) has convincingly argued that

Edgeworth tried to show that each and every ingredient of the successful research program of measuring temperature had a counterpart in the measurement and the conceptual background of utility theory.

Edgeworth's analogies are often à la Maxwell, that is, between mathematical forms, suggesting the existence of analogous logical relations between magnitudes. But they also suggested that the ultimate reality of utility was some kind of physical phenomenon, analogous to the phenomenon of matter in motion that was the ultimate reality of the feeling of hot and cold.

Clerk Maxwell had shown that temperature (feelings of hot and cold) is causally linked to average molecular speed, a physical phenomenon. According to Mueller, a thermometer is an intermediate link in this relationship, one that provides a way to measure molecular activity and, thereby, to provide a scale by which temperature can be quantified (pp. 717–718).⁴⁵ Analogously, “Edgeworth tried to use this successful research program, the reduction of temperature to matter in motion, to reduce utility to some mental activity that could be measured” (p. 714). The device to be used to make these measurements is the hedonimeter.

among others. FYE's close friends and Hampstead neighbors, the psychologist James Sully and the economist William Stanley Jevons, also influenced his treatment of psychological issues in *Mathematical Psychics*. See Barbé (2010).

⁴⁴ For an introduction to this research, see Narens and Skyrms (2020, chap. 4).

⁴⁵ One of Mueller's main objectives is to show that FYE measures utility on a ratio scale (i.e., a scale that has a fixed origin and is unique up to the size of the unit), as is the case with the Kelvin scale for measuring temperature.

As Mueller documents, FYE revisited what he said about utility measurement in *Mathematical Psychics* on many occasions.⁴⁶ While FYE acknowledged the difficulties with his approach to utility measurement in response to criticisms, he never completely abandoned his objective of providing a firm physical basis for measuring happiness.

Concluding Remarks

I know of two references to a hedonometer prior to the publication of *Mathematical Psychics*. The first is in a letter from Samuel Taylor Coleridge to Thomas Allsop dated June 10, 1821 (Allsop, 1836, pp. 229–230). This letter ends with Coleridge saying that a visit from Allsop would give him “a pleasure which, believe me, stands a good many degrees above *moderate* in the cordi or hedonometer of, Yours most cordially, S. T. Coleridge.” “Cordi-” is a now obsolete form of “cardi-,” which suggests that “cordi” is an abbreviation of “cardimeter,” which is presumably meant to be a device for measuring feelings of some sort. This interpretation is reinforced by Coleridge’s emphasis of “cordi” in “cordially,” as etymologically the latter word signifies that it is from the heart.

In the December 18, 1880 issue of the *Saturday Review*, there is an unsigned essay called “The Value of Signboards.” This essay concerns a legal case about the ownership of a painted signboard for an inn, The Royal Oak, following the bankruptcy of its tenant. The signboard was painted by David Cox, who is regarded as being one of the most distinguished English landscape artists of this period. In discussing the value of the signboard, the author writes:

The value of a thing, in money at least, is what it will fetch, and what it will fetch is determined by conditions which neither buyer nor seller can fix arbitrarily, or at his own pleasure. The problem what the “Royal Oak” [signboard] was worth in 1847 is one which political economy is unable to solve. Nor does the rival science of æsthetics help us much. Æsthetically the value of a picture, or anything else, is to be found in the pleasure it gives the owner. Who will construct a hedonometer for us which shall give the exact values in coin of the realm of a ’47 signboard and a bottle of ’47 port? Certainly none such has been hitherto constructed.⁴⁷

⁴⁶ FYE also used temperature analogies in his analysis of the concept of probability. When discussing how an individual’s assessment of the probability of drawing a white ball from an urn changes as the proportion of white balls increases, he says that “[t]he felt probability, the quantity of belief . . . [is the] measurement of a subjective feeling [that] is like the measurement of felt temperature by the thermometer. It is very like the Fechnerian measurements of sensation.” (Edgeworth, 1884, p. 224) Frank Ramsey (1931, p. 161) later spoke of such device: “For it is, I suppose, conceivable that degrees of belief could be measured by a psychogalvanometer or some such instrument . . .”

⁴⁷ The first use of the word “hedonometer” documented in the *Oxford English Dictionary* is from this quotation. See *Oxford English Dictionary*, s.v. “hedonometer (n.),” July 2023, <https://doi.org/10.1093/OED/9153598381>.

FYE had a law degree, so the legal case would likely have interested him. The indeterminateness of the exchange value of goods is a fundamental feature of FYE's theory of barter transactions. His interest in measuring pleasure is what motivated his discussion of a hedonimeter. From these considerations, FYE might seem to be a candidate for the authorship of this essay. However, the style is not his, which makes this possibility unlikely. "The Value of Signboards" appeared shortly before the publication of *Mathematical Psychics*, so it is possible that its author was someone who had some advance familiarity with its contents. If that is the case, then the mention of a hedonimeter in this essay might be a reference to FYE's hypothetical instrument.

Thermometers also made appearances in some of ME's children's tales. The glossary to Part 1 of *Early Lessons* includes an entry for a thermometer (Edgeworth, 1801b, p. 110). Descriptions of how a thermometer works are provided in Part 3 of the Harry and Lucy stories published in 1814 (Edgeworth, 1856, pp. 66–71) and in the last set of Harry and Lucy stories published in 1825 (Edgeworth, 1825, vol. 3, pp. 272–276).⁴⁸ In "Lame Jervis" from the collection *Popular Tales*, when the titular character, William ("Lame") Jervis, is shown the study of a Dr. Y—, the latter points out a thermometer and asks Jervis if he knows what it is and how it works (Edgeworth, 1804, pp. 36–37). Jervis later constructs various mechanical apparatuses himself.⁴⁹ In Part 2 of *Early Lessons*, Harry and Lucy are shown their uncle's study, which includes "several instruments and machines of various sorts," among which are a thermometer and barometer (Edgeworth, 1801c, pp. 112–113).

Of particular relevance here is ME's mention of a thermometer in relation to feelings in her 1796 story "The Mimic" from her first collection of tales for children, *The Parent's Assistant*. In the presence of his sister Marianne, Frederick provokes his other sister Sophia. This leads to the following exchange:

"There! There!" cried Frederick, pointing to the colour which rose in her cheek almost to her temples; "Rising! Rising! Rising! Look at the thermometer. Blood heat! Blood! Fever heat! Boiling water heat!" Marianne."

"Then," said Sophy, smiling, "you should stand a little farther off, both of you; leave the thermometer to itself for a little while; give it time to cool. . . ." (Edgeworth, 1796, pp. 105–106).

Here, Sophia's face serves as a thermometer to measure her feelings.

ME's father instilled in her a life-long interest in science and mechanical devices. She knew well many of the leading scientific figures of her time, learning first-hand of their research. Some of them were relatives or close friends. Her relatives included her brother-in-law, Thomas Beddoes (a medical researcher who

⁴⁸ Parts 3 and 4 of the Harry and Lucy stories were attributed to both RLE and ME when they were published in *Continuation of Early Lessons* in 1814. In an October 16, 1813 letter from ME to her cousin Sophy Ruxton, she wrote: "About eighteen pages of scientific matter was left to me by my father to make into a new volume of *Harry & Lucy* & this I have to do at this moment" (Butler, 1972, p. 166). When this letter was published in Pakenham (2018, p. 169), "eighteen" is replaced by "101". So, the actual composition of these stories was by ME based on her father's notes.

⁴⁹ Hoiem (2024, chap. 4) singles out this story for extended comment in her analysis of the use of self-governing machines in ME's fictions.

made pioneering experiments on treatments for pulmonary diseases) and Francis Beaufort (the inventor of the Beaufort scale for measuring wind speed), who was the brother of her step-mother Frances. Through Beddoes, she got to know the chemist Humphry Davy, the inventor of electrochemistry. The mathematician and astronomer William Rowan Hamilton (known to economists for the Hamiltonians used to solve dynamic optimization problems) became a close friend.⁵⁰ “The Mental Thermometer” provides an early instance of ME’s interest in scientific matters, an interest that later received extended practical expression in *Practical Education*.

In commenting on “The Mental Thermometer,” Butler (1972, p. 147) said that “the style, while admirably correct, [is] very stiff by comparison with her later writing.” Whatever its literary merits, this story deserves to be recognized for its insightful treatment in fictional form of some fundamental issues raised by utilitarianism—whether the capacity for happiness is person specific, what the nature of happiness and pleasure is, and how can happiness be measured. Maria Edgeworth’s concern with measurement issues reflected her awareness of the latest developments in the measurement of temperature. Her description of a device for measuring happiness anticipates by almost a century the celebrated account of a hedonimeter by her nephew, Francis Ysidro Edgeworth, and by over a quarter century the published description of Jeremy Bentham’s moral thermometer. Writing “The Mental Thermometer” at age sixteen was a remarkable achievement.

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⁵⁰ Brück (1996) provides an account of ME’s extensive network of scientific friends. Butler (1972) gives more details about her interactions with some of them. FYE also knew Hamilton. Newman (1987, pp. 87–88) speculates that this relationship helped stimulate his interest in mathematics and his use of the tools of dynamic optimization.

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