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3. Henry later reported to the Board of Regents that

I, therefore, presented the matter unofficially to the Chancellor of the Institution, Chief Justice Taney, and was advised by him to allow the matter to rest until the then existing excitement with respect to the organization of the Institution should subside, and that in the meantime the materials for a refutation of the charge might be collected and prepared, to be brought forward at the proper time, if I should think it necessary. [*Smithsonian Report for 1857*, p. 85.]

4. Benjamin C. Howard, *Reports of Cases Argued and Adjudged in the Supreme Court of the United States*, 24 vols. (Boston, 1844-1861), 15:62-137. For Henry's involvement in the case of *Morse v. O'Reilly*, see *Henry Papers*, 7:601n-

602n; David Paul Hochfelder, "Taming the Lightning: American Telegraphy as a Revolutionary Technology, 1832-1860" (Ph.D. diss., Case Western Reserve University, 1999), pp. 261-262.

5. Henry spoke before an audience of approximately two thousand at the Maryland Institute on March 27. His announced topic was "The Smithsonian Institution." Henry spoke, however, on "Science and the methods of scientific discovery" (see Doc. 128). According to a newspaper account, Henry discussed "the various sciences, arts and literature." He talked for about seventy-five minutes, speaking "in a plain, unassuming style—his voice clear and enunciation distinct—but without any approach to oratorical or rhetorical flourish." *Baltimore Republican and Argus*, March 28, 1855.

126. TO MOSES MACDONALD¹

Mar 24. 1855

Dear Sir,

To the enquiries propounded in your letter² of this morning I give the following replies.³

To the first question—namely: "Does not the merit of a scientific discovery belong to him who first demonstrated it, rather than to him who suggested it; I answer that this depends on the relative character of the suggestion and the demonstration. If the suggestion is a simple one which would readily occur to any one from previous analogy and the demonstration was one of difficulty or of labor, the merit would belong to the latter rather than to the former.

For example, the doctrine of universal gravitation was suggested previous to the time of Newton but the merit of the discovery is awarded to him because he devised means and encountered the labor of its verification.⁴

There are other cases however in which the scientific decision would be reversed. In these the suggestion would be of such a sagacious character and so definitely expressed and the means of verification so simple as to require neither talent nor labor to apply them.

To the next question; "Is or is not chloroform considered an ether," I give the following answer.

It is called an ether by Regnault,⁵ but as I have not kept up with the history of the investigation relative to this subject I can only refer you to his

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Chemistry and other late standard works on the science, for the desired information.⁶

I am very respectfully
Your obed't serv't
Joseph Henry

Hon. M. McDonald.

Letters Received, Records of the Office of the Secretary of War, RG 107, National Archives.

In William Jones Rhees's hand, with Henry's signature.

1. MacDonald (1815–1869), a Maine lawyer and politician, had just completed his second and last term in the House of Representatives. *BDAC*.

2. Not found.

3. The queries related to a congressional petition by William Thomas Green Morton (1819–1868). A Boston dentist, Morton had administered sulfuric ether to a patient undergoing an operation at the Massachusetts General Hospital. This well-publicized event in October 1846 led to the rapid adoption of anesthesia in surgical operations. After the operation, Morton took out a patent, along with Charles T. Jackson, for the "alleviation of pain during surgical operations" (*Report of Commissioner of Patents*, p. 26).

The patent was controversial from the beginning, as many in the medical profession criticized Morton's efforts to profit from his innovation and as priority disputes arose over credit for discovering the anesthetic properties of ether and over the principle of using anesthetics to relieve pain during surgery. For a variety of reasons, Morton was unable to enforce his patent even as the use of ether and other forms of surgical anesthesia became widespread.

In his congressional petition, Morton sought compensation from the government for the use of ether by medical officers of the army and navy. A Senate bill to compensate Morton was passed in 1854, but the House tabled the bill. In June of that year, Morton addressed a letter of protest, endorsed by 150 congressmen, to the president and the secretaries of war, navy, and treasury. Sometime that autumn, Secretary of War Jefferson Davis had referred the matter to Henry for an opinion on scientific questions, especially whether chloroform could be considered an ether and thus included under Morton's original patent. In a letter dated February 20, 1855, Davis reminded Henry to return a report on the matter.

According to a contemporary biographer of Morton, Henry gave an opinion in February that was favorable to Morton. After receiving Henry's

opinion, Davis submitted a report on the subject to President Pierce sometime prior to March 21. On that date, with Davis's report apparently before him, Pierce informed Congressman William Witte, an acquaintance of Morton's who had appealed to the president on Morton's behalf, that he needed to consult further with Davis, particularly as to whether to notify the war and navy departments to discontinue the use of anesthetics or to instruct them to purchase the rights to their use. On March 23, Witte again called on the president, who is quoted as saying:

There is a point which is not yet exactly clear to my mind, as to whether the patent includes all anaesthetic substances—for instance, chloroform; and for a little information on this subject, and to prevent any more doubt, I think it will be better to refer it to the Attorney General, so that I can find out exactly what the patent does cover. [Rice, pp. 409–410.]

In his letter MacDonald was evidently following up on Pierce's question about the patent's coverage of chloroform. MacDonald's other question, regarding the merit of scientific discovery, relates to advice given to Morton by Jackson prior to their filing the patent. Morton had consulted Jackson, a professor of chemistry at Harvard, about ether, and Jackson later claimed that he was the true discover of its anesthetic properties.

As in the case of Morse and the telegraph, one of the central questions was whether a patent was valid for only a specific example or an entire class of objects. Morton and Jackson's patent specified "the application of ether, or the vapor thereof" (*Report of the Commissioner of Patents*, p. 334). Did the patent cover all the numerous ethers, of which chloroform was one, or just sulfuric ether, the compound Morton used in his operation? His supporters argued that "so long as anaesthesia is produced by the application of alcohol, distilled with any acid, in such a way as to constitute what is known to

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chemists as *an ether*" then it was covered by Morton's patent (Rice, p. 396; italics in original).

Why MacDonald was querying Henry is not clear. MacDonald was apparently not one of Morton's supporters. He was the only member of either house of Congress from Maine not to support Morton's 1854 letter of protest.

After Morton's efforts to receive compensation from Congress failed, he sued the government, on the advice of President Pierce. But in 1862 the patent was declared invalid and his case was dismissed on the grounds that anesthesia was a scientific discovery rather than an invention.

Barbara M. Duncum, *The Development of Inhalation Anaesthesia with Special Reference to the Years 1846-1900* (London, New York, and Toronto, 1947), pp. 99-129; *American National Biography*, 24 vols. (New York and Oxford, 1999), s.v. "Morton, William Thomas Green"; Martin S. Pernick, *A Calculus of Suffering: Pain, Professionalism, and Anesthesia in Nineteenth-Century America* (New York, 1985), pp. 39-40; L. J. Ludovici, *Cone of Oblivion: A Vendetta in Science* (London, 1961), pp. 211-212; U.S. House, 29th Congress, 2d Session, *Report of the Commissioner of Patents, for the Year 1846*, House Documents, No. 52 (1847), pp. 26, 334; Nathan P. Rice, *Trials of a Public Benefactor, as Illustrated in the Discovery of Etherization* (New York, 1859); Jefferson Davis to Henry, February 20, 1855, abstracted in *The Collector: A Magazine for Autograph and Historical Collectors*, 1960, 73, no. 3: item v 360.

4. Henry and his contemporaries were well

aware of the claims of Robert Hooke on the basis of his speculations about gravity and the recognition of Isaac Newton instead for going beyond "mere conjecture" to "certainty." See, for example, *Encyclopaedia Britannica*, 8th ed., s.v. "Dissertation Fourth: Exhibiting a General View of the Progress of Mathematical and Physical Science, since the Revival of Letters in Europe," by John Playfair, 1:675.

5. Henri Victor Regnault, a French chemist and physicist. *Henry Papers*, 7:630n.

6. Chemists used the word "ether" in relation to alcohols. The latter were defined as "all neutral compounds of carbon, hydrogen, and oxygen, which unite directly with acids, water being eliminated whilst ethers are produced" (William Allen Miller, *Elements of Chemistry: Theoretical and Practical*, 2d ed., 3 vols. [London, 1860-1862], 3:147). Ethers were thus the neutral compounds produced by the reaction of an alcohol with an acid.

According to Regnault, the true ethers were derived from ethyl alcohol; the chemical formula for true ethers was C_4H_5X , where X was either an acid (vinic acids and compound ethers) or an element (simple ethers). In contrast, chloroform was a product of chlorine acting upon methylochlorohydric ether, an ether derived from methyl alcohol. Regnault gave the chemical formula for chloroform (known chemically as bichlorinated methylochlorohydric ether) as C_2HCl_3 . H. V. Regnault, *Elements of Chemistry for the Use of Colleges, Academies, and Schools*, ed. James C. Booth and William L. Faber, 2 vols. (Philadelphia, 1853), 2:516-587.

127. TO JOSEPH LEIDY

Smithsonian Inst
March 29th 1855

My Dear Dr

Your letter of the 22nd inst.¹ was duly rec^d but a press of business has prevented the return of an answer before this morning.

We need say no more about Dr. Genth's memoir,² what has been said in reference to it was the result of a mistake.³ I trust we shall never disagree as to the proper management of the Institution provided we can have a full interchange of views.

Though your memoir cannot well form a part of the next volume it can be published separately during the present year and distributed to all who would be particularly interested in the subject of which it treats. We