

May 3, 1844

Mr. Richardson is accompanied by his Parents<sup>5</sup> and you will oblige me by directing them to the objects of most interest to strangers in your city.<sup>6</sup>

With much Respect  
and Esteem I remain  
most sincerely yours &  
Joseph Henry

<sup>5</sup> William Richardson and Synia Higgins Richardson. *Memorials of Richard H. Richardson*, p. 3.

<sup>6</sup> Henry prepared a similar letter of introduction for the Richardson family to David B. Warden, May 1, 1844 (retained copy, Henry Papers, Smithsonian Archives). Notes in Henry's address book (Box 17, Henry Papers,

Smithsonian Archives) show that he also prepared introductory letters on behalf of the Richardsons to A.-A. De La Rive, p. [30], John Stevens Henslow, p. [32], Baden Powell, p. [33], and Thomas Henderson, Astronomer Royal of Scotland, p. [37]. Copies of these letters have not been found.

## TO WILLIAM WILKINS

*Copy, Letters Received, Registered Series, 1801-1870,  
Records of the Office of the Secretary of War, RG 107, National Archives<sup>1</sup>*

Princeton, College of New Jersey.

May 3<sup>d</sup> 1844.

Sir;

I have the honor to acknowledge the receipt of a letter from the War department, requesting my views as to the originality of M<sup>r</sup> Colt's method of producing explosions; it being understood according to your statement, that the combustible he employs is gunpowder, and that this is fired by means of galvanism, or other similar agency. In answer to this letter, I respectfully submit the following.

The explosion of gunpowder at a distance by means of galvanism has been familiar to men of science, and practical engineers for several years. The method now generally used was made public in 1832, and is the invention of D<sup>r</sup> Hare of Philadelphia.<sup>2</sup> It consists essentially in extending

<sup>1</sup> Published with minor textual variations in U.S. House, 28th Congress, 2d Session, *Colt's Submarine Battery*, House Documents, No. 127 (1845), pp. 16-17 (cited hereafter as "House Document No. 127"), and reprinted in Philip K. Lundberg, *Samuel Colt's Submarine Battery: The Secret and the Enigma* (Washington, 1974), p. 66.

Although Henry signed his letter, it was written by a copyist (perhaps his wife, Harriet,

whom he occasionally asked to prepare a neat and accurate copy). The copyist originally addressed Wilkins as Secretary of State rather than Secretary of War, but corrected the mistake. Another copy of the letter, in an unidentified hand (perhaps that of W. L. Nicholson, who worked with Henry's papers in the 1880s), is found in the Henry Papers, Smithsonian Archives.

<sup>2</sup> Hare (whose views regarding Colt's sub-



May 3, 1844

between the reservoir of powder, and the operator, two long thick wires of copper, the farther ends of which terminating in the powder, are united by a short wire of platinum of small diameter. The other ends of the copper wire, in the hands of the operator, at the desired moment of explosion, being suddenly brought in contact with the two poles of a galvanic battery, a current of galvanism is transmitted through the circuit of wires, which heating to redness the piece of platinum in the midst of the powder, produces the explosion.

The practicability of exploding gunpowder at a distance in this way, was established by the experiments of Dr Hare, and his results were verified, and applied to actual practise by several persons, before the time of the exhibitions of Mr Colt. In 1839 a series of experiments by Col. Pasley of the royal engineers was published in England relative to the explosion of a large quantity of powder by the galvanic process, at the bottom of the river Medway,<sup>3</sup> and as an evidence of the wide diffusion of the knowledge of this process I may mention, that I have now before me, a book published in Calcutta in 1841, in which is given a minute account of experiments of Dr

---

marine battery had also been solicited by Wilkins) had a long-standing interest in the application of galvanism to ignite gunpowder at a distance. As early as 1820 his "Account of New Eudiometers, &c. Invented by Robert Hare," which appeared in *Silliman's Journal*, 2:312-318, commented on the detonation of gunpowder by means of electricity. "The method now generally used" to which Henry made reference was Hare's "calorimotor," a plunge-type galvanic battery with which he began experimenting in 1831; see Hare's "Description of a Process and an Apparatus for Blasting Rock by Means of Galvanic Ignition," *Journal of the Franklin Institute*, 1833, n.s. 12:221-226; Lundeberg, *Samuel Colt's Submarine Battery*, pp. 9-12, and *Henry Papers*, 2:183.

In his own response to Wilkins, Hare reviewed his work on galvanic ignition and cited the two aforementioned articles, noting his suggestion in the 1833 article that the calorimotor could be adapted for detonating submerged mines. As did Henry, Hare also discussed the research done by other individuals, including O'Shaughnessy and Pasley. Hare also stated that Colt had learned of his work from John William Draper, who, in 1842, had assisted Colt in testing materials for the submarine battery in a laboratory at the University of the City of New York. "The process

which [Colt] uses," Hare concluded, "was one which I had previously employed." Hare's letter, dated May 1, 1844, appeared in House Document No. 127, pp. 12-14 (quote at p. 13); it is also reprinted in Lundeberg, *Samuel Colt's Submarine Battery*, pp. 62-63 (quote at p. 62).

<sup>3</sup> Sir Charles William Pasley (1780-1861, DNB), Director of the Royal Engineers' Institute for Field Instruction and Commandant of the Corps of Royal Sappers and Miners, during 1838-1839 tested the galvanic detonation of submerged gunpowder charges on the Medway River in England. Charles Wheatstone, John Frederic Daniell, and Michael Faraday rendered technical assistance for these experiments. The results were published anonymously as "Observations on Colonel Pasley's Operations in the Removal of Wrecks by Subaqueous Explosions," *The United Service Journal and Naval and Military Magazine*, 1839, part 2, pp. 183-197. Pasley subsequently used galvanically detonated gunpowder to blast shipwrecks from the Thames River and from Spithead, off Portsmouth Harbour. See also Lundeberg, *Samuel Colt's Submarine Battery*, pp. 5-7; *The Selected Correspondence of Michael Faraday*, ed. L. Pearce Williams, 2 vols. (Cambridge, England, 1971), 1:312-313, 329-333.



May 3, 1844

O'Shaughnessy of the Bengal army, in destroying a wreck sunk in Hoogly river, by a method which the author himself, calls the process of Dr Hare.<sup>4</sup>

The experiments on the Hoogly, as well as those on the Medway, were made in 1839, and since that time, as it would appear by the various publications on the subject in the different English scientific journals, the application of the galvanic process of exploding gun powder, has become an established part of the business of the English engineer.<sup>5</sup> In short I consider the laws of the transmission of Electricity through long wires, so fully developed by the researches of Ohm, Wheatstone, Daniell, & others, at least as far as they are applicable to the process in question, that I do not think it in the least degree probable, that M<sup>r</sup> Colt has added a single essential fact, to the previously existing stock of knowledge on this subject.

In conclusion, I wish it to be distinctly understood that the foregoing remarks, are all made in reference to the method of exploding gunpowder at a distance by means of galvanism, and are intended as a specific answer to the question proposed to me in your letter. Mr. Colt may perhaps not attempt to found his claims to originality, on the invention of the galvanic process—to which he can have no title—but on a new application of this process to a method of harbor defence, and also on a new arrangement of subaqueous magazines for the same purpose.<sup>6</sup> Of the validity of claims thus

<sup>4</sup> William Brooke O'Shaughnessy (1809–1889; *Henry Papers*, 5:445), an assistant surgeon with the Bengal Army, in 1839 used a galvanic battery and submerged gunpowder to clear a sunken barge from the Hooghly River near Calcutta. He described his apparatus and the undertaking in his *Notes on Natural Philosophy. First Series, On Galvanic Electricity* (Calcutta, 1841), pp. 24, 67–76. O'Shaughnessy termed Hare “the first to shew how platinum wires could be ignited at a great distance and even under water, and to propose the application of this fact to submarine explosions” (p. 21). The Henry Library contains a presentation copy of the work.

<sup>5</sup> By the early 1840s, English civil and military engineers were using galvanically detonated gunpowder to remove sunken vessels from waterways or to excavate and clear earth. Accounts of such operations appeared frequently in English and American journals. See, for example, “Operations against the Wreck of the ‘Royal George,’ and Proposed Great Explosion,” and “Wreck of the ‘Royal George,’” *Annals of Electricity, Magnetism, and Chemistry*, 1840, 5:71, 155–158; Hamilton K. G. Morgan, “On the Use of the Galvanic

Battery in Blasting,” *Silliman's Journal*, 1840, 38:33–35; John F.W. Herschel, “The Great Explosion at Dover,” *Journal of the Franklin Institute*, 1843, 3d ser. 5:270–272; Captain Stuart, “Notice of the Great Explosion at Dover,” *ibid.*, 5:325–327; and “Major General Pasley on the Recent Great Mining Operations near Dover,” *ibid.*, 6:28–40. See also *Encyclopaedia Britannica*, 8th ed., s.v. “Blasting.”

<sup>6</sup> Colt made no claim to originality for the idea of using electricity to detonate gunpowder. He duly credited Moses Shaw of Boston, who in 1828 experimented with blasting rock, as “the first person who made any practical use of electricity for the purpose of igniting large masses of gunpowder” (Colt to editor of the *Army and Navy Chronicle and Scientific Repository*, May 4, 1843, 1:570). Colt also acknowledged Hare as the first to conceive of using electricity to detonate gunpowder underwater (see, for example, Colt to Henry C. Murphy, House Committee on Naval Affairs, June 3, 1844, printed in Lundeborg, *Samuel Colt's Submarine Battery*, p. 70). Colt's plan to use submerged mines to sink ships was also not without precedent: Robert Fulton's work with anchored torpedoes in the late 1790s had



May 3, 1844

founded, I am not called on to give my opinion; but in justice to M<sup>r</sup> Colt, I ought to say that whatever may be the result of the investigations relative to the originality of his plans, I think he deserves credit for the industry, and practical skill, with which he has brought them before the Public.<sup>7</sup>

I have the honor to be very respectfully

Your obedient servant,

Joseph Henry

---

demonstrated the feasibility of this idea.

Colt's claim to originality rested in the method he devised of using mirrors in observation towers to determine when mines should be detonated beneath a passing ship. Fearing that close scrutiny of his idea might reveal technical flaws, however, Colt kept information about this component of his system so secret that Wilkins, most in the military, and other interested parties (including Henry and Hare) knew nothing about it. Moreover, all but one of his four demonstrations of the submarine battery were performed on *moored* ships; Colt sunk a moving ship in the last trial, in April 1844, but did not erect an observation post for the demonstration, and apparently did not use mirrors or a grid. In short, he was basing his claim upon a conception which had been neither tested nor shown to be feasible, and the details of which he had thus far refused to divulge.

<sup>7</sup> Henry's and Hare's lukewarm assessments of Colt's claim did nothing to help his case. His claim was dealt another damaging blow by the report of Colonel Joseph G. Totten, Chief of the U.S. Corps of Engineers, whom Wilkins had also requested to evaluate Colt's submarine battery. Totten, like the two scientists, cited the prior researches of Hare, Pasley, and others on the galvanic detonation of gunpowder. He criticized Colt's secretiveness and reluctance to let qualified experts assess the merits of his full system. Moreover, Totten surmised correctly that Colt had devised some

sort of observation tower for locating ships; he voiced deep misgivings that such platforms would be effective in darkness or fog, or that they could be safeguarded against enemy action (Totten to Wilkins, May 1, 1844, printed in House Document No. 127, pp. 6-11).

Based on these negative evaluations, Wilkins concluded that the money which Colt previously had received from the government was a sufficient "encouragement to the exercise of his talents" and that no further payment was warranted (Wilkins to J. W. Jones, May 8, 1844, printed in *ibid.*, p. 3). Before it passed final judgment on the claim, however, the House Naval Affairs Committee directed Colt "to communicate his secret to the Commissioner of Patents [H. L. Ellsworth] . . . to satisfy the committee of the reality of an invention or discovery" (report of House Naval Affairs Committee on Colt's claim, January 11, 1845, in *ibid.*, p. 20). Colt complied by applying for a patent, and Ellsworth did in fact find his observation tower a sufficiently original idea to warrant a patent. However, the House Committee, based on Totten's report, concluded that Colt's submarine battery was of little utility. Accordingly, it agreed with Wilkins that Colt was not entitled to additional compensation—a conclusion with which Secretary of the Navy John Y. Mason concurred.

*Ibid.*, pp. 17-22; Lundeborg, *Samuel Colt's Submarine Battery*, pp. 49-57.