Could You Have Been a Motoneer?

By ALEXANDER B. MAGOUN

hat is in a name, and where do names come from? In particular, where do the names of occupations originate? If the origins of "smith," "faber," and "wright," are lost to prehistory, we can trace the more recent job titles,

those created in the industrial revolutions of the late 18th and late 19th centuries, through their legacies in contemporary texts. The creation of new

jobs in new industries gave rise to the development of new professions. Professionalization represented more than a record of systemic training and accomplishment. It also marked a rise in the status of its members, particularly as they added more value to an economy and society through the application of their expertise.

That status stimulated debate over the qualifications for professional membership. Who in a new industry merited inclusion? The answer is complicated by the creation of new

and more. occupations in that industry; by the uneven, unstructured process of the development of expertise in those occupations as it migrated from apprenticeships and work experience to formal education and degree programs; and by the different skills, education, and training required for them. Words matter. One example of this debate in the late 19th century raised questions ranging from the demarcation of old professions from new ones to the status implicit in the professions' occupations, and from the esthetic quality of the proposed new word to the authority that anyone had over the social acceptance of a neologism in a decentralized, democratic society.¹

¹For an extended and thoughtful analysis of this issue with regard to the electrical professions, see Chapter 1, "Inventing the expert," particularly pp. 9-17, in C. Marvin, When Old Technologies Were New: Thinking About Electric Communication in the Late Nineteenth Century. New York, NY, USA: 1990. For a useful historical survey of professional development across European professions, see J. C. Albisetti, "Professionals and professionalization," in Encyclopedia of European Social History from 1350 to 2000, vol. 3, P. N. Stearns, Ed. New York, NY, USA: 2001, pp. 57-66. Accessed: Sep. 24, 2019. [Online]. Available: http://www.encyclopedia.com/international/encyclopediasalmanacs-transcripts-and-maps/professionals-and-professionalization

This article takes a closer look at the coining of the title "motoneer" and how it raised questions about the demarcation of old professions from new ones

I. PREINDUSTRIAL USES OF "ENGINEER" AND **ITS VARIANTS**

Engineers are members of one of the world's oldest professions, one with military origins after centuries of work on ingenious war machines, such as ballistas, catapults, and other engines. The counterintuitive nature of these devices seemed to outwit Aristotelian physics and intuition; in the 12th century CE, the concept of engin or gyn(e), derived from the Old French engine, extended beyond war machines to the mental tricks that could subvert the chivalric code of behavior.²

The conflicted medieval reputation of the "engynour" established a pattern of alternately appealing to or outraging observers. While engineers continued to be invaluable in constructing and deconstructing fortifications and military infrastructures, in popular culture one 15th-century English writer created a version of the life of Saint Katherine in which a "false traytoure" and "grete yngynour" offers King Maxent an "yngyne" on whose wheels her

²J. R. R. Tolkien, A Middle English Vocabulary. Oxford, U.K.: 1922, s.v. "gyn(e)"; see R. W. Hanning, "Engin in Twelfth Century Romance: An Examination of the Roman d'Enéas and Hue de Rotelande's Ipomedon," Yale French Stud. No. 51, 1974, pp. 82-101; and G. Barnes, Counsel and Strategy in Cambridge, Middle English Romance. U.K.: 1993, pp. 92-94 for the linguistic and etymological flexibility of gyn and its variants, and Chapter 4, "'Winning by gyn': The Auchinleck Manuscript (ii)," passim.

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Christian devotion would be broken.³ Another machine was the petard, a shaped explosive charge placed on the gate of a besieged fortress. William Shakespeare had Hamlet joke at the engineer's expense in a reflection of the dangers involved in playing tricks on the nature of things:

For 'tis the sport to have the enginer Hoist with his owne petar, an't shall goe hard.⁴

Two generations passed before John Bullokar's successor included "engineer" in the third edition of his pioneering English dictionary, as "a maker of engines." This was the uncommon, civil use of the military term, for "if a worde be of different significations ... I speak only of interpretation of the hardest."5 The man credited with inventing, in the late 17th century, the first machine for raising water through steam pressure, Thomas Savery, was, therefore, considered as "the most noted engineer."⁶ The government of His Majesty George III recognized James Watt as an engineer in its act assigning him "sole use and property of certain steam engines, commonly called Fire Engines, of his invention ... for a limited time."⁷ The men operating the other type of fire engine, for pumping water onto fires, also gained the name in less productive circumstances, in one case "accidentally pointing the engine pipe" at a woman in the window of a burning house and striking "her backward, and she was consumed with the building."8 Nonetheless, the first edition of the Encyclopaedia Britannica, despite its emphasis on the "different technical terms," confined the engineer solely to a military role, which was echoed overwhelmingly in 18th-century magazines.9

³"Life of Saint Katherine," in J. O. Halliwell-Phillipps, Ed., *Contributions to Early English Literature*. London, U.K.: 1849, p. iii, quotes on p. 15. Halliwell-Phillipps reproduced this version of the saint's life from the so-called Thornton Manuscript preserved at the Cambridge University Library; Thornton is thought to have compiled the poems and stories around 1440: "Description of the Cambridge and Lincoln Manuscripts," in Halliwell-Phillipps, Ed. *The Thornton Romances*. London, U.K.: 1844, p. xxv.

⁴*The Tragicall Historie of Hamlet*, Quarto 2, London, U.K.: 1604, 1605, Act III, Scene 4, lines 2577.5–2577.6, *Internet Shakespeare Editions*. Accessed: Sep. 26, 2019. [Online]. Available: https://internetshakespeare.uvic.ca/doc/Ham_Q2/scene/3.4/index.html

⁵J. Bullokar, "An introduction to the reader," in *An English Expositor: Teaching the Interpretation of the Hardest Words Used in Our Language*. London, U.K.: 1616, 1641, 1656, s.v. "engineer."

⁶S. Switzer, An Introduction to a General System of Hydrostaticks and Hydraulicks. London, U.K.: 1729, p. 325; C. Fox, "The ingenious Mr Dummer: Rationalizing the royal navy in late seventeenth-century England," *Electron. Brit. Library J.*, p. 25, 2007.

⁷D. Pickering, Statutes at Large, From Magna Carta to the End of the Eleventh Parliament of Great Britain, Anno 1761, vol. 31. London, U.K.: 1775, 15 Geo. III c. 61, p. 128.

⁸"Historical Chronicle for January," *The Universal Magazine of Pleasure and Knowledge*, vol. LXVI, Jan. 1780, p. 51.

⁹Encyclopædia Britannica; or, a Dictionary of the Arts and Sciences, Compiled Upon a New Plan, vol. 6, Part 2. Edinburgh, U.K.: 1771, s.v. "engineer." For an example of coverage of military engineers, see the fifteen references in *The Scots Magazine*, vol. 44, 1782.

II. ENGINEERS IN EARLY AMERICAN RAILROADS

By the 19th century, the broader meaning had become commonly understood and accepted, even as the success of its acceptance gave rise to another definition. Owing to Thomas Newcomen, Watt, Richard Trevithick, and a host of others, steam engines had become the prime mover for factories and transportation. Each of those thousands of engines, on land and sea, needed someone to tend and maintain it. The often neglected, American, steam power pioneer, Oliver Evans, is perhaps the first writer and practitioner to name that maintainer an "engineer", in The Abortion of the Young Steam Engineer's Guide. In reviewing the many uses of steam engines, Evans explained that its application with a mechanical extension on a "land carriage" could give the wheels "motion forward or backward at pleasure and enable the engineer to turn his carriage on a small space of ground."¹⁰

The term for that professional could have been Shakespeare's "enginer" in the manner of the miner, the baker, and the candlestick maker, but the doubled e outlasted it. In the United States, at the beginning of the railroad era around 1830, engineering remained as an unusual occupation outside government roles. Across hundreds of listings in city directories, no more than eight men called themselves engineers; two of them were careful to distinguish themselves as civil engineers.¹¹ Some of those professionals were undoubtedly the tenders and maintainers of engines rather than the designers or builders of engines and nonmechanical structures. Nearly a generation after Evans explained the principles of steam engines, however, a report on industry activities in the state of Pennsylvania made 83 references to engineers over the first six months of 1828: 82 of them were engaged in designing or managing the construction of canals and the remaining one oversaw a railway.¹²

Engineering construction brings with it the thrill of novelty in design or opportunities; maintenance is rarely an exciting subject until the maintained system breaks down. Five years later, in 1833, the Camden and Amboy Rail Road in New Jersey suffered the first steam locomotive disaster in North American history when an axle broke, derailing the car above it. In an early report, the engineer seemed responsible for he "was unable to stop his locomotive until the fallen car, with its contents,"—some 24 people—"had been dragged about 40 yards."¹³ An investigation absolved him of blame, but the first railroad accident in which passengers died initiated a pattern. Locomotive engineers,

¹⁰O. Evans, *The Young Steam Engineer's Guide*. Philadelphia, PA, USA: 1805, p. ix; also published that year as *The Abortion of the Young Steam Engineer's Guide*.

¹¹See [David Longworth], *Longworth's American Almanack, New-York Register, and City Directory.* New York, NY, USA: 1833; and [Robert Desilver], *Desilver's Philadelphia Directory and Strangers' Guide.* Philadelphia, PA, USA: 1829, 1835.

¹²S. Hazard, Ed., *The Register of Pennsylvania*, vol. 1, Jan./Jul. 1828.
¹³S. Hazard, Ed., "Dreadful accident," in *Hazard's Register of Pennsylvania*. Nov. 1833, p. 319.

responsible for all the factors in maintaining the engine at the speeds necessary to meet the schedule of proliferating timetables, gained public attention only when something went fatally wrong.

III. SHALL IT BE MOTONEER?

Members of today's maker movement may accept being lumped with candlestick makers, but then they have yet to form a professional society, curriculum, or licensing procedure for certified practice. The American Society of Mechanical Engineers was organized in 1880, following the organization of the United States civil engineers (1852) and professionalization of the country's doctors (1847) and lawyers (1878). These were occupations demanding increasingly specialized skills and often rewarding their practitioners with greater respect from the public and higher salaries from their employers. The notion that unschooled mechanics or engine tenders trained through apprenticeship might regard themselves as equal to electricians or electrical engineers stuck in the craws, however, of those who saw themselves as more intellectual workers with the insights and spreading applications of electric power generation, transmission, and conversion.¹⁴

These issues surrounding professionalism did not appear to affect George W. Mansfield, a new employee of the new Daft Electric Motor Company in the summer of 1883 (see Fig. 1).¹⁵ As a mining engineer with electrochemical training at the Massachusetts Institute of Technology (MIT) and a member of the founding editorial board of MIT's student newspaper, Mansfield joined the electric railway pioneer and entrepreneur Leo Daft's company upon graduation that spring as a chemist, replacing an older classmate and shortly making the transition to electrical engineering.¹⁶ At that time, MIT did not enjoy the prestige gained in the 20th century. Twenty-eight students, largely from the state of Massachusetts, graduated in 1881; Charles R. Cross implemented the formal study of electrical engineering in the Physics Department the year before Mansfield graduated. Yet, perhaps referred by Cross, who

¹⁴See A. M. McMahon, *The Making of a Profession: A Century of Electrical Engineering in America, 1884–1984.* New York, NY, USA: 1984, especially Chapter 2, "The new engineering age," pp. 31–60. Accessed: Sep. 22, 2019. [Online]. Available: https://ethw.org/w/images/ e/ee/The_Making_of_a_Profession.pdf

¹⁵"Railway industries," *Railway World*, Apr. 1883, p. 322. For more on Daft's meteoric career, see A. J. Manson, "The development of the electric motor," *Railway and Locomotive Engineering*, vol. 24. Aug. 1911, p. 353; J. J. Cunningham, "Forgotten pioneer: Leo Daft and the Excelsior Power Company," *IEEE Power Energy Mag.*, vol. 16, no. 4, Jul./Aug. 2018, pp. 108–120; New York City Landmarks Preservation Commission, "Excelsior steam power company building," Designation List 492 (LP-0962), Dec. 2016. Accessed: Sep. 23, 2019. [Online]. Available: http://www.neighborhoodpreservationcenter.org/db/ bb_files/2016—Excelsior-Steam-Power-Company-Building.pdf; and the biography, timeline, and transcribed period articles in "Leo daft." Accessed: Sep. 23, 2019. [Online]. Available: http://www.geni.com/ people/Leo-Daft/1914047

¹⁶Massachusetts Institute of Technology, *Eighteenth Annual Catalog of the Officers and Students*. Boston, MA, USA, 1882, p. 93; "News from the classes," *Technol. Rev.*, vol. 20, p. 709, 1918.



Yours tiney, Ro Daph

Fig. 1. Electric motor and railway entrepreneur Leo Daft, c. 1901. From Cassier's Magazine, July 1901.

was well connected in the electric motor field,¹⁷ during that summer and fall, Mansfield helped prepare the first public demonstration of Leo Daft's electrically powered locomotive, *Ampère*.¹⁸

As Daft's electric locomotive ran around the test track at his facility in New Jersey and up and down a portion of the mountainous Saratoga, Mt. McGregor and Lake George Railroad line in New York state, USA, Mansfield realized that the man operating the motor was not an engineer (see Fig. 2). Therefore, "a word was needed," for Daft's, Thomas Edison's, and others' innovations in electric traction suggested that the world's horse- or steam-powered trams and streetcars would soon run on electricity.¹⁹ In a new trade journal in 1884, Mansfield submitted a three-column article on the railroad "Rival Fast Coming to the Front With Capabilities Vastly Superior to Steam—Electricity." Quickly dispensing with the rival Edison–Field–Weston "electric road" at the Chicago exhibition, Mansfield described Daft's latest

¹⁷See "Minutes of consolidation meetings," pp. 5–13 passim, and "Interview with professor Charles R. Cross," pp. 46–50, in *The American Electric Railway Company*. New York, NY, USA: 1884.

¹⁸A. J. Bianculli, Iron Rails in the Garden State: Tales of New Jersey Railroading. Bloomington, IN, USA: 2008, p. 81.

¹⁹"Railway industries," Railway World, Jun. 16, 1883, p. 641.



THE DAFT ELECTRIC LOCOMOTIVE.

Fig. 2. Leo Daft's Ampère with the driver whom George Mansfield was moved to retitle a "motorneer," followed by "motoneer," in 1883–1884. The direct current was fed by the third rail in contact with two spring-mounted wheels in the locomotive that powered the motor in the box behind the motorneer. The 12-hp engine pulled the car holding 68 passengers up 1800 m of narrow gauge track on a 1.5% grade in 11 min. From T. C. Martin and Joseph Wetzler, The Electric Motor and its Applications (New York: 1887).

electric locomotive—the narrow-gauge *Pacinotti*—which served 37 500 paying passengers on the New Iron Pier on Coney Island in Brooklyn, New York. He used "motorneer" three times while describing the *Pacinotti*'s operation and noted the labor savings of "having only one man run the motor."²⁰

That same fall, tucked deep in the Correspondence columns of *The Electrician and Electrical Engineer*, someone reported on the demonstration of Leo Daft's electric motor and generator powering an electric locomotive in the Mechanics' Fair Building in Boston, MA, USA. "The motor is located in a box-like structure . . . upon which, on an easy seat with the governing switches directly before him, sits the 'motoneer'."²¹ The writer was undoubtedly Mansfield. A month later, he proposed the term for drivers of electric locomotives in a brief letter to the editor of *Electrical World*: "now, since electricity is to play such a prominent part in railroading, will not its need be felt?"²²

Mansfield did not explain how he arrived at that exact term, but we can imagine that he started with "motor" and then played with suffixes. Motorer? Motoreer? Try saying these words. There is a slurring of the soft consonant r with the surrounding vowels that leads a speaker to trail off, the tongue barely moving in one's mouth as the air associated with the sounds passes by. His new term needed another consonant to move the tongue and give the word more definition. Taking an n from "engineer," Mansfield had motorneer—or maybe not. "After some deliberation" and circulation of the first term at Daft's works in Greenville, NJ, USA, he settled on "motoneer" and pitched the term to the readers of the most popular publication in the exploding electrical industry. Noting disingenuously that motoneer had "already appeared in several articles" as well as a book on the world's railroads,²³ Mansfield concluded, "as a suggestion, I offer it."

An associate of Mansfield's echoed his suggestion. "The application of electricity to machine work of all kinds is likely to give rise to new words and terms. One such has already appeared ... coined by George W. Mansfield.... Now 'motorneer' is simply unendurable to the ear. But it has got into use, and its employment by writers is spreading fast. Some word is needed-a word that shall do for the electric locomotive or 'motor,' as it is called, what 'engineer' does for the wheeled steam engine. Since 'motorneer' has crept into existence, the best thing to be done ... is to accept it and pare it down by cutting out one r and forming the compound after the analogy of Greek compound words . . .: as logomachy, from $\lambda o \gamma o \varsigma$ and $\mu \dot{\alpha} \chi \eta$; or $\chi o \rho o \delta \iota \delta \sigma \kappa \alpha \lambda o \varsigma$, a chorus teacher, in both of which only the stem of the noun is used. So if we say motoneer, the word, although a mongrel, will not offend either the ear or offend the analogy of the language."24

The problem that Mansfield offered to solve was not an obvious one for the founder of *The Electrical World*, William J. Johnston, or the writer whose letter he published in response to Mansfield's proposal. "Motorneer" was not just reflective of status anxiety and a strategy to relieve it. It was symptomatic of a larger issue as industrial societies adopted and applied electricity with more refinement in more diverse fields. It "called attention to the unsatisfactory state today of electrical nomenclature, technical and popular," which Johnston foresaw worsening with the steady increase of electrical applications, "and there is practically no central authority to prevent any man

²⁰"Electric railroads," *Amer. J. Railway Appliances, August*, vol. 15, 1884, p. 99; see also George W. Mansfield, "Performance of the Daft electric motors," *Elect. World*, Nov. 15, 1884, p. 199.

²¹"Electric railroads," *Amer. J. Railway Appliances*, Aug. 15, 1884, p. 99; see also Mansfield, "Performance of the Daft electric motors," *op cit.*, Nov. 15, 1884, p. 199.

²²G. W. Mansfield, "Shall it be 'Motoneer?"" *Elect. World*, Nov. 15, 1884, p. 198.

²³For example, Mansfield, "Shall it be 'Motoneer?" p. 198; W. S. Kennedy, *Wonders and Curiosities of the Railway*, Chicago, IL, USA: 1884, pp. 165–166.

²⁴"Notes," *The Critic and Good Literature*, no. 46, Nov. 15, 1884, pp. 239–240.

from using any 'lingo' that might seem right in his own eyes." The problem appeared in telephony and its "succession of 'electrophone,' 'microphone,' 'megaphone,' 'photophone,' 'radiaphone,' 'audiphones,' and 'aurophone,'' as well as in lighting, secondary batteries, and materials ending in the suffix "ite" that were as "familiar in electricians' mouths as household words." The explosion of words for electrical units "derived from the names of illustrious men" gave rise to the twin challenges of not only remembering words sometimes "cut short or compounded as fancy or necessity dictates" but also "recalling their use and value."²⁵

The proliferation also hinted at national interests. When the United States National Conference of Electricians accepted the British Association for the Advancement of Science's proposal of the "Watt" as the standard unit of power, one member "wanted something he would call a 'Henry,' and probably others lay in wait with something else to be called a 'Morse,' or an 'Edison,' or a 'Thomson."²⁶ Johnston saw no easy solution to regulating electrical neologisms: "yesterday it was 'dynamo,' today it is 'motoneer,' tomorrow it will be 'radiaphonist' or 'carboneer,' or 'synchronous multiplexer"-a term that gained wide acceptance in the 1970s. Whether the legitimacy of new terms was conferred from above or gained credence from below, Johnston regarded the issue as a part of the price of building "a new society, living under new conditions, and acquiring every day new implements of industry."27

Others outside the industry offered their opinions. "The latest new word is 'motorneer,' announced the Boston Transcript. "However, 'motorneer' is simply unendurable, though it has got into use, and its employment by writers is spreading fast as an equivalent for engineer."²⁸ The Nation weighed in on what it called "a very bad word" in a critique reprinted by the New York Evening Post, and overlooking Mansfield's conversion to motoneer, the writer observed that the "sound is sufficiently objectionable, but that is not the worst feature of the new word." In keeping with the proper suffix for the tender of an engine, the tender of a motor should be a "motoreer." Therefore, "if a new word is necessary, it is to be hoped that this form will be adopted." This led to a dispute with The Hartford Courant, which held that "the suffix is not 'eer' but 'er' and engine-er is a word of very easy construction" with the logical implication being "that motor-er is the analogous form and not motoreer."29

Thomas D. Lockwood was less charitable. Born in England in 1848 and trained as a telegrapher and electrician after the American Civil War, Lockwood was a man of encyclopedic memory, growing repute, and overweening

²⁶For the conference attendees' discussion of the watt, see "National conference of electricians," *Elect. World*, Nov. 8, 1884, pp. 181–182.

elitism.³⁰ Founder of the Bell Telephone Company's Patent Department in 1879, he had just published "a practical guide and handbook for electrical students, operators, and inspectors" that went through four United States editions in 11 years.³¹ Because of his professional responsibility to be conversant with the expanding world of telecommunications patents and technology, Lockwood became an amateur historian of telecommunications. He stayed in contact with the pioneers of telegraphy and telephony in the United States and eventually helped found the Telephone Pioneers of America.³²

Lockwood had a deep knowledge of and appreciation for the English language, and he did not appreciate unnecessary or clumsy changes in it, regardless of the revolutions in power and communications technologies: "the coiners of new words have, this time, overstepped the line and given us a monstrous hybrid that has not a single redeeming future or a single excuse for life." He responded as quickly as the magazine's schedule permitted, venting with special vituperation against Mansfield's modest proposal, and to Johnston's title to his letter, which implied that a new word was necessary for electric railroad engineers. After inveighing against the redundant uselessness of "cablegram" on top of "telegram" and the "word-making fatuity" that generated "electrolier," Lockwood argued that "motoneer' is the worst specimen yet launched upon a long-suffering public." He quoted Webster's dictionary to point out that a motor, from Latin movere, to move, is "a source or originator of mechanical power; a moving power, as water, steam, animal strength, etc." An engine, in turn, from Latin ingenium, which he did not define, is a "mechanical contrivance by which any physical power is applied to produce a given physical effect," which can be modified by any word reflecting a power source: steam, air, heat, electromagnetic, gas, and so on.33

Mansfield's proposal was part of a larger effort to name newly discovered or applied physical phenomena. The addition of the volt, watt, erg, dyne, henry, ampere, ohm, farad, and decimal multiples of some of these was frustrating enough to editors and other senior members of the electrical engineering and scientific professions. It was just as bad that workers in the related trade and craft industries might merit names for their occupations that could be confused with those in the professions that

²⁵"Electrical Lingo," *Elect. World*, Nov. 22, 1884, p. 204.

²⁷"Electrical Lingo," p. 204.

²⁸Boston Transcript, undated, quoted in The Tech, vol. 4, no. 4, Dec. 3, 1884, p. 50.

²⁹"Notes," *The Nation*, Number 1013, Nov. 27, 1884, p. 460, also quoted in "Miscellaneous notes," *Elect. World*, Dec. 20, 1884, p. 260; and *idem*, Number 1015, Dec. 11, 1884, p. 504.

³⁰For Lockwood's background, see "Deposition of Thomas D. Lockwood," *In Equity, American Bell Telephone Company et al., Complainants, v. American Cushman Telephone Company et al., Defendants,* vol. 3, Boston, MA, USA: 1887, p. 1487; and E. H. Goss, *The History of Melrose, County of Middlesex, Massachusetts.* Melrose, MA, USA: 1902, p. 375.

³¹T. D. Lockwood, *Electricity, Magnetism, and Electric Telegraphy:* A Practical Guide and Hand-Book for Electrical Students, Operators, and Inspectors. New York, NY, USA: 1883, 1888, 1890, 1894.

³²See his letters in the T. A. Edison Papers Digital Edition. Accessed: Sep. 24, 2019. [Online]. Available: http://edison.rutgers.edu/digital/; and "The evolution of the telephone switchboard," *Trans. Amer. Inst. Elect. Eng.* vol. 21, Jan. 1903, pp. 3–30.

³³T. D. Lockwood, "A mutineer against Motoneer," *Elect. World*, Nov. 22, 1884, p. 211.

made their employment possible. This was Mansfield's transgression, as Lockwood and a writer for the *Iron Trade Review* observed: "the next thing, we will have 'Gaseteer' for the man that runs the gas engine, 'Killeteer' for the manipulator of the Keely motor, and 'Muleteer' for the engineer of the canal boat."³⁴

The pseudonymous "Ampère" weighed in a week after Lockwood, with a proposal supported by Johnston "unless it can be improved upon." He praised Lockwood for his "pointed and well-directed shots" at Mansfield's suggestion of the "hybrid, spectacular 'motoneer." Ampère pointed out that, in England and "so far as I know in all European languages," the term engineer was limited to "a person skilled in the principles and practice of engineering," that is, "a man who designs or builds an engine," only in the United States' democratic culture had the meaning been extended "to the person who drives or manages an engine."³⁵

Such usage began in the 1830s, coinciding with the proliferation of steam-propelled boats and trains during Andrew Jackson's populist presidency, and British writers applied it similarly.³⁶ One author remarked on the presence of engineers on the steamboats traveling the Mississippi River and its tributaries, describing one as an "ignoramus" as part of a caution on the quality and safety of unregulated riverboat journeys.³⁷ Ampère's solution to a suffix common to other occupations was the gendered suffix, "-man." He might have noted that the Brotherhood of Locomotive Firemen had been publishing its journal in the United States since 1876, although it would not have helped his case to know that the firemen were following the example of the older Brotherhood of Locomotive Engineers, whose members they often apprenticed to informally in the search of higher wages and status.³⁸ Ampère concluded, "why not stop inventing new words and adopt 'motorman.' ... It is short, and to the point ... with long line of pure Saxon ancestry-tradesman, workman, footman, etc."39

Johnston, the editor, agreed with "Ampère" that motorman "though unpretentious, hits the idea nicely, and ...

³⁴Quoted in "The growth of electrical nomenclature," *Elect. World*, Nov. 29, 1884, p. 217; reprinted in *The Electrician and Electrical Engineer*, Jan. 1885, p. 7.

³⁵"The sweet simplicity of 'Motorman," *Elect. World*, Nov. 29, 1884, p. 216.

³⁶See, for example, J. Ross, *Narrative of a Second Voyage in Search of a Northwest Passage*. Brussels, Belgium: 1835, pp. 4, 6, 14, 40, and 146, for indications of common usage.

³⁷C. J. Latrobe, *The Rambler in North America*, vol. 1. New York, NY, USA: 1835, p. 224. For other references to engineers tending steam engines in the U.S. and England, see "Miscellaneous—From the United States Gazette," *Niles' Register*, Sep. 10, 1831, p. 20, and "Miscellaneous-Locomotive," *Niles' Register*, Aug. 4, 1832, p. 402.

³⁸See the *Wikipedia* entry for "Brotherhood of Locomotive Firemen and Enginemen." Accessed: Sep. 26, 2019. [Online]. Available: https://en.wikipedia.org/wiki/Brotherhood_of_Locomotive_Firemen_ and_Enginemen, which largely draws on P. M. Taillon, *Good, Reliable, White Men: Railroad Brotherhoods, 1877–1917.* Urbana, IL, USA: 2009.

³⁹"Ampère," "It must not be Motoneer," *Elect. World*, Nov. 29, 1884, p. 223.

gives electricians a new word just as the age of motors seeks for it."⁴⁰ Lockwood complimented Ampère's wit, hinting that he knew the writer based on his writing. He also applauded the motorman proposal along with Johnston but cautioned against applying it exclusively to "the attendant ... when there is any necessity for calling him anything." There were, after all, water motors and air motors as well as electric motors, a fact that Johnston confirmed by noting the profusion of "machines operated by means of water, gas, air, steam, electricity, and sheer brute strength" at the "Motor" exhibition in Vienna, Austria, that week.⁴¹

Having followed the critical response to his letter, Mansfield finally responded without admitting defeat. Observing that "the nomenclature of electricity, by its very magnitude, will bring far more trouble than all the other sciences," he asserted that he had both a "reason and a foundation" for motorneer. Its "derivation and termination are common, plain, and pure." Mansfield based his adaptation on the definition of engineer as "one who manages a steam engine" and its pronunciation as "en-gineer" in Joseph Worcester's respected dictionary that was competing at the time with the Merriam brothers' vigorous marketing of Noah Webster's dictionary. Mansfield was too polite to point out that Webster syllabized engineer as Worcester did. The only distinction in definition was that Webster and his successors omitted "steam" to describe the managed "engine," while they made "engineer" synonymous with the "engine-driver" who "manages an engine; especially ... as a locomotive, steamboat, and the like."42 In closing, Mansfield complimented the editor and strained to tolerate Lockwood's "entertaining and instructive" letter. Surely, the latter could help "build up a brief and pure electrical lingo.... judging by his able writings." Given Lockwood's "second thoughts," the younger man felt "quite confident that when it comes relative to 'motoneer,' he will be as strong pro as now con."43

Without saying in so many words, however, Mansfield had democratically solved an issue of status regarding the distinction between professional engineers and the men who tended their products. Electrified rail transport offered many advantages over the horse or steam power, and developments in Europe and the United States indicated that there would be soon thousands of new engineers visibly operating the electric locomotives that hundreds or thousands of degreed engineers had invisibly designed, tested, and built. Here was an opportunity to distinguish in the public's mind the difference between the

⁴⁰"The sweet simplicity of 'Motorman,'' *Elect. World*, Nov. 29, 1884, p. 216.

⁴¹T. D. Lockwood, "Motorman," *Elect. World*, Dec. 6, 1884, p. 234; "The coinage of new words," *idem*, p. 228.

⁴²J. E. Worcester, *A Dictionary of the English Language*. Boston, MA, USA: 1860, 1878; N. Webster, C. A. Goodrich, and N. Porter, *An American Dictionary of the English Language*. Springfield, MA, USA, 1877.

⁴³G. W. Mansfield, "The nomenclature of electricity," *The Electrical World*, Dec. 6, 1884, p. 234.

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heads—the innovative members of the nascent American Institute of Electrical Engineers, whose first technical meeting took place a month before he wrote—and the hands the men pulling levers to maintain the performance of the new electrically powered system, without ranking one socially below the other. Ampère's footman serves another man, after all, a master, who could be a physician or Lockwood's electrician. In Mansfield's world, engineers and motoneers enjoyed separate statuses but equal suffixes.

IV. WHAT BECAME OF GEORGE MANSFIELD?

As for Mansfield, he went "through fire and water with [Daft]" in innovating various electric power and traction systems. An itinerant career in the expanding electric traction industry followed the decline of Daft's technical fortunes. In December 1888, while living in Boston, Mansfield applied for a U.S. patent on an electric locomotive with cars that automatically adjusted to tight turns. The next year, while residing in Cleveland, OH, USA, he applied for and received another patent on an improved electric motor, one that could be constructed "as cheaply as possible with but few parts, and one that shall be extremely simple in construction," which he assigned to two Bostonians.⁴⁴ He promoted electric traction and power in the trade press, at meetings, and public lectures.⁴⁵

During this time, a connection with Charles Coffin of the Thomson-Houston Company enabled a series of positions, one as an "electrician" installing Thomson-Houston motors on the Hoosac Valley Street Railway in Massachusetts, which served as a test bed for the system, and another as the director of its Construction Department.⁴⁶ From 1891 to 1892, Mansfield directed the East Side Street Railway Company, an overhead electric railroad with 10 km of track, in Brockton, MA, USA.⁴⁷ He also represented the Attleboro, North Attleboro, and Wrentham Railway and the Allentown and Bethlehem Rapid Transit Company at the annual meetings of the American Street-Railway Association, where he also received \$50 as compensation for committee reports on electric power systems.⁴⁸

By the end of the century, Mansfield had secured a basic patent on rimless spectacles, married, and worked alternately as the Director of the Norwalk Tramway

⁴⁷Massachusetts Board of Railroad Commissioners, *Annual Report* [Including Railroad and Street Railway Returns] of the Board of Railroad Commissioners. Boston, MA, USA: 1892, pp. 316–317.

⁴⁸ "The dependent-overhead or underground-system of electric motive power," in *Proc. Verbatim Rep. 11th Annu. Meeting Amer. Street-Railway Assoc.*, Brooklyn, NY, USA: 1893, pp. 15 and 46.

Company in the state of Connecticut, the New England Electric Vehicle Transportation Company in Boston, and the C. E. Dustin Company, dealer and builder of electrical equipment, in New York City.⁴⁹ Seven years later, Mansfield joined a management team as the Vice President of the Westerly Railway & Lighting Company.⁵⁰ After spending some years touring in Europe and South America, he became the "electric solicitor" of the Tampa Electric Company before he died in 1918 as superintendent of a coal dock of the Central Stevedoring Company in Erie, PA, USA.⁵¹

V. FATES OF MOTORNEERS, MOTONEERS, AND MOTORMEN

Mansfield's words spread more than later observers, lacking access to Google Books, realized. In 1889, the American correspondent for The Electrician in England reported that "on one of the new roads ... at Cincinnati [Ohio] the word 'motorneer' has been definitely adopted for drivers of the cars. Each of the men in charge of a motorcar or a locomotor has a band around his hat with the word 'motorneer' on it. This new coinage is not a very elegant one nor is it very generally liked, but it seems to be out of sheer force of necessity, and ... because it has some sort of rough phonetic analogy to 'engineer'."52 The New York Sun picked up on it in 1890 as an occupation in the Asbury Park, New Jersey, where J. R. Borden operated the electric railway that the Daft Company had installed in the town two years before.⁵³ Motoneer gained particular acceptance at a distance from the tastemakers in New York City. In the American Midwestern city of Wichita, KS, USA, 15 men identified themselves as motoneers in 1891; 47 did likewise in Vancouver, BC, Canada, in 1908.⁵⁴ A Chicago newspaper observed without comment that 2400 km away in New Haven, CT, USA, "the sign over the motorman reads, 'Please do not talk to the motorneer'."55

Mansfield's terms also gained traction, as it were, in fiction. The popular writer Alice French, writing as Octave Thanet, conflated motoneer and motorneer in her 1892 novel, *Stories of a Western Town*, which centers on the efforts of an entrepreneur to upgrade his hometown

⁵⁰American Street Railway Investments, New York, NY, USA: 1906, p. 374.

⁵¹Bulletin of the Massachusetts Institute of Technology, vol. 47, no. 3, "Register of former students," Mar. 1912, p. 274; "News from the classes," *Technol. Rev.*, vol. 17, no. 4, Apr. 1915, p. 281, and *idem*, vol. 20, 1918, p. 709.

⁵²"American notes," The Electrician, Nov. 1, 1889, p. 659.

53"Motorneer," Amer. Notes Queries, Apr. 5, 1890, p. 275.

⁵⁴Seventh Annual Directory of the City of Wichita for 1891. Wichita, KS, USA: 1891; Directory of Vancouver Island and Adjacent Islands for 1909. Victoria, BC, USA: 1908; see also "Hallo'een Night," Springfield [Missouri] Leader, Nov. 1, 1893, p. 4.

55" Jetsam," The Daily Argus News, Aug. 13, 1895, p. 7.

⁴⁴"Electric locomotive," U.S. Patent 424070, applied Dec. 1, 1888, granted Mar. 25, 1890; "Electric Motor," U.S. Patent 406922, applied Feb. 27, 1889, granted Jul. 16, 1889.

⁴⁵Amherst, MA, USA (1890). See *Union Lecture Course* broadside. Accessed Sep. 12, 2019. [Online]. Available: http://www.digitalamherst.org/items/show/757.

⁴⁶Verbatim Report of the Seventh Annual Meeting of the American Street-Railway Association. Brooklyn, NY, USA: 1888, p. 113; G. G. Niles, The Hoosac Valley: Its Legends and Its History. New York, NY, USA: 1912, p. 470.

⁴⁹"Spectacles," U.S. Patent 615624, applied Apr. 19, 1898, granted Dec. 6, 1898; H. V. Poor, *Poor's Manual of Railroads*, 32nd Annu. Number, New York, NY, USA: 1898, p. 937; Massachusetts Inst. Technol., *Thirty-Fifth Annual Catalog of the Officers and Students*, Boston, MA, USA, 1899, pp. 240 and 262.

by upgrading its horsecar railway to electric power.⁵⁶ An imaginative newspaper reporter in New Orleans foresaw motorneers in 1950 protected in cabins from the climate, who would deliver large packages to households on "light and speedy motorcycles" riding on "pneumatic tires."⁵⁷

By 1890, Johnston, Lockwood, and their colleagues' fears were, in some ways, realized. Writers used "motorneer" with and without quotes in three articles in one issue of *Electric Power*, while across the Atlantic Ocean an editorial commented on electrical neologisms⁵⁸:

A remarkable phenomenon connected with the development of the electrical arts ... is the intermittent appearance of what may be called philologic strain. We have already alluded to it in our several discussions of the word "motorneer." Another occasion has now arisen by reason of Viscount Bury's call for a verb corresponding to "steaming" and "sailing" to denote "progression by electric power." The Viscount's own suggestion is "volt" or "ohm." Thus, "An electric launch takes about an hour to 'volt' from Mortlake to Putney;" or "Sixty miles a day would be a fair day's 'ohming' for a small launch." Others suggest "electrize," "electrate," "volize," "mote," "motor," "faradate," "amber," "tric," and "squirm." This is evidently a case that needs to be taken in time. The idea of "ohming" or "squirming" down the harbor is appalling. Who will come to the rescue?

Mansfield's terms had their rivals overseas. In 1897, William H. Preece, chief engineer of the British Post Office, was "surprised and pleased to find ... in Marseilles that the man directing the electric tramcars ... sometimes in America called the motorneer is called the *wattman*." Preece's understanding "that the term is very general in France" was confirmed that May when Parisian newspapers were "nearly unanimous in attributing" a fatal accident "to the negligence of the 'watt-man'."⁵⁹ He went on to encourage "our friends in Glasgow" to adopt the term at the same time that they adopted electric railways.⁶⁰ Five years later, the Glaswegians fulfilled Preece's wish when Andrew Jamieson, professor of electrical engineering at Glasgow Technical College, expressed the hope that new rules for the city's electric tram operation could be given to "Wattmen' instructors, inspectors, and drivers" in order to improve its power efficiency.⁶¹

To be sure, in citing the uses of wattman by three French authors between 1897 and 1907 in his dictionary, Edouard Bonaffé ascribed its compound origins to the Englishspeaking world, defining the term as the "conducteur mécanicien d'un moteur ou véhicule électrique."62 Four years later, the editor of the American Western Electrician caught up with Preece's neologism, "which he offers for general use without comment. This word is 'wattman,' ... our familiar friend, the motorman, in short." Despite the advantage of one less syllable, the editor doubted its appeal. The term is, "to our thinking, is neither pleasing to the eye nor mellifluous to the ear, and we regard it with a mild feeling of hostility, even though it is true that 'motorman' is not as distinctive as it should be."63 That did not stop the French. The Paris Metropolitan Railroad called its motormen "wattmen" for the Paris Exposition of 1901 and was criticized for their one week's training, instead of the two or three months' drilling that one editor considered appropriate, as the railroad scaled up its staff for the event.⁶⁴ By 1906, the term had spread to Francophone Europe, thanks in part to the aptly named John Wattmann, the director of the municipal tramways of Cologne, Germany, who explained their roles in monitoring power consumption at the 1906 International Congress of Tramways and Local Railroads.65

The demands of the position were considerable. William Elmer, Jr., chronicled his experiences as a Daft Company motorneer in Asbury Park, NJ, USA, the summer before he began his electrical engineering degree at Princeton University. His responsibilities included replacing and maintaining armatures, commutators, cables, and overhead switches, as well as mastering forward, turnout, and reverse operation of the car in all weather, day and night, through manipulation of levers, buttons, mallets, and belts, sometimes in the presence of horse-drawn buggies.⁶⁶ Adding to the stress was the need to operate hand brakes, which one report suggested were responsible for 75% of streetcar accidents. This was not surprising given the need to apply them "between 250 and 400 times daily" and the consequent fatigue on the motor operator.⁶⁷

⁵⁶O. Thanet, *Stories of a Western Town*. New York, NY, USA: 1892, p. 4, 218; *idem, Scribner's Magazine*, Aug. 1892, p. 135, and Feb. 1893, p. 214.

⁵⁷J. H. Whyte, *New Orleans in 1950 City*. New Orleans, LA, USA: 1899, quoted in E. F. Haas, "New Orleans in 1950: A view from the past," *Louisiana History, J. Louisiana Historical Assoc.*, vol. 35, no. 1, p. 28, 1994.

⁵⁸Electric Power, vol. 2, no. 17, p. 147, May 1890.

⁵⁹"Accident on an electric tramway," *The Electrician*, May 1897, p. 66.

⁶⁰W. H. Preece, "Watt and the measurement of power," James Watt Anniversary Lecture, Greenock, Scotland, delivered Feb. 5, 1897, reprinted in *The Electrical Engineer*, Feb. 19, 1897, p. 238. My thanks to "Wanswheel" of the cs.trains discussion list for this reference.

⁶¹M. B. Field, "Notes on the testing of tramway motors, and an investigation into their characteristic properties," *J. Soc. Telegraph Eng.*, vol. 31 (1901–1902), and "Discussion," p. 1317.

⁶²E. Bonaffé, *Dictionnaire Etymologique et Historique des Anglicismes*. Paris, France: 1920, p. 168. My thanks to "Wanswheel" of the trains.com "String Iining" forum for this reference.

^{63&}quot;Editorial," Western Electrician, Jul. 20, 1901, p. 38.

⁶⁴"The Paris Metropolitan," *Railroad Gazette* XXXIII, no. 4, Jan. 25, 1901, p. 66.

⁶⁵J. Wattmann, "Résultats obtenus par l'emploi des Compteurs de Courant et autres sur les Voitures de Tramways," in *Proc. Congrès Int. Tramways Chemins Fer d'Intérèt local, 14 Assemblée Générale, Comptes Rendus Détaillés.* Milan, Italy: Sep. 17–21, 1906, pp. 320–333.

⁶⁶W. Elmer, Jr., "Through the Motorneer's eyes," *Electr. Power*, Vol. 2, no. 18, Jun. 1890, pp. 196–201. *Princeton Alumni Weekly*, vol. 3, no. 21, Feb. 28, 1903, p. 346.

⁶⁷E. J. Wessels, "Power brakes vs. hand brakes," Verbatim Report of the Thirteenth Annual Meeting of the American Street-Railway Association, Brooklyn, NY, USA, 1895, pp. 185–186.



Whatever its name, the job was stressful for legal and psychological reasons as well. Early one November evening in 1891, the motoneer's bell ringing and the passengers' vells failed to alert deaf pedestrian James Funston to the electric tram that cut off his legs in Dubuque, IA, USA.⁶⁸ The Los Angeles Consolidated Electric Railway had been operating for four years when, in 1894, the Los Angeles Herald decried "MOTORNEER AT FAULT." Frank P. Abbott was declared negligent in the death of Ethelburt Fyke, who jumped in front of an oncoming Los Angeles Terminal Company steam engine, ironically enough, when Abbott was slow to react to an imminent collision. Passengers nearly killed a "wattman" in Brooklyn, NY, USA, when his train chopped a heedless teenager crossing the tracks into four pieces.⁶⁹ Accidents left motormen with "aparitions [sic] of that ghastly face, the writing agony of the victim... the savage denunciations of an ignorant mob and more, haunt the dreams and torture the future life."⁷⁰ Cases were regularly brought to trial, and motoneers and motorneers became part of United States case law on negligence balancing the "Duty of Motoneer" with the duty of pedestrians or in accidents "caused by [an] incompetent and intemperate engineer."⁷¹ In legal circles, the profession of motorneer persisted, all the way to the United States Supreme Court.⁷²

Meanwhile, track totals rose from 9307 km in 1890 to 35 406 km in 1902 to 55 368 km in 1907, with

⁶⁸"Dubuque herald," Galena [Illinois] *Daily Gazette*, Nov. 3, 1891, p. 3.

⁶⁹"One was killed," *Los Angeles Herald*, Dec. 24, 1894, p. 8; "Un Jeune Homme Décapité par un Tramway," *Le Peuple de Montmagny*. QC, Canada, May 3, 1907, p. 3.

⁷⁰ "Street railway wage question," *The Motorman and Conductor*, vol. 14, no. 12, p. 6, Nov. 1906.

⁷¹See (52 La. Ann.) Farrar v. New Orleans & C. R. Co. (No. 13,144), Supreme Court of Louisiana Jan. 9, 1900, Southern Reporter, vol. 26, p. 995; and "Brakeman injured," The Publisher's Editorial Staff, A Common Sense Digest of American Negligence Cases, vols. 17. Chicago, IL, USA: 1914, p. 112.

⁷²Google Books search for "motorneer" and "motoneer" for the years 1895 to 1920.

commensurate passenger totals of two billion in 1890, five billion in 1902, and 11 billion in 1912.73 In the circles of the electric railway industry, Mansfield's neologisms lost what sway they had (see Fig. 3). In 1913, as the industry continued rising to its peak of popularity in the United States, the Motorman, Conductor, and Motor Coach Operator began publication. At the end of the 19th century, professor George Carpenter's textbook on English composition highlighted motorneer as a "barbarism," one of the expressions "sometimes carelessly used by persons who should know that they are not English words."74 American Engineer and Road Journal reported that electric train advocate and designer of New York City's Grand Central Station, William Wilgus, served as motorman, not motorneer, on the first electric train to enter the station in 1906.75

VI. CONCLUSION

While engineers no longer contend with the status issues that provoked Mansfield's suggestion, the issues of demarcations in an evolving profession continue. Those inside the computer industry, who try to distinguish between software engineers, developers, or coders in one group, and computer engineers and programmers in another, may be relieved that the public or their employers do not lump them all as "compuneers."

Acknowledgment

The author would like to thank the Google Books Staff for rapid relabeling volumes in the public domain; the

⁷⁴G. R. Carpenter, *Exercises in Rhetoric and English Composition* (*Advanced Course*), 5th ed. New York, NY, USA and London, U.K.: 1899, pp. 19 and 25.

⁷⁵Amer. Eng. Road J., Nov. 1906, p. 439.

⁷³D. L. Ames and L. F. McClelland, *Historic Residential Suburbs: Guidelines for Evaluation and Documentation for the National Register of Historic Places*. National Register Bulletin, Sep. 2002, p. 18; "Robert Post," *Urban Mass Transit: The Life Story of a Technology*. Westport, CT, USA: 2007, p. 63.

Internet Archive; Chronicling America: Historic American Newspapers at the Library of Congress; the California Digital Newspaper Collection at the Center for Bibliographical Studies and Research, University of California at Riverside, Riverside, CA, USA; the Illinois Digital Newspaper Collections at the Library at the University of Illinois at Urbana– Champaign, Champaign, IL, USA; and "Wanswheel" of the cs.trains discussion list and the trains.com "String Iining" forum for international references.

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