ARTICLE

Speaking Machines, the Trial of Articulation, and Deaf Education in Modern France

Sabine Arnaud*

Centre Alexandre Koyré, CNRS
*Corresponding author. E-mail: sabine.arnaud@cnrs.fr

Abstract

If cochlear implants continue to meet with much resistance from parts of the Deaf community and beyond, this reflects constructions of speech that have been at the core of conceptions of humankind for over three centuries. Starting in the 1750s, Julien Offray de La Mettrie advocated for deaf people's potential for speech. This was also the time of the creation of schools for deaf children, which led to a surge of debate about teaching sign language versus speech. The reception of the speaking machine of Canon Mical, a now forgotten inventor, offered another context in which to question the source of the expressive power of language. By retracing debates about the mechanical nature of articulated speech, the potential limits of communication, and what really constitutes its expressive power, we can better understand how the experience of current technology develops out of conflicts first introduced at the birth of modernity.

> Let us not confine the resources of Nature; they are infinite, especially when supported by great art.
>
> Julien Offray de La Mettrie, *L'homme machine*[1]

Over the last several decades, the importance given to speech as a mode of communication has drastically increased. On the one hand, the invention of speaking robots and interfaces has fostered debates about what constitutes natural communication, credibility, verisimilitude, and expressivity.[2] Engineers, psychologists, and neurologists have shared their expertise about machine learning and image and signal processing.[3] Other recent developments have attempted to adapt so-called

---

[1] Julien Offray de La Mettrie, *L'homme machine* (Amsterdam, 1747), 77.

[2] See especially Cynthia Breazeal, "Emotion and Sociable Humanoid Robots," *International Journal of Human-Computer Studies* 59/1 (2003), 119–55; Breazeal, *Robot Emotion: A Functional Perspective. Who Needs Emotions?* (Oxford, 2005), 271–310; Ginevra Castellano, Loic Kessous, and George Caridakis, "Emotion Recognition through Multiple Modalities: Face, Body Gesture, Speech," in Christian Peter and Russell Beale, eds., *Affect and Emotion in Human–Computer Interaction* (Berlin, 2008), 92–103; Rachel Kirby, Jodi Forlizzi, and Simmons Reid, "Affective Social Robots," *Robotics and Autonomous Systems* 58/3 (2010), 322–32.

[3] Céline Jost, Brigitte Le Pévédic, Tony Belpaeme, Cindy Bethel, Dimitrios Chrysostomou, Nigel Crook, Marine Grandgeorge, and Nicole Mirnig, eds., *Human–Robot Interaction: Evaluation Methods and Their*

"talking heads" for communication with deaf people.[4] A group of engineers working in Paris VIII, for example, has created "Greta," a human–computer interface that produces facial expressions, lip movements, and cued speech (codified gestural signs based on hand shape and hand position that complement speech communication in order to facilitate it).[5] According to its inventors, this three-dimensional audiovisual talking head not only provides a crucial tool to facilitate communication between hearing and deaf people; it also allows telephone communication as well. On the other hand, cochlear implant surgery is now a common practice on newborns diagnosed with deafness. It is offered with the claim that cochlear implants provide the best support for learning speech and should be provided as early as possible.[6] A wide range of people, especially in the medical and scientific field, see the cochlear implant as the solution to promoting access to language building, which is based upon the view that mastering speech is necessary for a full integration into society.

For many sign language users, by contrast, the cochlear implant is a device that has merely perpetuated the illusion that access to speech benefits deaf people.[7] For this community, cochlear implants are an obvious declaration about human norms. Experiencing the cochlear implant as a threat to Deaf culture, along with the various physical pains associated with its use, has led some to undergo surgery to have their implants withdrawn.[8] If cochlear implants as well as human–computer

---

Standardization (Cham, 2020); Céline Jost, Brigitte Le Pevedic, and Frédéric Pugnière-Saavedra, *Vers une communication homme–animal–machine?* (Louvain-la-Neuve, 2015); Céline Jost, Brigitte Le Pévédic, and Dominique Duhaut, "Étude de l'impact du couplage geste et parole sur un robot," in *Interactions et intercompréhension: Une approche comparative Homme-Homme, Animal-Homme-Machine et Homme-Machine* (Louvain-la-Neuve, 2013), 301–16.

   [4]Hela Daassi-Gnaba and Jaime Lopez Krahe, "Universal Combined System: Speech Recognition, Emotion Recognition and Talking Head for Deaf and Hard of Hearing People," *Assistive Technology Research Series* 25 (2009), 503–8; Jean-Luc Schwartz, Frédéric Berthommier, and Christophe Savariaux, "Seeing to Hear Better: Evidence for Early Audiovisual Interactions in Speech Identification," *Cognition* 93 (2004), B69–B78; Jonas Beskow, Inger Karlsson, Jo Kewley, and Giampiero Salvi, "SYNFACE: A Talking Head Telephone for the Hearing-Impaired," in Klaus Miesenberger, Joachim Klaus, Wolfang Zagler, and Arthur Karshmer, eds., *Computers Helping People with Special Needs* (New York, 2004), 1178–85.

   [5]Orin Cornett, "Cued Speech", *American Annals of the Deaf* 112 (1967), 3–13.

   [6]See, for example, Tinne Boons, Leo De Raeve, Margreet Langereis, Louis Peeraer, Jan Wouters, and Astrid van Wieringen, "Expressive Vocabulary, Morphology, Syntax and Narrative Skills in Profoundly Deaf Children after Early Cochlear Implantation," *Research in Developmental Disabilities* 34/6 (2013) 2008–22; Håkan Hua, Björn Johansson, Lennart Magnusson, Björn Lyxell, and Rachel J. Ellis, "Speech Recognition and Cognitive Skills in Bimodal Cochlear Implant Users," *Journal of Speech, Language, and Hearing Research* 60 (2017), 2752–63; Susan Nittrouer and Amanda Caldwell-Tarr, "Language and Literacy Skills in Children with Cochlear Implants: Past and Present Findings," in Nancy Young and Karen Iler Kirk, eds., *Pediatric Cochlear Implantation: Learning and the Brain* (New York, 2016), 177–98.

   [7]Over the last forty years, the use of a capital D to talk about Deaf people refers to deaf culture, while the use of a lower-case d refers to an audiological condition. For an evaluation of the varying uses of the capital D, and the construction of meaning and community of people, see Annelies Kusters, Maartje de Meulder, and Dai O'Brien, *Innovations in Deaf Studies* (Oxford, 2017), 13–15. Following their position in the introduction to their book, I use the term "deaf" with a small d as the most inclusive term throughout the article, when the context does not require a capital D or another term, such as deaf and mute, or deaf–mute.

   [8]Carl Croneberg, linguist of American Sign Language, professor at Gallaudet University, first coined the term "deaf culture." William Stokoe, Dorothy Casterline, and Carl Croneberg, "Appendix D: Sign Language

interfaces based on lip movements continue to meet with so much resistance from parts of the Deaf community and beyond, this reflects constructions of speech that have been at the core of conceptions of humankind for over three centuries. Throughout modern history, the prevalent hearing culture has hypostatized the role of hearing and speech in the development of intelligence and societal progress. The cochlear implant, as well as peripheral interfaces, cannot avoid entering into a long history of associations and connotations around a mechanistic understanding of physiology. Strikingly, they pivot on debates that first emerged in the second half of the eighteenth century in France, building upon a mechanistic understanding of speech and the body and leading to debate about the source of the expressive power of language.

In the mid-eighteenth century, Jean-Jacques Rousseau, Étienne Bonnot de Condillac, and Pierre Louis Moreau de Maupertuis, to name only three of the most famous philosophers of the time, invoked "articulation" in relation to the historical development of civilization. In doing so, they endowed the word with a wider significance than previous men of letters. Whereas seventeenth-century authors of works on speech and the education of deaf people, such as John Bulwer, Gérauld de Cordemoy, William Holder, and Charles and Pierre Perrault, had used the word to describe the physiological act of speaking—the use of the voice and the organs of the mouth to perform speech—Rousseau and Maupertuis added a wider epistemological sense. Articulation, they argued, had emerged out of an earlier and more primitive form of communication based on gestures, in response to the need to express ideas with greater and greater precision. Explicitly opposing articulation to gesture, they regarded the infinite variety of vocal articulations as a mark of epistemological and historical progress, an advance over earlier and cruder forms of communication. Condillac similarly regarded articulation as an exclusively human activity, in contrast to the sounds of animals, a position that was developed further by the writer Jean de Castillon, who distinguished articulation from the mere utterance of a cry. Articulation in his usage applied exclusively to cases when speakers attached ideas to syllables.[9]

Contemporaneously, philosophers (such as Julien Offray de La Mettrie), preceptors, and teachers, as well as inventors and men of letters, found in the development of deaf education and the building of speaking machines a chance to inquire into the potential or the limits of a mechanistic understanding of speech.[10] While teachers conceptualized deaf people's learning of articulation, deaf writer Pierre Desloges saw in the mechanical dimension of articulation the very reason for avoiding it. As inventors strove to create speaking machines, men of letters questioned where the expressive power of language was located, and whether articulation alone could fully transmit it. While the mechanistic understanding of the body

---

and Dialects," in William Stokoe, Dorothy Casterline, and Carl Croneberg, eds., *A Dictionary of American Sign Language* (Silver Spring, MD, 1965).

[9]Jean de Castillon, *Discours sur l'origine de l'inégalité parmi les hommes pour servir de réponse au discours de M. Rousseau sur le même sujet* (Amsterdam, 1756) 74–6; Bonnot de Condillac, *Essai sur l'origine des connaissances humaines* (1746) (Paris, 1999), vol. 1, 77.

[10]Hobbes's, Locke's, and Leibniz's analysis of language, signs, and man's speech in comparison to parrots' built another legacy of the conceptualization of articulation, which, in the interest of space, I have set aside in the context of this article.

related to an approach that favoured speech over gestures and sign language, resistance emerged to considering speech as the exclusive medium for human communication, highlighting, instead, the role of gestures and sign language. The legacy of these debates would spread throughout the nineteenth century, while the expression of the speaking machine would serve as a metaphor for evaluating deaf people's ability to speak, and would contribute to decisions about the education that would best serve them.

This article will examine how, for many late eighteenth-century authors in an age that deemed articulated speech one of the key markers of civilization, debates around deaf education and the building of a speaking machine showed that language could not be reduced to articulation. The debates around articulated speech prompted a discussion about expectations for speech in contrast to gestures and sign language, and the role of language in general in human exchanges. My purpose is thus to investigate how a disaggregation of language from speech occurred in the opposition of mechanical conceptions of articulation to the role of gesture and sign language, in order to see the impact of both on conceptions of language and on deaf people's relation to speech from the very inception of deaf pupils' schooling. The point is, then, to see how a series of associations and connotations drew links between specific modes of communication, emphasized priority in gestural signs or articulation, and created familiarities that would later be reread as markers of identity and exclusive choices. Going back to the eighteenth century and tracing these emerging debates about the mechanical nature of the human and/or speech via La Mettrie, Claude-François Deschamps de Champloiseau, Desloges, and the reception of Canon Mical's speaking machines will allow us to see how much the experience of current technology occurs in reaction to a venerable set of claims.

* * *

La Mettrie, whose publications were officially banned in France yet still circulated there clandestinely, was probably the most vilified philosopher of the eighteenth century for offering a new conceptualization of the mechanistic understanding of the human.[11] In 1747, he was forced to flee to Amsterdam before finally being welcomed at the court of Frederick the Great. Trained as a physician and writing with a philosophical scope, he translated several works by Herman Boerhaave, who had also developed a mechanical understanding of the body.[12] Going so far as to title

---

[11]On the circulation of illegal publications in the *Ancien Régime* see Robert Darnton, *The Forbidden Best-Sellers of Pre-revolutionary France* (New York, 1996).

[12]On La Mettrie see Jessica Riskin, *The Restless Clock* (Chicago, 2016), 151–88; Aram Vartanian, *La Mettrie's L'Homme Machine: A Study in the Origins of an Idea* (Princeton, 1960); Keith Gunderson, "Descartes, La Mettrie, Language and Machines," *Philosophy: The Journal of the Royal Institute of Philosophy* 39/149 (1964), 193–222. La Mettrie's way of using the philosophical tradition against itself, and his promoting and attacking Descartes, have been examined in detail by Kathleen Wellman. See especially Kathleen Wellman, *La Mettrie, Medicine, Philosophy, and Enlightenment* (Durham, NC, 1992), 137–45, 172–8. I am not here entering the discussion on how much La Mettrie was influenced by vitalist thinking and how much that took over his mechanic materialism; what is important here for me is La Mettrie's use of the metaphor of the machine to think about the body, and not whether La Mettrie was a pure materialist. On the importance of vitalist thought for La Mettrie see Ann Thomson, "L'Homme-machine: Mythe ou métaphore?" *Dix-huitième siècle* 20 (1988), 368–76; Roberto Lo Presti, "La machine plus que machine

his book *Man a Machine* (published in Amsterdam in 1747), La Mettrie asserted that it was not the philosopher but the anatomist who was best equipped to envision the physical, moral, and rational potential of man:

> Do we need … to prove that Man is only an Animal or an assemblage of springs which all wind each other up without it being possible to say at which point of the human circle Nature began? If these springs differ one from another, it is only in location and degree of force—never in terms of their Nature. As such, the Soul is just a principle of movement or a sensitive material part of the brain that we can regard with some certainty as the principal spring of the entire machine. It has a visible influence on all of the others, and even appears to have been made first.[13]

This went much further than simply speaking of the body as an "animal machine,"[14] as some physicians, such as Claude-Nicolas Le Cat, had done, or as a "bodily machine,"[15] as Georg Ernst Stahl had argued. In fact, La Mettrie made "machine" more than a metaphor reserved for the body.[16] He made the machine the point of departure for thinking about both the body *and* the mind, and understood their relationship in plastic terms as interdependent. He defended the need to understand human reason, sensibilities, and actions from the perspective of physiology, and concluded that far from being limited by their faculties at the start, humans could constantly evolve. "Man is a machine," he declared bluntly, "and … there is in the universe only one substance, modified in various ways."[17] This conception of man as a machine was of a piece with his vision of man as a being who could transform itself. La Mettrie did write that the soul exists, but by saying that the soul is a principle that is located in the brain, he transformed it into a physiological entity, thereby assimilating its organization and functioning to the rest of the body. He added, "The brain has its muscles to work, just as the legs have some to walk."[18] A hierarchy between the brain and the rest of the

---

ou l'automate transfiguré: L'anthropologie de Julien Offray de La Mettrie et la réinvention du mécanisme medical," *Gesnerus* 67/2 (2010) 163–87; Charles T. Wolfe, "A Happiness Fit for Organic Bodies: La Mettrie's Medical Epicureanism," in Neven Leddy and Avi S. Lifschitz, eds., *Epicurus in the Enlightenment* (Oxford, 2009), 69–83. On Boerhaave's medical doctrine's influence on La Mettrie, and on his criticism on certain uses of mechanism in medical cures, see Wellman, *La Mettrie, Medicine, Philosophy, and Enlightenment*, 107–34. See also Ann Thomson, "La Mettrie, lecteur et traducteur de Boerhaave," *Dix-huitième siècle* 23 (1991), 23–9.

[13] La Mettrie, *L'homme machine*, 135.

[14] See, for example, Claude-Nicolas Le Cat, *Traité des sensations et des passions en géneral et des sens particuliers*, 2 vols. (Paris, 1767) 1: xi–xxxi.

[15] Georg Ernst Stahl, *Vraie théorie médicale*, in Stahl, *Oeuvres médico-philosophiques et pratiques*, vol. 3, trans. T. Blondin (Paris, 1864), 25–478, at 43; see also Stahl, *Recherches sur la différence qui existe entre le mécanisme et l'organisme*, in Stahl, *Oeuvres médico-philosophiques et pratiques*, vol. 3 (1706), 178–252. On Stahl see Anne Vila, *Enlightenment and pathologie, Sensibility in the Literature and Medicine of the Eighteenth-Century France* (Baltimore, 1998).

[16] See Philippe Huneman and Charles T. Wolfe, "Man-Machines and Embodiment: From Cartesian Physiology to Claude Bernard's 'Living Machine,'" in Justin E. H. Smith, ed., *Embodiment: A History* (Oxford, 2017), 257–97.

[17] La Mettrie, *L'homme machine*, 176.

[18] Ibid., 128.

body was established, but this hierarchy was purely physiological and had no other value than the organization of a machine and its actions.

By conceptualizing thinking as a physiological activity, La Mettrie was reading Descartes's *Treatise of Man* in the light of the medical writings of his time.[19] He understood the workings of the soul as those of the brain, and let the reader contemplate whether all metaphysical spheres would forthwith dissolve. While Descartes had set linguistic beings, hearing or deaf, in opposition to machines and animals who did not have access to language, La Mettrie opposed those who could speak to all other beings, invoking deaf people, apes, and machines as exemplary case studies. He kept questioning the human monopoly on language. He considered the question whether it was possible to design a functioning speaking machine solved by Jacques de Vaucanson's invention of a flautist automaton, stating that a few more parts, or "strings," would be enough to give it the ability to speak.[20] Deaf people were at the centre of his reflections on language. He made the possibility of teaching deaf people to speak, as advertised by Johann Conrad Amman's method in his 1700 publication *De Loquela* (an extension of his 1692 work *Surdus Loquens*), the incentive to question whether speech could be taught to other mute beings and things, and so to rethink who/what actually had access to language.[21] He recounted Amman's technique of having pupils repeat words over and over, thereby agitating their throats and having them

> feel through the Eustachian tube a trembling, a titillation that makes them distinguish acoustic air from non-acoustic air and teaches them that they are speaking, even if with a harsh and coarse voice—which can only be softened by exercise and by repeating the same sounds. Here is the origin of a sensation

---

[19]René Descartes, *Discours de la méthode*, in Descartes, *Oeuvres*, vol. 6, ed. Charles Adam and Paul Tannery (Paris, 1902), 92; Descartes, "Lettre à More," 5 Feb. 1649, in Descartes, *Oeuvres*, vol. 5, ed. Adam and Tannery (Paris, 1902), 267–80; on Descartes' philosophy and the automaton see Peter Dear, "A Mechanical Microcosm: Bodily Passions, Good Manners, and Cartesian Mechanism" in Christopher Lawrence and Steven Shapin, eds., *Science Incarnate: Historical Embodiment of Natural Knowledge* (Chicago, 1998), 51–82; François Duchesneau, *Les modèles du vivant de Descartes à Leibniz* (Paris, 1998); Minsoo Kang, *Sublime Dreams of Living Machines: The Automaton in the European Imagination* (Cambridge, 2011), 116–24. On the role of language and the machine in Descartes's philosophy see Leonora Cohen Rosenfield, *From Beast-Machine to Man-Machine* (New York, 1940); Sergio Moravia, "From *Homme Machine* to *Homme Sensible*: Changing Eighteenth-Century Models of Man's Image," *Journal of the History of Ideas* 39 (1978), 49–60; Noam Chomsky, *Cartesian Linguistics* (Cambridge, 2009); Scott Maisano, "Infinite Gesture: Automata and the Emotions in Descartes and Shakespeare," in Jessica Riskin, ed., *Genesis Redux: Essays in the History and Philosophy of Artificial Life* (Chicago, 2007), 63–84; Julian Jaynes, "The Problem of Animate Motion in the Seventeenth Century," *Journal of the History of Ideas*, 31 (1970), 219–34; Thomas S. Hall, "Descartes' Physiological Method: Position, Principles, Examples," *Journal of the History of Biology* 3 (1970), 219–34, 53–81. Descartes is also said to have possessed an automaton; see Minsoo Kang, "The Mechanical Daughter of René Descartes: The Origin and History of an Intellectual Fable," *Journal of Modern History* 14/ 3 (2017), 633–60.

[20]In the mid-1730s, Jacques Vaucanson had toured Europe with his tambourine player and flute player performing twelve songs, and, a decade later, with a digesting duck made up of four hundred moving parts.

[21]Johann Conrad Amman, *Surdus Loquens* (Amsterdam, 1692); Amman, *Dissertation de Loquela* (Amsterdam, 1700), trans. as *A Dissertation on Speech* (London, 1873). *Surdus Loquens* was reprinted three times in the subsequent fifteen years, and translated into English in 1694; *De Loquela* was reprinted four times in the forty years following its publication, and translated into German in 1747.

that was previously unknown to them. Here is the model of the fabrication of all our ideas. We ourselves learn to speak only by imitating the sounds of others, comparing them to ours, and finally finding them similar.[22]

For La Mettrie, education had the potential to transform any being by creating new habits; he proposed thinking about the development of intelligence alongside the acquisition of speech. Building on the idea of speech as a connection between the body and thought, La Mettrie equated the mechanism of speech with the articulation of ideas themselves. For him, the learning of meanings and of ordered sounds went hand in hand: the experience of articulating specific words was the natural complement to accessing their sense. Speech acquisition, then, was equal to the acquisition of ideas. The impression of phonetic sounds on the acoustic nerves, he believed, gave access to ideas through the repetition of the association. Sets of nerves and fibres activated the memory in the process of articulating these sounds:

> This education consists of a pure mechanism—the one's action of speech on the other's hearing, which renders the same sounds and teaches the arbitrary ideas that we have attached to these sounds: or, to stay with the case of our deaf–mute people, in the impression of air and sounds that one makes them render mechanistically, as I have said, on their own acoustic nerve, which is one of the cords … thanks to which sounds and ideas will be engraved in the medullary substance of the brain, and thereby sow the first seeds of intellect and reason.[23]

In this formulation, La Mettrie endowed articulation with the power of creation through imitation. Articulation, then, was not only geared toward external communication, toward expression per se; it also had the power to foster memory and thereby strengthen the connection between ideas. Uttering words was a way to learn meanings, to memorize them, and to potentially create new understandings of them.

To my knowledge, La Mettrie was the first to employ the word *sourd-muet* ("deaf–mute"),[24] which replaced the then customary *sourd et muet* ("deaf and mute"). By making a compound out of the two words in his 1747 *Histoire naturelle de l'âme* (Natural History of the Soul), La Mettrie presented muteness as a mere consequence of deafness, rather than a condition with a physiological origin. And this is probably what also led him to promote speech acquisition rather than sign language for deaf–mute people. La Mettrie freed deaf people from the requirement to hear in order to function as linguistic beings, but in doing so he reframed their linguistic needs to the one phonological model privileged by hearing people. In his approach, the development of speech became a step in the development of the capacity to think, even if the sounds used to render these thoughts are arbitrary.

---

[22]Julien Offray de La Mettrie, *Histoire naturelle de l'âme, augmentée de la Lettre critique à madame la marquise du Chatelet* (Oxford, 1747), 308–9.

[23]La Mettrie, *Histoire naturelle de l'âme*, 309–11. See also La Mettrie, *L'homme machine*, 74–6.

[24]It would only become widespread after the French Revolution forty years later.

Language was arbitrary, and one was to learn to think in the practice of articulation. According to La Mettrie's mechanistic understanding of the body, the teaching of speech was a way to think through the experience of thought—an experience that could be fully understood only in physiological terms.[25] The exercise of speech develops the mind by exercising the body through the organic motion of the thinking process, just as linguistic activity takes place in hearing people. As such, what matters is not so much hearing the sounds as producing them, since this activity of the organs is what gives rise to our ideas. The sensations of the throat when talking make up for and supplement those of the ear. The teaching of articulation, then, was the key to human development.

La Mettrie also used the model of musical instruments to describe bodily reactions, drawing an analogy between violin strings, the harpsichord, and the brain.[26] He compared the trembling of violin strings to the "strings" of the brain to insist on the principle of reaction, which guides the response of an individual even before she or he formulates it. From quivering to wincing to stiffness following a shock—all these reactions can be ordered on a scale, and emotions understood within mechanistic values.

While Descartes had found a model to describe living organisms in a machine that was to serve the mind and its spontaneous utterances, La Mettrie's mechanistic understanding of speech created the possibility to transform the mind in the very act of speaking. Descartes was not interested in distinguishing sign language from articulation; La Mettrie was. Descartes invoked deaf people simply to show that he had considered and included all linguistic forms of discourse; La Mettrie invoked them as proof that physiological constraints could be shifted. By playing with the boundaries of such constraints, and reversing the expected order of physiology in which hearing is the first step toward speech, deaf people could speak without hearing, by simply imitating. Not only that, but deaf people could learn to speak, and articulation could be their access to thought. Deaf people's potential to learn articulation illustrated humanity's transformative potential.

* * *

The preceptor Jacob Rodrigue Péreire, a contemporary of La Mettrie's and in some ways an exemplar of his theories, taught speech to a few deaf aristocratic children. He presented his pupil Saboureux de Fontenay at the Academy of Science; in a 1750s report, René Antoine Ferchault de Réaumur, Charles Marie de la Condamine, and Georges-Louis Leclerc de Buffon applauded the results that his teaching of speech had achieved.[27] Later, Saboureux de Fontenay and

---

[25]A few works previously made references to the invention of earlier speaking machines, one created by Albert le Grand and destroyed by his disciple Thomas Alquinus, another created by Bacon and a third by Kirchner, without original sources to confirm the extent to which these heads could actually articulate. See Bernard Lamy, *La rhétorique*, 3rd edn (Paris, 1958), 199, David Lindsay, "Talking Heads: Simulacra The Early History of Talking Machines," *Invention & Technology* 12/1 (1997), 57–63; Kang, *Sublime Dreams*, 90–93; Riskin, *The Restless Clock*, 28, 137–40.

[26]Julien Offray de La Mettrie, *L'homme machine* (Pauvert, 1966), 82–3.

[27]This report was signed by René Antoine Ferchault de Réaumur, Charles Marie de la Condamine, and Georges-Louis Leclerc de Buffon. Cf. Georges-Louis Leclerc Buffon, *Histoire naturelle, générale et*

Mademoiselle Marois, another of his pupils, wrote positively about their experiences with the teaching of speech.

Yet Péreire's experiments were themselves the object of discussion and doubt. In his *Discours sur l'origine de l'inégalité parmi les hommes* (Discourse on the Origin of Inequality among Men), Jean de Castillon dwells on the unequal access to speech in 1756.[28] The Italian philosophy and mathematics professor, who fled to Utrecht before he was also welcomed at the court of Frederick II, evokes Péreire's teaching to insist how difficult and short-lived such education is. Recounting how one of Péreire's pupils started pronouncing words imperfectly as soon as his master ceased his education, Castillon saw a "primitive inflexibility" that took over again as soon as deaf pupils no longer made speech their priority. He insisted that even hearing children begin speaking relatively late.[29] "Does not this slow and tough progression say how foreign articulation is to mankind?" he asked, concluding, "A child who has never heard speech will never speak."[30]

Not long afterward, schools for deaf children of all social backgrounds started to open in Paris, Angers, and Orleans. Keeping his distance from Péreire's initiatives, Abbé de l'Épée, in Paris, developed a technique of methodical signs that imitated French language by employing gestural signs. Revising the signs in use among deaf children, his method combined signs indicating the kind of word these signs stood for (adverbs, articles, nouns, verbs) and, when applicable, their number and gender, as well as signs that stood for meanings, so that pupils could translate written French and gestural signs reciprocally. He opened the first school for deaf children that was to obtain international renown, and published several of his methods for teaching deaf children.[31] While he did not oppose the teaching of articulation, and even published a method to explain the technique, he firmly insisted on the necessity of starting with the teaching of signs as a crucial step to developing pupils' understanding. Articulation, he stated, should come only in a second phase, when deaf pupils had already mastered signs. He also explained that the desire to teach language to as many deaf pupils as possible led him to drop the teaching of articulation for lack of time. In the 1770s a series of polemics ensued, with Péreire and with Samuel Heinicke, a German teacher who advocated the exclusive teaching of speech.[32]

---

particulière, avec la description du Cabinet du Roy (Paris, 1749), vol. 3, 360–61. Several works have investigated Péreire's method; see especially Edouard O. Seguin, *Jacob Rodrigues Péreire: Premier instituteur des sourds et muets en France (1744–1780)* (Paris, 1847).

[28] Castillon, *Discours sur l'origine de l'inégalité*.

[29] Ibid., 78.

[30] Ibid., 80–81.

[31] This article does not dwell on the Abbé de l'Épée's work, which has already been much covered by scholarship. See especially Sabine Arnaud, "The Order of Signs: Perspectives on the Relationship between Language and Thought during the First Century of Widespread Sign Language Teaching, 1760–1880," *History of Education Quarterly* 60/4 (2020), 520–45; Arnaud, "From Gesture to Sign: Sign Language Dictionaries and the Invention of a Language," *Sign Language Studies* 20/1 (2019), 41–82; on the opposition between de l'Épée and Péreire see Jean-René Presneau, *Signes et institution des sourds: XVIIIe–XIXe siècle* (Seyssel, 1998); Sabine Arnaud, "Fingerspelling and the Appropriation of Language: The Shifting Stakes of a Practice of Signs," *Sign Language Studies* 19/4 (2019), 565–605; Jonathan Rée, *I See a Voice: A Philosophical History of Language, Deafness and the Senses* (London, 1999), 142–4.

[32] On these debates see Rée, *I See a Voice*, 153–76.

In 1777, Claude-François Deschamps de Champloiseau, a priest who had opened a small school in Orleans, joined the debate, further developing Amman's method.[33] His *Lettre à un capitaine de cavalerie* (Letter to a Captain of Cavalry), followed two years later by a *Cours élémentaire d'éducation des sourds et muets* (Elementary Course for the Teaching of the Deaf and Mute), detailed his methodology and included a generous selection of excerpts from texts by physicians and pedagogues, as well as Beauvais de Préau's French translation of Amman's *De Loquela*. Four years later, *De la manière de suppléer aux oreilles par les yeux* (How to Supplement the Ears with the Eyes) completed these works, while his *Elementary Course* was reprinted in 1783 and 1794.[34] Though Deschamps has been forgotten today, these republications attest to the importance of the debate at the time. While paying homage to de l'Épée, Deschamps argued that the signification of signs is "equivocal and arbitrary."[35] In his view, signs could neither satisfy the intellectual needs of the deaf, nor protect them from isolation. He put forth two main reasons to defend speech instead: it is the most widespread mode of communication, and its heuristic value favours the transmission of knowledge.[36] His assessment of signs relied on two factors: the physiology of speech and its political function as a binding link to society.[37] To satisfy the need for speech by which people would be able to interact fully in society, his method intended to explain what he called "the mechanism of speech"[38]—in which articulation simply results from the correct positioning of the organ of the mouth (detailing how to position the lips, the cheeks, the palate, the tongue) and the intake and exhalation of the correct amount of air. He described how to pronounce each vowel, and then the consonants associated with each vowel. He described the larynx with the precision of a physician, marveling as he distinguished the mechanism that guides the breath with the constantly modified opening of the mouth and the glottis. In Deschamps's account, speech seems to be the product of a machine—the coordination of a range of instruments: the tongue, lips, teeth, glottis, ligaments, and "a liquor that constantly moistens the larynx" (otherwise known as saliva).[39]

Deschamps explains that while for hearing people speech is a gathering of articulated sounds, for deaf people it is a series of mute signs that they perform through the use of the voice and to which they attach ideas.[40] Far from crystallizing the value of the original cry, he speaks of it as a formless and unarticulated sound,[41] without variation or modulation.[42] He compares the sounds that deaf people utter

---

[33]Presneau, *Signes et institutions des sourds*.

[34]Claude-François Deschamps, *Lettre à un capitaine de cavalerie* (Paris, 1777).

[35]Deschamps, *Cours élémentaire d'éducation des sourds et muets, suivi d'une dissertation sur la parole, traduite du latin de Jean-Conrad Amman, par M. Beauvais de Préau* (Paris, 1779), xiii.

[36]Many have investigated the role of speech. See, for example, Charles Bonnet, who borrows Condillac's model of the statue and insists on the role of speech for reflection, and perfecting the activity of the soul. Charles Bonnet, *Essai sur les facultés de l'âme*, in Bonnet, *Oeuvres d'histoire naturelle et de philosophie*, 12 vols. (Neuchatel, 1782–83), 6: 141–2, 170.

[37]Deschamps, *Cours élémentaire*, 41–43.

[38]Ibid., 81, 180, 181.

[39]Ibid., xvii–xviii.

[40]Ibid., xxi

[41]Ibid., xx, also xviii.

[42]Ibid., xviii.

to those of a hearing person abandoned at birth and living alone.[43] As such, Deschamps's stance was far from Rousseau's *Essay on the Origin of Languages*.[44] In that essay, Rousseau invested the original cries of humanity with a presence and immediacy whose strength weakened with education and civilization. He endowed them with the potential to transmit the authenticity of human experience, a potential which would be increasingly lost as people adopted societal forms of communication.[45] Deschamps, on the contrary, did not attach speech to interiority. Even if he saw it as a gift from God, he did not attach any ontological value to it.[46] For Deschamps, the value of speech resided entirely in the capacity to convey a message. He approached it as an instrument. What counted was its reliability, its diffusion as a mode of communication, and its accessibility to all.

Deschamps, just as much as La Mettrie, differed from contemporary men of letters such as Antoine Court de Gébelin, who associated sound with meaning.[47] For Deschamps, articulation was important because the brain associated what the eyes read on the lips, or what the throat articulated, with a meaning that the interlocutors had learned. Language merely functioned, and everyone could learn it because it was arbitrary. Similarly to La Mettrie, Deschamps argued for the use of anatomical knowledge and a deployment of physiology toward pedagogical aims. Yet Deschamps also shifted the stakes that La Mettrie had located in Amman's work, and in the learning of speech. While La Mettrie focused on the ability to speak and therefore to think, Deschamps devoted a large part of his treatise to lipreading as the means to access knowledge; for him, the sense of sight had to be trained in order for knowledge to be acquired. But Deschamps's work was in turn to be questioned.

<p style="text-align:center">* * *</p>

Taking a stand against Abbé Deschamps's methods of teaching articulation, Pierre Desloges claimed in 1779, "I say it frankly: if signs are suppressed from the education of the deaf and mute, it is impossible to make of them anything other than speaking machines."[48] To my knowledge, Desloges was the first deaf writer to publicly disparage the teaching of speech. Though their opinions clashed, Abbé Deschamps published Desloges's essay in 1779 and included it as an addition to

---

[43]Ibid., xviii.

[44]As Derrida magisterially showed in his *Of Grammatology*, for Rousseau and Condillac writing had its origin in speech; articulation, in their view, is already on the brink of writing, in opposition to an original language emerging from breath and cries. Jacques Derrida, *De la grammatologie* (Paris, 1967) 350–60; see also Jean Starobinski, *Jean-Jacques Rousseau: La transparence et l'obstacle* (Paris, 2006); Jean-Jacques Rousseau, *L'origine des langues* (1781) (Paris, 1993); Condillac, *Essai sur l'origine des connaissance humaines*; Pierre-Louis Moreau de Maupertuis, *Dissertation sur les différents moyens dont les hommes se sont servis pour exprimer leurs idées* (1758); see also Merian, *Analyse de la dissertation sur l'origine du langage, qui a remporté le prix en 1772* (1783).

[45]Cf. Jean-Jacques Rousseau, *Les confessions* (Paris, 1782); Jean Starobinski, *L'oeil vivant, la transparence et l'obstacle* (Paris, 1961); and Derrida, *De la grammatologie*, 203–5.

[46]Deschamps, *Cours élémentaire*, 18.

[47]Antoine Court de Gébelin, *Monde primitif, analysé et comparé avec le monde moderne* (Paris, 1773), 10–22, 22–9.

[48]Pierre Desloges, *Observations d'un sourd et muet, sur un cours élémentaire d'éducation des sourds et muets* (Amsterdam, 1779), 29.

his own *Elementary Course* in the later editions of his work, mentioning that he had intervened as little as possible in editing it, and that he had persuaded the author to add a few words about himself at the beginning. In the autobiographical sketch, Desloges briefly recounts how he lost his hearing after contracting smallpox at the age of seven. He was taught sign language at age twenty-seven by a deaf Italian man who worked as the servant to an actor of the *commedia dell'arte*, and developed it partly out of his master's pantomime. He had never followed the teaching of de l'Épée, but had been to some of his classes open to visitors, and worked as a bookbinder.

In his footnotes, Desloges referred to the pedagogical writings of de l'Épée, the *Grammaire universelle* (Universal Grammar) by Court de Gébelin, *L'essai synthétique sur l'origine et la formation des langues* (Synthetic Essay on the Origin and Formation of Language) by Abbé Alexis Copineau, and *Cours d'étude pour l'éducation du prince de Parme* (Course of Study for the Education of the Prince of Parma) by Abbé Bonnot de Condillac to support his claims. For him, the mechanical repetition of sounds prevented deaf people from gaining any access to meaning. The arbitrary laws of speech would not provide them with any understanding of the world unless they first learned the natural language of signs and developed it among themselves.

While for Desloges articulation was not a route to agency, sign language was. Deaf people did in fact have a language readily available, he insisted, offered by nature. He emphasized the natural, social, and intellectual value of sign language, with which deaf pupils learned to analyze their surroundings as they developed it. He declared,

> It would be a gross error to look at us as a type of automaton destined to vegetate in the world. Nature … always supplements with one sense what is lacking in others. The language we use among ourselves, being nothing other than a faithful image of the objects that we want to express, is singularly fitting to give us a rightness in our ideas and to extend our insight by the habit it gives us of constantly observing and analysing.[49]

The idea of a *supplement*, already present in La Mettrie and Deschamps, emerged in Desloges's writing, but this time the point was not to supplement the ears with the eyes, but to endow deaf people with an aptitude for reflection and a greater capacity for thought.[50] While articulation was a passive means of learning meaning, sign language, a language they had developed by themselves and among themselves, enhanced both their abilities and their autonomy. It resulted from their continuous analysis of the world.

As such, Desloges's conception was opposed to La Mettrie's. For La Mettrie, as we have seen, the fabrication of our ideas happens in the sensation of speech, making the voice an instrument of thought, as though the articulation of words emulated the articulation of thought. According to Desloges, on the other hand, the

---

[49]Ibid., 34.
[50]On the concept of supplement and its use in eighteenth-century writing see Derrida, *De la grammatologie*, 203–34.

learning of articulation meant forgoing understanding, and the time spent perfecting pronunciation only meant less time for linguistic mastery and understanding.

By resorting to the metaphor of "speaking machines," Desloges was not only referring to the much wider controversy of man as machine which was spreading throughout the eighteenth century; he was also alluding to the contemporary fascination for automatons and showing that he had kept up to date with their construction, as advertised by the *Journal de Paris*. In fact, the task Canon Mical set for himself—to create a mechanism emulating the human voice—had been the subject of several theoretical articles before the actual mechanism was completed in 1778.[51] At the time, interest in speaking machines was growing on a European scale. In 1779, the Saint Petersburg Academy of Science held a competition in which a prize was awarded to whomever could determine how to pronounce the vowels A, E, I, O, and U, and create the best instrument reproducing the *vox humana*. The German physicist Christian Gottlieb Kratzenstein won the prize for his organ pipe, which used reeds to imitate the human voice, and his essay was translated and published in French three years later in the *Journal of Physics*.[52] In the meantime, the Hungarian inventor Wolfgang von Kempelen had started working on his own speaking machine, and in 1791 he published a German work that he then quickly translated into French.[53]

Although automata and ticking machines (such as clocks) have been the subject of some of the most attentive and inspired publications in recent years, little attention has been given to speaking automata.[54] The texts surrounding the debates about speaking machines provide excellent opportunities for investigating the parallel that was created between a mechanistic understanding of the body and a mechanistic understanding of language.[55] Though Mical's speaking heads were not as successful as Jacques Vaucanson's automata, they did radicalize the discussion around what still, for many, constituted the singularity of the human: speech.

---

[51]Louis Petit de Bachaumont, *Mémoires secrets pour servir à l'histoire de la République des lettres en France, depuis 1762 jusqu'à nos jours*, 36 vols. (London, 1786) 26: 256–8; *Journal de Paris*, 1 May 1778, 483. Further articles would be published announcing that the speaking machines could be visited: *Journal de Paris*, 1 May 1784, 533. On Mical see F. X. de Feller, *Biographie universelle*, 12 vols. (Paris, 1834), 8: 366–7. Mical was a canon, as stated in Faujas de Saint-Fond's letter to Benjamin Franklin of 18 June 1783; see *Founders Online*, National Archives, at https://founders.archives.gov/documents/Franklin/01-40-02-0115. Original source: *The Papers of Benjamin Franklin*, vol. 40, *May 16 through September 15, 1783*, ed. Ellen R. Cohn (London, 2011) 193–4.

[52]Christian Gottlieb Kratzenstein, "Sur la naissance et la formation des voyelles," *Journal de physique*, 1782, 358–80.

[53]Wolfgang von Kempelen, *Mechanismus der Menschlichen Sprache nebst Beschreibung seiner Sprechenden Maschine* (Vienna, 1791); Kempelen, *Le mécanisme de la parole, suivi de la description d'une machine parlante, enrichie de XXVII planches* (Paris, 1791).

[54]See Riskin, *The Restless Clock*, 123–8, 142–5.

[55]On eighteenth-century automata see also William Clark, Jan Golinski, and Simon Schaffer, *The Sciences in Enlightened Europe* (Chicago, 1999) 126–65; Kang, *Sublime Dreams*; Adelheid Voskuhl, *Androids in the Enlightenment* (Chicago, 2013); Alison Muri, *The Enlightenment Cyborg: A History of Communications and Control in the Human Machine, 1660–1830* (Toronto, 2007); Matthew L. Jones, *Reckoning with Matter* (Chicago, 2016). On automata in the early modern world see Jessica Keating, *Animating Empire* (University Park, 2018).

Freemason Canon Mical is said to have begun working on his machine in the early 1750s.[56] In their book *Instruments and the Imagination*, Thomas L. Hankins and Robert J. Silverman recount that in 1778 Mical "made a ceramic head, which could utter a few phrases. He destroyed this mechanism … because he felt it was unworthy of the praise it received in the *Journal de Paris*."[57] Mical went back to work, and in 1783 the Academy of Science published a report praising the novelty of his experiment following the presentation of his latest creation.[58] The next year, his two huge speaking machines, both made of bronze, were shown to the public as advertised in the columns of the same journal. Mical was presented to the king, but on the very same day on which hot-air balloons were also on the roster, and it was the latter that captured the king's interest. Mical was denied the financial assistance he was hoping for. He is said to have destroyed the heads within a couple of years, disappointed in his work and by the lack of support he received for it.[59] However, the invention did receive repeated acclaim in the press. Far from the uniform wonder Adelheid Voskuhl has described in the reception of the Jacquet-Droz family's musician automata, Mical's heads became the pretext for more focused discussions about speech and its human characteristics, and about the machine's potential.[60]

Between 1778 and 1785, Mical's speaking heads prompted a discussion on articulation, one that also incidentally involved deaf people. In 1783, a flyer advertising them in Paris proclaimed,

> A problem in mechanics that had been considered to this day unsolvable, or at least extremely difficult, has been solved.
> The Academy of Science has stated in its report that these speaking heads can shed the greatest light on the mechanism of the vocal organ and on the mystery of speech: it adds that this work is worthy of praise for the novelty of its importance and for its execution.[61]

De facto, the invention of the speaking machine was built upon an inquiry into articulation and intonation. Men of letters, teachers, and deaf people rewrote the image and potential of the speaking machine over the next several decades, echoing or contradicting each other in evaluating the worth of a mechanistic understanding of articulation. For some, the crucial issue was the role of language in distinguishing the human from a machine or an automaton; for others, the most important fact was the constant human striving to create a double. On the whole, discussion

---

[56]Ramsay Gordon, "L'Abbé Mical et les têtes parlantes: L'histoire de sa vie, l'histoire de son œuvre," paper delivered at the 10e congrès français d'acoustique, Lyon, 2010

[57]Thomas L. Hankins and Robert J. Silverman, *Instruments and the Imagination* (Princeton, 1995), 186.

[58]Archive of the Académie des sciences, letters from 12 and 16 Aug. 1783, cited in Alfred Chapuis and Edouard Gélis, *Le monde des automates*, 2 vols. (Paris, 1928), 2: 181–211.

[59]Hankins and Silverman, *Instruments and the Imagination*, and Chapuis and Gélis, *Le monde des automates*, concur with this hypothesis. Jessica Riskin, *The Restless Clock*, 142.

[60]Adelheid Voskuhl, "Producing Objects, Producing Texts: Accounts of Android Automata in Late Eighteenth-Century Europe," *Studies in History and Philosophy of Science* 38 (2007), 422–44.

[61]Advertised in the *Journal de Paris*, 1 April 1784, 409, and 11 April 1784, 449.

around speaking machines renewed claims not only about deaf people's access to language, but also about the relationship between language and human nature.

Antoine de Rivarol, an essayist and journalist, wrote, "Mical showed his referees the same simplicity of plan, the same resources, the same results one admires when dissecting the organ of the voice in man."[62] According to Rivarol, the machine reproduced not only the sounds, but the internal shape, of the body. For Mical, the idea was that the machine would imitate physiology and repeat the same operation on air that takes place inside the body, thus linking knowledge of anatomy to knowledge of movement, and, from the experiments with musical instruments, reengaging with the body in terms of mechanics.[63] Mical did not leave any writings about his experiments, but the *Journal de Paris* devoted eight articles to the invention, and several men of letters evoked or elaborated upon it in their own publications, including Rivarol, who spoke of it in two short essays in addition to an unsigned (though easily recognizable) article in the *Journal de Paris*.

While Simon Schaffer, Jessica Riskin, and Voskuhl have dwelt upon the parallels between the building of automata and the development of industrialization and trade during the Enlightenment, Mical's speaking heads in France repeatedly elicited interrogations on language, universality, communication, and the potentials of mechanistic understanding. More than than an example of the disciplining of the body and its uniformization, critics saw these automata as unfinished machines, as intermediary steps towards the construction of fully functioning ones. In fact, the fascination with talking heads did not emerge solely from the perspective of engineering. The main source of debate and criticism around the speaking heads was articulation. Opinions differed: in his report to the Academy of Science, the anatomist Félix Vicq d'Azyr, who had himself devoted a treatise to the voice,[64] saw Mical's speaking head as a step forward that nevertheless required a considerable amount of further refining, describing it as a "*very imperfect* imitation of the human voice."[65] Writer and art critic Moufle d'Angerville, on the other hand, stated that the heads said "enough that one could not refuse them the gift of speech."[66] The question of the quality of the pronunciation soon moved beyond that of the actual results of the machine, to address the importance of establishing a baseline reference for French.

Since the start of the eighteenth century, pronunciation, especially of French and Latin, had increasingly been a topic of discussion. Spoken from Saint Petersburg to Lisbon, French had the particularity (and still does) of being pronounced

---

[62]Antoine de Rivarol, *Lettre à Monsieur le Président de … sur le globe aérostatique, sur les têtes parlantes et sur l'état présent de l'opinion publique* (Paris, 1783), 24.

[63]On musical instruments automata see Adelheid Voskuhl, *Androids in the Enlightenment* (Chicago, 2013); Simon Schaffer, "Enlightened Automata," in William Clark, Jan Golinski, and Simon Schaffer, eds., *The Sciences in Enlightened Europe* (Chicago, 1999), 126–67.

[64]Félix Vicq d'Azyr, *Premier mémoire sur la voix: De la structure des organes qui servent à la formation de la voix* (Paris, 1785).

[65]Cited in Hankins and Silverman, *Instruments*, 186.

[66]Moufle d'Angerville, Pidansat de Mairobert, and others continued Louis Petit de Bachaumont's register after his death in 1771. Louis Petit de Bachaumont, *Mémoires secrets pour server à l'histoire de la République des lettres*, vol. 25 (London, 1784), 257; on this publication see Dena Goodman, *The Republic of Letters* (Ithaca, 1994), 156–60.

differently from its spelling. The fact that it was used in so many regions and countries only increased the disparities in pronunciation.[67] Men of letters such as Charles Pinot Duclos and Jean-Jacques Rousseau deplored the nonchalance with which their contemporaries articulated and altered words in pronouncing them, considering it a sign of the corruption of the time.[68] Entering the fray with his article, Rivarol championed Mical's invention for its ability to preserve testimonies of pronunciation over centuries. Taking the example of differing French and German pronunciations of Latin, Rivarol endowed the machine with the role of fixing current pronunciation of languages for the future, thus lessening their shift over time. He even invoked the possibility of creating a single European language, the pronunciation of which would be determined and recorded by the speaking machine to maintain its uniformity in diverse locations. In his *De l'universalité de la langue française* (Discourse on the Universality of the French Language) and his *Lettre sur le globe aérostatique, sur les têtes parlantes et sur l'état de l'opinion publique à Paris* (Letter on the Aerostatic Globe, on the Speaking Heads, and on the State of Public Opinion in Paris), Rivarol went so far as to compare the heads to Gutenberg's invention of the printing press.[69] Additionally, in anticipation of the machine's future clarity of enunciation, Rivarol mused about its potential use in the teaching of deaf people.

Montmignon soon joined Rivarol in his claim that the speaking head could be a tool in the service of homogeneity and universality.[70] In his 1785 *Système de prononciation figurée, applicable à toutes les langues, et executé sur les langues françoise et angloise* (System of Figurative Pronunciation, Applicable to All Languages and Executed in French and English), Montmignon criticized the diversity of pronunciation and spelling in French, as well as the numerous homonyms found in the French language. In his opinion, prosody ought to guide the use of language. Considering pronunciation the key to harmony and expressivity, he suggested adding written signs to the words in order to guide pronunciation. Further associating Mical's invention with the debates on pronunciation, and reserving the last chapter of his work for the speaking heads, he saw in their current state "a really simple means of fixing and determining the duration of the syllables, which is the most essential part of prosody."[71] Montmignon thus hypostatized the speaking head as

---

[67]See, for example, Sébastien de Brossard, *Traité de la manière de bien prononcer, surtout en chantant, les termes italiens, latins et françois* (Paris, 1703); Père Buffier, de la Compagnie de Jésus, *Grammaire françoise sur un plan nouveau, avec un traité de prononciation des e et un abrégé des régles de la poésie françoise*, ed. aug. (Paris, 1721); Pipoulain-De Launay, *Méthode pour apprendre à lire le françois et le latin* (Paris, 1741); Abbé Moules, *Règles pour la prononciation des langues françoise et latine* (Paris, 1761).

[68]Charles Pinot Duclos, "Remarques sur la grammaire générale et raisonnée," in Antoine Arnauld and Claude Lancelot, *Grammaire générale de Port-Royal*, 2nd edn (Paris, 1810); Jean-Jacques Rousseau, *Essai sur l'origine des langues* (1781) (Paris, 1993).

[69]Rivarol, *Lettre à Monsieur le Président*.

[70]Minsoo Kang has illustrated how the sphere of automata in the eighteenth century took a new turn when imitation was privileged over wonder. Kang, *Sublime Dreams*, 55–102. On sixteenth- and seventeenth-century automata see Jonathan Sawday, *Engines of the Imagination: Renaissance Culture and the Rise of the Machine* (Milton Park, 2007); Kara Reilly, *Automata and Mimesis on the Stage of Theatre History* (London, 2011).

[71]Jean-Baptiste Montmignon, *Système de prononciation figurée, applicable à toutes les langues, et executé sur les langues françoise et angloise* (Paris, 1785), 134.

an optimal tool to evaluate, record, and teach French at its best throughout France and beyond for generations to come. "One should think of them," Montmignon continued, "much less as a pleasant spectacle offered by the love of wonder to avid curiosity, than as a precious discovery we might take advantage of to attain the means of fixing the pronunciation of languages."[72] Implicit in this assertion was a belief that the time of baroque wonder had ceded to a time for the formalization and fixation of the French language. Accordingly, the automata were to progress from spectacles of wonder to instruments of practical concern. The speaking machine was not intended simply to fascinate, but to educate; not to suggest, but to correct; not to open up new sounds and tones, but to establish laws of utterance. The speaking machines were not meant to imitate emotions, or attain grace. Rather, they were meant to function as a registry of sounds to be consulted, a tool possibly destined to be regulated by the French Academy. The objective was to have an unchanging and unbiased basis for reference, but Montmignon seemed to forget that the mechanism was nothing more than a human production. As such, the mechanism's value no longer lay in its ability to reproduce human communication per se, but in its ability to furnish what was absent from such communication: stability, reliability, and permanence lasting centuries.

Characterizing the voices of the speaking heads as superhuman, and emphasizing that the listener had to get used to them—and thus justifying what some had seen as an imperfection—Montmignon proceeded to consider the heads as entities with much greater potential. He believed that it would not be long before the work reached completion; the speaking heads would be able to reproduce all the letters of the alphabet distinctly, as well as different types of voices, and to reproduce all articulations of language. The point was not that the machine should be capable of reproducing a full conversation, but that it would be able to pronounce all sounds and articulations, distinguishing short from long syllables, as well as uttering specific words as examples. Montmignon also imagined that the speaking heads could make comparisons between languages possible.

Montmignon went so far as to see in Mical's invention the potential for a new experiment that would change the lives of deaf people. He presented the machine as something that would complete the work of nature by providing humanity with a new means of communication. Inspired by Louis Bertrand Castel's unfinished construction of a harpsichord of colours,[73] he imagined the creation of a harpsichord for which each touch would reproduce a vocal sound. With fourteen "elementary voices" and twenty-two articulations, all French pronunciations in use would be covered, Montmignon concluded, requiring only a small number of keys. He suggested organizing the keys in three ranks: one for simple voices, one for diphthongs and compound voices, and one for articulations. The result would be a new panorama of speech: "Speaking is pronouncing and combining vowels and articulated sounds. Speaking with the aid of the ocular harpsichord would be a representation and combination of colours. Writing is nothing more than assembling and combining letters; the writing of the ocular harpsichord would be an assemblage

---

[72]Ibid., 133–4.

[73]He never completed his work, but published Louis-Bertrand Castel, *Clavecin pour les yeux avec l'art de peindre les sons, et toutes sortes de pièces de musique* (Paris, 1725).

and combination of infinite variety, of colours and the nuances derived from them."[74] Montmignon saw in the speaking harpsichord a chance for isolated deaf people to be integrated into society; art would supplement nature.[75] The machine would speak for them, and with its help they would be able to read their fellows' responses.[76] Montmignon described how this speaking machine would offer the greatest substitute for the ear and enable deaf people to enter into the reciprocal communication of ideas. And so, just a few years before Joseph Lakanal planned his *école normale* (training school for teachers), here already was a tool to unify pronunciation throughout France.[77] In the wake of the French Revolution, Joseph-Alexandre-Victor Dhupay also devised a scheme of education via an automaton to allow access to the greatest number of pupils, built again on the potential of a speaking machine—yet it never gained much attention or support among teachers for deaf or blind pupils, nor among teachers of ordinary primary schools.[78]

One final article was published in the *Journal de Paris* a month and a half later devoted to the speaking heads, by an author identified only as "Count ***." It was also the most elaborate. Striving to find a balance between the varying responses to the speaking machines, it explained that Mical's invention had surprised people to the point of dramatically increasing their expectations. Spectators quickly turned impatient. If the machine could utter four whole phrases, then they wanted it to utter any word from the dictionary. Having grown accustomed to the marvel before their eyes, they now wanted the speaking machine to cover the complete repertoire of language. The author, however, questioned the success of the machine in terms of its expressivity:

> What gives speech such a physiognomy, what allows it to be heard so well, is the intention that one puts into it, it is the accent and the gestures. Pantomime alone conveys more emotion than speech without accent and pantomime. The most confined minds put intention into what they say, because thought is for them never separated from language. But we struggle to hear a parrot, because it speaks without intention; this is why automata, only ever speaking to the ears, at first stun auditors, who need time to become familiar with them.[79]

In a few sentences, the author captured the limits of mechanical articulation and promoted other means of discourse and exchange. It is clear that, for him, progress could

---

[74]Montmignon, *Système de prononciation*, 140.

[75]No traces of such an experiment have been found, however, and Montmignon's proposition was never publicly discussed. Ibid., 142.

[76]Ibid., 142.

[77]Pierre Macherey, "L'idéologie avant l'idéologie: L'École normale de l'an III," in François Azouvi, ed., *L'Institution de la raison: La Révolution culturelle des idéologies* (Paris, 1992), 41–9; Dominique Julia, ed., *École normale de l'an III: Une institution révolutionnaire et ses élèves* (Paris, 2017).

[78]Joseph-Alexandre-Victor Dhupay, *Règlement et maison de la journée heureuse* (Aix, 1799); Jean-Luc Chappey, "Utopies en contexte: Questions sur le statut du pédagogue sous le Directoire," *La révolution française* 4 (2013), 1–18.

[79]*Journal de Paris*, 22 May 1784, 624.

and would be made in the quality of the automaton's utterances, but this did not mean that it would ever be able to provide spectators with a moving experience. If he made no overt mention of sign language, the emphasis on gesture and pantomime nevertheless placed gestural signs at the forefront of the linguistic experience, and left utterance in the background. Articulation seemed to come alive and convey a message only if accents and gestures were part of the experience, making the intention clear. What enabled and enlivened intercourse was precisely that which could not be automated. A paradox emerged: despite the fascination for the speaking machine, that which made speech expressive was not the exclusive province of speech.

Men of letters criticized the speaking machine not so much for its lack of precision in the articulation of words (which they expected to be overcome in a few years) as for its lack of naturalness and intention. Far from discussing the failure in the mechanics per se, critics dwelled upon the failure in the results as a means to interrogate communication and its universality, its potentials, its requirements. In their analysis, speech could not be restricted merely to the capacity to articulate. By their failure to reproduce what constituted intercourse, the speaking machines illuminated not only the specific qualities of humans, but also their expectations, the ultimate needs involved in human communication. Just as much as deaf people, hearing and speaking people questioned the powers of the mechanical production of language, asking how much of what makes us human is characterized by faculties that these mechanics cannot reproduce.

<p style="text-align:center">* * *</p>

In comparing deaf pupils' learning to speak to the actions of speaking machine, Desloges was initiating a metaphor that would be regularly invoked by teachers throughout the nineteenth century. Claude Fauchet, vicar of Bourges, preacher to the king, was the first to follow it; he mentioned it in his elegy for Abbé de l'Épée to emphasize that the latter had not simply made deaf people into mere "ingenious machines," but had endowed them with spiritual qualities.[80] When Abbé Sicard, who was to become the first director of the National Institute for the Deaf and Mute, borrowed the metaphor, about twenty years after Desloges, it was to strategically posit that a deaf–mute child was a sort of "walking machine whose organization, in terms of its effects, is inferior to that of animals"[81]—until these children were educated, that is. He even compared them to "automata."[82] Education, however, would endow deaf pupils with fully human qualities; it would reveal them to themselves, in opposition to a mechanistic understanding of the body, and toward an affirmation of the ontological nature of linguistic activity. Sicard later reconsidered the use of this metaphor, which caused an uproar that continued even after his death, for carelessly lowering the status of deaf people in order to emphasize the importance of education and indirectly call for a commitment from the government.[83] Fauchet and Sicard dismissed the approach taken by

---

[80]Abbé Fauchet, *Oraison funèbre Charles-Michel de l'Épée* (Paris, 1790), 32.

[81]Roch-Ambroise Sicard, *Cours d'instruction d'un sourd-muet de naissance, et qui peut être utile à l'éducation de ceux qui entendent et qui parlent*, 2nd edn (Paris, 1803), xi.

[82]Ibid., xvi.

[83]Ferdinand Berthier, *L'Abbé Sicard* (Paris, 1873).

Deschamps to instead affirm the spiritual dimension made available via methodo-logical signs.[84]

While attempts to build automata and speaking machines surfaced only sporad-ically in the nineteenth century, references to speaking machines and automata in deaf pedagogy abounded.[85] The opposition was regularly brought up by deaf and hearing teachers alike. Henri-Charles Guilhé, who taught at the Royal Institute for Deaf–Mutes in Bordeaux, stated of education that the "great objective that it sets is not to start automata, not to mechanically animate machines, but to supple-ment nature, that is to train men, and to render these men to society."[86] Yet deaf teachers were themselves sometimes in favour of prioritizing articulation, including Benjamin Dubois, himself deaf since the age of six,[87] who opened a school in Paris in 1837 to teach deaf people to speak. Joseph Piroux, the hearing director and main teacher of a school he had created in Nancy, spoke with great reserve about Dubois's school: "Certainly, one teaches parrots to speak; and one even seems to succeed at making dogs understand speech. What am I saying? Even speaking machines were invented. Schools of all times and in all countries have given birth to speaking deaf–mute children. But always and for a reason, no one recorded their state prior to being educated."[88] Implying that deaf people who were able to speak were always those who had had some hearing or had become deaf after birth, Piroux invoked the speaking machine as a way to demystify any belief in what speech would really bring to deaf people. Deaf people might speak; it took a lot more to fully appropriate language, and therein lay the real challenge. When, a dec-ade later, the physician Alexandre Paul Blanchet of the Imperial Institute in Paris boasted about the possibility of teaching all deaf pupils to speak,[89] Ferdinand Berthier, a deaf teacher from the same institution, invoked Piroux's words in turn. Thus the divide was not between hearing and deaf people, but between the partisans who prioritized speech and those who prioritized signs. In fact, even Piroux, a few years later, developed a method to teach speech to some of his pupils.

---

[84]They were not strictly speaking in favor of sign language, as the methodological signs they advocated were based on the syntax of written French. See Arnaud, "The Order of Signs."

[85]Robert Brain, "Standards and Semiotics," in Timothy Lenoir and Hans Ulrich Gumbrecht, eds., *Inscribing Science* (Stanford, 1998), 249–85. For uses of the metaphor of mechanics see notably John Tresh, "La 'technesthétique': répétition, habitude et dispositive technique dans les arts romantiques," *Romantisme* 150/4 (2010), 63–75. Further references about automata can be found in Riskin, *The Restless Clock*, 214–95; Kang, *Sublime Dreams*, 185–296; Jonathan Sterne, *The Audible Past: Cultural Origins of Sound Reproduction* (Durham, NC, 2003); Raymond Kurzweil, *The Age of Intelligent Machines* (Cambridge, 1999); Eric G. Wilson, *The Melancholy Android: On the Psychology of Sacred Machines* (Albany, 2006).

[86]Henri-Charles Guilhé, *De la civilisation, comment on peut en apprécier les degrés, et jusqu'à quel point les sourds-muets peuvent y prendre leur place* (Bordeaux, n.d.) (brochure owned by the Institut Baguer in Paris—no date could be identified either in library catalogs or in databases, most probably printed around 1840).

[87]See Auguste Bébian, *Examen critique de la nouvelle organisation de l'enseignement dans l'Institution royale des sourds-muets de Paris* (Paris, 1834), 17–18; Jean-Jacques Valade-Gabel, *Lettres, notes et rapports* (Grasse, 1894), 40.

[88]Cited in Ferdinand Berthier, *Observations sur la mimique considérée dans ses rapports avec l'enseigne-ment des sourds-muets* (Paris, 1853), 13.

[89]See Sabine Arnaud, "Fashioning a Role for Medicine: Alexandre-Louis-Paul Blanchet and the Care of the Deaf in Mid-Nineteenth-Century France," *Social History of Medicine* 28 (2015), 288–307.

The metaphor of a speaking machine was used to caricature exercises of articulation—the patient repetition of vowels, consonants, syllables, and words—but also the lack of access to meaning that these entailed. Teaching speech, for many, meant moving away from a holistic understanding of the human. The reference to mechanics, in fact, had become so prevalent that when, in 1865, Auguste Houdin opened a boarding school in Passy, a rich suburb incorporated into Paris just a few years earlier, "for the physiological development of hearing and speech," he had to address it. In an attempt to empty the idea of mechanism of all negative connotations, he defended his project before the academy of medicine, and to the new commission on deaf–muteness, postulating,

> Certainly the living speech of deaf children will have to follow the path that everything follows in its development down here on earth, and that even the soul follows. At first mechanical, like that of the hearing person who spells and recites monotonously—mechanical, that is, as long as we stay with the lessons of M. Jourdain—speech will eventually cease to be [mechanical] the day that deaf people no longer speak words, but their thoughts. Because on that day, thought will have invigorated speech, just as the soul invigorates the body![90]

Some fifteen years before the state designated speech as the goal of deaf education, Houdin was one of the very few to try to teach it.[91] Referring to Mr Jourdain, the character in the famous Molière play *Le bourgeois gentilhomme* (The Middle-Class Gentleman), who, as an adult, discovers with his tutor that he "has been speaking prose for forty years without even knowing it," Houdin inferred that his teaching of speech would not be limited to grammar but would impart a key instrument to thought. When the teaching of speech was implemented starting in August 1879, leading other institutions to relinquish the teaching of sign language, the metaphor began to be regularly used by deaf writers attacking the change in teaching methods.[92] Even Louis Capon, a former pupil of the National Institute of Deaf–Mutes in Paris—who, born deaf, had also created a school, with the support of his peers, for the deaf speaking in Elbeuf, Normandy, as early as 1871—resorted to it. Capon had won not only the support of his colleagues, as signaled by his presiding over an association for deaf–mutes of both sexes in Normandy, but also the acknowledgment of the state for his dedication; he was both a laureate and an officer of the Académie française. At an international congress for deaf–mutes in Chicago in 1892, after more than eleven years of teaching, he warned, "If you don't explain what you teach with speech, [the deaf pupil] will learn like a machine and will not know at which moment to use an expression, for the simple reason that he or she won't have understood anything, nor felt anything, and, as a

---

[90]Auguste Houdin, *La parole rendue aux sourds-muets et l'enseignement des sourds-muets par la parole: Mémoire à l'Académie impériale de médecine, et particulièrement à la nouvelle commission de surdi-mutité* (Paris, 1865), 74–5.

[91]On that era of deaf education see Patrick Bourgalais, *Les miroirs du silence 1800–1934* (Rennes, 2008), 219–55.

[92]See Anne T. Quartararo, *Deaf Identity and Social Images in Nineteenth-Century France* (Gallaudet, 2008).

result, not remembered anything."[93] Despite the promises of the oralists, he felt, speech would not bring agency if it was not taught in correlation with signs. A few years later, Henri Gaillard, a deaf writer and editor who was closely involved in the education of deaf people and in advocating for their respect as citizens entitled to full rights, came back from a congress in England reporting frustration about the oral method that made participants say that "the majority of speaking deaf–mute people are looked upon more as speaking automata than as men with a conscience."[94]

Whether the positions were in favour of or against articulation, the image of the speaking machine served to articulate two fears about deaf pupils, oscillating between their being mere machines that could only be made to come alive through linguistic education, and the fear that they would be turned into speaking machines if taught articulation. If Sicard, Guilhé, Houdin, and Gaillard believed that linguistic education could transform the deaf beyond mechanical existence, then Desloges, Piroux, Berthier, and Capon believed that speech alone could not allow for a full experience of communication. There was a risk, the latter feared, of reducing the deaf person's utterances to little more than mechanical responses. The use of the metaphor of the machine both questioned the long-standing fascination with articulation, and illustrated its failure.

<p style="text-align:center">∗ ∗ ∗</p>

This article has investigated how, in a century that made speech one of the markers of civilization, an antagonistic relation to speech developed in parallel, in texts ranging from deaf pedagogy to considerations of language. These debates postulated the limited character of the mechanics of articulation, and equated communication to a series of elements that could not be programmed. One could write down and regulate pronunciation, but what about those silences and signs, those meaningful gestures and pauses?

"Speaking machine" became a metaphor that was used to convince readers of a vision regarding articulation. Authors made use of variations on the legacy of a philosophical understanding of the body derived from the image of the machine. These innovations and alternative approaches gave the consideration of a mechanical dimension a different function. On the one hand, to invoke it as a methodological and epistemological fiction opened the possibility for all, including deaf people, to access speech. With La Mettrie, Péreire, Deschamps, Mical, and Montmignon, articulation started with the acquisition of external knowledge. It became a *technē* that found its validity only in exteriority, in listeners that confirmed the quality of the mechanism, of an elocution, by their external understanding. Linguistic mastery was the ability to adopt others' mode of communication. It was born in exteriority and returned to it; it was only conceived as an exchange.

---

[93]Louis Capon, *Comité français de participation au Congrès international des sourds-muets de Chicago* (Elbeuf, 1893), 15.

[94]Henri Gaillard, "Impressions d'Angleterre, La convention des sourds-muets," *Revue des sourds-muets*, 6 Oct. 1907, 81–83, at 82.

On the other hand, opposing an ontological dimension of the definition of the human to the speaking machine and its use as a metaphor led to questions about the relation to speech. With Desloges, the Count ***, and a host of teachers of sign language, language found its coherence first in the autonomous intention, key to its understanding and exploration, to which they opposed a communication limited to content, without moral or civic dimensions. The body is one with the person's intention, which could be expressed in part with gestures and signs, and fully with sign language. Learning speech would instead deprive deaf people of access to a language—sign language—in which they could fully express themselves and understand the world. For these authors, Mical's speaking machine, far from presenting speech as a complete means of intercourse, was on the contrary crucial for considerations of the limits of speech, both in terms of the lack of cohesiveness in pronunciation of the language with the meaning expressed, and in terms of the lack of all other contextual markers. In different ways but strikingly, and occurring at around the same time, the building of a speaking machine and deaf education showed that articulation without a body that stood for it remained emptied of its force. Articulation without full mastery of the utterance would void the message of its meaning; it was only one part of communication, which the entire body performed through its posture and gestures. That proved to be the reason both for Mical's failure, and for why deaf people such as Desloges and his followers throughout the nineteenth century refused to make speech their sole means of communication. As such, these debates led thinkers to take a position both on deaf education and on what constituted effective communication and self-expression. While the history of deafness was long dominated by the figure of the Abbé de l'Épée, over the last two decades advocates and historians of Deaf studies have found in Desloges a figure who embodies their identity politics. Well beyond France, in Germany, Spain, and, even more prominently, in the United States, where his work has been translated, Desloges has become a reference, while Deschamps has been forgotten.[95] Strikingly, Desloges's defence of sign language as an autonomous language that can be fully translated has not lost any actuality, making him today a herald of the deaf community for presenting sign language as a language of empowerment.

---

[95]Renate Fischer, "Die Erforschung der natürlichen Gebärdensprache im Frankreich des 18. Jahrhunderts," *Das Zeichen* 63 (2003), 12–20; Harlan Lane, *The Deaf Experience: Classics in Language and Education* (Gallaudet, 2006); H-Dirksen L. Bauman, *Open Your Eyes: Deaf Studies Talking* (Minneapolis, 2007) 1, 5–7; Anne T. Quartararo, *Deaf Identity and Social Images*, "Pierre Desloges and the Early Deaf Community"; Eva Llopis Coloma, "Educación de sordos y Lengua de Signos en la Francia prerrevolucionaria: el caso de Pierre Desloges," *Synergies Espagne* 2/2 (2009), 99–106; Yann Cantin, "Pierre Desloges, Le Regard sourd du 18e siècle: Autour des *Observations d'un sourd et muet (1779)*," *Dix-huitième siècle* 50 (2018), 357–71.