

Digital Echoes: Narrating Galen's Theory of Voice in a Digital Interface

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This lightning talk presents an ongoing project that explores how complex philological research is transformed into an interactive digital narrative, with particular attention to the interpretive processes that such transformation entails. The case study is a reconstruction of Galen's (129–216 CE) theory of phonation, one of antiquity's most intricate physiological accounts, surviving only in scattered passages across the Galenic corpus, and the interface developed to communicate it. The project targets two overlapping audiences: scholars and advanced students in classical studies, history of medicine, and digital humanities, for whom the interface offers a new mode of engaging with dispersed and technically demanding source material; and, more broadly, anyone interested in how ancient scientific reasoning can be made intellectually accessible without sacrificing rigour. By creating a “living text,” the ancient work and its interpretation take on a fresh vitality as an interactive story.

The specific case study can also be intriguing for vocalists and musicians interested in the history of voice production research. No ancient author articulated more forcefully the importance of voice than Galen, who wrote that “The voice, which reports the thoughts of the mind, is the most important of all the works of the soul...” (*UP* 16.3, 385,27–386,2 Helmreich). Yet despite this prominence, Galen's account of voice production has remained understudied, owing to two compounding difficulties: the material is conceptually dense, and its core mechanism is inherently dynamic — resistant, that is, to the static formats in which ancient scientific texts are conventionally presented and studied.

Galen emphasises not static structure but movement: the generation of forceful exhalation (*ekphysēsis*), its generation through thoracic and abdominal action, its acceleration within the narrowing *glōttis*, the striking of the laryngeal cartilages, and the eventual emergence of voice. This sequential, process-driven character makes phonation an unusually apt case for digital narrative: the physiological mechanism already possesses an implicit story logic, cause follows

cause, structure activates structure, and prose description struggles to render simultaneously visible and coherent.

To communicate this dispersed and sequential model, I developed a digital interface that presents phonation not only as a physiological process but as a story. The user is guided along a narrative pathway: from auxiliary respiratory structures to the trachea, and finally to the larynx, where voice materialises. Rather than asserting that ancient scientific explanation is inherently well-suited to digital storytelling, the project treats this as a hypothesis under investigation: the interface is itself a test of whether narrative structure can serve as a legitimate scholarly framework for communicating ancient physiological reasoning, and the talk will reflect on what that experiment has so far revealed.

A central feature of the project is its integration of manually authored scholarly visualisations: diagrams, 3D models, and animations, into a unified, interactive environment. These materials were originally created as research tools for analysing anatomical relationships or illustrating stages of *ekphysēsis*; within the interface, they become narrative elements orchestrated into a stepwise sequence. A 3D rendering of the laryngeal cartilages appears precisely at the moment in the explanatory sequence when Galen's text describes their role in striking the accelerated breath; a diagram of the *glōttis* links directly to an animation demonstrating airflow modulation, enabling users to see how a textual description corresponds to a visual event. What distinguishes this from simple display is the principle of narrative sequencing: each visual element is positioned within a causal chain, so that the interface enacts the logic of Galen's physiology rather than merely illustrating it. The current prototype [Fig. 1] demonstrates this orchestration in the laryngeal sequence, and the talk will present this and further examples in motion.

The LLM's role in this workflow is specific and bounded: it reads structured analytical text, descriptions, causal sequences, and anatomical relations and proposes the ordering and transitions of the narrative sequence, which are then reviewed, corrected, and refined by the author. The interface was developed using Antigravity, combining two models with distinct roles: Gemini Pro 3.1 for code generation and interface construction, and Claude Sonnet 4.5–4.6 for interpreting structured analytical text and proposing narrative sequences. This division was methodologically deliberate, assigning each model to tasks aligned with its strengths, and made the points of human intervention, where authorial judgement overrode computational proposal,

more visible and accountable. The talk will also address the limitations this choice entails, including the risk of visually anachronistic representations that do not reflect Galen's own anatomical concepts.

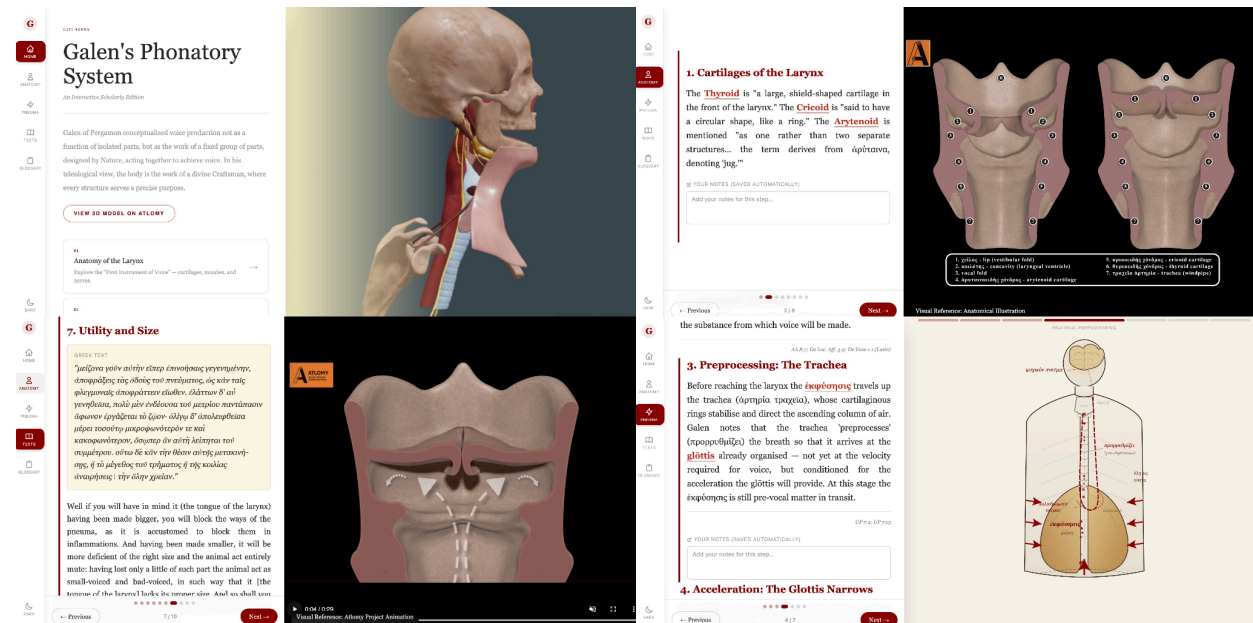


Fig. 1. Four views of the *Peri Phōnēs* interface. Clockwise from top left: the home screen with a preview of the 3D model (ATLOMY); the Cartilages of the Larynx step, integrating labelled rendering of the *glōttis* with Galenic nomenclature; the Tracheal Preprocessing step, with a schematic diagram rendering the causal sequence of *ekphysēsis*; and the Utility and Size step, presenting Greek source text (*De usu partium* 7) alongside an animation of *glōttis* aperture. Each view illustrates the interface's principle of narrative sequencing, in which visual elements are positioned within an explicit causal chain.

This integration of textual philology with multimodal visualisation sits within an established body of DH scholarship arguing that digital visualisation is never neutral but always interpretive (Drucker 2014; Ridge 2020). The present project takes that argument seriously as a reflexive constraint: if visualisation is inherently interpretive, then the choices made in constructing this interface, which causal sequences to foreground, which anatomical structures to render, and how transitions are timed, are themselves scholarly arguments, not merely design decisions. This aligns with work emphasising narrative as central to meaning-making in digital environments (Ryan 2004; Manovich 2013), and with scholarship demonstrating that multimodal

representations can illuminate causal structures that prose alone cannot fully render (Sinclair & Rockwell 2016; Drucker 2020; Tufte 1997; McCloud 1993; Viégas & Wattenberg 2007).

By presenting this prototype, the talk argues for a model of digital humanities practice in which interface design becomes a form of knowledge production — an extension of, rather than a substitute for, textual analysis. The case of Galen's phonation theory is offered not as an isolated philological exercise but as a transferable model: the hybrid workflow developed here, in which AI assists in proposing narrative sequences while human oversight ensures fidelity to ancient sources, is applicable to any body of complex historical or scientific writing that resists conventional static presentation. The talk will reflect critically on what this experiment has revealed so far, including where the approach has exposed interpretive limits as well as possibilities.

References

Drucker, Johanna. *Graphesis: Visual Forms of Knowledge Production*. Cambridge, MA: Harvard University Press, 2014.

Drucker, Johanna. *Visualization and interpretation: Humanistic approaches to display*. MIT Press, 2020.

Manovich, Lev. *Software Takes Command*. New York: Bloomsbury, 2013.

McCloud, Scott. *Understanding Comics: The Invisible Art*. New York: HarperCollins, 1993.

Ridge, Mia. *The Museum as Data: The Politics and Practicalities of Data-Driven Cultural Collections*. London: Routledge, 2020.

Ryan, Marie-Laure. *Narrative Across Media: The Languages of Storytelling*. Lincoln: University of Nebraska Press, 2004.

Sinclair, Stéfan, and Geoffrey Rockwell. *Hermeneutica: Computer-Assisted Interpretation in the Humanities*. Cambridge, MA: MIT Press, 2016.

Tufte, Edward R. *Visual Explanations: Images and Quantities, Evidence and Narrative*.
Cheshire, CT: Graphics Press, 1997.

Viégas, Fernanda, and Martin Wattenberg. "Visualisation as Communication." *IEEE Computer Graphics and Applications* 27.2 (2007): 38–42.