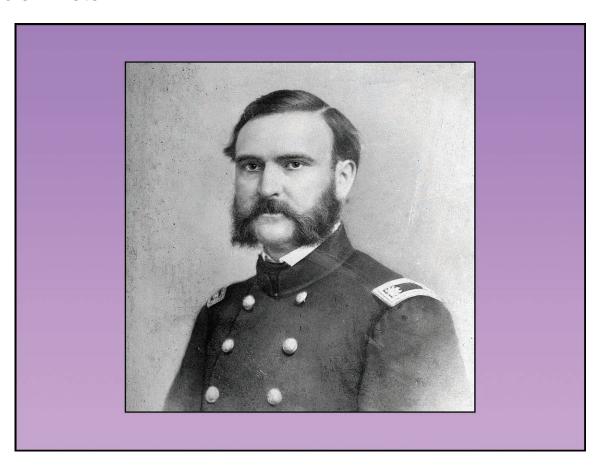
- Swenson ER, Maren TH: A quantitative analysis of CO2 transport at rest and during maximal exercise. Respir Physiol 1978: 35:129–59
- 15. Longmuir IS, Forster RE, Woo CY: Diffusion of carbon dioxide through thin layers of solutions. Nature 1966; 209:383-4
- Ward WJ 3rd, Robb WL: Carbon dioxide-oxygen separation: Facilitated transport of carbon dioxide across a liquid film. Science 1967; 156:1481-4
- 17. Enns T: Facilitation by carbonic anhydrase of carbon dioxide transport. Science 1967; 155:44–7
- 18. Gros G, Moll W: The diffusion of carbon dioxide in erythrocytes and hemoglobin solutions. Pflugers Arch 1971; 324:249–66
- Gros G, Moll W: Facilitated diffusion of CO2 across albumin solutions. J Gen Physiol 1974; 64:356–71

- Gros G, Moll W, Hoppe H, Gros H: Proton transport by phosphate diffusion–A mechanism of facilitated CO2 transfer. J Gen Physiol 1976; 67:773–90
- Gutknecht J, Bisson MA, Tosteson FC: Diffusion of carbon dioxide through lipid bilayer membranes: Effects of carbonic anhydrase, bicarbonate, and unstirred layers. J Gen Physiol 1977; 69:779–94
- 22. Lindskog S, Silverman DN: The catalytic mechanism of mammalian carbonic anhydrases. EXS 2000; 90:175–95
- Swenson ER: Pharmacology of acute mountain sickness: Old drugs and newer thinking. J Appl Physiol (1985) 2016; 120:204–15
- 24. Endeward V, Al-Samir S, Itel F, Gros G: How does carbon dioxide permeate cell membranes? A discussion of concepts, results and methods. Front Physiol 2014; 4:382

## ANESTHESIOLOGY REFLECTIONS FROM THE WOOD LIBRARY-MUSEUM

## Charles Halpine or How Chloroform Killed Simultaneously a General and a Private



Born in Oldcastle, County Meath, Ireland, Charles Graham Halpine (1825 to 1868) emigrated to the United States in 1851. He worked as a journalist and editor in Boston, Washington, D.C., and then New York City, before joining the Union's 69th New York Volunteer Infantry. During the Civil War, he penned poetry and prose for periodicals and eventually books under the pseudonym of "Miles O'Reilly," a hapless Irish private in the "47th Regiment New York Volunteers." Progressively reassigned and promoted through the ranks, Halpine was photographed (above) as a lieutenant colonel. By the time Halpine resigned his commission, he had been breveted to brigadier general for merit. In August of 1868, while self-administering his own remedy for insomnia and migraines, 43-yr-old Halpine accidentally overdosed on undiluted chloroform. And that is how chloroform killed simultaneously a general (Halpine) and a private (O'Reilly). (Copyright © the American Society of Anesthesiologists' Wood Library-Museum of Anesthesiology.)

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