



## Hermann Ludwig Ferdinand von Helmholtz

1821-1894

Driven by both empirical knowledge and mathematical reasoning, Helmholtz made extraordinary contributions to natural philosophy, including both imaging and vision science. Fundamentally important examples include the Helmholtz theorem and the Helmholtz equation, which describe vector and scalar properties of light fields. The first informs us that fields are derived from point and current sources. The second allows predictions of wave propagation. Trained as a physician, he was also interested in practical problems. His invention of devices such as the ophthalmoscope brought him immediate fame for its ability to peer inside the eye. Helmholtz advanced the concept of trichromatic color vision and the epistemological view that human sensations are unconscious inferences that merely symbolize their stimuli. The latter transformative idea made use of Helmholtz' understanding of optical illusions. He constructed a popular formulation of the principle of energy conservation, developed the theory of vortex motion, and pioneered theories of music and sound which contributed to the later development of acoustic imaging. Over his career he served as an army surgeon, professor of physiology, and professor of physics in his German homeland.