LIGHT AND EXPERIENCE

by John H. Lienhard

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Today, we throw a new light on experience. The University of Houston's College of Engineering presents this series about the machines that make our civilization run, and the people whose ingenuity created them.

Art historian Kenneth Clark describes the 17th century. He begins with the odd words, "The Light of Experience." The 1600s saw the emergence of modern science, and to tell us about that, Clark begins with the Dutch masters -- with Hals, Vermeer, and Rembrandt. He begins with their use of light.

Clark uses the words light and experience in their metaphorical as well as their literal senses. The Dutch masters were consummate handlers of light. Sunlight etches buildings in stark morning clarity. It flows through windows. It carries images through mirrors. Light illuminates and clarifies our experience.

The rise of 17th-century science was built on a new kind of experience. It gave us the first scientific experiments. An experiment is a synthetic experience that illuminates our understanding. The Dutch had also invented telescopes and microscopes. When the Italian Galileo got hold of those lenses, he knew what to do with them. He was one of the first to isolate experience into experiments -- to focus light on component pieces of nature in controlled settings.

We see the very character of this revolution in thought in those remarkable Dutch paintings. Here's a group of farm animals drawn in a documentary detail that outreaches modern photography. There is a doctor doing an autopsy for seven observers. Bones and tendons are laid bare along with the intent horror of the onlookers. No detail is missed. The light of the new science floods in as the doctor creates an experience that forever changes the lives of those seven startled watchers. Hals illuminates the face of René Descartes in a portrait whose eyes bore into the 17th-century viewer.

This remarkable century finally gave us Isaac Newton, who broke light into its spectrum of component colors -- whose experiments and whose mind finally gave us a new dimension of control over light. Alexander Pope expressed the 18th century's awe of Newton when he wrote,

Nature and Nature's laws lay hid in Night.
God said, Let Newton be! And all was light.
Well, all this began a long time before Newton. Newton, in fact, ended the 17th century by casting light of a new kind on experience. He abstracted experimental results to a point at which the common observer could no longer recognize them. He brought in the

18th century by basing science on mathematics. Newton transcended the color of everyday experience. The acute observation of nature that had begun in Holland had finally penetrated beyond anything the eye could look at directly.

I'm John Lienhard, at the University of Houston, where we're interested in the way inventive minds work.