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remainder of the model is painted red to distinguish it from the van der Waals surface. A second block is now prepared to fit against the cut surface of the model and this one is provided with an outward surface such that the isotherms in the two-phase region are horizontal. This is shown in place in Fig. 3. When the model is shown to a class, it can be pointed out that the profile of this second block projected in the P, T plane gives the curve of vapor pressure as a function of temperature, or the boiling curve. This affords a good opportunity also to illustrate the behavior of the pressure as the substance is heated at constant volume, the discontinuity in

slope at the cut being very evident. The meanings of the critical point and of the critical isotherms become very clear when the model is viewed with this block in place, as does also the idea of the continuity of liquid and vapor states.

Figure 4 shows the model with the two blocks removed. The first-mentioned block representing the van der Waals equation has a portion on the left-hand side so thin that it is scarcely possible to represent it even in wood. As can be seen in Fig. 2, the absence of this portion leaves a small quasi-triangular area of the cut uncovered, a minor defect which is readily forgiven by the students.

Reproductions of Prints, Drawings and Paintings of Interest in the History of Physics

17. Frescos in the *Tribuna di Galileo*, Part I

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THE three frescos in the compartments of the domed ceiling of the innermost room of the *Tribuna di Galileo*¹ depict three momentous periods in GALILEO's life—the rising, the zenith and the setting of his genius. They are the work of LUIGI SABATELLI.

In the first, reproduced in Plate 1, the young student is watching intently a swinging lamp in the Cathedral of Pisa (the inclined flame shows that the lamp is actually swinging). The face of the young GALILEO is very expressive and the position of the hands—a device previously used by RAPHAEL—indicates that he is following a train of thought. So absorbed is he that his hat has fallen from his hand and is seen lying near his feet. According to the well-known story (probably apocryphal) GALILEO timed the swings with the only watch he possessed, his own pulse, and thus discovered the isochronism of



PLATE 1. Galileo discovering the isochronism of the pendulum. [From the fresco in the *Tribuna di Galileo*.]

¹ See Reproduction 16 of this series.



PLATE 2. Galileo presenting his telescope to the Republic of Venice. [From the fresco in the *Tribuna di Galileo*.]



PLATE 3. Galileo imparting his discoveries in dynamics to Torricelli and Viviani. [From the fresco in the *Tribuna di Galileo*.]

the pendulum, a discovery that led later to his design for a pendulum clock.

In the second fresco (Plate 2) GALILEO is shown presenting his newly invented telescope to the Doge and Senate of Venice and explaining how the Republic could make use of the invention (this he actually did on August 24, 1609). One of the Senators is not able to restrain his impatience to look through the telescope and three others are grouped behind him, one waiting to succeed him and the other two speculating about the possible uses of the instrument.

The third painting (Plate 3) shows GALILEO, old and blind, communicating his last ideas on dynamics to TORRICELLI and VIVIANI, the last two and the most loved of his disciples. GALILEO is seated, his left hand placed on a terrestrial globe, and his right indicating the importance of the ideas he is expounding, while TORRICELLI, seated near him, and VIVIANI, youthfully on his feet, listen to him with intelligent attention.

The word "impossible" is to a scientist much like a spur to a horse.—WILLIAM D. COOLIDGE