around them, some have their tastes better developed in other directions, and some have minds incapable of ever understanding the simplest natural phenomenon; but there is also a large class of students who have at least ordinary tastes for scientific pursuits." Students of the last class may be drawn closer to physics by good laboratory courses and by an acquaintance with the great minds who developed the science.

Of course, historical matter is not to replace laboratory practice, or the discussion of theory; nor do I mean that elementary classes, whose time for the study of physics is already too limited, shall be burdened with a long and systematic course on the history of physics. Introduce historical matter incidentally and skilfully, and you will find it to be the honey which renders the bread and butter more palatable. Where is the student of physics who will not be fascinated by the experiments on air-pressure by Otto von Guericke and the illustrations accompanying the text? Here is a picture of fifty men pulling by ropes and vainly struggling to overcome the atmospheric pressure against one piston. There is an engraving representing eight pairs of horses, four pairs on each side, pulling for all they are worth to separate two huge Magdeburg hemispheres. It is of interest to know that Robert Boyle would probably not have discovered the law bearing his name except for an absurd criticism made on some of his earlier researches by a would-be physicist. Linus, professor at Luttich in Netherlands, declared that the air is very insufficient to perform such great matters as the holding up of a mercury column twenty-nine inches high; he claimed to have found that the mercury hangs by invisible threads (funiculi) from the upper end of the tube and to have felt them when he closed the upper end of the tube with his finger. This criticism incited Boyle to renewed research and led him to the discovery of his law.

Again, let the student be drawn into the confidence of the historian and laugh with him at the undignified behavior of the Carthusian monks. In Paris a large number of them were formed into a line 900 feet long, "by means of iron wires . . . . between every two," and then Louis XV. caused an electric shock from the newly invented Leyden jars to be administered to them. The whole company of austere monks, at the same instant of time, gave a sudden spring, and presented a sight decidedly ludicrous.

Quaint theories and hypotheses, now long forgotten, often possess peculiar charm. When the pupil has acquired some knowledge of the spectrum, can he fail to be interested in some of the speculations of Newton? How Newton carried on his experiments, not in a public laboratory, but at his chamber in Cambridge; how he introduced light into the darkened room through a small circular hole, passed it through a prism, and then beheld the display of colors on the wall. "Comparing the length of this colored spectrum with its breadth", says Newton, "I found it about five times greater; a disproportion so extravagant that it excited me to a more than ordinary curiosity of examining from whence it might proceed."

Newton showed that this phenomenon was due to the fact that some rays are more refrangible than others, but before he hit upon the right explanation he advanced several hypotheses, only to find that each was disproved by the facts. One of these guesses is of particular interest, as it shows that Newton's profound mind had dwelt upon a subject prominent in modern athletics, namely, the subject of "curved pitching." Surely the modern student would find it hard to

[1] *Phil. Trans.* Abr., Vol. I. p. 128.