Stillman Drake. *Galileo Studies*. Ann Arbor: The University of Michigan Press, 1970. Pp. 289. \$8.50.

Over a period of fifteen years, Stillman Drake has published a series of important biographical essays that have shed considerable light on various aspects of Galileo's life and work. The appearance in book form will be welcomed not only by the historian of science but by the general reader who wishes to assess the role Galileo played in the scientific revolution.

Renaissance scholars may be particularly interested in one of Professor Drake's later papers in which he draws attention to the little explored relation between Renaissance music and the rise of experimental science. Between 1585, when he left the University of Pisa, and 1589, when he obtained the chair of mathematics at that University, Galileo lived mainly in Florence, giving private tuition in mathematics. It is precisely during this period that his father, Vincenzo Viviani, carried out a number of experiments to refute the belief that sonorous numbers were the cause of consonance. Referring to the celebrated opinion of Pythagoras that the small-number fractions are always associated with agreeable tones, Vincenzo confirmed that the ratios 2:1, 3:2, 4:3 will give octaves, fifths, and fourths for strings of like material having lengths in these ratios, or for columns of air having similar lengths. But he also showed that the ratio 9:4 was just as closely associated with the fifth as the ratio 3:2, and by implication, the ratio 27:8 — ratios which were proscribed by the musical theorists who believed in sonorous number as a cause. Galileo's father also experimented with strings of different materials and different weights and discovered that unison cannot be consistently obtained between two strings if they differ in any respect. Thus, by depriving number of causal properties, he called attention to the real significance of number as it refers to the specific dimensions of length, surface, volume and weight. We have here a source of his son's interest in the experimental verification of mathematical relationships. The evidence is circumstantial but it is heightened by the fact that Galileo was himself an accomplished musician and that music in the sixteenth century was still considered a special branch of mathematics.

In the introductory essay, the author makes a spirited attack on historians of ideas who interpret and sometimes reconstruct Galileo's scientific thought with the aid of pre-conceived philosophical patterns. Professor Drake himself advocates sticking to the facts, but this reviewer cannot avoid the impression that the facts as he describes them are often observed from a vantage point that is not itself immune from criticism. Whatever its merits, positivism is a philosophical bias, and the reader of *Galileo Studies* will perhaps wish to restore a proper sense of balance by rereading Alexandre Koyré's *Etudes Galiléennes*. Read in conjunction, Koyré's work and Drake's studies will provide excellent material for a stimulating debate on the real nature of Galileo's achievement.

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Robert S. Lopez. *The Three Ages of the Italian Renaissance*. Charlottesville: University Press of Virginia, 1970. Pp. 103.

In this brief volume, the Italian Renaissance, characterized according to the classical three ages of adult human life, emerges as a beautiful but superficial woman who, deluded by "confident expectation" in her youth from 1454-94, fluctuates between self-assurance