

with uniform intensity. We shall first of all dwell exclusively on the first kind of variability; of this, the earliest instance accurately *observed* is furnished (1638) by Mira, a star in the neck of Cetus. The East-Friesland pastor, David Fabricius (the father of the discoverer of the spots on the sun), had certainly already observed this star on the 13th of August, 1596, as of the third magnitude, and in October of the same year he saw it disappear. But it was not until forty-two years afterward that the alternating, recurring variability of its light, and its periodic changes, were discovered by the Professor Johann Phocylides Holwarda, Professor of Franeker. This discovery was further followed in the same century by that of two other variable stars, β Persei (1669), described by Montanari, and χ Cygni (1687), by Kirch.

The irregularities which have been noticed in the periods, together with the additional number of stars of this class which have been discovered, have, since the beginning of the nineteenth century, awakened the most lively interest in this complicated group of phenomena. From the difficulty of the subject, and from my own wish to be able to set down in the present work the *numerical elements* of this variability (as being the most important result of all observations), so far as in the present state of the science they have been ascertained, I have availed myself of the friendly aid of that astronomer who of all our cotemporaries has devoted himself with the greatest diligence, and with the most brilliant success, to the study of the periodically varying stars. The doubts and questions called forth by my own labors I confidently laid before my worthy friend Argelander, the director of the Observatory at Bonn, and it is to his manuscript communications that I am solely indebted for all that follows, which for the most part has never before been published.

The greater number of the variable stars, although not all, are of a red or reddish color. Thus, for instance, besides β Persei (Algol in the head of Medusa), β Lyræ and ϵ Aurigæ have also a white light. The star η Aquilæ is rather yellowish; so also, in a still less degree, is ζ Geminorum. The old assertion that some variable stars (and especially Mira Ceti) are redder when their brilliancy is on the wane than on the increase, seems to be groundless. Whether, in the double star α Herculis (in which, according to Sir John Herschel, the greater star is red, but according to Struve yellow, while its companion is said to be dark blue), the small companion, estimated at between the fifth to the seventh magnitude, is