

and Richter, have promised to continue their researches on the subject, some great and important fact must, he thinks, issue from their labours.

*An Investigation of all the Changes of the variable Star in Sobieski's Shield, from five Years' Observations, exhibiting its proportional illuminated Parts, and its Irregularities of Rotation; with Conjectures respecting unenlightened heavenly Bodies. By Edward Pigott, Esq. In a Letter to the Right Hon. Sir Joseph Banks, K.B. P.R.S. Read February 7, 1805. [Phil. Trans. 1805, p. 131.]*

Mr. Pigott, some years ago, presented to the Royal Society a paper, which is printed in the Philosophical Transactions for the year 1797, on the periodical changes of brightness of two fixed stars. The first part of the present paper consists of a series of observations made since those of the former paper, during the space of nearly five years, on one of the said stars, namely, that in Sobieski's Shield. These observations are fully detailed in various tables; and mean results are deduced from the observations given in the former paper, and from those described in the present one. The results are as follows:—Rotation of the star on its axis, 62 days.—Duration of brightness at its maximum, without any perceptible change,  $9\frac{1}{2}$  days.—Duration of brightness when it does not attain its usual brightness, 20 days.—Duration of brightness at its minimum, without any perceptible change, 9 days.—Ditto when it does not decrease so much as usual, 20 days.—Decrease in time, from the middle of its full brightness to the middle of its least, 33 days.—Increase of time, from the middle of its least brightness to the middle of its full, 29 days.—Extremes of its different degrees of brightness, 5th to 9th magnitude.—Mean of its usual variation, 5th to 6th magnitude.

In the second part of this paper Mr. Pigott proceeds to examine some of the other phenomena belonging to this star, particularly one which, he says, is common to most of the variables, and likewise in some degree to our sun, namely, that the times of their periodical returns of brightness are, in general, irregular. In hopes of making some discovery respecting the cause of these irregularities, or at least of assisting future astronomers to form some opinion respecting them, Mr. Pigott made a series of observations on the star here treated of, beginning in October 1795, and ending in October 1801. These observations are detailed at full length in two tables; and it appears from them, that the periodical returns of brightness are uncommonly fluctuating, and that the differences between the extremes are very considerable. Mr. Pigott then, by way of explanation, offers the following opinions and inferences.

1st. That the bodies of the stars are dark and solid.

2ndly. That their real rotation on their axes is regular, following uniform impulses.

3rdly. That the surrounding medium does, at times, generate and

absorb its luminous particles, in a manner nearly similar to that which Dr. Herschel has supposed to take place with regard to the sun's atmosphere.

4thly. That as the variable star in Sobieski's Shield is occasionally diminished in appearance to the 6th or 7th magnitude, or even to a smaller magnitude, it appears that these luminous particles are but sparingly dispersed in its atmosphere.

5thly. He asks, may we not with much plausibility represent such luminous particles as spots, somewhat circular, and of no great extent.

6thly. That the principal bright parts are but slight patches, may, he says, be presumed, from the perpetual changes they undergo, and also from such changes being very visible to us.

7thly. He thinks we may obtain some idea of the relative situation or intervals between these bright parts, by the observations of the increase and decrease of brightness, as thereby the changes and times elapsed are pointed out.

Mr. Pigott says he has tried, practically, the effect of the above suppositions, by placing small white spots on a dark sphere, which sphere being turned round, represented the various changes as nearly as could be expected. Of these changes several views are given, accompanied with some observations on variable stars in general; in the course of which the author supposes it probable that many stars have lost their light, and that there are many others which have never shown a glimpse of brightness. He even asks, whether we may not suppose the number of these unenlightened stars equal to that of those endowed with light? If so, he thinks that by being collected together in clusters, as in the Milky Way, they must intercept all more distant rays; and if free from any intervening lights, must appear as dark spaces in the heavens, similar to what has been observed in the southern hemisphere.

Mr. Pigott, at the conclusion of his paper, says he thinks there are strong reasons to believe that the sun's luminous appearance has been at times considerably diminished; also, that he has little hesitation in conceiving it may, at some future period, be reduced to small patches.

*An Account of some analytical Experiments on a mineral Production from Devonshire, consisting principally of Alumine and Water. By Humphry Davy, Esq. F.R.S. Professor of Chemistry in the Royal Institution. Read February 28, 1805. [Phil. Trans. 1805, p. 155.]*

The mineral, of which an account is here given by Mr. Davy, was found many years ago by Dr. Wavel, in a quarry near Barnstaple. It was then considered as a kind of zeolite; but Mr. Hatchett, who visited the place in the year 1796, describes it as filling some cavities and veins in a rock of soft argillaceous schistus; and from that circumstance concluded, that it most probably did not belong to the