

remarkable which has ever happened to anyone," and which came to him, he says, as the direct gift of God. "Ever since the time of my strange vision" (previously narrated) "until now" (when he is nearly sixty years of age), "an aureole of glory, marvellous to relate, has rested on my head. This is visible to every sort of man to whom I have chosen to point it out; but those have been very few." (One wonders they did not see it round their own heads also.) "This halo can be observed above my shadow in the morning from the rising of the Sun for about two hours, and far better *when the grass is drenched with dew*. It is also visible at evening about sunset.

"I became aware of it in France, at Paris, for the air in those parts is so much freer from mist, that one can see it there far better than in Italy, mists being far more frequent among us. However, I am always able to see it and to show it to others; but not so well as in the country I have mentioned." (Cellini's Life, Symonds's Translation. vol. ii. p. 111.)

Branch Hill Lodge,
Hampstead Heath, N.W.
1899, June 15.

Yours faithfully,
B. WOODD SMITH.

The Parallax of the Gegenschein.

GENTLEMEN,—

Prof. Barnard in his very interesting article on the Gegenschein, which is abstracted in the June number of the 'Observatory,' mentions my theory, which assumes it to be a tail to the Earth, produced by the escape of molecules of helium and hydrogen away from the Earth in a direction opposite the Sun. He remarks, however, that the absence of any parallax is fatal to this theory.

Perhaps the following considerations will show that the absence of any observable parallax does not invalidate the tail theory.

First, I assume that our tail is a very long one, that is, of the order of millions or tens of millions of miles. This assumption is justified by the analogy of comets' tails.

Secondly, that the gases composing the tail are in a state of extreme tenuity, and the light which we see is the integrated result of the excessively feeble reflexions coming from all distances along the axis of the tail, *excepting* those nearer parts where it will be hidden in the Earth's shadow.

Now it is only the nearer parts, say within the Moon's distance, which could show a horizontal parallax exceeding one degree, and an angular displacement less than this would be impossible to observe with any certainty in so ill-defined and faint an object.

Judging from the large apparent size of the gegenschein, it would seem unlikely, however, that the tail would be wholly

hidden within the Earth's shadow between us and the Moon's distance; there would be outlying parts which, it might be thought, should give evidence of parallax.

But would these outlying nearer parts be visible at all? Suppose that the tail were presented to us sideways instead of end on, I believe that it would be absolutely invisible, even on the darkest sky. According to my view it is only on account of the enormous depth of excessively rare gas through which the line of light passes that we are able to perceive anything whatever. For this reason I think that the nearer portion of the tail, lying outside the central parts obscured by the Earth's shadow, would not reflect enough light to be separately visible.

Admitting that the gegenschein is an extra terrestrial phenomenon, and that it is due to reflected sunlight, the absence of any indication of a dark centre, such as would be caused by the shadow of the Earth projected upon it, shows that the light, or a large proportion of it, must come from a region beyond the apex of the shadow-cone, so that, so far as I can see, it comes to this: either we must assume that there exists at an immense distance from the Earth, yet always in the same relative position to it, a round disk or roughly-spherical mass of matter (dust-like or gaseous); or that there is an elongated stream of matter, the axis of which is directed towards the Earth.

The latter seems to me to be the least difficult to imagine, because the outward flow of matter along the stream, as in a comet's tail, explains the constant relative position.

The weakest point in my theory, I think, is this:—If the tail spreads out in the form of a cone say of 15 degrees, the intensity of the reflected light ought to diminish very rapidly with the distance from the Earth, and a large proportion of the total illumination as seen from the Earth should in this case come from the nearer parts of greater density. Consequently there should be evidence of the Earth's shadow seen as a dark space in the centre and evidence of parallax in the outer ring of light.

With regard to Mr. Anderson's objection, of course a more satisfactory theory would be one which explained both the gegenschein and the zodiacal light. I do not see, however, why the mere optical superposition of the gegenschein upon the zodiacal band should show that there is any real relation between them. Nor do I see why it should be considered to be "obviously connected" with the zodiacal band.

Prof. Barnard states, in the article referred to above, that the zodiacal band is not always present. No distinct band is visible in August and September or in March, so that at these times the gegenschein is just as obviously an independent phenomenon.

Yours faithfully,

J. EVERSHED.

Kenley, 1899, June 4.