of Calcutta. The photos are not as could be expected, but I am a new hand at the subject and should be excused. On the 13th by an inadvertence the glass side was exposed. It was discovered too late, but as it gives the relative positions of the planets all right, I think not much harm is done. It is possible to get from the 1st and 3rd photos the actual angle between the planets at the nearest approach and the time it took place because these photos were taken every 24 hours. The fourth projection shows what it is like although the drawing is not at all perfect.

The Absorption of Light in reference to the Infinity of the Universe.

By Rev. A. C. Ridsdale, M.A., F.R.A.S., F.R.Met.S., M. Lond. Math. S., F.Ph.S., A.L.C.M., Foreign Member Societe Astronomique de France.

Of late years the important question has been much debated, as to whether the stars of the universe occupy only a limited space, or on the other hand are distributed without limit throughout infinite space. The answer largely depends upon the further question, as to whether light when traversing immense distances in space suffers diminution by absorption on its way to our Earth, or not. Firstly, we will assume for the sake of argument, that the stars *are* infinitely distributed, and that light does *not* suffer absorption. And let us see what would follow. Now, with the Earth as centre of vision, we may assume, an infinite number of imaginary or geometrical spherical surfaces, whose radii from the Earth are proportional to the natural sequence 1, 2, 3, 4, 5, &c. Then the number of stars at the second surface will be by elementary geometry four times the number at the first. And the stars at the distance of the third surface will be four times the number at the second, and so on. But at the same time the area of the star-discs will vary inversely to the square of their distances. Thus, whilst the number of the stars at the second surface will be four times the number at the first, yet, at the same time, the area of the individual star-discs will be diminished by one-fourth. Hence the total area of star surface at the second sphere will be equal to that at the first, and that at the third equal to that at the second, and so on to infinity. If then as per hypothesis, there be an infinite number of these geometrical concentric surfaces, extending that is to an infinite distance from, the Earth, the whole face of the sky would be covered with stars, with no intermission,

except for the black disks of the planets and satellites, and dusky markings representing Sun-spots. This then would be the curious aspect of the heavens, if the stars were distributed infinitely, and if at the same time their light suffered no absorption in space during their immense journeys to reach our Earth. But if star-light *does* indeed suffer absorption before, it reaches us, then even, though we still assume that the number and distribution of the stars is infinite, the aspect of the heavens will be wholly different from our first assumption and would not appear to be covered with stars. Now, although it is hardly possible that the pure ether of interstellar space should be capable of absorbing light (since no other form of energy has ever been observed as having been produced to take its place), yet it is highly probable that star-light may suffer diminution, on account of the intervention of opaque or semi-opaque substances, such as dark or extinct stars, meteor swarms, and cosmic dust or nebulous matter of all varieties of densities. If then we adopt the opposite assumption, namely, that star-light, *does* suffer diminution by absorption on its immensely long journey to the Earth, let us see what result can be drawn, by working out the problem mathematically. Now, let us assume (what is not in itself at all improbable), that one quarter of the light say of a star at the distance of our first concentric spherical surface is absorbed on its journey to the Earth. Then only three quarters of its light will actually reach our globe. And again three quarters of three quarters, or the square of three quarters, or nine-sixteenths of the light of a star at the second concentric surface will actually reach the Earth. And the same ratio will hold good for all the concentric surfaces to infinity. Hence, we have an infinite, rapidly converging, geometrical series, whose sum, in the limit, is the number 3. Thus the total light which reaches the Earth from all the stars together, will only be three times as great as the light which reaches us from the stars at the distance of the first or nearest concentric surface. And this result is very approximately in accordance with facts. We arrive then at this conclusion. Either the distribution of stars in space is not infinite, or else there must be such a thing as absorption of light in space.

[Short Article written at Rev. Canon A. N. Banerjee's request, for October number of the "Record", by A. C. R.]