border and the centre of the sun, and also in some respects by the zodiacal light, so perceptible in our climate during the equinoxes.

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Archelaus, who lived in the year 448, B. C., was the last philosopher of the Ionian Sect; he said, regarding the sun,—"It is a star, only it surpasses in size all other stars." The conjecture for what is not based upon any measurement, or any observation, deserves no other name, was certainly very bold and very beautiful. Let us pass over an interval of more than two thousand years, and we shall find the relation of the sun and the stars established by the labors of the moderns, upon a basis which defies all criticism. During nearly a century and a half, astronomers endeavoured to determine the distance between the stars and the earth; the repeated failures with which their researches were attended, seemed to prove that the problem was insolvable. But what obstacles will not genius, united to perseverance, overcome? We have discovered within a very few years the distance which separates us from the nearest stars. This distance is about 206,000 times the distance of the sun from the earth, more than 206,000 times 95,000,000 of miles. The product of 206,000 by 95,000,000 would be too much above the numbers we are in the habit of considering, to warrant its annunciation. This product will still more strike the imagination, when I refer to the rapidity with which light travels. Alpha, in the constellation of the Centaur, is the star nearest to the earth, if it be allowable to apply the word near to such distances as those of which I am about to speak. The light of Alpha, of the Centaur, takes more than three years to reach us, so that were the star annihilated, we should still see it for three years after its destruction. Recall to your recollection that light travels at the rate of 192,000 miles in a second; that the day is composed of 86,400 seconds, and the year of 365 days, and you will feel as thunderstruck before the immensity of these numbers. Furnished with these data, let us transport the sun to the place of this, the nearest star, and the vast circular disc, which in the evening occupies a considerable time in descending entirely below the same line, would have dimensions almost imperceptible, even with the aid of the most powerful telescopes, and its brilliancy would range among the stars of the third magnitude, you will thus see what has become of the conjecture of Archelaus. One may perhaps feel humiliated by a result which reduces so far our position in the material world; but consider that man has succeeded in extracting everything from his own resources, whereby he is elevated to the highest rank in the world of thought.

We would remark that in the recent works of complete astral catalogues, we shall find that the number of stars visible to the naked eye in a single hemisphere, namely, the northern, is less than three thousand. A certain result, and one, which, notwithstanding will strike with astonishment, on account of its smallness, those who have only vaguely examined the sky on a beautiful winter night. The character of this astonishment will change if we proceed to the telescopic stars. Carrying the enumeration to the stars of the fourteenth magnitude, the last are seen by our powerful telescopes, we shall find by an estimate which will furnish us the minor limit, a number superior to 40,000,000, (40,000,000 of suns!!) and the distance from the farthest of them is such that the light would take from three to four thousand years to traverse it. We are then, fully authorized to say, that the luminous rays,—those rapid couriers,—bring us, if I may so express it, the very ancient history of these distant worlds. A photometric experiment, of which the first indications exist in the Cosmotheoros of Huygens, an experiment resumed by Wollaston a short time before his death, teaches us that 20,000 of stars the same size as Sirius, the most brilliant of the firmament, would need to be agglomerated to shed upon our globe a light equal to that of the sun. On reflecting upon the well known fact, that some of the double stars, are of very different and dissimilar colours, our thoughts naturally turn to the inhabitants of the obscure and revolving planetary bodies which apparently circulate around these suns; and we would remark, not without real anxiety for the works, the paintings, of the artists of these distant worlds, that a day lightened by a red light, succeeds not a night but a day, equally brilliant, but illuminated only by a green light.

But abandoning these speculations, however worthy they may be of admiration, we shall come back to the chief question, which I have proposed to treat in this account, to try, if possible, to establish a connection between the physical nature of the sun and of the stars. We have succeeded by the help of the polarizing telescope, in determining the nature of the substance which composes the solar photosphere, because by reason of the great apparent diameter of the orb, we have been able to observe separately the different points of its circumference. If the sun were removed from us to a distance where its diameter would appear as small to us as that of the stars, this method would be inapplicable, the colored rays proceeding from the different points of the circumference would then be intimately mixed, and, we have said already, their mixture would be white. It appears, then, that a must not apply to stars of imperceptible dimensions, the process which so satisfactorily conducted us to the result in regard to the sun. There, are, however, some of these stars, which supply us with the means of investigation. I allude to the changing stars. Astronomers have remarked some stars whose brilliancy varies considerably; there are even some which, in a very few hours, pass from the second to the fourth magnitude; and there are others in which the changes in intensity are much more decided. These stars, quite visible at certain epochs, totally disappear, to reappear in periods longer, or shorter, and subject to slight irregularities. Two explanations of these curious phenomena present themselves to the mind; the one consists in supposing that the star is not equally luminous on all parts of its surface, and that it experiences a rotatory movement upon itself; thus it is brilliant when the luminous part is turned towards us, and dark when the obscure portion arrives at the same point. According to the other hypothesis, an opaque, and, in itself non-luminous satellite, circulates round the star, and eclipses it periodically. In accordance with one or the other of these suppositions, the light which is exhibited some time before the disappearance, or before the reappearance of the star has not issued from all points of the circumference. Hence, there can be no doubt of the complete neutralization of the tints of which we have just spoken.

If a changing star, when examined by a polarizing telescope remains perfectly white in all its phases, we may rest assured that its light emanates from a substance similar to our clouds, or our inflamed gas. Now, such is the result of the few observations that have been hitherto made, and which will be highly useful to complete. This means of investigation demands more care, but succeeds equally well, when applied to those stars which experience only a partial variation in their brilliancy. The conclusion to which these observations conduct us, and which we may, I think, witnout scruple generalize, may be announced in these terms; our sun is a star, and its physical constitution is identical with that of the millions of stars with which the firmament is strewed.—*American Annual of Scientific Discovery.*

Mode of Constructing Telegraphs in India.

From Calcutta to Rajmoole, the conductor is laid under ground, in a cement of melted resin and sand. From that village through