than the calculations of his predecessors. The result was that the one star revolved round the other in the space of ninety-four years: also using Kruger's previous determination of the parallax (which gave a distance of the star from the solar system amounting to about 120 billions of miles), that the mass of 70 Ophiuchi is about three times as great as that of the Sun, and that the distance of the two stars composing it from each other is about thirty times that of the Earth from the Sun. Double-star observations generally continue, and will doubtless long continue, to be an interesting field of research.

Another determination of the parallax and distance of a fixed star has been published, and is referred to in the June number of THE STUDENT (p. 378). The star is *a* Centauri, in the southern hemisphere already known to be the nearest of all the fixed stars. Professor Moesta, Director of the Observatory at Santiago in Chili, discussed a large number of observations made by him and came to the conclusion that the parallax was 0″88. Comparing this with other determinations, it may, we think, be safely inferred that this quantity is really about nine-tenths of a second, and consequently the distance a little more than twenty billions of miles.

From the above hasty and imperfect sketch, it will be seen that the progress of astronomy during the past year has been far from unsatisfactory. And we may hope that during the present it will at least be not less so.—*The Student.*

The Coming Transits of Venus.

The London Herald says: The Astronomer Royal is doing good service in preparing betimes for the greatest astronomical events of the century. The transits of Venus will take place in 1874 and 1882. Though it may seem a long time to look forward to, to those who are unacquainted with the amount of preparation required for such observation, those who know the difficulty of procuring a large number of first-rate instruments, unless plenty of time is allowed, will know that there is really no time to be lost, especially if, as we should hope would be the case, all the expeditions sent out are provided with precisely similar instruments and apparatus. If any amount of failure takes place, it will not be from want of preparation on Mr. Airy's part. At the late meeting of the Royal Astronomical Society, he showed that there was nothing indefinite about his ideas; he had already prepared careful maps both for observing the ingress and the egress of the planet. He showed the importance of sending expeditions to several places, because, among other considerations, a thousand obstacles might interfere with the observations in any particular place.

There are places which, if weather, etc., are favorable, will be admirable for all purposes, but, as in the case of Kerguelen Land, the chances are very much against a clear atmosphere. Captain Toynbee said this Land is seldom to be found on account of the fog. If practicable, no expedition will be of the importance of one sent to the South Pole, *i. e.*, as near to it as possible. At the South Pole the effect of parallax will be greatest, that is to say, the position of Venus will vary to the greatest extent on the sun's disc. The Astronomer Royal in his maps suggests two points, one in Enderby's Land but here the sun would be too low for it to be a certainly advantageous position—he greatly preferred a point in the Antarctic Continent, where Sir James Ross landed.

As a place for observation nothing could be better. The only point is, will the severity of the climate admit of the expedition? Captain Richards the hydrographer to the Amiralty, spoke well upon it. He showed that if properly fitted out and provided with good huts, clothing and food, there would be no further objection to the place than must stand in the way of any arctic expedition. Those, however, who joined in it would have to make up their minds to one thing, namely, that they would have to spend a year upon the spot; because it was unapproachable at anything near the time when the transit will take place. To show, however, that he did not consider this any way fatal to the position as a station for observation, he said that he should much like to be one of the party himself. In this he was fully borne out by Captain Davis, who landed there with Sir James Ross. So that we may hope that this, at least, will be one station, and that the government will not postpone till too late the preparations to make it as favorable for the comfort of the spirited observers who will join in the expedition as for the objects of the enterprise. It may possibly he advisable to send out an exploring party previously, though Captain Davis did not seem to think it would be necessary.

The first great difficulty in all places will be to get the absolute longtitude. No ordinary nautical longtitude will be of the slightest value. Observations necessary can be made at any places easily accessible, as far as England is concerned, as at Alexandria, where the telegraph will be of great use; at many places too in the United-States, where we can safely leave the work to the Americans. We may especially do the same in the case of the Russians, where the exact longitude of Orsk, the extremity of the great arc of longitude extending from that place to Valencia, is known to a millionth part of a second, or in other words, to absolute certainty. The other places which are recommended to the English Government are—Mauritius for one season, and Madagascar for another. If, however, it should be thought unnecessary to fix on both of these spots, then an intermediate station, viz., on the Island of Bourbon, would be preferable. If the Astronomer Royal can show that the two stations would be of a considerable advantage we hope no financial reasons will prevent his wishes being carried out. Above all things we would urge upon the authorities the importance of making up their minds as to the instruments to be used, and in losing no time in having them put in hand. There is one more point worth noticing. How far photography can be depended upon as to accuracy in helping to discover the sun's distance is not easy to answer off-hand, but certainly it is not to be doubted that much useful and interesting information may be secured by its means.

ART.

New Uses Of Aniline.

Coal, a substance which we take up with tongs in order not to soil our fingers, is not only concentrated heat and light, but is the producer of the most beautiful coloring substances with which we are acquainted.

It has long been known that the aniline colors extracted from coal are used by the dyer, but it is much less generally known that they are applicable to many other purposes.

Since the year 1862, large quantities of aniline colors have been employed by paper manufacturers for the coloring of their paper pulp, or for the azuring of the surface of the paper after its final manufacture.

Aniline has here replaced ultramarine, metallic oxides, and dye woods. It is introduced in aqueous solution into the pulp or at the period of sizing.

The various kinds of shades for windows, lamps, etc., made to imitate fine porcelain, are covered by aniline. A design is printed on paper by means of an aniline lake, dissolved in a solution of a salt of aniline. This is then laid on damp albuminous paper. The color is taken up and fixed by the albumen, and the whole design is reproduced on the paper in a beautiful manner.

Wafers, sand for drying ink, etc., are colored by means of aniline.

Red and violet writing inks are prepared with salt of rosaniline.

Typographical inks are made by dissolving the colors in alcohol holding a resinous substance in solution, and which are precipitated by the addition of water. The precipitate, when dry, is pulverized and mixed with varnish and with ground barytes or white zinc. Instead of barytes or zinc, starch colored by aniline may be rubbed into the varnish.

The same aniline colors are utilized for the coloring of hanging papers, aquarelles, photographs, etc. Photographs obtained by this process are very remarkable for their transparency and delicacy of tint.

Refuse of wool, in the shape of dust colored by aniline, is employed to manufacture the "velvet coated" papers.

Lakes on wood, with splendid matallic lustre are obtained by steeping the wood in hot concentrated solutions of aniline colors, drying rapidly in a current of heated air, and coating with a transparent varnish of copal dissolved in ether. The same operation applies to the coloring of straw hats, and to the production of artificial leaves.

Beads and false enamels are colored with aniline.

The colored globes used for public illuminations are also stained in the same way. For this purpose, they are steeped in a solution of albumen, dried, and thrown into the aniline solution. By this simple process, globes are obtained more splendid even than by the use of the solution of gold or Cassius purple.

Artificial stones, mother-of-pearl, and ivory are treated in an identical manner.

Soap, cold cream, pomatum, cosmetic powders, candles, and lucifer matches are colored by aniline.