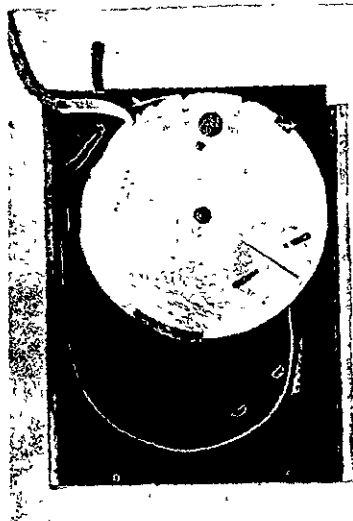


which was becoming detached in Fig. 4 is completely separated from the rest of the group in Fig. 5. This detached spot is more than six times as large as the earth, and yet its area is not one two-thousandth part of the surface of the sun's visible hemisphere

The question of temperature is a grave one, for a very slight difference in the warmth of the air in one part of the tube will spoil the chances of successful observation. In the case of this new telescope, it is proposed to keep the observatory always at one constant mean temperature, as near as possible to that of the night.

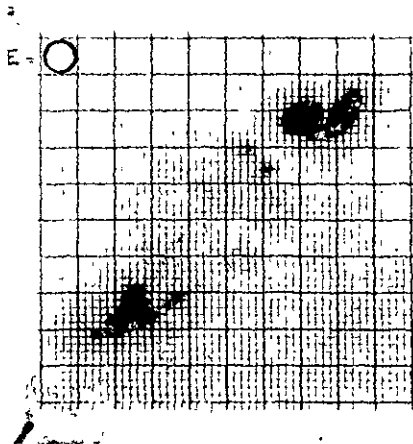
when the sun gets there. They will be far away from the places they now occupy. Let us see how long it would require the sun to travel to the place where Arcturus now is. The parallax accepted for that star gives its distance such that light requires 160 years to come from us to him and that we should go to him will require nearly 2 500 000 years at the rate of 12 miles a second. In the light of such figures a period of 75,000 years becomes a mere point of time a watch in the night.



ASTRONOMICAL PHOTOGRAPHY—FIG. 2

A Huge Telescope.

The huge telescope presented by the late Mr. Yerkes to the Williams Bay observatory is still the most powerful instrument of the kind extant, but a much larger telescope still is to be built for the solar observatory of the Carnegie Institution on Mount Wilson, in California. This telescope, for which the funds are being provided by Mr. John D. Hooker, of Los Angeles, is to be of the reflecting type; and some idea of the immense stride in telescopic construction, which will be made by this new addition to the astronomer's resources, may be gathered from some notes supplied to *Engineering* by Professor Hale, of the observatory on Mount Wilson. The largest reflector hitherto made has a 60in. diameter silvered-glass mirror, of which the glass has a thickness of 8in. and weighs one ton. In the proposed new telescope the mirror will be 100in. in diameter, necessitating a thickness of glass of 13in., and a weight of four and a half tons. The Herculean task of casting and annealing this huge mirror has been entrusted to the Plate Glass Company of St. Gobain. The equally formidable task of grinding, figuring and testing will be undertaken in the workshops of the observatory itself, under the direction of Professor Ritchey; and lastly, the mounting of the instrument is to be entrusted to the Union Iron-works Company, a firm which is well known as the builders of battleships and cruisers for the American Navy. It is estimated that the making and mounting of this telescope will take about four years. The question of its behaviour when finished will arouse considerable interest, for, undoubtedly, if its performance be satisfactory, it will be a great gain to astronomy. Its huge aperture, combined with comparatively short focal length, will make it extremely valuable for spectroscopic work of the fainter stars; but as telescopes of increasing size are taken into use very great difficulties are encountered.

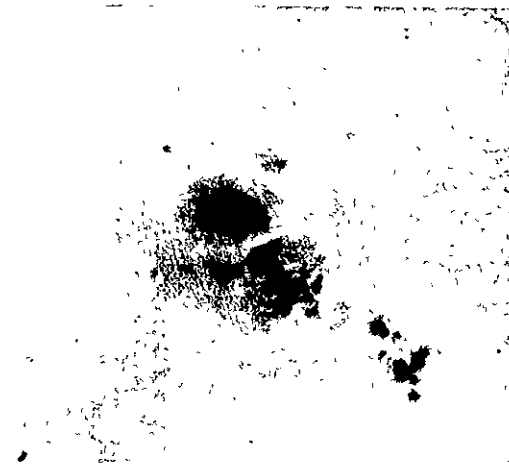


ASTRONOMICAL PHOTOGRAPHY—FIG. 3.

The Orbit of the Sun and the Solar System.

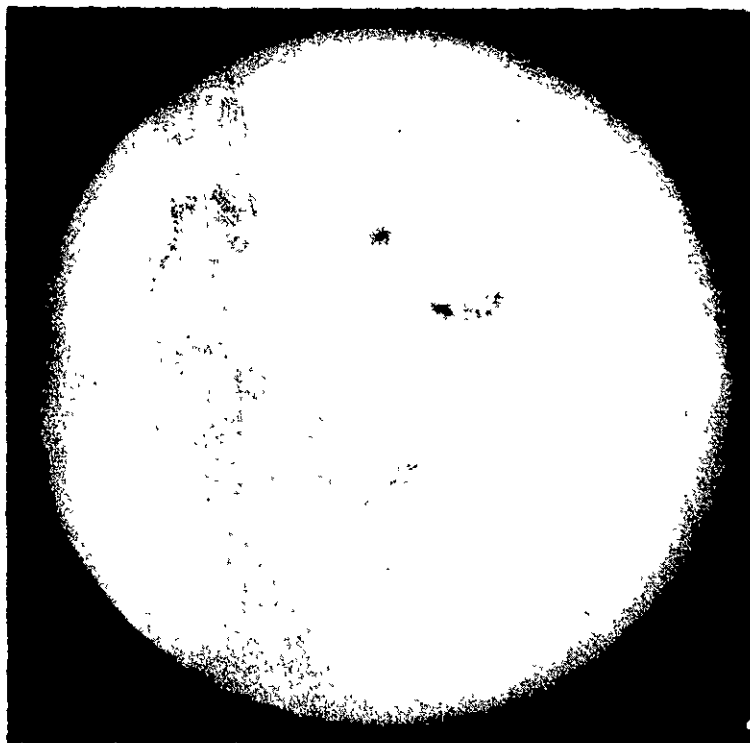
Professor Peckham, of the Adelphi College, Brooklyn has descended heavily on the theory of the gentlemen who recently described the orbit of the sun and the solar system with a great display of interesting detail. Here is the pith of the Professor's refutation—

"As to the speed of the sun in its path, astronomers are agreed that this is about 12 miles a second. At this velocity, which is a slow one as velocities go in the heavens, we go 1,036,800 miles a day, as any one can determine by multiplication, instead of 5,000,000 miles a year, as the writer states, and nearly 400,000,000 miles a year. Yet the stars are



ASTRONOMICAL PHOTOGRAPHY—FIG. 4

The determination of the point in the sky towards which the sun is moving is a matter of much interest to astronomers but it is one on which no more than a beginning of investigation has been made. Herschel, more than a hundred years ago, studied the proper motion of the stars, and located this point in the constellation Hercules. Many others of the highest repute including Struve and our own Newcomb, have followed Herschel, and have reached a slightly different result, although they do not remove the point very far from Hercules. It is now located near Vega in the constellation of Lyra, or by Campbell, at a spot 10 deg south of this star. The opposite point is near Sirius and not near Polaris. Any one who is interested in this investigation will find a statement upon it given in Milton's "Astronomy," the latest and best text book for students beginning the subject



ASTRONOMICAL PHOTOGRAPHY—FIG. 5.

so remote that the sun will require 68,000 years to cross the space separating it from the nearest star at this enormous rate of motion. Again, astronomers are agreed that the sun is moving toward Vega and not Arcturus, and that it will require the sun 558,000 years to pass by Vega. But we shall never pass by Vega, although we are moving toward it, nor would we pass Arcturus, if we were at present moving toward that star, since these stars are themselves moving, and will not be where they are now

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