tendency to recurrence of spots on the same parallels of latitude, both of individual spots on almost precisely the same parallel, and of groups within the same general limits. The parallels 71° to 75° Heliog. N.P.D. have been but rarely visited; the parallels 77° to 85°, frequently; from 86° 30′ to 89° 30′, not at all; from 90° to 92°, very rarely; from 92° to 94°, not at all; from 95° to 103°, frequently; from 103° to 107°, very rarely. In connexion with this circumstance, I would suggest whether it be not worth while to examine into the possibility of an explanation arising from the hypothetical revolution of an inner body, on which may be situated the volcanic centres of eruption, in a shorter period than the revolution of the envelope on which we see the effects in the form of ruptures of continuity. It will appear to any one who considers this suggestion that, to bring it to the test of facts, there will be required a collection of observed positions of nuclei on the same parallel, together with the times of their first appearance on the envelope; and accordingly, I would recommend fellow-labourers on this subject to be careful to record the occurrence of outbreaks which they may succeed in ascertaining to have taken place between two consecutive days."

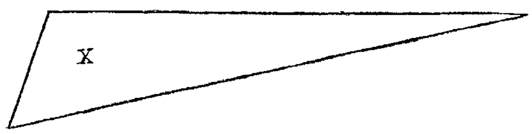
Remarks on the Orbits of α Centauri and σ Coronæ Borealis.

By Capt. W. S. Jacob, Astronomer at Madras.

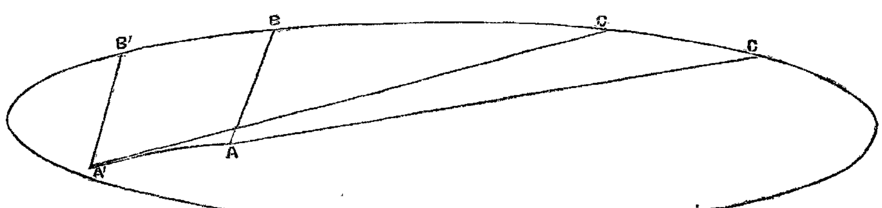
In the *Monthly Notices* for January are given the elements of two orbits for *α Centauri*, contributed by Messrs. E. B. Powell and J. R. Hind. The latter, probably, represents the observations pretty fairly, but the former can scarcely be said to do so, as it makes the observed distances before 1846 all too great, and after that epoch all too small, while even in the angles there is in a general way the same opposition of signs, though not quite without exception; in such a case, it is evident that the sum of the errors or of their squares must be capable of considerable reduction.

" But, in fact, the agreement of the orbit with observation is no proof that it is even an approximation to the true one: where we have given only a small portion of the periphery of an ellipse, it is evident that with a very slight change of curvature we may adapt it to many different ellipses; and, even when we are pretty sure of the dimensions of the apparent ellipse, it may happen that a very slight change of position of the projected focus may cause a great variation in the true elements. This is the case in the present instance: I have computed a number of orbits for this star, but for some years have given up the attempt, as the data are insufficient; though we can lay down the apparent orbit very closely, we cannot as yet get even a decent approximation to the true one.

" The reason is this: La Caille's observations in 1751, though not, of course, minutely accurate, enable us to fix the periodic time within a small quantity; since the stars had returned to the same relative position about 1830, the period must evidently be about 79 years, within a year or two either way; and as we know pretty exactly the area now described annually by the radius vector, we can also fix nearly the total area of the apparent ellipse. The path described from 1834 to 1854, the only time within which trustworthy observations are available, is shown on the slip marked X, and is of such extent and small curvature that it must



include the extremity of the minor axis, and having given the curvature at this point and the area, the dimensions of the ellipse are fixed. It appears that the axes must be about 28″·80 and 6″·86, as shown in the lower diagram. If we now try to fit the slip X to the periphery of the ellipse, we find it may take the position A B C; but, by reason of the slight change of curvature



in so elongated an ellipse for a considerable distance on either side of the minor axis, it may also be *slided* round the curve as far as A′B′C′ without material error, the locus of the principal star, or projected focus, being the thick line A A′, and, with the exception of not being *very* likely to fall quite close to either extremity, it may as well occupy one part of the line as another, and the observations will be equally well represented whatever point be fixed on. This, then, allows a range in per. pass. of from 1858·5 to 1867·8, and in *e* from ·54 to ·96; while *a* may range from 15″ to 31″. These limits may be a little further extended by slight variations in the dimensions of the apparent ellipse, but they will be somewhat narrowed by the end of the current year; for if the first position be nearly true, the places at 1856·0 will be 309°·0 and 3″·75, and if the second, 312°·6 and 3″·45,—a difference which observation would be sure to detect; still we shall not be able to get a good approximation until the extremity of the ellipse has been reached, or nearly so.

"*σ Coronæ Borealis.*

"In the same Number (page 90) is given, also by Mr. Powell, an orbit for *σ Coronæ Borealis*, which appears from the comparisons cited to agree closely with observation. There are, however, a few epochs omitted where the agreement would not be quite so close; it may also be doubted whether the plan of grouping together several epochs into one is quite legitimate, for in the case of such quick-moving stars the mean of angles extending over two years would not correspond to the mean of the times.

"The following elements will be found to represent the observations pretty fairly, but they will admit of considerable variation:—

$$\tau = 1831{\cdot}17$$
$$\varpi = 107^\circ\ 13'$$
$$\Omega = 1\ \ 57$$
$$\lambda = 101\ \ 57$$
$$\gamma = 46\ \ 47 \quad \cos = [9{\cdot}83552]$$
$$e = {\cdot}3088$$
$$P = 195^{yr}{\cdot}12 \qquad n = 1^\circ{\cdot}845$$
$$a = 2''{\cdot}717$$

Comparison.

Date.	Observer.	θ_o	$\theta_c-\theta_o$ ∠	arc.	ρ_o	$\rho_c-\rho_o$
		° ′	′	″	″	″
1781·79	H	347 32	− 46	·038		
1802·74	,,	11 24	+ 85	·058		
1819·60	Σ	50 18	+ 183	·081		
1821·30	H & S	65 15	− 302	·129		
1822·67	Σ	61 0	+ 300	·123		
1823·47	H & S	72 56	− 199	·082	1·45	−·055
1825·44	S	77 31	+ 104	·040	1·48	−·160
1826·77	Σ	89 0	− 171	·065	1·30	+·012
1828·50	H	92 6	+ 183	·069		
1830·28	H	105 5	− 36	·014	1·22	+·092
1830·52	D	107 17	− 93	·035		
1830·76	Sm	107 36	− 37	·014	1·30	+·014
1831·34	D	111 32	− 93	·035	1·57	−·250
1831·36	H	108 46	+ 79	·030	1·39	−·070
1832·37	Sm	114 54	+ 21	·008	1·40	−·054
1832·55	D	115 57	+ 13	·005		
1833·36	,,	120 37	− 43	·017	1·30	+·084
1833·58	Sm	120 42	+ 14	·006	1·20	+·190
1835·50	,,	130 54	− 86	·033	1·40	+·048
1839·67	,,	145 6	− 6	·003	1·60	+·064
1843·35	,,	155 54	− 2	·001	1·80	+·015
1846·21	*j*	161 58	+ 49	·027	2·25	−·300*
1853·14	,,	177 54	− 54	·034	2·18	+·040
1853·35	Powell	175 12	+ 130	·083		
1854·05	*j*	177 52	+ 45	·029	2·22	+·036

* Only a single night's measure, and not very good.

"N.B. As it is desirable that the same observer should be always designated by the same letter, and as J has been already appropriated by Manuel Johnson, it will be better to keep to *j* for designating my observations."

5 *March*, 1855.

Description of an Observatory erected at Grantham.
By J. W. Jeans, Esq.

"I erected this observatory about five years since. The transit-room is placed between the two roofs; the timbers which carry the floor-joists being firmly spiked to the rafters of the roofs, abutting against their tye-beams; the pedestal of the transit is quite free from the floor; the walls are of wooden frame-work covered with sheet-iron, canvassed and papered inside; the roof ditto ditto, but having felt under the iron, which is galvanised. The equatoreal-room is constructed in a similar manner; the joists of the floor being carried by the outer or western purling of the roof, at one end, passing quite clear of the inner or eastern purling, and being carried at the other end by timber uprights passing down to the party wall. A large box full of sand is attached to the eastern purling, upon which the equatoreal rests, quite independent of the floor, and but little affected, except by the vibration of the house itself; the walls of this part are lined with boards; the roof consists of light wood framing, covered with felt and sheet iron; it has double shutters, about 22 inches wide, opening quite across from curb to curb, in four sections closed at top by a square shutter, which can be raised so as to allow observations quite in the zenith. The curb is made of American oak, top and bottom double, lined with one-eight inch sheet-iron, and running on cast-iron balls. I cannot state the cost of erection, as it was partly constructed of old materials, and I did a great deal of the work (nearly the whole of the dome) myself.

"The transit is by Cary, 2 ft. long, 2 in. aperture, 6 in. circle, divided to 30′, reads to 1″; striding level; it is very steady to its adjustments, and performs very well. The equatoreal also by Cary, $3\frac{7}{8}$ in. aperture, 5 ft. 9 in. solar focus, circles 9 in. diameter, H. C. divided to 1^m reads to 2^s, D. C. divided to 15′ reads to 30″; it performs very fairly. The clock-work to it is of mine own adaptation. The clock is an old one, Grantham make, dead beat, and furnished with a wooden compensating pendulum-rod, of mine own construction; its rate is very steady and good. My position, according to mine own observation, is

	°	′	″	
Lat.	52	24	52	North
Long.	0	39	0	West.

[The foregoing description was accompanied by a complete and very neatly executed drawing of Mr. Jeans's observatory.—EDITOR.]