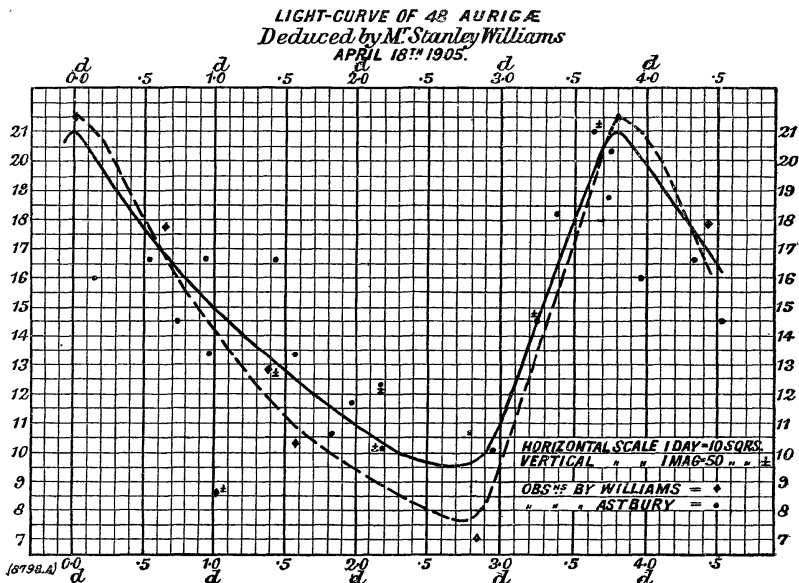This conclusion is perfectly just, but Dörfel was not quite accurate in some of the details. He seems to have thought that the perihelion passage took place on the 10th of December, about a week before the date assigned by Encke's exhaustive investigation; and, as Delambre remarks, from the account he had heard ("Astronomie au dix-huitième siècle," p. 673), does not bring it anything like so near the sun at perihelion as the more accurate determination of Newton did. But though we may, therefore, allow, with Delambre, that there is justice in Pingré's expression, that "l'on peut un peu rebattre des louanges données à Dörfel "pour ses observations," surely great credit is really due to him for his investigation of a parabolic orbit for the comet at the time it was made, before Newton had proved that comets must move in one of the conic sections with the sun at a focus. Indeed, Delambre thinks that Pingré took in the matter "un ton trop "déclamateur."

The Variable Star 48 Aurigæ.

By T. H. Astbury.

Early in the month the earlier observations of this star were plotted out roughly and submitted to Prof. Turner, who, from inspection, suggested a period of about $3^d \cdot 6$. Later on I sent the whole of the observations (good and bad) to Mr. Stanley Williams, whose skill and experience very promptly arrived at a period of much the same duration, together with the light-curve of the star, which is, I believe, the brightest variable discovered in N. declination during the last 36 years. His permission to communicate these conclusions to the Association was readily granted, and I endeavoured to summarise the results in the form of a "paper." But I found it impossible to do justice to Mr. Williams in this manner, and therefore send copies of his letters.

LIGHT-CURVE OF 48 AURIGÆ
Deduced by Mr Stanley Williams
APRIL 18TH 1905.

HORIZONTAL SCALE 1 DAY = 10 SQRS.
VERTICAL „ 1 MAG = 50 „ „
OBS.NS BY WILLIAMS = ♦
  „ ASTBURY = •

For the greater convenience of those interested I append a copy of the light-curve, which is explained in the letters themselves.

Croft Villas, Wallingford,
        25th April 1905.

Following are the letters referred to :—

DEAR MR. ASTBURY,   18th April 1905.
        MANY thanks for your interesting letter and observations of 48 Aurigæ. I have been puzzling over the questions of the type and period of this variable with the help of your observations, and fancy that I have solved the mystery, and that it is a short-period variable of the δ Cephei type with a period of $3^{d} \cdot 8$.

As there did not seem to be much or any certain change of brightness in two or three hours, I took the mean of the observations for each night, excluding altogether those made at Wallingford with Sky 3 or at Hove with Sky 1; excepting for those nights on which nothing better was available. In the latter case the results were marked $\pm$, as being necessarily very uncertain. This work was done in the first place for the observations made here, and the results were reduced by means of the following light-scale :—

Comp. Star.		Light Scale.
a	=	$18 \cdot 1$
b	=	$10 \cdot 0$

a is 49 Aurigæ and b 28 Geminorum.

Then the means were obtained for your observations for each night in the same manner, and reduced to the above light-scale by assuming that your brightest observation $5^{m} \cdot 0$ corresponds to my brightest observation 21; and your faintest observation $5^{m} \cdot 6$ to my faintest 8. This would or should render our observation nearly comparable.

A maximum is clearly indicated for about 10^{h} on April 6. We both agree as to this, so, using this as starting point and with an assumed period of $3 \cdot 8$ days, the observations were all plotted on squared paper according to the interval by which they follow the previous maximum.

Enclosed is a copy of the resulting diagram, which shows clearly, I think, the type of variation, and that the assumed period of $3 \cdot 8$ days must be nearly correct.

The vertical scale of the diagram is rather an extended one, as a space of nearly five of the horizontal lines corresponds to a tenth of a magnitude, and considering the unfavourable weather prevailing, &c., the observations are not more discordant than might have been anticipated. In fact, the only really wide observation is yours of March 22, and even here the disagreement is not great—the observation shows clearly that the star was bright at the time. In no other case do the observations differ from the light-curve by more than a tenth of a magnitude,

excepting your observation of March 27,* and on this occasion
there is an uncertain observation (±) made here on the same
night, which suggests that your estimate was a little too bright.

The details of the light-curve are, of course, still doubtful.
The black ink curve represents the observations in general, but
those made here would be better satisfied by the dotted (red)
ink curve. A little change in reducing your observations to my
scale would, however, bring us into uniformity. A better agree-
ment might also be brought about by a *slight* alteration in the
adopted period of 3·8 days. The range of variation would be
about $0^m·55$, and the minima precede the maxima by about
one day ($1^d·1$).

I see that Prof. Turner has communicated your discovery of
the variability of this star to the editor of the " Astronomische
Nachrichten," who has given it the provisional designation of
47.1905 Aurigæ. The permanent naming of the variable will
be done later on by the committee of the Astronomische Gesell-
schaft, probably some time in the autumn.

The following is a list of the observations, with the interval
by which they follow the previous maximum, and the brightness
according to my provisional light-scale :—

Date.				Follows Max. by	Brightness.	Observer.
		h	m	d		
March 18	-	8	22	- 3·75	18·8	A.
„ 19	-	8	15	- 0·94	16·7	A.
„ 21	-	8	15	- 2·94	10·1	A.
„ 22	-	9	15	- 0·18	16 0	A.
„ 24	-	9	37	- 2·20	10·1 ±	A.
„ 25	-	10	40	- 3·24	14·5 ±	A.
„ 27	-	9	53	- 1·41	16·7	A.
„ 27	-	9	30	- 1·40	12·8 ±	W.
„ 29	-	9	22	- 3·39	18·2	A.
„ 30	-	8	15	- 0·54	16·7	A.
„ 30	-	10	7	- 0·62	17·8	W.
„ 31	-	9	0	- 1·57	13·4	A,
„ 31	-	9	27	- 1·59	10·3	W.
April 2	-	10	4	- 3·62	21·0 ±	A.
„ 3	-	8	0	- 0·73	14·5	A.
„ 4	-	10	0	- 1·82	10·6	A.
„ 5	-	9	33	- 2·80	10·6	A.
„ 5	-	11	27	- 2·88	7·5	W.
„ 6	-	8	26	- 3·75	20·4	A.
„ 6	-	9	43	- 0·01	21·5	W.
„ 7	-	8	42	- 0·96	13·4	A.
„ 7	-	11	3	- 1·01	8·6 ±	W.
„ 8	-	9	2	- 1·98	11·7	A.
„ 12	-	8	55	- 2·17	12·3 ±	A.

Future maxima should occur at about the following times :—
April 21, 14^h; April 25, 10^h; April 29, 5^h; and May 3, 0^h.

* The uncertain observation made here on April 7 is not worth
mentioning.

If the weather is only fine, it is to be hoped that some more observations may be obtained, though for really good results we shall probably have to wait until the autumn.

<div align="right">Yours very faithfully,
A. STANLEY WILLIAMS.</div>

P.S.—What first induced you to think that the star was variable?

DEAR MR. ASTBURY,   20th April 1905.

YOUR account of what led to your discovery is highly interesting, and it is evident that it was not due to a mere accident, but was the result of systematic observations.

It is no mean feat to discover the variability of a short-period star like this, in which the whole range of variation barely exceeds half a magnitude! There is very little merit attaching to the discovery of a variable by photography, but I always feel great admiration for a *visual* discovery of the kind.

There is a good deal of guesswork in the endeavour to ascertain the period, &c. of a short-period variable like this, and one may try for weeks without coming to any satisfactory result where the observations are not very numerous. I was inclined at one time to think with you that it might be of the β Lyræ type. What led me to think otherwise was the fact that, when your observations had all been reduced, there should have been a larger proportion making the star bright than is actually the case.

Your period of rather more than 7 days is very nearly double of 3·8 days. Now that the moon is going, I hope it will be practicable to secure some more observations, though the star will be getting into an unfavourable position.

<div align="right">Very faithfully yours,
A. STANLEY WILLIAMS.</div>

<div align="center">

Tasks for Totalities.

By MISS A. M. CLERKE, Hon.M.R.A.S.

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The critical relation between the apparent diameters of the sun and moon has been and is of incalculable advantage to the progress of solar physics. The adjustment is, for purposes of curious scrutiny, almost ideally perfect. Yet its closeness throws a heavy load of responsibility upon observers. The narrow overlap of the screening body leaves but little time for the continually multiplying throng of experiments which must be performed, if at all, while its actual interposition lasts. Hence the necessity for anxious consideration beforehand of the observational programme. The golden seconds at our disposal must be doled out carefully to the most deserving objects. Their due administration demands long and serious consideration.

p. 1894.   B