We have $n \cdot \cos (N + l) = \begin{cases} -\begin{bmatrix} 1.77616 \end{bmatrix} & \text{for N. limit.} \\ -\begin{bmatrix} 1.76883 \end{bmatrix} & \text{for central eclipse.} \\ -\begin{bmatrix} 1.76137 \end{bmatrix} & \text{for S. limit.} \end{cases}$

In these formulæ, as has been previously explained when presenting similar ones, all quantities within square brackets are logarithms; l is the geocentric latitude, or the geographical latitude diminished by the angle of the vertical; L the longitude from Greenwich, counted positive towards the east; and t results in mean time at Greenwich.

First, let it be required to find the latitude of the central line and the north and south limits in the longitude of the Observatory at Moscow, 2h. 30m. 17s., or 37° 34′3 east of Greenwich.

Longitude + 37 34 3 Constant75 51 8	For North Limit. Constant 1.77616 n + 1.94089
A38 17.5	Cos. $(N + l)$ -9.83527
$n. \sin N \dots + 1.92757$	
Constant +1.43336 Cos. A +9.89480	N + 1 133 11'0 N 75 52'9
$n. \cos. N \dots + 1.32816$	7 57 18'1 Angle of vert 10'5
Tan. N +0.59941	Lat. of N. limit 57 28.6
N 75 52.9	For South Limit.
Sin. N +9.98668	Constant1.76137 n +1.94089
n +1.94089	Cos. $(N + l)$ -9.82048
For Central Line.	N + 1 131 24 5
Constant1.76883	N 75 52'9
n +1.94089	7 55 31.6 Angle of vert, 10.8
Cos. $(N + l)$ -9.82794	This is a second of the second
	Lat. of S. limit 55 42 4
N + 1 132 17.4 N 75 52.9	
Add angle of vert 56 24'5	
Lat. of central line. 56-35'1	

In this manner by assuming other longitudes near that of Moscow we trace out the belt of totality.

Next, to find the times of beginning and ending of the total phase at any point in the vicinity. Calculating for the observatory of Moscow, the geographical latitude of which is $+55^{\circ}$ 45'3, we proceed thus:—

Geographical latitude... +55 $45^{\circ}3$ Constant ... -23 $34^{\circ}5$ Angle of the vertical ... +37 $34^{\circ}3$

Log. cos. w ... +9.97483

No 24 ^s ·8 No 1065 ^s ·6 - 3593 ^s ·8 No 3 - 4659 ^s ·4 h. m. s 1 17 39·4 17 32 29·6 Long. E. 2 30 17·0 Middle 18 45 7·2 Moscow M.F. + 24·8					
No 24 ^s ·8 No 1065 ^s ·6 - 3593 ^s ·8 No 3 - 4659 ^s ·4 h·m. s 1 17 39·4 Constant 17 32 29·6 Long. E. 2 30 17·0 Middle 18 45 7·2 Moscow M.T. + 24·8	Constant Sin. w	ant 1.87565 Constan v 9.51962 Sin. l	at -3.11123 +9.91639	Cos. 1	. +9.75228
No 24 ^s ·8 No 1065 ^s ·6 - 3593 ^s ·8 No 3 - 4659 ^s ·4 h. m. s 1 17 39·4 17 32 29·6 Long. E. 2 30 17·0 Middle 18 45 7·2 Moscow M.F. + 24·8		1.39527	- 3 02762		
Constant 17 39 4 17 32 29 6 16 14 50 2 Long. E. 2 30 17 0 Middle 18 45 7 2 Moscow M.F. + 24 8	No	24 ^s ·8 No		No	- 3.25222 - 3.25328
Constant 17 39 4 17 32 29 6 16 14 50 2 Long. E. 2 30 17 0 Middle 18 45 7 2 Moscow M.T. + 24 8			4659s·4		
Long. E. 2 30 17'0 Middle 18 45 7'2 Moscow M.F. + 24'8		Constant	- I I7 39 4		
+ 24.8		Long. E.			
Totality \ 18 44 42 4		Middle	18 4 <u>5</u> 7.2 + 24.8	Moscow M	T.T.
begins \ 10 44 42 4 "" ""		begins	18 44 42 4	,, ,,	
Totality 18 44 42 4 ,, ,, Totality ends.		Totality ends.	18 45 32.0	. ,, ,,	

GEOGRAPHICAL NOTES

THE Japan Gazette publishes an account of a visit recently paid by a Japanese steamer to the Bonin Islands, about which but little is known. Some eighteen months ago the Japanese took possession of the islands (which are in N. lat 27°, about 520 miles from Yokohama), and established their head-quarters at Port Lloyd, Peel Island, which is the only harbour in the Bonins. The islands are described as high, rocky, and even mountainous; and the shores are, for the most part, precipitous, and lined with coral reefs. The vegetation is chiefly tropical, palms of various kinds being abundant. Wild goats and pigs abound on all the islands, and deer on one of them. Lemons, sweet potatoes, bananas, Indian corn, &c., thrive there; but the attempt to introduce cocoa-nut trees has not yet proved successful. On the return voyage the steamer visited the outlying Japanese island of Hachijo, which has an area of forty miles, and is said to contain 10,000 inhabitants. It is mountainous, and its sides to a great extent precipitous. At the northern end of the island there is a volcanic peak, rising to a height of 2,800 feet above the sea. The roads on the island are mere narrow and stony paths, and the people are poor. Three-fifths of the population are said to be women. Almost every available spot on the hill-sides in Hachijo is terraced and cultivated, but sufficient rice cannot be grown, so that sweet potatoes form one of the principal articles of food.

AT the meeting of the subscribers to the African Exploration Fund held the other day, a resolution was passed to adopt the route recommended by the Committee, from Dar-es-Salaam, towards the northern end of Lake Nyassa, and thence, if possible, to the south end of Lake Tanganyika. The return journey might be made as fas possible along the valley of Lufigi. As we have already intimated, Mr. Keith Johnston, with whom will be associated another European, will lead the expedition, which will probably leave England in October next.

THE distribution of prizes of the Geographical Society of Paris, which had been postponed owing to the forthcoming exhibition, will take place at the Sorbonne on the 27th inst. Mr. Stanley, it is understood, will be present to receive the gold medal awarded him. The National Geographical Congress will take place in the beginning of September in the hotel built by the Paris Geographical Society, and which will be inaugurated on this occasion. It is said on good authority that the presidency of that Congress will be given to M. de Lesseps.