

The Internal Heat of the Earth

ON looking over the account, contained in vol. xii. p. 545, of Prof. Mohr's interesting observations on the internal heat of the earth, I found that, according to the law which seems to prevail between the depths of 700 and 3,390 feet, there will cease to be any increase at all in the temperature exactly at the depth of one English mile, or 5,280 feet.

The reason of the discrepancy between this result and that previously given, is to be found in the last entry in your table, where only the upper part of the stratum between the depths of 3,300 and 3,500 feet, is taken, instead of the whole 200 feet, as in the other strata.

The following continuation of the table will make this evident:—

Depth.	Increase per 100 feet.
3300 to 3500 feet ... ..	0'445° R.
3500 „ 3700 „ ... ..	0'395 „
3700 „ 3900 „ ... ..	0'345 „
3900 „ 4100 „ ... ..	0'295 „
4100 „ 4300 „ ... ..	0'245 „
4300 „ 4500 „ ... ..	0'195 „
4500 „ 4700 „ ... ..	0'145 „
4700 „ 4900 „ ... ..	0'095 „
4900 „ 5100 „ ... ..	0'045 „
5100 „ 5280 „ ... ..	0' „

By adding the various increments of temperature below the depth of 3,390 feet to the temperature there observed of 36°756° R., we obtain 40°81° R., or 123°82° F. as the maximum temperature.

To temperature at	=	36°756° R.
Add at 3390 feet		
„ 3400 „	0'044 „	
„ 3500 „	0'445 „	
„ 3700 „	0'790 „	
„ 3900 „	0'690 „	
„ 4100 „	0'590 „	
„ 4300 „	0'490 „	
„ 4500 „	0'390 „	
„ 4700 „	0'290 „	
„ 4900 „	0'190 „	
„ 5100 „	0'090 „	
Between 5100 and 5280	0'045 „	
		40°81°

There is a further remark called for by the manner of filling up the gap above 700 feet. If we compare the increment given for the stratum between 600 and 700 feet, namely 1'10, with that of the next stratum, namely, 1'097, we get a difference of only 0'003 instead of 0'05, as in all other parts of the table. It would be more in accordance with the lower part of the table if we could proceed thus:—

Depth.	Increase per 100 feet.
Above 100 feet ... ..	1'30°
100 to 300 „ ... ..	1'25 „
300 „ 500 „ ... ..	1'20 „
500 „ 700 „ ... ..	1'15 „
700 „ 900 „ ... ..	1'097 = 1'10 nearly.

Whether the facts observed will warrant such an extension of the table is a question into which I forbear to enter.

Bradford, Oct. 27

JOHN WILLIS

OUR ASTRONOMICAL COLUMN

40 ERIDANI.—Prof. Winnecke measured, in addition to the well-known distant companion of this star, which is affected with nearly the same large proper motion, two small stars which he calls D and E. It would be interesting to ascertain if these stars are fixed, or if they also follow the principal one in its rapid motion through space, and measures taken during the present season may be expected to decide the point.

The results obtained in 1864 are:—

A D 1864'842	Position 185°04'	Distance 75''85
A E „ „	312'48	„ 89'45

If we adopt Mädler's proper motions for 40 Eridani, from the Dorpat Observations vol. xiv., or -2''188 in R.A. and

-3''470 in declination, we find for 1875, Nov. 15, if D and E are fixed—

A D ..	Position 155°2'	Distance 41''1
A E ..	„ 336'9	„ 107'3

Sir John Herschel had probably in view the physical connection of D and E with their bright neighbour when he suggested that at least a diagram of the relative situation of the small stars near it should be made.

The *comes* B which partakes of the large proper motion of A is itself a close double-star, II. 80 of Sir W. Herschel and  $\approx$  518, and Struve first notified its probable binary nature. Dawes refers to the difficulty attending measures in 1851, but the list of epochs is decisive as to rapid orbital motion. We have for comparison—

Herschel 1783'08	Position 326°7'	Distance 4''-8
Struve 1825'12	„ 287'7	„ „
O. Struve 1850'94	„ 160'2	„ 3'93
Dawes 1851'06	„ 160'0	„ 3 ±
O. Struve 1851'50	„ 160'2	„ 3'85
Winnecke 1864'85	„ 147'6	„ 4'46

Dawes estimated the magnitudes of the components 10½ and 11, but there is a suspicion of variability of the smaller one.

PROPER MOTION OF  $\alpha^2$  CENTAURI.—The values given in our catalogues for the proper motion of this star in declination are not so accordant as might be expected if only the more reliable or modern observations are used. Thus the Cape General Catalogue has +0'83, the Melbourne General Catalogue +0'49.

Perhaps as reliable a figure as any that can be derived from data so far published will be obtained by comparing the declination of the Melbourne Catalogue with that given by the Astronomer Royal's reduction of the observations of the Rev. Fearon Fallows at the Royal Observatory, Cape of Good Hope, 1829-31. With Prof. Peters' elements for precession, this comparison gives +0'4399. If we similarly compare with Johnson's observations at St. Helena, we find +0'4867. Probably La Caille's declination has been used in working up the adopted Cape value, as on comparing it with the Melbourne declination for 1870, we should have for the proper motion, +0'723.

For proper motion in right ascension, the comparison of Fallows and Melbourne General Catalogue gives -0'5235s., and the substitution of Johnson for Fallows alters this to -0'5462s.

THE "ASTRONOMISCHE NACHRICHTEN."—A General Register of the contents of this publication, so indispensable to every practical astronomer, from vols. lxi. to lxxx., by Dr. C. F. W. Peters, [is announced (Mauke, Leipzig).

The last number contains the Washington observations of the satellites of Uranus and Neptune during the first five months of the present year, with numerous measures of the position of the companion of Sirius in the years 1873-75; also, remarks by Prof. Asaph Hall on the determination of the mass of Mars from perturbations of the minor planets, in which Massalia, Echo, Beatrix, and Peitho are mentioned as the planets best adapted for this purpose. Magnifying powers of 610 and 890 were generally used for the satellite-observations, but on a few occasions one of 1,290 was employed; the companion of Sirius was generally measured with 400, all the observations being taken with illuminated wires in a dark field.—The death of Dr. August Reslhuber, so long director of the Observatory at Kremsmünster, is announced.

A NEW PALMISTRY

DR. ALEXANDER ECKER, the well-known authority on matters prehistorical, as well as Professor of Comparative Anatomy in Freiburg, Baden, contributes to