

As this is the first occasion on which such a peculiarity has been recorded or figured, I prefer to leave all speculation as to the cause out of the question. We need a good deal more research before we can deal satisfactorily with the biological problems involved in such appearances. As a help towards this, I bring together here a list of all those works which have come under my own and Prof. Andrews's notice, in which abnormalities in annelids are recorded:—

1. Andrews: "Proc. U.S. Nat. Mus.," vol. xiv., p. 283, 1891.
2. Andrews: "Amer. Nat.," vol. xxvi., p. 725, 1892.
3. Bell: "Ann. Mag. Nat. Hist.," vol. xvi., p. 475, 1885.
4. Bell: "Proc. Zool. Soc., Lond.," 1887, p. 3.
5. Bonnet: "Œuvres d'Hist. Nat. et de Phil.," vol. i., p. 167 seq. 1779.
6. Breese: West Kent Nat. Hist. Soc., 1871.
7. Broome: "Trans. Nat. Hist. Soc." Glasgow, 1888, p. 203.
8. Bülow: "Archiv. f. Naturg.," vol. xlix., 1883.
9. Brunette: "Travaux de la Sta. Zool. de Cette," p. 8, Nancy, 1888.
10. Claparède: "Les Chaet. du Golfe de Naples," p. 436, 1868.
11. Fitch: "Eighth Report on Insects of State of New York," appendix, p. 204 seq. Albany, 1865.
12. Foster: Hull Scientific Club, February, 1891. Reported in weekly sup. *Leeds Mercury*.
13. Friend: "Science Gossip," 1892, pp. 108, 161.
14. Grube: "Archiv. f. Naturg.," vol. x., p. 200, 1844.
15. Horst: "Tydsch. ned. Dierk. Veren.," 2nd ser., D.I., Af. i., p. xxxii, 1882.
16. Laugerhaus: "Nov. Act., K.L.C.D. Acad.," vol. xiii., p. 102, 1879.
17. Marsh: "Amer. Nat.," vol. xxiv., p. 373, 1890.
18. Macintosh: "Challenger Reports," vol. xii., 1885.
19. Robertson: "Quart. J. Mic. Soc.," vol. xv., p. 157, 1867.
20. Zeppelin: "Zeit. f. Wiss. Zool.," vol. xxxix., p. 615 seq. 1883.
21. Catalogue Terat. Spec. in Mus. Roy. Coll. Surgeons, London, 1872.

HILDERIC FRIEND.

The Zero Point of Dr. Joule's Thermometer.

IN the course of a discussion on "Exact Thermometry" I described (NATURE, vol. xli. p. 488) the results obtained by heating thermometers for a considerable time to 280° and 356°; and pointed out by means of a diagram that at 356°, after about ten hours, the rise of the zero point became—at any rate approximately—a rectilinear function of the logarithm of the time; though at 280°, even after more than 300 hours' heating, the rise appeared to be rather more rapid than would correspond to such a simple relation.

Dr. Joule observed the rise of the zero point of a thermometer at the ordinary temperature during a course of no less than thirty-eight years ("Scientific Papers," vol. i. p. 558), and it occurred to me that it would be of interest to ascertain the relation to the logarithm of the time in this case also.

The following table contains the dates of Dr. Joule's observations; the total number of months from the date when the first reading was taken; the corresponding logarithms; the total rise of the zero point in scale divisions (13 divisions to 1° F.); the total rise calculated from the formula $R = 6.5 \log. t - 4.12$, where t is the time in months; and lastly the differences between the observed and calculated zero points.

Date.	Time in Months.	Log. t .	Total rise of zero point in scale divisions.		
			Observed.	Calculated.	Δ
April 1844	0	—	0	—	—
Feb. 1846	22	1.342	5.5	4.6	-0.9
Jan. 1848	45	1.653	6.6	6.6	0
April 1848	48	1.681	6.9	6.8	-0.1
Feb. 1853	106	2.025	8.8	9.0	+0.2
April 1856	144	2.158	9.5	9.9	+0.4
Dec. 1860	200	2.301	11.1	10.8	-0.3
March 1867	275	2.439	11.8	11.7	-0.1
Feb. 1870	310	2.491	12.1	12.1	0
Feb. 1873	346	2.539	12.5	12.4	-0.1
Jan. 1877	393	2.594	12.7	12.74	+0.03
Nov. 1879	427	2.630	12.92	12.98	+0.06
Dec. 1882	464	2.667	13.26	13.22	-0.04

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The agreement between the observed and calculated values is certainly remarkable, and the + and - differences are evenly distributed.

Ten years have now elapsed since the last reading was taken, and if the thermometer is still in existence it would be of great interest to know what further rise has taken place in its zero point. According to the equation the reading should now be 13.86.

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THE APPROACHING SOLAR ECLIPSE,
APRIL 15-16, 1893.

THE total solar eclipse of April 15-16, 1893, is not only one of the longest of the century, but is the last of the century from which we are likely to get any addition to our knowledge of Solar Physics. The longest duration of totality of this eclipse is 4 minutes 46 seconds, and as the path of the moon's shadow lies to a great extent on land, there is a considerable choice of possible stations with long durations of totality. Commencing in the Southern Pacific the line of totality passes in a north-easterly direction and enters Chili at Charañah in 29° southern latitude, crosses the South American continent, and issues at Para Cura, a village near Ceara, at the north-east corner of Brazil, in latitude 3° 40' south. It crosses the Atlantic at its narrowest part and enters Africa at Point Palmerin, near Joal, almost midway between Bathurst and Dakar, and in latitude 14° north; the shadow finally leaving the earth in the interior of Northern Africa. The eclipse will be observed by several parties of astronomers in Chili, Brazil, and Africa, there being almost absolute certainty of fine weather in Chili and Africa, and a reasonable probability in Brazil.

The English arrangements to observe the eclipse have been made by a joint committee of the Royal Society, the Royal Astronomical Society, and the Solar Physics Committee of the Science and Art Department, South Kensington; Dr. A. A. Common, LL.D., F.R.S., undertaking the duties of Secretary. Two expeditions will be sent from England, one to Africa and the other to Brazil, the expenses being defrayed by a grant of £600 from the Royal Society.

The African expedition will be in charge of Prof. T. E. Thorpe, and will consist of Prof. Thorpe, Mr. A. Fowler, Mr. Gray, and Sergeant J. Kearney, R.E. The Brazilian expedition will be in charge of Mr. A. Taylor, who will have with him Mr. W. Shackleton.

Prof. Thorpe and his party will leave Liverpool by the British and African mail steamer on March 18th, arriving at Bathurst on April 2nd. They will be met at Bathurst by a gunboat kindly placed at the disposal of the expedition by the Admiralty, and will be conveyed at once to Fundium, a station on the Salum River, about sixty miles from Bathurst; this being the station selected by the Committee from the three which were offered by the French Government. The gunboat will remain with the expedition, and the officers and crew will assist in the preparations for and in the actual observations of the eclipse. After the eclipse the party will be taken to Bathurst on the gunboat, and will return to England by a British and African mail steamer, if one is available. From the time-tables of the steamers now published it appears, however, that there will not be any mail steamer available until the end of April, and in this case a cruiser will meet the party at Bathurst and bring them to the Canary Islands or to Gibraltar, from either of which places they will be able to return by mail steamer, arriving in England early in May.

The members of the expedition to Brazil will leave Southampton by the Royal Mail steamer on February 23 for Pernambuco, arriving at the latter place on March 12. They will take passage by the local mail steamers to Ceara, at which place they will arrive about March 20.