

If the space be nearer to the station, or if the difference in density be more than 1-100th part, these deflections must be multiplied by a corresponding quantity.

7. The paper is concluded by a revision of some of the calculations in the former communication. The mass of the mountain region above the level of the plains is shown to be somewhat more than four-millionths of the mass of the earth.

III. "On the Thermal Effects of Compressing Fluids." By J. P.

JOULE, LL.D., F.R.S. &c. Received October 9, 1858.

(Abstract.)

The author in this paper gives an experimental demonstration of the correctness of Professor Thomson's formula, $\theta = \frac{Tep}{JK}$, where θ is the thermal effect, T the temperature from absolute zero, e the expansibility by heat, p the pressure, J the mechanical equivalent of the thermal unit, and K the capacity for heat. The fluids experimented on were water and oil, with the results tabulated below:—

	Temperature of the liquid.	Pressure applied in atmospheres.	Experimental result.	Theoretical result.
Water...	1·2 Cent.	25·34	—0·0083	—0·0071
	5	25·34	0·0044	0·0027
	11·69	25·34	0·0205	0·0197
	18·38	25·34	0·0314	0·0340
	30	25·34	0·0544	0·0563
	31·37	15·64	0·0394	0·0353
	40·4	15·64	0·0450	0·0476
Oil	16	7·92	0·0792	0·0886
	17·29	15·64	0·1686	0·1758
	16·27	25·34	0·2663	0·2837

IV. "Note on Archdeacon PRATT's paper on the Effect of Local Attraction on the English Arc." By Captain CLARKE, R.E.

Communicated by Lieut.-Colonel JAMES, R.E. Received June 30, 1858.

The following letter of Colonel James will explain the nature of this communication; the numerical statements, being not susceptible

of abridgement, are reserved for the Philosophical Transactions, in which the paper will appear.

“ Ordnance Survey Office,
Southampton, June 29, 1858.

“ In the valuable communication by Archdeacon Pratt ‘ On the Effect of Local Attraction upon the Plumb-line at Stations on the English Arc of the Meridian between Dunnose and Burleigh Moor,’ which is published in part I. vol. cxlvi. of the Philosophical Transactions, the data for the calculation are taken from vols. ii. and iii. of the Trigonometrical Survey, which were published in 1811. Since the publication of those volumes the triangulation has been extended over the whole of the United Kingdom, new bases have been measured, and all the calculations have been revised; and as considerable errors have been detected in the distances used as data by Archdeacon Pratt, I directed Captain Clarke to substitute the correct distances in the formulæ used by the Archdeacon, and recompute the ellipticity and the amount of the local attraction at the several stations. The accompanying paper contains the results; and you will see that we have simply made the numerical computations without presuming to alter the formulæ employed; in fact I have considered it almost a duty on our part to supply the labour of recomputation, the necessity for which was caused by the errors in our first published volumes.”

“ HENRY JAMES.”

“ G. G. Stokes, Esq., Sec. R.S.”

November 30, 1858.

ANNIVERSARY MEETING.

The LORD WROTTESELEY, President, in the Chair.

Mr. J. G. Jeffreys reported, on the part of the Auditors of the Treasurer’s Accounts, that the total receipts during the past year, including a balance of £27 5s. 8d. in the hands of the Treasurer, amounted to £3864 15s. 3d.; and the total expenditure during the same period, including a balance of £47 9s. due to the Society’s Bankers, amounted to £4048 1s. 11d., leaving a balance due to the Treasurer of £183 6s. 8d.

The thanks of the Society were voted to the Treasurer and Auditors.