

## NOTE ON THE MEASUREMENT OF THE PELTIER E.M.F.

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A RECENT article in this journal<sup>1</sup> includes the results of some measurements of the Peltier E.M.F. which I think fail to do justice to the method used. The frequent extreme disparity between the two compensation terms, which should be nearly alike, seems to require explanation. The method, in the cases referred to, was that devised by me in April, 1910, and published October, 1910.<sup>2</sup> At that time I gave the results of a series of ten measurements of the Peltier E.M.F. for nickel-copper, the mean being  $6.75 \times 10^{-3}$  volts at  $28.7^\circ$ . During July and August of the present year (1911) after further investigation of the method, and improvement in the mechanical arrangement of the apparatus, the following determinations were made. None of those made are omitted. The junctions were those previously used.

Working formula:

$$P = \frac{ai_a^2 + bi_b^2}{4ni}$$

 $n = 5$  (number of junctions).

$ai_a^2$	$bi_b^2$	$i$	$P$	Approx. Mean Temperature.
.1128	.0983	1.50	$7.04 \times 10^{-3}$	30.0°
.1093	.1047	1.60	6.69	28.5
.1152	.1113	1.70	6.66	29.0
.1224	.1158	1.80	6.62	26.5
.1324	.1251	1.90	6.78	29.0
.1349	.1298	2.00	6.62	28.5
.1508	.1322	2.10	6.74	28.5
.1508	.1421	2.20	6.66	28.0
.1591	.1446	2.25	6.75	29.5
.1591	.1550	2.30	6.83	29.5
.1676	.1603	2.40	6.83	29.5
.1792	.1563	2.50	6.71	30.5

Mean of twelve results:  $P = 6.74 \times 10^{-3}$  volts at  $28.9^\circ$ .<sup>1</sup> Caswell, *PHYS. REV.*, XXXIII., 5, November, 1911.<sup>2</sup> Barker, *PHYS. REV.*, XXXI., 4, October, 1910.

A second series, repeating eleven of the twelve values of  $i$ , resulted as follows:

$ai_a^2$	$bi_b^2$	$i$	$P$	Approx. Mean Temperature.
.1036	.0963	1.50	$6.66 \times 10^{-3}$	28.0°
.1082	.1091	1.60	6.79	30.5
.1105	.1113	1.70	6.52	25.5
.1200	.1204	1.80	6.68	28.5
.1273	.1262	1.90	6.67	27.5
.1349	.1322	2.00	6.68	30.0
.1401	.1446	2.10	6.78	32.0
.1454	.1485	2.20	6.68	28.0
.1563	.1576	2.30	6.82	30.0
.1676	.1603	2.40	6.83	30.0
.1763	.1684	2.50	6.89	30.0

Mean of eleven results:  $P = 6.73 \times 10^{-3}$  volts at  $29.1^\circ$ .

There is no doubt still room for investigation, and certainly for extension, of the method. I have great confidence in its validity. I will be glad if others shall contribute to the development of the method, and I hope to do so myself, following ideas now fairly definite. Mr. F. W. Jordan<sup>1</sup> has done some highly interesting work along somewhat similar lines.

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<sup>1</sup> Jordan, Phil. Mag., April, 1911.