Art. VII.—Note on Temperatures of Maximum Density.

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(Read May.)

Kohlrausch* has investigated the expansion of Vulcanite (Hartgummi, Kammmasse,) and found that between 16° and 35° C the true linear coefficient of expansion *(e)* at the temperature *t* is given by the formula:

$$e = 61 \times 10^{-6} + 76 \times 10^{-8} t$$

If the formula hold beyond the experimental limits, it follows that *e* must have the value 0, when

$$t = -81.^{\circ}7\ \text{C.}$$

For higher values of *t*, *e* will be positive; for lower values it will be negative. At this temperature, therefore, Vulcanite must have minimum volume or maximum density, if the above formula holds. The probability that the formula deduced from experiments between $+16^{\circ}$ and $+35^{\circ}$ should be true for -80° is not great, but it may, nevertheless, be worthy of notice that it indicates vulcanite as being perhaps one of those peculiar substances having temperatures of maximum or minimum density.

The following substances have also laws of expansion within the limits of experiment, which indicate temperatures of maximum or minimum density beyond these limits:

	Temperature of Maximum Density.	Temperature of Minimum Density.
Diamond†	$-41^{\circ}.9$ C	.....
Copper Oxide†	— 4.3	.....
Emerald†	— 4.2	.....
Iodide of Silver‡ (crystal)		-137° C
Do. (cast)		— 59.3
Do. (compressed precipitate)		— 45.4

* Pogg. Ann. Phys. Chem.—cxlix (1873), p. 577.

† Fizeau, Comp. Rend. lxviii., p. 1125 (Pogg. Ann. Phys. Chem., cxxxviii. (1869), p. 26.

‡ Fizeau, Comp. Rend., lxiv. (1867), pp. 314 and 771—(Pogg. Ann. Phys. Chem., cxxxii (1867) p. 292.)

I may add a table of the substances which have temperatures of maximum or minimum density within the limits of experiment:

	Temperature of Maximum Density.	Temperature of Minimum Density.
Darcet's Metal* ($Bi_{13}Sn_{10}Pb_{8}$)	50° C	35° C
Iodide of Silver†	145.5	
Iodides of Silver & Lead (alloy)‡	141	121
Lipowitz's Metal* ($Bi_{11}Pb_{6}Cd_{4}Sn_{5}$)	40	25
Rose's Metal (Spring)* ($Bi_{7}Sn_{6}Pb_{4}$)	55	40
Wood's Metal* ($Bi_{4}Pb_{2}Cd_{2}Sn$)	35	..

*Spring, Ann Chim. Phys. (5) vii. (1876) p. 178

†Rodwell, Proc. Roy. Soc., Lond., xxv. p. 272.

‡Rodwell, Proc. Roy. Soc., Lond., xxxii (1881) p. 540.