

XXXV.—*Note on the Refraction and Magnetic Rotation of Hexamethylene, Chlorohexamethylene, and Dichlorohexamethylene.*

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A SPECIMEN of hexamethylene was obtained by one of us (Trans., 1898, 73, 932) by the long-continued fractional distillation of Galician petroleum and was believed at the time to be pure. Its molecular refraction and magnetic rotation were determined by Dr. W. H. Perkin, sen., and the data obtained by him were published in the paper.

It was afterwards found (Trans., 1899, 75, 873) that the hexamethylene could be partially, but not completely, frozen, and that it therefore contained a small quantity of another hydrocarbon, probably a heptane. By a series of fractional crystallisations, the hexamethylene was separated from the paraffin, and was finally found to melt practically constantly at  $+4.7^{\circ}$ . Dr. Perkin has redetermined the refraction and magnetic rotation of this pure specimen, and has very kindly sent us the results for publication:

*Hexamethylene.*

The magnetic rotation was as follows:

Temperature.	Specific rotation.	Molecular rotation.
15.0°	0.9503	5.664

The calculated value for the molecular rotation is  $1.023 \times 6 = 6.138$ ; it will be seen, therefore, that the observed value differs from the calculated, being considerably lower.

The refractive power is given in the following table:

	Index of refraction.	Specific refraction.	Molecular refraction.
	$\mu$ .	$\frac{\mu-1}{d}$ .	$\frac{\mu-1}{d} p$ .
H <sub>a</sub> .....	1.42673	0.54552	45.824
H <sub><math>\beta</math></sub> .....	1.43416	0.55503	46.622
H <sub><math>\gamma</math></sub> .....	1.43861	0.56071	47.100

Dispersion, H <sub>$\gamma$</sub>  - H<sub>a</sub> = 1.276.

The temperature was 15° and the density  $d$  15°/4° was 0.78224.

Dr. Perkin has also redetermined the refraction and magnetic rotation of the specimens of monochlorohexamethylene and dichlorohexamethylene (Trans., 1898, 73, 932), because, although the rotation of the former was lower than he expected, and that of the latter was

about correct, the refractive values of both were higher than the calculated by nearly a unit. He points out that, generally, if the refractive value is high, the magnetic rotation is proportionately a good deal higher. The new results, however, confirm those previously obtained.

By an error, the calculated value for Cl displacing H in the molecular magnetic rotation was given in the paper referred to as 1.558 instead of 1.479 for the mono- and 1.391 for the di-displacement. The theoretical values for the two chlorine derivatives are therefore appended.

The values obtained by Dr. Perkin are as follows :

*Monochlorohexamethylene.*

Magnetic rotation :

Temp.	Spec. rot.	Mol. rot.	Previous result.	Diff.
13.5°	1.1171	7.501	7.478	0.023
6CH <sub>2</sub> = 6 × 1.023 .....				6.138
Cl disp. H as in monochloro-paraffins ...				1.479
				<hr/> 7.617
Mean observed value.....				7.489
				<hr/>
Difference .....				0.128

Refractive power :  $d \ 15^\circ/4^\circ = 0.97923$ .

	$\mu \ 15^\circ$ .	$\frac{\mu - 1}{d}$ .	$\frac{\mu - 1}{d} p$ .	Previous numbers.	Diff.
H <sub>a</sub> .....	1.45472	0.46437	55.027	54.989	0.038
H <sub><math>\beta</math></sub> .....	1.46307	0.47289	56.038	56.008	0.030
H <sub><math>\gamma</math></sub> .....	1.46812	0.47805	56.649	56.604	0.045

*Dichlorohexamethylene.*

Magnetic rotation :

Temp.	Spec. rot	Mol. rot.	Previous result.	Diff.
13.5°	1.2307	8.955	8.905	0.05
6CH <sub>2</sub> = 6 × 1.023 .....				6.138
Cl <sub>2</sub> disp. H <sub>2</sub> as in CH <sub>2</sub> Cl <sub>2</sub> .....				2.782
				<hr/> 8.920
Mean observed value .....				8.930
				<hr/>
Difference ... ..				0.010

Refractive power :  $d \ 15 \cdot 2^\circ / 4^\circ = 1 \cdot 16668$ .

	$\mu \ 15 \cdot 2^\circ$ .	$\frac{\mu - 1}{d}$ .	$\frac{\mu - 1}{d} p$ .	Previous numbers.	Diff.
H <sub>a</sub> .....	1.48556	0.41619	63.677	63.659	0.018
H <sub><math>\beta</math></sub> .....	1.49467	0.42400	64.872	64.853	0.019
H <sub><math>\gamma</math></sub> .....	1.50218	0.43044	65.857	65.800	0.057

The values for the dispersion H <sub>$\gamma$</sub>  - H<sub>a</sub> for monochlorohexamethylene, 1.622, and for dichlorohexamethylene, 2.180, differ but slightly from the corresponding values, 1.615 and 2.141, previously obtained.

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