

Viscosity of Air and Electronic Charge.

THE value of "e", the electronic charge, as found by Millikan in his famous oil-drop method is rather low as compared to that determined by X-ray methods. This value is ascribed to the uncertainty about the value of the viscosity coefficient of air. The value of the viscosity of air as measured by Kellström¹ recently, is higher than that taken by Millikan in his calculations to determine the value of "e". When Kellström's value of η , the viscosity coefficient of air is substituted in Millikan's data, a higher value for "e" is obtained which is nearer to the value of "e" as found by other methods.

We have measured the value of η by a modified form of Wagstaff's method² in which air flows through a capillary tube. Our value of η is higher than that used by Millikan and it is interesting to note that our value of η is closer to Kellström's value, who has used the rotating-cylinder method. Thus the two independent methods give values for η which are higher than that used by Millikan.

The value of η (a mean of 61 readings) as found by us is 1855.5×10^{-7} c.g.s. units at 28° C. This reduces to 1830.8×10^{-7} c.g.s. units at 23° C. and to 1816.2×10^{-7} c.g.s. units at 20° C.

The following table gives the values for η at 23° C. as determined by different observers and the corresponding values of "e", the electronic charge, using Millikan's data.

Observer	Method used	$\eta \times 10^{+7}$ c.g.s. units	$e \times 10^{+10}$ e.s. units
Gilchrist ³ (1913)	Rotating-cylinder	1825.7	4.7822
Rapp ⁴ (1913)	Capillary tube	1822.7	4.7704
Millikan ⁵ (1913)	Rotating-cylinder	1822.5	4.7704
Harrington ⁶ (1916)	Rotating-cylinder	1822.6	4.7704
Kellström ⁷ (1935)	Rotating-cylinder	1834.8	4.8180
Kellström ¹ (1936)	Rotating-cylinder	1834.9	4.8180
Authors	Capillary tube	1830.8	4.8022

A detailed report of these experiments will be published shortly elsewhere.

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- ¹ Kellström, *Phys. Rev.*, 1936, **50**, 190.
- ² Wagstaff, *Phil. Mag.*, 1923, **45**, 84.
- ³ Gilchrist, *Phys. Rev.*, 1913, **1**, 124.
- ⁴ Rapp, *ibid.*, 1913, **2**, 363.
- ⁵ Millikan, *ibid.*, 1913, **2**, 109.
- ⁶ Harrington, *ibid.*, 1916, **8**, 738.
- ⁷ Kellström, *Nature*, 1935, **136**, 682.

Synthesis of 5 : 6-Benzohydrindene.

WITH the expectation of finding out a new method for the synthesis of 1 : 2-Cyclopenteno-Phenanthrene, which is the parent C-skeleton present in the sterols and bile acids, the following preliminary attempt in that direction was made starting from hydrindene. The scheme though failing in the original project is undoubtedly interesting in its application for the synthesis of polycyclic carbon ring compounds.

Succinic anhydride condensed with hydrindene in presence of anhydrous aluminium chloride giving mainly γ -Keto- γ -5-hydrindyl-*n*-butyric acid (m.p. 123–124°), this on reduction by the Clemmensen method gave γ -5-hydrindyl-*n*-butyric acid (m.p. 56°) which on cyclisation with 85% sulphuric acid gave 6 : 7-Cyclopenteno-1-Keto-1 : 2 : 3 : 4-tetrahydronaphthalene (b.p. 167°/6 mm.). This Keto compound was reduced by the Clemmensen method to 6 : 7-Cyclopenteno-1 : 2 : 3 : 4-tetrahydronaphthalene (b.p. 125–126°/6 mm.), which on Selenium dehydrogenation at 300–340° yielded 2 : 3-Cyclopentenonaphthalene, *i.e.*, 5 : 6-benzohydrindene, m.p. 94°. Picrate golden yellow needles, m.p. 120–121°. The method is being extended for the synthesis of polycyclic hydrocarbons. The experimental details will be published in a chemical journal in due time.

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