Prof. J. C. McLennan and Mr. D. A. Keys.

were always comparative ones, the one set being taken with the free flame and the other when it was kept supplied with the mercury vapour.

20

Z 15

CT10

FLE

DE

DEFLECTION

Ő

Zin and 7 graph vapor obtai

In a particular set of experiments, which will serve to illustrate the conductivity of the mercury vapour in the flame, a series of readings given by the galvanometer was taken when the potential of the battery was varied from 5 up to 237 volts, and the flame was free of mercury. A current of 5.5 ampères was then sent through the heating circuit, and when the furnace attained thermal equilibrium with its surroundings and the supply of mercury to the flame was steady, the second set of readings was taken with the same applied voltages. Table I gives the results of this particular experiment. The applied voltages are given in column I, and the galvanometer deflections without and with the mercury vapour are given in columns II and III respectively. The differences between these readings are given in column IV, and they represent the measures of the conductivity contributed by the vapour. Curves corresponding to the readings in columns II and III are given in fig. 3, and the curve in fig. 4 represents the differences given in column IV. From the form of the latter curve it will be seen that a saturation current was approximately obtained with the vapour when the applied potential was about 240 volts.

Voltage.	Deflection without Hg.	Deflection with Hg.	Difference due to Hg
Column I.	Column II.	Column III.	Column IV.
	cms.	ems.	ems,
5	1 '3	2.4	1 .1
20	2 .4	4 .2	2.8
40	3.4	6.5	3 .1
c_{Θ}	4.8	8.8	4 '0
80	5.2	10.2	5.0
95	5.9	12.2	6.3
112	6.4	13.2	6.8
132	7 2	13.8	6.6
157	7.6	14.4	6.8
177	8.0	16.8	8.8
197	8.6	17.2	8.6
217	0.6	18.0	9.0
237	9.8	20.4	10.6

711 1 1 1	1.1	
Table 1	-M	ercury.

596