Gas Burners and Standards of Candle-Power.

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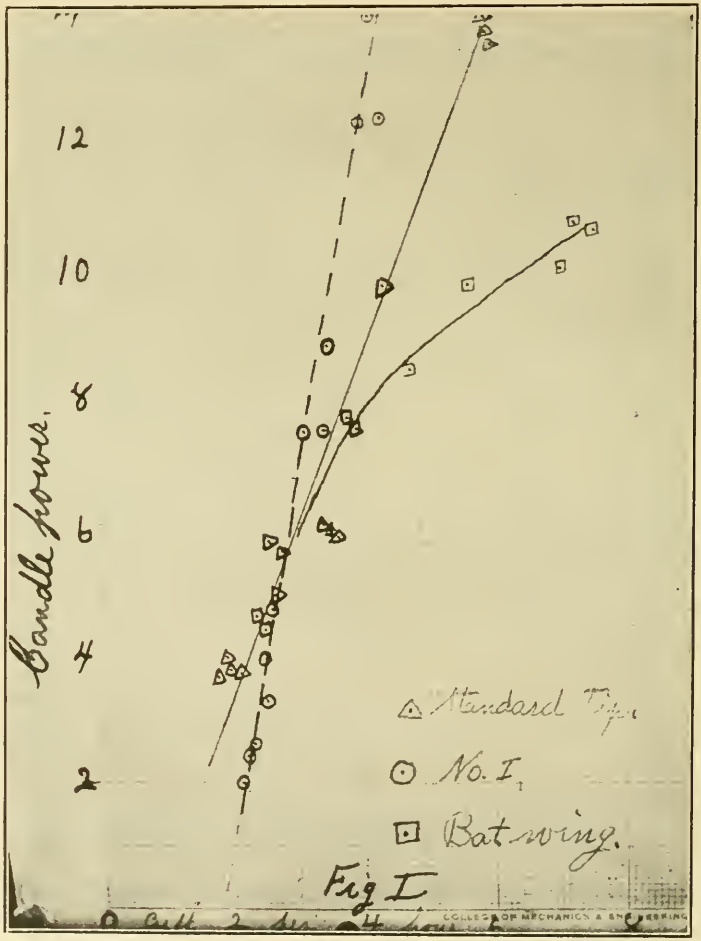
It seems to be taken by common consent that 16-candle-power gas means that the candle-power of the lamp burning the particular gas should be 16 candle-power when the rate of consumption is 5 cubic feet per hour at 1-inch water pressure. The kind of burner used is more or less an open question. The fishtail burner is specified by some of the older authorities. The common practice of gas companies seems to be to use an Argand or circular burner with a chimney. The question "What is the candle-power of the gas?" is one of considerable moment at the present time. Dr. Foley, of the Department of Physics, Indiana University, has been employed by the city of Bloomington during the last two years to make monthly reports of the gas supplied to the city. As a result of these measurements suit has been brought to annul the franchise of the gas company. Indianapolis has its gas troubles. Almost every city seems to have more or less trouble with gas. The fact that the burner used on the Bloomington gas company photometer gave higher values than a standard fishtail burner and that commercial Argand burners gave results consistent with the fishtail burner, suggested the experiments which were carried out by Mr. Oi. The work consisted in changing the air supply and the number of openings in the commercial Argand gas burners and comparing the candle-power to the candle-power given by the standard fishtail. The Argand burner used had 36 openings in a circle of 2.2 cm. diameter and used a chimney 5 cm. in diameter. The one used by the gas company had 24 holes in a circle $\frac{2}{3}$ the diameter of the commercial burner, and used a chimney $\frac{2}{3}$ the diameter of the commercial chimney. The air supply in the burner was largely through the center, while the commercial was supplied about equally inside and outside the cylindrical flame. The supply of gas was regulated by regulating the pressure of the gas by an automatic regulator. The results will be given by means of curves where candle-power is plotted against the consumption in cubic feet. Since the quality of the gas was variable a curve for the standard fishtail was taken for each set of observations. Fig. I gives the curves for three burners with the actual values shown by points. The points in triangles △ are for the standard

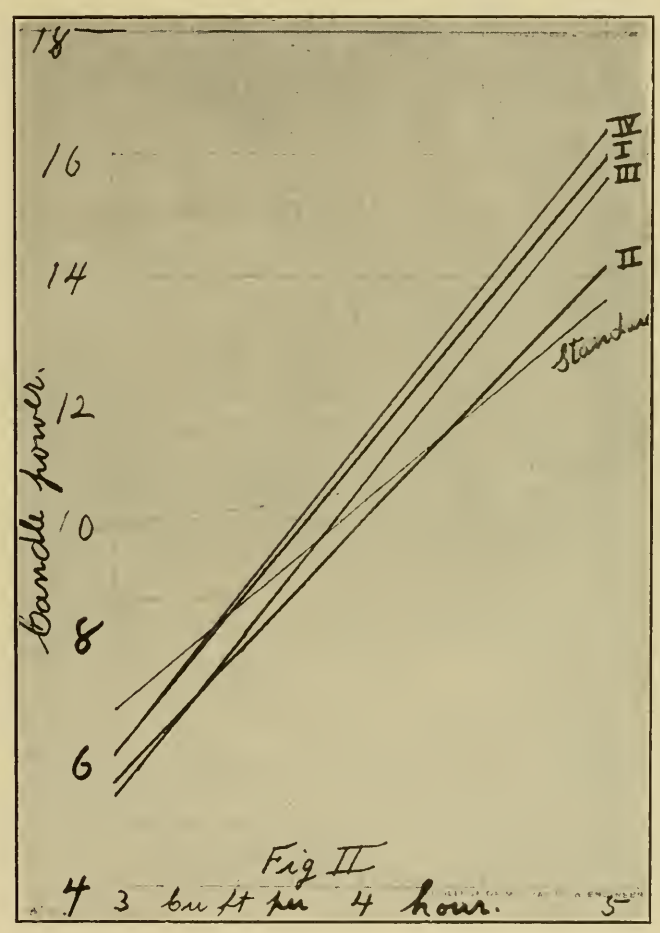
fishtail tip. Points in squares ⊡ are for a slotted lava tip or bat-wing burner. Points in circle ⊙ are for Argand burner No. 1.

In Fig. II are the mean values reduced to a standard basis, namely, 13.6 cubic feet gas, the mean values of the gas throughout the experi-



ments as shown by the standard fishtail burner. Burner No. I was a commercial burner, with the air supply almost all cut off from the outside of the cylindrical flame. Burner No. II was a commercial, with the holes closed with copper plugs, or 18 holes open. Burner No. III had one-

third the holes closed, or 24 holes open. Burner No. IV ...d 24 holes and almost all the outside air cut off. No. V was a combination of Nos. I and III. From the curve we see that with 13.6 candle-power gas (standard tip) No. II gives 14.2 candle-power, No. III gives 15.6, No. I gives 16 candle-power, and No. IV gives 16.4 candle-power.



If by simply manipulating the burner 13.6 candle-power gas can be raised to 16.4 candle-power, or 20 per cent., it is high time that some definite and authoritative action is taken to define the standards for gas measurement.