

GAS FLAMES AND GAS EXPLOSIONS.

BY W. F. ROECKER,

High School of the University of Wisconsin.

a—Woulff bottle, two-neck.

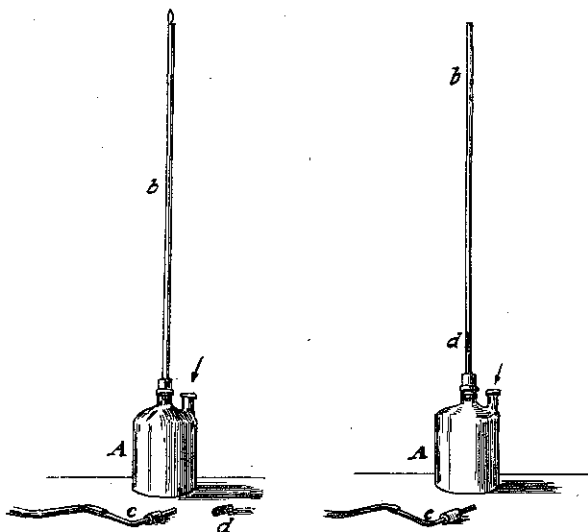
b—Glass tube, 1 m. long, 1 cm. diameter.

c—Glass and rubber connection to gas jet.

d—Fine mesh copper gauze, 1 cm. wide, loosely rolled into a cylindrical plug.

With the apparatus here indicated the nature, luminosity and propagation of gas flames and the nature and prevention of gas explosions may be quickly and effectively demonstrated.

In both cases the apparatus is attached to the gas jet, the gas is lit at the end of tube (b) [with the proper precautions], the large yellow flame is adjusted to a height of about 5 cm., and the apparatus is disconnected by removing (c); do not turn off the gas until (c) has been disconnected. In case II, (d) is placed in tube (b). The Woulff bottle may be partly filled with sand to give it stability.



Case I demonstrates the following points:

1. The luminosity of a gas flame is decreased and finally vanishes as the amount of air mixed with the gas is increased.
2. If the air supply is increased further a point is reached at which the flame is self-sustaining and begins to be propagated in

the direction of the gas supply. This explains the "striking back" of Bunsen burners.

3. The increase in speed of propagation down tube (b) shows that a further increase in air supply increases the rate of propagation until the speed becomes almost instantaneous so that the mixture flashes or explodes.

Case II demonstrates in addition that

4. A flame can not be propagated through a good conductor because the burning gas is brought below its kindling temperature by it. This explains the action of the Davy lamp. To prove that the explosive mixture was really there in case II, hold a burning candle at the opening for (c).

Facts incidental to this experiment but of interest in this connection are:

1. Air is about twice as heavy as illuminating gas.

2. Illuminating gas begins to flash when mixed with air 1 to 5, is most explosive when mixed 1 to 6 or 7, and becomes non-explosive again when the proportion exceeds 1 to 12. This explains in part why well ventilated mines are free from explosions.

3. A gas explosion travels faster than sound.

The great advantage which this apparatus offers is that the flame is visible at every stage of the experiment. It is adapted from Blochman's *Luft, Wasser, Licht und Wärme*.

NEW APPARATUS FOR FALLING BODIES.

By A. A. UPHAM,

State Normal School, Whitewater, Wisconsin.

The apparatus about to be described is new, only in that it is compared with Galileo's inclined plane used three hundred years ago. It has been used by the writer for twenty-five years. So it is about as new, relatively, as a year old automobile.

The device consists of a common 2"x4" scantling, Figure 1, sixteen feet long, if the room in which it is to be used is high enough. If the room is lower, a shorter piece must be used and only three falls can be observed. The scantling should be cut exactly the right length to spring into place between the ceiling and the floor and remain fixed. Two rows of holes are bored in one of the 4" faces, to receive wooden pegs about five-eighths of an inch in diameter and two to three inches long. The rows should be one inch apart. Up to the pegs of one row an iron or