Dieterici (Fr.) Alfārābī's Philosophische Abhandlungen. 8vo. *Leiden* 1892. The Author.

Fayrer (Sir J.), F.R.S. On Serpent-worship and on the Venomous Snakes of India. 8vo. *London.* The Author.

Hehir (P.) Microscopical Observations on the Hæmatozoön of Malaria. 4to. *Madras* [1891]. The Author.

Riccò (A.) Terremoti Sollevamento ed Eruzione Sottomarina a Pantelleria. 4to. *Roma* 1892. The Author.

Wolf (R.) Astronomische Mittheilungen. No. 79. 8vo. [*Zürich*] 1892. The Author.

Bronze Medallion, 7 inches diameter, cast in honour of Professor Rudolph Virchow, For. Mem. R.S.

Virchow Testimonial Committee, Berlin.

March 31, 1892.

Mr. JOHN EVANS, D.C.L., LL.D., Treasurer and Vice-President, in the Chair.

A List of the Presents received was laid on the table, and thanks ordered for them.

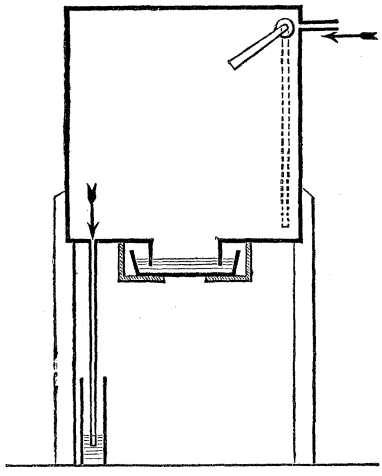
The following Papers were read:—

I. "An Improved Apparatus for ascertaining the Sensitiveness of Safety-lamps when used for Gas-testing." By FRANK CLOWES, D.Sc. (Lond.), Professor of Chemistry, University College, Nottingham. Communicated by Professor ARMSTRONG, F.R.S. Received March 24, 1892.

An apparatus devised for the purpose of testing the sensitiveness of different forms of miners' safety-lamps, when they are employed for detecting and measuring low percentages of firedamp, has been already described in the 'Roy. Soc. Proc.' (vol. 50, 1891, p. 122).

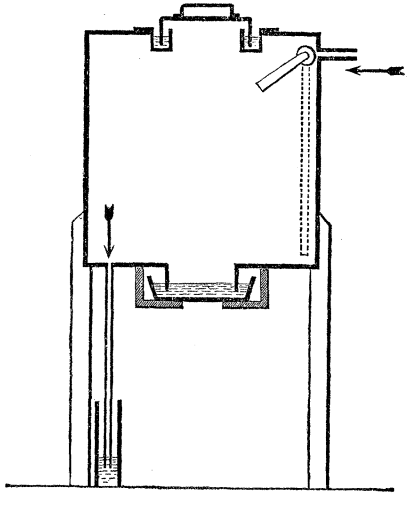
The section of the apparatus (fig. 1) shows that the apparatus consists of a large cubical wooden box or chamber, into the upper part of which the requisite measured volume of methane or firedamp can be introduced, the complete admixture of this gas with the air of the chamber being then secured by swinging up and down a broad wooden flap, the area of which is nearly equal to the square section of the chamber.

Fig. 1.



The only inconvenience and delay experienced in making a series of tests in this chamber, with varying mixtures of gas and air, arose from the difficulty in rapidly, and with certainty, replacing the mixture in the chamber by fresh air. This was attempted at first by blowing air from bellows through the opening in the floor of the chamber. But the process was tedious and uncertain, because the

Fig. 2.



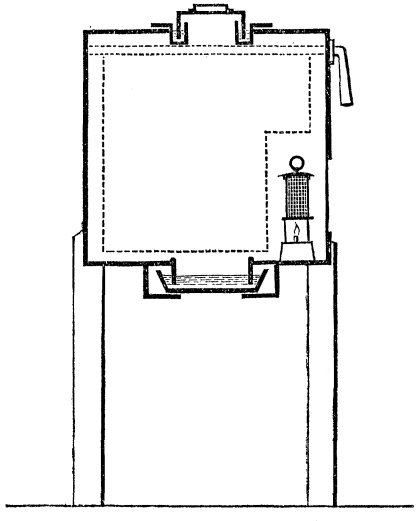
gases heated by the burning of the lamps tended by their lightness to remain near the roof of the chamber, and were, therefore, only gradually removed by a process of dilution with fresh air.

The renewal of the atmosphere in the interior of the apparatus is now effected by a much more certain and simple means.

An opening is made in the roof of the chamber, immediately over the large aperture in the floor, and corresponding to it in size. This upper opening is closed with a water-seal, as in the case of the lower one. To effect this a square trough of sheet zinc, about 2 inches in depth, is fitted closely against the edge of the aperture, and a weighted deep-edged lid dips into water, which nearly fills this trough. By bedding a broad flange of this trough with red lead upon the top of the chamber, screwing down broad wooden strips upon the flange, and brushing the surface over with melted paraffin-wax, an air-tight joint was at once obtained (see fig. 2).

The replacement of the atmosphere in this modified chamber is effected by removing the water-seals from both the upper and the lower openings. The chamber, after having been used in an experiment, is then found to be filled with fresh air after simply being allowed to stand for a few minutes. The replacement of the atmosphere within the chamber may be secured in the course of a few seconds by swinging the flap up and down several times. By this means not only is the introduction of the fresh air much more rapidly effected than by the use of bellows, but the complete removal of the gaseous mixture filling the chamber is secured with certainty.

FIG. 3.



[Increased accuracy has been obtained in the recent experiments made with the hydrogen lamp, hereafter described, in the test chamber by the removal of a small part of the mixing flap (see fig. 3). This renders it possible to place the lighted safety-lamp in the chamber before the gas is introduced and mixed with the air; since it enables the flap to be swung within the chamber without touching the lamp. Accordingly the test is commenced by placing the lamp in position close to the glass front; the chamber is then closed, the measured volume of gas is introduced and mixed with the air by moving the flap, and the "cap" is observed, and its appearance noted as soon as it undergoes no further change. The chamber is only opened finally when the lamp is to be removed. Any slight alteration in the gaseous mixture, which was formerly caused by the subsequent introduction of the lamp, is thus avoided.—March 26, 1892.]

II. "On the Application of a Hydrogen Flame in an ordinary Safety-lamp to the Detection and Measurement of Firedamp." By FRANK CLOWES, D.Sc. (Lond.), Professor of Chemistry, University College, Nottingham. Communicated by Professor ARMSTRONG, F.R.S. Received March 24, 1892.

In a former paper ('Roy. Soc. Proc.,' vol. 50, p. 122) an apparatus was described in which the appearance of the "cap" over the flame of a safety-lamp could be observed and measured when the lamp was exposed to definite mixtures of air with methane or firedamp. The relative sensitiveness of different forms of lamp, and of different flames, when they are applied to the detection and measurement of "gas," was thus readily ascertained. It was stated that the flames of colza oil, rape oil, mixed oils, benzoline, methylated spirit, and hydrogen had been experimented upon: and that the non-luminous flames producible by benzoline, alcohol, and hydrogen far excelled the more or less luminous oil flames in their power of indicating low percentages of inflammable gas or vapour in the air. It was further found that the delicacy of the test was much increased by grinding the inner surface of the back of the glass cylinder of the lamp so as to destroy its reflecting power.

Ashworth's modified benzoline safety-lamp was especially referred to as an efficient lamp both for lighting and for gas-testing. The brilliant illuminating flame gave a forward light equal to one miner's candle. When it was reduced in size by drawing down the wick it became blue and non-luminous: and when it was viewed in this condition against the ground glass surface, or, better still, against the dead-black background produced by smoking the interior of the