Formulæ Nos. 1 and 2.

Split No. 3.—6 ft. by 4 ft., 700 ft. long; pressure, 3·88 lb. per square foot.

Area = 6 ft. × 4 ft. = 24 = A.

$$\frac{\text{Area}}{\text{Perimeter}} = \frac{24}{20} = 1{\cdot}2 = \text{R}.$$

$$\frac{\text{Pressure}}{\text{Length}} = \frac{3{\cdot}88}{700} = 0{\cdot}00554 = \text{S}.$$

$$\sqrt{\text{RS}} = \sqrt{1{\cdot}2 \times 0{\cdot}00554} = 0{\cdot}0815.$$

```
 0·0815
    113
 ------
   2445
   815
  815
 ------
 9·2095 = velocity, in feet per second.
     24 = area.
 ------
 368380
184190
--------
221·0280 = cubic feet per second.
      60 = seconds in a minute.
-----------
13,261·6800 = cubic feet per minute.
```

"Miners' Guide" gives 13,288 cubic feet per minute.

Formulæ Nos. 1 and 2.

Split No. 4.—4 ft. by 5 ft. 600 ft. long; pressure, 3·88 lb. per square foot.

Area = 5 ft. × 4 ft. = 20 = A.

$$\frac{\text{Area}}{\text{Perimeter}} = \frac{20}{18} = 1{\cdot}11 = \text{R}.$$

$$\frac{\text{Pressure}}{\text{Length}} = \frac{3{\cdot}88}{600} = 0{\cdot}00646 = \text{S}.$$

$$\sqrt{\text{RS}} = \sqrt{1{\cdot}11 \times 0{\cdot}00646} = 0{\cdot}0847.$$

```
 0·0847
    113
 ------
   2541
   847
  847
 ------
 9·5711 = velocity, in feet per second.
     20 = area.
--------
191·4220 = cubic feet per second.
      60 = seconds in a minute.
-----------
11,485·3200 = cubic feet per minute.
```

"Miners' Guide" gives 11,506 cubic feet per minute.

The rule given is correct in principle, and if the illustrations given in the "Miners' Guide" are really practical examples, the empirical number 113 in the formula is correct for airways of a similar character to those on which the experiment was made. This number would require to be varied for smoother or rougher airways—smaller if rougher and larger if smoother; or, what would amount to the same thing, the number 113 could be used throughout and a co-efficient used according to the roughness or smoothness of the airways. An example of the vast difference in the carrying-capacity of rough and smooth airways is given in the *New Zealand Mining, Engineering, and Building Journal*, Vol. iii., No. 43, new issue, 23rd July, 1903, last paragraph of page 499 and first portion of page 500. The article in the *Journal* referred to is an article on "Chimney Design and Construction," but the paragraph indicated is peculiarly applicable to airways in mines: "Flue-linings are desirable, not alone for their protection against fire, but because of their smooth surface and their uniform size. In fact, a rough brick flue, 8 in. by 8 in., when lined becomes 6 in. by 6 in., and although the cross-section is not much more than half, the draught is almost equally as good. The shape of the flue must be such as to give a large area, with little friction. Thus a circular flue is better than a square one, and a square better than an oblong rectangle. A triangle is bad, for, with but half the area of a square, it has 85 per cent. of the wall-surface. The corner spaces, moreover, soon fill with soot, so as to reduce the original area