one having sides 8·093 ft.? Now, the area of an airway 8·093 square feet is 65·496, and this divided by 7, the height of the proposed airway, gives 9·3566, which is only the approximate width of the proposed airway, as, although the areas are equal, the mean depths are not equal, and they would not have the same carrying-capacity. This, however, can be corrected by the rule (Formula No. 5) —*the carrying-capacity of airways is proportional to the areas of the respective airways multiplied by the square roots of their respective mean depths (length and pressure being the same).* Thus—

Proposed Rectangular Airway.

Area, 65·496	Log.	1·8162148
Perimeter, 32·713	„	1·5147204
Mean depth	„	0·3014944
$\sqrt{\text{Mean depth}}$	„	0·1507472
Area, 65·496	„	1·8162148
92·675	=	1·9669620

Airway 8·093 ft. square.

Area, 65·496	Log.	1·8162148
Perimeter, 32·372	„	1·5101695
Mean depth	„	0·3060453
$\sqrt{\text{Mean depth}}$	„	0·1530226
Area, 65·496	„	1·8162148
93·162	=	1·9692374

Now, as 92·675 : 93·162 :: 65·496 : the required area—

93·162	Log.	1·9692374
65·496	„	1·8162148
		3·7854522
92·675	„	1·9669620
65·840	=	1·8184902 required area.

Required area, 65·840
7 × 9·3566 = 65·496

Second area too small by 00·344
$\frac{0·344}{7}$ = 0·0491 extra width.
9·3566 approximate width.
0·0491 extra width.

9·4057 required width.
7

65·8399 required area.

The working-out of this question in the "Miners' Guide" is correct, but the formula is too complicated. The formula here given is more simple, less liable to error, and the result shows it to be practically correct; it also shows the use of the mean depth, and the rules for determining the relative air-carrying capacity of various forms of airways.

NOTES ON MINE-VENTILATION (COMPARING WATER FORMULA WITH AIR FORMULA).

Water Formula.

$\sqrt{\text{RS } 10{,}560}$ = v. theoretical
or 102·76 $\sqrt{\text{RS}}$ = v. „
or 4 $\sqrt{2g\text{RS}}$ = v. practical.

Air Formula No. 1.

113 $\sqrt{\text{RS}}$ = v. practical.

What would be the velocity of water in a waterway 1,000 ft. long, 4 ft. square, with a head of 100 ft. of water?

Area, 4 ft. × 4 ft. = 16 ft. = A.
$R = \frac{A}{P} = \frac{16}{16} =$ 1 ft. = R.
$S = \frac{100·}{1{,}000} =$ 0·1 = S.
Coefficient = 0·32 = C.

Formula $\sqrt{\text{RS } 10{,}560}$ = theo. vel.
= 102·76 $\sqrt{\text{RS}}$.
= 102·76 $\sqrt{0·1}$.
= 102·76 × 0·316 = 32·47216 = theo. vel.
32·47216 × 0·32 = 10·3910912 = vel.

Air-pressure, 1·5524 in. on water-gauge = 8·07248 lb. per square foot.

Area, 4 ft. × 4 ft. = 16 ft. = A.
$R = \frac{A}{P} = \frac{16}{16} =$ 1 ft. = R.
$S = \frac{8·07248}{1{,}000} =$ 0·008072 = S.

Formula 113 $\sqrt{\text{RS}}$ = v.
R × S = 1 × 0·008072 = 0·008072
$\sqrt{\text{RS}} = \sqrt{0·008072} =$ 0·09
0·09 × 113 = 10·17 = vel.

Water Formula.

$\sqrt{\text{RS } 10{,}560}$ = v. theoretical
or 102·76 $\sqrt{\text{RS}}$ = v. „
or 4 $\sqrt{2g\text{RS}}$ = v. practical.