

EFFECT OF VARYING CONDITIONS.

The wide variations in the working-conditions underground will naturally cause considerable differences in the counts obtained from the various samples, even from those taken at short intervals at the same place. Among the more important of the causes affecting the sample obtained may be mentioned—

- (a.) The air-space. In confined places like winzes and dead ends the counts are likely to be higher than in open stopes, &c.
- (b.) Quantity of air circulating. The larger the volume of air circulating, the more the dust is diluted and the smaller the count.
- (c.) Eddy currents. These are especially produced by the exhaust from the machine drills, and the counts will vary considerably according to the position where the instrument is held.
- (d.) Character of rock drilled. Hard rock as a rule produces more dust-particles than softer rock, even though it is not drilled so fast.
- (e.) Rate of drilling. Other things being equal, the number of particles of dust projected into the air should be approximately proportional to the rate of drilling.
- (f.) Type of hole. It seems probable that a hole bored below the horizontal will produce less dust than an "upper," as the dust has a greater chance of being killed by the water in the hole.
- (g.) Humidity of the air. This will affect the amount of dust in suspension in levels and return airways. Saturated air rapidly precipitates dust, and this accounts for the almost entire absence of dust in the upcast shafts.
- (h.) Dryness of the rock. Where the rock or country being drilled is moist, less dust is given off. Reference has already been made to the necessity for thoroughly wetting dry working-places.

MICRO-PHOTOGRAPHS.

A few micro-photographs accompanying this report will afford ocular evidence of the nature of the dust produced in several operations. The magnification is in all cases forty diameters. The photographs are not necessarily of average spots—in fact, represent some of the worst samples obtained during the course of the work.

SUMMARY OF RESULTS.

Samples: Where taken.	Number of Samples.	Average Number per Cubic Centimetre of Injurious Particles (under 5 Microns).	Per Cent. of Particles under 5 Microns to Total Dust.	Remarks.
Upcast shafts	16	10	100	Air saturated.
Levels	8	25	94	Intake air.
Levels, vicinity of shrinkage stopes	2	54	90	After filling trucks.
Stopes (no drilling in progress) ..	8	47	98	Drawing off shrinkage stope.
Stopes, hammer-drill, axial water-feed	3	62	97	Holman stoper.
Ditto	11	50	98	Ingersoll Leyner 248.
Winzes (no drilling in progress) ..	6	48	95	..
Winzes, hammer-drill, axial water-feed	3	147	98	Denver "Clipper."
Winzes, 15 minutes after firing ..	6	97	94	Ventilated by compressed air.
Rises (no drilling in progress) ..	3	29	98	..
Drives, reciprocating-drill, water-jet	15	94	97	Holman.
Drives, reciprocating-drill, axial water-feed	3	81	96	Edgar.
Ditto	2	125	96	Ingersoll E. 33.
Drives, hammer-drill, water-jet ..	11	127	92	Ingersoll "dry" stoper.
Drives, hammer-drill, axial water-feed	10	117	94	Ingersoll "wet" stoper.
Ditto	30	76	98	Ingersoll Leyner 248.
"	27	177	96	Waugh's "Tubro."
"	4	485	99	Dry place not hosed down before working.
Drives, after shovelling ..	6	135	90	..
Drives, face 10 minutes after blasting.	3	84	96	Dust cleared by fan.
Drives, return air 10 minutes after blasting	3	744	93	Blasting dust.
Rise, 15 minutes after blasting ..	4	990	99	Blasting dust.