

At the adjoining Ralph's Colliery a disastrous explosion occurred during 1914 (when naked lights were in use), originating from gas from a blower in an old standing pillar area. A few days after the explosion I measured an accumulation of 350,000 cubic feet of explosive mixture, and took several samples in duplicate therefrom, using an electric safety-lamp for a light. The richest sample contained—Methane, 48·1 per cent.; oxygen, 10·10 per cent.

At Kaitangata No. 1 Colliery, in the Otago Provincial District, fire-damp was detected by safety-lamp and reported by examining officials on forty-four days during 1916, the largest quantity found at one place being 250 cubic feet of gaseous mixture. With falling barometer there occurs an efflux of gas from goaf; there is also apparent liberation of occluded gas at the coal-faces. Bord and pillar on the panel system is here adopted. During 1879, when naked lights were in use, a disastrous explosion occurred at this colliery by reason of a naked light being carried into unexamined old workings, as at Ralph's during 1914, before mentioned.

The brown coal mined in the Waikato and Kaitangata districts has the following composition:—

					Taupiri Extended.	Kaitangata No. 1.
Fixed carbon	...	...	...	...	44·23	38·00
Hydrocarbon	...	...	...	...	41·07	39·96
Water	...	...	...	...	13·14	18·22
Ash	...	...	...	...	1·56	3·82
Sulphur, per cent.	...	...	...	...	0·32	0·40

The quantity of air circulating was measured by me by means of two new anemometers of Biram-Davis type; the temperature was taken with the Davis miners' hygrometer. The analyses of mine-air are by J. S. MacLaurin, D.Sc., F.C.S., Dominion Analyst. In these investigations I received valuable assistance from Inspectors Boyd Bennie and E. R. Green in their respective districts.

Analyses of Ventilation and of Mine-air.

Name of Colliery and of Ventilating District.	Total Quantity of Air circulating per Minute.	Number of Persons in District.	Quantity of Air per Person per Minute.*	Temperature, in Degrees F.		Analysis of Return Air.			
				Wet Bulb.	Dry Bulb.	CH ₄ .	CO ₂ .	Oxygen.	
TAUPIRI EXTENDED COLLIERY. (28/2/17, between 9 a.m. and 3 p.m.)									
North side, No. 5 level east (tail-rope section)	Cub. Ft. 11,328	41	Cub. Ft. 276	Deg. 67·5	Deg. 68·5	Per Cent. 0·02	Per Cent. 0·10	Per Cent. 20·73	
North side, No. 5 level west	8,096	14	578	66	67	less than 0·02	0·08	20·82	
North side, No. 6 level east	3,502	10	350	68	69	..	..	..	
North side, No. 6 dip west	5,971	43	139	69	70	less than 0·02	0·10	20·75	
West side, No. 4 dip	16,308	45	362	68	69	Ditto	0·10	20·80	
West side, No. 4 level	9,243	36	229	70	71	..	0·05	20·86	
Total effective in all ventilating districts	54,448	..	..	..	..	..	..	..	
Sealing and leakage	32,852	24	..	..	..	..	..	..	
Main return at upcast shaft	87,300	..	..	69	69·5	..	0·09	20·64	
<i>Remarks.</i> —Barometer, 30·10", rising. Thermometer in shade at surface, 4 p.m. : Wet bulb, 60·5°; dry bulb, 69°. Sirocco fan. Water-gauge, 1·2". R.P.M. 280.									
KAITANGATA No. 1 COLLIERY. (16/1/17, 9 a.m. to noon.)									
Main-seam district	5,906	6	984	..	..	{ 0·18 0·20	{ 0·28 0·30	{ 20·68 20·64	
Extension district	5,751	13	442	..	..	{ 0·44 0·40	{ 0·22 0·22	{ 20·50 20·53	
No. 6 and Mundy's district	11,521	31 (and 2 horses)	332	..	..	..	..	..	
Total effective in all ventilating districts	23,178	..	..	..	..	..	..	..	
Sealing and leakage	9,309	20 (and 9 horses)	195	..	..	..	..	..	
Main return at upcast shaft	32,487	..	..	..	..	{ 0·43 0·40	{ 0·30 0·32	{ 20·46 20·48	
<i>Remarks.</i> —Barometer, 30·25", steady. Sirocco fan. Water-gauge, 1·3".									
KAITANGATA No. 2 COLLIERY. (17/1/17, 9 a.m. to noon.)									
Main-workings district	8,679	32	271	..	..	..	..	..	
Six-foot-seam district	3,040	5 (and 1 horse)	488	..	..	..	..	..	
Total effective in all ventilating districts	11,719	..	..	..	..	..	..	..	
Sealing and leakage	5,451	8 (and 2 horses)	531	..	..	..	..	..	
Main return at fan drift	17,170	..	..	..	..	{ 0·22 0·25	{ 0·48 0·48	{ 20·17 20·09	
<i>Remarks.</i> —Barometer, 29·84", falling. Sirocco fan. Heating of coal-seam in evidence.									

* Where horses were employed, a deduction of 600 cubic feet per horse per minute has been made before the quantity per person has been computed.