sample taken was 0·97, and the maximum percentage of CO was 0·008. The two samples which yielded the highest percentage before mentioned were taken at the commencement of shovelling after blasting by gelignite, being the most unfavourable ventilation conditions under which men are likely to work in our mines. The increased proportion of the CO_2 and CO in the above cases would probably be produced by blasting, and the relatively small proportion of these gases obtained under the conditions would indicate that the "oxygen balance" of the explosives is in the right direction, and that, with the modern explosives of high quality such as those used, the harmful nature of the resultant gases is reduced to a minimum. The highest percentage of carbon-monoxide gas detected in the smoke when shovelling commenced at Waihi mines was 0·0025, and from Reefton mines 0·008; and, as Dr. Haldane has stated that "noticeable symptoms of carbon-monoxide poisoning were never produced with less than 0·02 per cent. of CO, since absorption ceased when the blood became saturated to a comparatively slight extent," it may reasonably be concluded that this gas is not produced in our metal-mines under normal conditions in hurtful quantities, and is never produced unless accompanied by carbon-dioxide.

As a result of the above investigations, giving the percentages of noxious gases found in our mines under unfavourable conditions, we are of opinion that for New Zealand mines a carbon-dioxide standard slightly stricter than the British standard should be fixed—viz., a maximum of 1 per cent., the British standard being $1\frac{1}{4}$ per cent.

Underground Temperatures.

In deep metal-mining operations it is sometimes necessary to circulate a larger volume of air than is required to produce, from a quality standpoint alone, adequate ventilation. For the purpose of reducing the temperature of the rock-surfaces a greater volume of air is necessary, for if this were not effected hard work would be either intermittent or unbearable in the heated atmosphere of many deep and hot mines, in which class those of the Hauraki Goldfield in this Dominion must be included. Observations made with the object of determining the rate of increment of temperature with depth in several countries where deep mining is conducted have shown considerable divergence in different places, as will be seen from the following comparisons of the results of temperature observations :—

Locality.	Depth required for an Increase of 1° Fahr. Ft.
Comstock, U.S.A.	33
Witwatersrand, Transvaal	208
British Collieries (mean)	64
Bendigo, Victoria	77
Ballarat, Victoria	80
Thames, New Zealand	43·5
Waihi, New Zealand (approximate)	32·8

The relative rock-temperatures at the 1,000 ft. level at Thames and at Comstock are 83° Fahr., and at Waihi approximately 85° Fahr.; but it was found that, owing to various causes, the temperature throughout the Waihi Goldfield at any particular horizon was by no means constant.

During our investigations we found that the air in the working-places at Waihi and Thames was highly saturated, generally to the extent of 90 per cent. or more, and that the wet-bulb temperature of the air in working-places ranged between the following limits at the deepest levels :—

	Underground (Wet Bulb).	Outside in Shade (Dry Bulb).
Thames Goldfield (1,000 ft. level)	70° to 83·5°	55°
Waihi Mine (1,000 ft. level)	61° to 82·5°	56·5°
Waihi Grand Junction Mine (944 ft. level)	64·5° to 83°	55°
Waihi Extended Mine (960 ft. level)	79·5° to 89°	50°

On the Reefton Goldfield the rock-temperatures are not nearly so great, the highest temperature recorded—viz., 78° Fahr., wet bulb—being obtained at the 1,266 ft. level in the Progress Mine.