of operation. It must, above all, be capable of use by inexperienced men and those found on the ground. It must be safe, durable and economical.

Acetylene gives a light the brilliance of which is beyond question and on analysis the light is found to be the nearest approach to sunlight of any artificial light yet produced, with regard to its effect on the purity of air in confined spaces, we quote from a recognised authority, Prof. Vivian E. Lewes: "The researches of Dr. Grehant have shown us that when burning with a smokeless flame, no carbon monoxide can be detected in the products emitted by the combustion of acetylene, and its sanitary position will, therefore be defined by the amount of oxygen abstracted from the air and carbon dioxide produced, as compared with other illuminants. Taking the average-sized room which would be well lighted by an illumination equal to 64 standard candles, we find that this amount of light from the various illuminants would show the following results:

	Oxygen removed from air cubic feet.	Products of water vapour.	Combustion carbon dioxide.
" Sperm candles	38.5	26.2	43.6
" Paraffine in oil	24.9	14.0	39.8
" London gas—			
Batswing burner	26.1	29.4	19.2
Argand burner	23.0	25.6	17.0
Regenerative burner	10.6	8.3	5.2
Incandescent burner	3.1	4.6	1.8
" Acetylene	5.0	2.0	4.0 "

The incandescent electric light of course is not mentioned as it is ideal in this respect, but we see that with the exception of the incandescent mantle gas burner, nothing approaches acetylene. It might also be said in justice to the objects of this paper that the paraffine oil mentioned in the table was not burned in smoky miners' lamps where obviously its bad effects would be largely magnified.

Attempts have been made to perfect an acetylene lamp which would endure the severe service imposed by conditions found even in the best tunnels and mines. The Baldwin Acetylene Mine Lamp, illustrated herewith, has been in use for the last year and during this time under close investigation, the results have been uniformly satisfactory. These lamps are now offered in Canada by The James Cooper Manufacturing Co., Ltd., of Montreal.

This lamp is made in two styles, the smaller, known as the Superintendent's Lamp, is intended for superintendents, surveyors, mine bosses, inspectors and others moving about from place to place. It is useful for surveying purposes, as the flame when looked at end on, is only about 1-8 inch in diameter, and there is a metal point on the lamp, just under the centre of the flame, which permits of its being set very accurately over a surveying point. It weighs 9 oz. and will hold a charge of carbide sufficient to keep it burning at full brilliancy for four hours. It takes only a couple of minutes to clear out and recharge the lamp with carbide and fill the tank with water.

The larger form or Gang Lamp, is intended for headings, enlargements, stations and switching points where a large volume of light is required to permit several men to work. The No. 8 lamp, burning ½ foot per hour, gives about 20-candle power. The No. 7 burning ¼ foot per hour, gives slightly more than half this amount of light, or about as much as six sperm candles, or three oil lamps. The actual illuminating effect is far greater since it gives off absolutely no smoke to deaden the light.

These lamps are solidly made of cast iron to stand severe usage and one may be turned upside down or rolled about on its side without fear of the light going out, or in any way affecting its burning qualities.

Relative to the cost of operating, it has been found that 1 lb. of calcium carbide will easily give four cubic feet (often more) of gas. Carbide will cost in quantities about six cents per pound at the mine. No. 7 lamp holds ½ lb. of carbide and has a burner consuming ¼ cubic ft. per hour, or a run of eight hours for three cents. No. 8 holds 1 lb. of carbide, and has a ½-foot burner and will cost 6 cts. for 8 hrs. light.

To afford a further comparison of operating costs we select the New Mexico mine already referred to, working 365 days in the year, and consider it using Baldwin lamps burning ½ lb. of carbide a day:

FIRST YEAR.

Candles for 350 men at $3 per month per man one year		$12,600 00
Lay 365 No. 7 lamps at $5 cost	$1,825 00	
175 lbs. carbide a day for one year	3,832 50	5,657 50
		$6,942 50

SECOND YEAR.

Candles, same as first year		$12,600 00
175 lbs. carbide a day	$3,832 50	
Repairs, say 50 cts. a lamp on 350 lamps	175 00	4,007 50
Saved by using Baldwin lamps		$8,592 50

These lamps have been extensively adopted by the contractors of the New York subway and have proved most suitable for their severe usage.

CANADIAN TRADE IN MINING MACHINERY.†

IF evidence were required of the great and rapidly growing importance of the mining and smelting industries of the Dominion to the trade and commerce of the country, it will be found in the immense volume of trade being done by our mining companies with the manufacturers and dealers in mining machinery and mining supplies. For the past couple of years this trade in Canada has aggregated several millions of dollars, and Canadian engineering establishments have been worked to their fullest capacity, while a very large trade has been done with other countries, most notably the United States. Some idea of this expansion may be gathered from the following figures, from the Trade and Navigation Returns periodically published by the Department of Customs. The following table shows the value of the mining and smelting machinery imported free of duty during the fiscal years ended 30th June, 1900 and 1899:—

	1900.	1899.
Nova Scotia	$320,038	$ 24,243
British Columbia	182,087	88,911
Ontario	145,040	142,216
Quebec	30,661	26,621
New Brunswick	10,246	212
Manitoba	1,600	1,080
N. W. Territory	674	10,926
Yukon	33,841	5,591
	$724,187	$299,800

The following table shows the monthly returns of the value of the mining and smelting machinery, free and dutiable, imported into Canada from 30th June, 1900, to 30th September last:—

Month.	Free.	Dutiable.	Total.
July	$59,222	$7,570	$66,792
August	129 398	2,544	131,942
September	151,211	2,786	153,997
October	170,954	175	171,129
November	110,393	6,801	117,194
December	103,794	28,724	132,518
1901.			
January	111,134	4,196	115,330
February	162,030	9,689	171,719
March	62,185	806	62,991
April	52,921	517	53,438
May	259,309	6,180	265,489
June	162,674	12,269	174,943
July	58,919	4,267	63,186
August	70,979	16,428	87,407
September	84,479	599	85,078
Total	$1,749,602	$103,551	$1,853,153

The following table shows the sources from which our imports of mining machinery, free and dutiable, were derived:—

Month.	From Free.	From U. S. Dutiable.	Great Britain Free.	Great Britain Dutiable.	Other Countries.	Total.
1900.	$	$	$	$	$	$
July	54,766	7,570	2,320	.....	2,136	66,792
Aug	125,751	2,544	3,647	.....	....	131,942
Sept.	147,351	2,786	3,860	.....	....	153,997
Oct.	162,637	172	8,278	.....	39	171,129
Nov.	103,993	6,801	6,400	.....	....	171,129
Dec.	98,164	4,734	5,630	23,990	....	132,518
1901.						
Jan.	111,129	4,196	5	.....	....	115,330
Feb.	162,030	9,689	....	.....	....	171,719
March	58,980	806	....	.....	3,205	62,991
April	51,971	517	950	.....	....	53,438
May	257,523	6,180	1,786	..	....	265,489
June	162,369	10,602	305	1,667	....	174,943
July	58,486	4,267	433	.....	....	63,186
August	70,764	16,428	215	.....	....	87,407
Sept.	82,945	518	1,534	.....	82	85,078
Total	$1,708,859	77,813	35,363	25,657	$5 461	1,853,153

† The Canadian *Mining Review*.

TRANSFER OF A BOUNDARY SMELTER.

By E. Jacobs.

THE purchase by the Montreal & Boston Copper Co., Ltd., of Montreal, Quebec, of the smelter built early last year by the Standard Pyritic Smelter Co., near Boundary Falls, has been definitely announced. Reports had been in circulation for a week or more, previous to the completion of the transaction, to the effect that it had been closed, but these lacked confirmation until Jan. 20th. The smelter property latterly belonged to Mr. Wm. Price, of Quebec, he