

it passes the tests of the Bureau and does what is claimed for it. This applies also to lamps, explosives, etc., submitted for tests.

In spite of this the evidence is largely in favor of the Draeger apparatus, as I find there are reputed to be over 900 Draeger, 250 Westphalia, 70 Fleuss in use through the States. This may be largely due to business methods of the agents, but certainly the Draeger leads the way.

Here again opinion differs as to the value of the Draeger types, 1907 as against those of 1910 and 1911. I find that the proportion in existence and use in the U. S. A. is about seven of 1907 types to three of 1910-11, and in the majority of instances the users swear by the type they are used to and will not adopt the newer or other forms.

The result of my own investigations is that for general purposes our own 1907, with the few improvements since made, is as simple and serviceable as any, though the new form of helmet, 1911 type, is a most decided improvement on the old, and the carrying of the pressure gauge on the front instead of back gives greater confidence to the wearer. The Westphalia 1911 type is practically the Draeger. Whilst the Fleuss is as efficient as the two former types, it is much cheaper to use in the matter of cost of charges for practice. The Aerolith, I could not get any first-hand information respecting it and thought it better to reject that which was passed on second hand.

One special feature of rescue work in the U. S. A. adopted by the Federal Bureau, the States, and some of the larger companies like our own whose operations cover a large area, is the use of the Mines Rescue Car. These are Colonists cars of the class met with on the Intercolonial Railway as second class with the drop bunks at the roof. The whole of the space from one platform inwards for about 30 ft. is cleared and devoted to workshop purposes, the rest is arranged for kitchen, toilet, extra bunks, or stores. I append a rough sketch of ground plan of the cars I examined and enumerate the equipment and staff carried. The Bureau has now eight of these cars on the road, or attached to rescue stations in different States, and several are fitted out and used for similar purposes by some of the larger companies. These cars carry only one type of apparatus aboard, generally about eight sets. They carry likewise from 800 to 1,000 cubic feet of oxygen in Store Bottles, 4 sets Pulmotors, 12 electric hand lamps, Recharging Board (lamp), Hand Pump for oxygen; Length of rope for life line in smoke; Portable telephone sets and cable on drum with relays; oxygen stretcher on wheels; four stretchers (army pattern); six First Aid boxes, similar to Johnsons; Water Gauge; six Wolf Safety Lamps; Tools, as many and varied as possible; Hall's Self-Rescue Apparatus; Konig, or other type of smoke helmet; pump and hose; a desk telephone and means of readily connecting up to the local system; Transformer and means of connecting up to local electric light supply for charging lamps and lighting car; as many extra stores and parts as experience dictates, and distance from nearest source of supply makes necessary. The crew attached to a car are from 4 to 6 in number under the charge of, and rendering strict obedience to a Foreman or Engineer who is an experienced miner, as well as accomplished in Rescue work and First Aid. All men are now required to be competent for First Aid as well as for Rescue work. In the past, though not so much now, these cars were used for propaganda and training work, in some of the more remote mining camps, but the Bureau

endeavors to persuade the complete training at the Rescue Station be taken. The crew of the car are paid: The Foreman \$125.00 and expenses. Assistants start at \$100.00 per month and increase \$5.00 per month per year, also with expenses. They are required to live in a house adjacent to the Station and must have a telephone installed. They are required to obtain leave of absence at any time, and to have their whereabouts at any time well indicated to their Foreman. The physical appearance of the crew is a very irregular one, but on the whole the short, stocky type, seems to be most in evidence, probably because this type is most pronounced through the coal regions.

By careful enquiry I found that the officials had met the same weaknesses and difficulties in handling and training that I had experienced, and seem to have not bothered themselves when a weakness developed in the apparatus but bought another and scrapped the old. Some of the companies, however, religiously stick to original apparatus, and send them up for overhauling and repair.

In the matter of changes, since the work began in Cape Breton, several minor alterations have taken place which have added to the efficiency and mobility of the 1907 type. These include the newer style of side pipe, the newer form of rubber lining and method of attachment, also means of attaching the valve to rubber hand pump, changes in form and efficiency of accumulators for lamps, the Pulmotor itself and probably some others that I have not come across.

Summing up the results of my investigations into the field of Rescue work, I must confess that I see no marked advance in the methods of the U. S. A. Bureau over those used in Glace Bay, except in the matter of surgical examination of men before using the apparatus, and again in the adoption of the Mine Rescue Car. In the case of the men connected with the Dom. Coal Co. Rescue work, they, being a purely voluntary organization, it was not deemed advisable to impose any surgical test; the matter of a man's fitness for the work was left to his own disposition towards it, and the judgment of the Instructor, on his showing through the tests imposed, but I firmly believe that the time has now arrived when we should dispense with any haphazard method, and have all men certified.

I much question if the present form of Draeger is likely to give the same satisfaction as the 1907 type. The necessity for renewing a mans charges of oxygen and Regenerator whilst at work seldom arises, as most men have had enough at the end of two hours work. If the 1907 type be somewhat modified and provided with a gauge at front, it will be found as good and useful as any. In any case where our type of apparatus has been installed I think it better to stick to it, and not mind types as this may lead to confusion.

Rescue Foremen generally, outside the Mines Bureau, agreed with me on the difficulty experienced in ensuring each mine being represented by men from each shift, so that in the event of trouble there would always be some trained men available who knew the mine. Cases have occurred in the States where all the trained men were in the mine at the time of trouble, and so no one could be readily obtained to lead the way. When our own rules were drawn up three and a half years ago, a provision was made that this should not occur, but I think when selecting men for training, this important point is lost sight of by our own people.

With regard to the Pulmotor as a mechanical aid in Rescue work, its construction and action are the

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