

more tends to circulate in the air for breathing.

The longer the test continues, the less heat can this very moist air abstract from the mouth and throat. The mouth and throat are quite comfortable in the hot room of a Turkish bath, for instance, where the dry air has a temperature of over 200 degrees F., a temperature considerably above that of the body. Now the air returning from the regenerators with a temperature much below 200 degrees F., and, therefore, nearer the body temperature than is that of a Turkish bath, was yet distinctly painful, so that I feel inclined to attribute this to its saturated condition in virtue of which it failed to take up any heat from the mucous membrane of the throat. On the contrary, we have evidence that this moist circulating air was giving up heat in a marked, unpleasant and at times painful manner to the mucous membrane of mouth and throat.

#### *VIII. Oxygen Deficiency; its Bearing on Syncope.*

On only one occasion did the committee encounter a sudden loss of consciousness as the result of some untoward condition in any type of rescue apparatus, although we not infrequently experienced symptoms due to deficiency of oxygen from some irregularity in the apparatus. One of these accidents happened in a smoke-filled irrespirable atmosphere, which was also hot and moist (dry and wet bulbs 84 and 80 degrees F., respectively). A Mecos apparatus with Mecos half-mask had not been in the mine many minutes, when the alarm was given that one of the party had been rendered unconscious. In less than a minute we had reached him and removed the mask. His own account was that he had suddenly become dull of hearing and very sleepy, after which he lost consciousness. He had evidently fallen down without any dyspnoea or convulsions, and thus did not alarm any of the members of his team. Owing also to the density of the smoke, none of his companions had noticed anything the matter with him, but when they called to him and got no answer, they at once rang the electric bell and had the ventilation reversed. His pulse on entering had been 76, on coming out it was 112.

His temperature was 98.4 degrees F. before the test began; it was not ascertained on his coming out owing to the accident having happened so recently.

Another accident happened in a respirable but intensely hot and moist atmosphere. At the end of an hour and ten minutes one of the subjects wearing a Mecos became suddenly seriously distressed. On recovering, he still showed signs of mental confusion, for he persisted that the tap of the controlling valve had become displaced, when it was impossible for it to have been twisted at all. Just previously to the accident he had fallen backwards over a steam pipe while dragging a weight along the corridor; he was under the impression that this had displaced the tap. Subsequently a careful examination of the apparatus was made, when it was discovered that a small fragment of metal from a gauze had become detached by the fall and had looped in the injector-nozzle, completely blocking it up. There is no doubt, therefore, that the subject had suffered from a somewhat sudden diminution of his oxygen supply and would have been rendered unconscious had he not been at once released from his apparatus.

We are inclined to regard these accidents as of considerable importance in their bearing on the choice of men for the wearing of rescue apparatus, since it seems possible that one man in twelve, or, say, ten per cent., may, on suffering from oxygen deficiency, faint without giving any such warning as would be given by an attack of dyspnoea. In other words, the possibility of oxygen-deficiency syncope instead of the more common oxygen-deficiency dyspnoea is a serious affair, for the danger of including a person in the rescue who is liable to loss of consciousness is obvious. If separated some little distance from his companions such a person might fall down unconscious and be left behind without having been able to attract notice to his condition, and in consequence, would be a serious handicap to the rescue team. This emphasizes the grave danger of allowing one or two men to enter an irrespirable zone by themselves, and the necessity of every team consisting of such a number that the unaffected men can rapidly carry out anyone who may become unconscious.

#### *IX. Mental Fatigue in Tests of Group III.*