The Inspectors found the managers always willing to make any arrangement as regards privies which the Department might request, and under the Act of 1898 the Inspectors have ample powers to compel mine-owners to make all sanitary improvements.

Many of the levels are not being worked, or perhaps only one or two hands are there engaged. It is obvious that on these no privy is required, and too many might well lead to neglect and so result in serious nuisance. It might be well to provide that where a certain number of men work at one level—say, a shift of twenty or more—a privy shall be placed on that level; but the arrangement can well be left to the discretion of the Inspector. It is very necessary, however, that Inspectors should have power to prosecute men detected in misusing a privy or defecating elsewhere, and to this extent No. 6 of the suggestions of the Miners' Union might well be adopted. Suggestions 1, 3, 4, and 5 are also to be recommended—*i.e.*, prohibiting deposit or burial of night-soil in the mine, the provision of iron pans to be cleansed once a week, and the regular use of dry earth or sawdust.

2. General Cleanliness.

Mr. Betts complained of the stagnant waters lying along the levels, and thought that they should be better drained. In this direction the union makes the following suggestion: (7.) "That all levels where work is carried on should be cleared up at least once in each month."

It did not appear to me that this was exactly a sanitary question. Of course, to walk through wet and mud is disagreeable, but unless the drives are passing through naturally dry strata it is unavoidable. In wet ground the drives have trenches at the side to carry off the water.

Inspector Richards pointed out one direction in which improvement might be made—*i.e.*, that the men be prevented from throwing paper and scraps of food about those parts of the levels at which they take their meals, as such refuse accumulating and decaying may cause a nuisance. It would be well to provide a box for such scraps and compel the men to use it.

3. Ventilation.

Mr. Betts complained that the mines were not sufficiently ventilated, so that the air in some of the workings became polluted and overheated, especially in the working-faces of the drives which were "dead-ends" (that is, before circulation of air had been made by connecting them with other levels by means of the stopes). In these places the men suffered from the fumes left after explosives of the nitro-glycerine type had been used in blasting. He considered the temperature too high also in some places, and thought that the health of the men suffered. He thought it necessary that fresh air driven by means of fans be conveyed to these places by means of wooden chutes, and this is embodied in the following suggestion by the union: (9.) "We would suggest that pure air be conducted to each working-face in 'dead-ends,' in addition to the compressed air that may be used to work the drilling-machine."

In all these quartz-mines the ventilation is chiefly natural, though sometimes where a long level is being driven with no connection to other levels a fan is used, but usually the managers then rely on the waste air from the rock-drilling machines. This air is at a pressure of 260 lb. to the square inch, and is conveyed in a 4 in. pipe, a rapid series of jets discharging as the machine works. At such a pressure there is probably more air carried into the face than there would be by a fan-and-box arrangement; but the miners have a notion that compressed air is not so pure or respirable as air carried in the ordinary way. It probably is drier, but otherwise there is nothing to alter or pollute it during the process of compression. The general arrangement is that the main shaft acts as a downcast for the air; the current, produced by differences of temperature and aided by the exhaust from the rock-drills, passes along the drives and up through the workings to the upper levels, and thence to the open air by another shaft. There did not appear to be any elaborate system of baffle-doors, &c., to direct the current in the required direction, but the drives are comparatively short, and there is therefore not the difficulty of ventilating which exists in coal-mines with perhaps many miles of underground workings, nor is there the danger from noxious gases. In one or two places I noticed doors were provided where there was special need for diverting the air-current. It is to be regretted that owing to an accident to the apparatus I was unable to test samples of the air in various parts of the mines; however, Mr. Betts handed me a series of analyses taken on behalf of the Miners' Union by the School of Mines authorities, and these appear on the whole satisfactory. Thus the highest return of carbonic acid is 0.44 per cent., which is not excessive comparing it with a series of analyses prepared by Dr. Haldane of the return-air in mines. It must be remembered that 3 per cent. or 4 per cent. of CO_2 must be present before any symptoms whatever show themselves in men breathing such an atmosphere. Certainly, judging merely by sensation while passing through the mines, I nowhere found the air oppressive, and my impression was that the ventilation was satisfactory.

The question of dangerous gases can practically be left out of account. There is no evidence that firedamp is produced in these quartz-mines, thus making their ventilation of less importance than when coal-seams are being worked. Apparently two gases have occasionally to be reckoned with—*i.e.*, carbon-dioxide and sulphuretted hydrogen. The carbon-dioxide probably occurs in the form of "black damp," which is a mixture of CO_2 and nitrogen. There are times when in some of the mines at Reefton the air is irrespirable, the lamps will not burn, and the work has to be stopped. These occasions are rare, and are probably the outcome of some peculiarity in the barometric pressure, causing an inrush of the residual gases found in the interstices of rocks; but the evidence as to the season and weather providing the necessary conditions was not very definite. Apparently the condition does not last many hours, and the mine clears itself very rapidly. There is little or no danger to life from the appearance of this gas, for the failure of the lights is a sufficient warning of the presence of "black damp," and the lamp would be extinguished long before the air was irrespirable by man.* The occurrence is so rare as to make the matter of small importance.

* "A man may penetrate without harm into an atmosphere containing four times as much black damp as would extinguish a lamp."—Report by Haldane on causes of death in colliery-explosions: Home Office Report, 1896.