essentially necessary in all fiery collieries, and if employed together, being coupled with a reasonable and vigilant care, they diminish considerably the chances of explosion. Most truly it may be affirmed that to effect this diminution the aid of nearly every contrivance or scientific invention devised has been brought to bear, and is, where practicable, in operation. Gas, where known to exist, and where it is met with almost daily exuding from floor, or roof, or sides, can be dealt with, except in the extraordinary cases of outburst, by providing sufficient air to mix with it and render it harmless; for light carburetted hydrogen will, if combined with a certain proportion only of oxygen, reach a point at which contact with flame would produce an explosion: the aim therefore must be to have such a quantity of air as to have no narrow margin beyond such proportion, and to let it be too much in volume rather than too little. All working-places should, and must, be, according to the rules, examined before their occupants commence work. This examination is made at each colliery by a staff of deputies, and should be of a very searching description. Moreover, it should be made in each case within as short a time as is reasonably practicable of the commencement of operations by the miner. In every case, both in fiery and non-fiery mines, this precursory inspection is to be made with safety-lamps. The men to whom is intrusted this duty are supposed to be selected from their fellow-workmen as steady, careful, and experienced; and indeed this is necessary, for upon their competency and attention depends, perhaps more than upon anything else, the safe working of the mine. The mark left in every man's working-place by the deputy is his voucher of examination, and the workman's authority to begin his work. This voucher refers of course to the time at which such examination was made, and can be no guarantee that the safety then existing will continue. Many circumstances not under control, or the workman's own neglect and carelessness, might and probably would convert a position of comparative safety into one of peril. A faithful and strictly accurate report of what he has found in the course of his inspection constitutes a very important item in the deputy's duties, and this is to be recorded daily in a book. I impress on this class that, so far as gas is concerned, their report must contain mention of all and any which they find, no matter how small in quantity, and no matter whether removed at the time or not. The rules require any gas found to be reported, hence it is a mistaken idea, as I have had occasion to point out to some deputies, to suppose that if they find a very little gas, which, by putting up a sheet at the time or by some other easily effected means, is removed before they leave, then no entry concerning the same need be made. It must be remembered that to a great extent those who have the control and guidance of mines must depend upon the reports of subordinate officials, who, in consequence of their number, are able to visit all districts of a mine, and so steps can be taken to insure, so far as may be, the workings being carried on with safety. Objections have been raised by some people to the employment of any deputy who cannot read or write. It is quite true there are many such, but I should be very sorry for the most part to debar them. They are, generally speaking, otherwise better qualified for their position than many who can do both, being practical men of great and varied experience in all the duties incumbent on their office. The reports in such cases should be dictated by themselves personally, then read over to them, and then they should affix their mark in the presence of a witness. As education spreads, however, this class of deputy will die out, the proportion even now being nothing like so large as formerly of those who are unable to write their own reports. Air-courses should be attended to, all brattice or air-pipes, or boxes and sheets, carefully watched, as well as stoppings and doors, the latter of which should be hung so as to fall-to of themselves. Air should sweep round every place. No holes or hiding-places must be allowed to remain, where the insidious gas can lurk. The main roads only are not to be supplied with air, to the neglect of other places. Air will naturally travel by the shortest and most direct route available, and therefore it is necessary to conduct it by artificial means through the ramifications of a colliery, in order that a pure and sufficient current be taken to all persons at work, and noxious gases diluted and removed. Where furnaces exist as means of ventilation, let them in every case be fed with fresh air, and on no account should the return air be allowed to pass directly over the flames. For many reasons I prefer fans in fiery collieries, and I am thankful that such mechanical appliances are yearly increasing in number, so that in mines where safety-lamps exclusively, under the strictest supervision, are allowed, the anomaly of a large open light, even upon the very best principle of construction, is less frequently met with. In addition to the careful examination of the workings before men go to work which I have alluded to, the deputies and others in charge must maintain a strict supervision during the working-hours in all air-ways, working-places, and travelling roads, and over all things relating to the safety of the workmen. It is yet left for me to remind the workmen that attention to all the above matters on the part of those in authority will be of no avail whatever unless they themselves, on their part, do all that in them lies to co-operate for the common safety by obedience to rules and a proper exercise of ordinary care and judgment. I do not believe myself that the use of safety-lamps engenders inadequate ventilation: at least my experience does not teach me so. If safety-lamps are rejected where they ought to be used, those who act with such recklessness would equally disregard ventilation, and if any person detects fire-damp in his working-place he is obliged by the rules to cease working. The use of the safety-lamps and adequate ventilation, it must be repeated, produce in combination what either alone cannot. The best ventilation possible may be upset and utterly disarranged in a moment in the simplest way: a sudden outburst, the leaving open of a door, disarrangement of a brattice-sheet, or temporary neglect of the ventilating power may each and all effect this, and a naked light might then produce an explosion. The term 'adequate ventilation' is somewhat vague, and bears different interpretations by different managers, but sufficient should be provided to dilute gases and render them innocuous.

It will be seen from the above that Mr. Wardell prefers a fan for ventilating fiery mines, and impresses strongly the necessity of not allowing the vitiated air to come in contact with the flames where furnaces are used. He likewise considers