The Chairman then called for the first communication, which was a

**DESCRIPTION OF A DIRECT-ACTING STEAM FAN FOR THE BETTER VENTILATION OF COAL MINES. BY JAMES NASMYTH, ESQ., OF PATRICROFT, MANCHESTER.**

Mr. Nasmyth began by referring to the disastrous accidents which had arisen from defective ventilation,—within the last two years there having been 190 lives lost in the neighbourhood of Barnsley alone. This wholesale destruction of human life urgently called for an energetic effort to remove the evil. By increased means of ventilation, and thus getting rid of the accumulation of explosive gases, they would be striking at the root of the evil. This had been hitherto done by causing a rarefaction of air in one of the ascending shafts of the mine by means of a furnace burning below. It had, however, been proved that the furnace system of ventilation was deficient, disastrous accidents having occurred in mines so ventilated. Some more efficient means of sweeping away the accumulation of impure air was therefore called for, and Mr. Nasmyth recommended his direct-acting fan as supplying the desideratum. Economy was among its advantages: if one-tenth of the coal at present burnt in a furnace to produce direct rarefaction, were burnt under a boiler applied to a small engine for the purpose of working the fan, it would generally produce a much greater effect. Another important advantage possessed by this ventilating apparatus was, that it was above-ground and accessible, instead of being below-ground, as at present. In case of accident they would thus have full means of re-ventilating the mine. At present many hours had generally to elapse, in case of accident, before the mine could be sufficiently re-ventilated to render a descent safe, and probably one-half of the sufferers died a lingering death from suffocation, and not from the immediate effects of the ex-
plosion. The steam fan was about to be put in operation near Wakefield, and its simplicity of action recommended it to all who had seen it. Mr. Nasmyth explained the action of the fan by referring to a drawing which he had prepared. On the fan being made to revolve rapidly, the volumes of air contained between the vanes were forced out, while fresh air rushed in to supply its place. He recommended that the steam engine should be placed in direct communication with the fan, and that the engine should have a very short stroke. A speed of 300 revolutions per minute was thus very easily attained, and 20,000 cubic feet of fresh air per minute could be forced into a pit with a fan whose vanes were eight feet in diameter. A fan whose vanes were double the diameter would be amply sufficient to ventilate the largest mine in Britain. The whole apparatus, including steam engine, would cost about £160. With so efficient a means of ventilation, attainable at so small a cost, it would be a disgrace, in these times of civilization, if such wholesale destruction of human life were allowed to occur.

The second communication, being upon an apparatus for effecting the same important object, was read by Mr. Biram.

DESCRIPTION OF THE FAN ERECTED FOR THE VENTILATION OF THE HEMINGFIELD PIT, BELONGING TO EARL FITZWILLIAM, AT ELSECAR. BY B. BIRAM, ESQ.

This fan, which is eight feet diameter and nine inches wide, has eight vanes, which are so arranged that each forms the segment of a screw which revolves in the same plane. The angle of the extremity or outer edge of the vanes is about 23 degrees with the plane of rotation, making the pitch of the screw about 10 feet 10 inches. The area for the passage of air through the fan is about 47 superficial feet, which, multiplied by 10 feet 10 inches, —the pitch of the screw,—gives 509 cubic feet as the