

The Obstetric Air-tractor.—We (*London Medical Gazette*) make the following extract from a communication forwarded to us by Dr. Simpson, in reference to his ingenious invention of the Obstetric Air-tractor :—

If we could fix upon the *exposed* portion of the foetal scalp, the suctorial disc of a limpet or cuttle-fish with the usual force with which they adhere to the sea rocks, to which they are attached, we should have in many cases a power sufficient to enable us to apply by them the necessary amount of extractive force. The discs of the limpet and of the cuttle-fish attach themselves firmly to the surfaces to which they adhere, by being formed so as to act upon the principle of the common sucker used by the schoolboy to lift stones, &c.—viz, by removing, or rarefying as far as possible, the air placed between the attaching and attached body, and thus taking advantage of the great power exercised by pressure of the atmosphere upon the surfaces of solids. This pressure is, as is well known to all, equal to nearly fifteen pounds upon the square inch when the subjacent vacuum is perfect; or, in other words, it would require a force equal to fifteen pounds of every square inch attached, to effect the separation of surfaces thus united. The limpet and cuttle-fish have the surface of the acetabula or discs with which they fix themselves so strongly upon the rocks, bedewed with a thick mucous secretion; after placing the surface of the disc upon the part to which they are to attach themselves, they, by a muscular movement, raise the centre of the disc so as to produce a more or less perfect vacuum; and the cuttle-fish has a central body in the middle of each disc, which it draws up and uses for this purpose, exactly on the principle of the piston of a syringe.

Such an arrangement and apparatus may be imitated by art; and, when rendered more perfect and complete, may perhaps give us a simpler and safer obstetric power for some cases than even the forceps. In one protracted case which Dr. Simpson described, he had lately made use of this power to extract the child. When applied, the head was still high up in the pelvic cavity, and the instrument easily afforded such a hold of the head as to allow it to be slowly dragged forwards and extracted. During this extraction, the instrument required to be reapplied once or twice. Dr. Duukan and Mr. Dickson were present at the delivery.

The instrument used in this case was very rude and imperfect. It consisted of a common metallic vaginal speculum, fitted with a piston, and with the edge of the trumpet-shaped concave disc at its outer or broader end covered with leather. This broader and leathery end was coated with lard, and applied to the head of the child; and then an exhausting effect was produced by moving the piston forwards. The apparatus would admit of much improvement and simplification, as by the mouth of it being made expandible, and capable of altering in shape, instead of metallic and fixed; by the inner edge of it being coated, as in atmospheric railways, by a thin layer or cushion of air enclosed in caoutchouc; by the exhausting apparatus being valved and more perfect, &c. &c.* But if the Air-tractor could not be made both simple and satisfactory in its application, it would not replace the forceps, and more experience would be required to decide whether it had any title to do so.

If the instrument, when properly constructed, should be found to succeed, it would be still more advantageous in replacing the long, than in replacing the short forceps. In the case in which it was used, the head was of the height in which long forceps are usually required. If a suctorial tractor should answer in some long forceps cases, and enable us to drag with sufficient force upon the exposed portion of the scalp, it would save the danger dreaded by many, of wounding the uterus by introducing and working the blades of so long an instrument as the long forceps high up in the neck and cavity of the uterus itself.

Presentations of the breech sometimes require instrumental assistance. The hook passed over the flexure of the thigh is dangerous, and very apt to injure. The forceps, as recommended in these presentations by some authorities, are often inapplicable and inefficient. Perhaps the Air-tractor may afford us a new and sufficient instrumental force for the management of some of these cases. Its use would be simpler and safer than any of the other methods proposed.

Dr. Simpson further observed, that he was not aware that any one had applied practically this obstetric means, before it was employed in the case detailed to the Society. But the idea of using such a power had been long ago proposed by a gentleman, for whose works and talents they all entertained the utmost respect—Dr. Arnott, of London. In his admirable work on Physics, (p. 636) Dr. Arnott alludes to the subject in the following words: "The forceps (says he) to be well and safely used, requires address, which even the naturally dexterous man cannot possess without a degree of continued practical familiarity with it; and, except in large towns, a man must be unfortunate in his practice who often requires it; hence the really small number of persons who use it well. A tractor of three inches in diameter would act upon any body, to lift or draw it, with a force of about a hundred pounds—with more, therefore, than is ever required or allowable in obstetric practice. In lifting a stone, the tractor does not act as if it were glued or nailed to the stone, but merely bears or takes off the atmospheric pressure from one part, and allows the pressure on the opposite side, not then counterbalanced, to push the stone in the direction of the tractor: so when placed upon the child's head, it would not pull by the skin, in the manner of a very strong adhesive plaster applied there, as uninformed persons would be apt to suppose; but by taking off a certain atmospheric pressure on the other side or behind to urge the head forward on its way. Of course the pressure in such a case would not operate on the head directly, but through the intervening parietes and contents of the abdomen. It would be preferable to have a gentle and diffused action of the tractor over a large space, rather than an intense action on a small space; and, therefore, a tractor for the purpose now contemplated should not be very small, and should have a little air underneath it in a slight depression or cavity at its centre. The forceps must be more effective than the tractor for rectifying malposition of the head, and

diminishing its transverse diameter; but the tractor will answer both these purposes in a greater degree than might at first be expected.

In conclusion, Dr. Simpson stated that he had now used the Air-tractor which he had constructed in several cases of labour, and with results answering his best expectations. But it doubtless admitted of much further improvement in construction, in mode of application, in working, and other details.—*Proceedings of Edinburgh Obstetric Society, 20th December, 1848.*

* Since the preceding abstract was drawn up, I have made a great variety of experiments, with the view of ascertaining the best form of disc or mouthpiece and exhauster. I find that a syringe and piston, valved like the common breast-pump, so as to make a perfect vacuum, and having a disc attached to it formed of a double cup, the outer cup of caoutchouc, and overlapping considerably the edges of an inner and smaller cup of metal or gutta-percha, makes an Air-tractor possessed apparently of the necessary applicability, and requisite adhesive and extractive power.—J. Y. S.