twisted it round. Had he formed his columna from the *whole thickness of the lip*, there would have been no necessity for *twisting* it, and in all probability the operation would have proved successful.

N. B.—The two first cases are detailed in the London Medical Gazette for April 17, 1830.

99, George Street,
September 10, 1830.

ART. VIII.—*Observations on the influence of imperfect supplies of fresh Air, long continued, on the general Health.*

By WILLIAM WATSON, Esq. Surgeon, Wanlockhead.

FROM the experiments of Lavoisier, Davy, Allen and Pepys, and Dr W. F. Edwards, we learn, that air containing a certain proportion of oxygen gas is indispensable to effect the requisite changes on the blood of the pulmonary artery; that in the course of successive respirations, the oxygen gradually diminishes and that its place is supplied by variable proportions of carbonic acid gas; and that, in consequence of these changes in the air respired, frequent fresh supplies are requisite. It was also ascertained by Allen and Pepys, that when an animal breathes the same quantity of air without change, death ensues before all the oxygen disappears; and that when the same portion of air is respired until it can no longer effect the requisite changes, it still contains only 10 per cent. of carbonic acid.

In all the experiments of these observers, the animals were made to respire an atmosphere which was gradually becoming vitiated, until insensibility, or fatal *asphyxia* took place; and no attention was paid to the question, how far an atmosphere not frequently changed is capable of supporting life, and what influence such an atmosphere exercises on the functions and health of the animal body?

This question, I think, may be illustrated, if not determined, by the situation of miners, who are under the necessity of following their avocations in places so remote from the general mass of the atmosphere as to be almost insulated; and where, of course, there is neither a regular ingress of atmospheric air, nor egress of the substances formed during respiration and combustion. In these places the air is so rapidly inhaled that a considerable diminution of the quantity of oxygen must follow, and its place being supplied by an equal quantity of carbonic acid gas, the bulk remains unaltered. The carbonic acid, however, from its specific gravity falls to the bottom

of the mine, where its presence is indicated by a candle burning more obscurely than when placed at a greater height.

But carbonic acid is scarcely ever accumulated in such quantities as to affect the action of breathing, except in so far as that is connected with the process of oxidation and assimilation, and then its effects are very material ; since all the nutritive particles, before they can be assimilated with the blood, must be submitted to the action of the atmospheric air through the medium of the lungs. " In this way," to use the words of one of our ablest philosophers, " respiration may be said to be carried into every part of the body." Since, then, a certain proportion of oxygen is so necessary for the due support of the animal system, and since it has been demonstrated by satisfactory experiments, that a medium, consisting entirely of oxygen, would excite the action of all the vital functions to such a degree as even to cause the extinction of life, it seems a natural inference, that the inhalation of a medium deprived of a part of its oxygen should be attended with very different results—namely, a loss of tone or debility in proportion to the quantity inhaled.

That this is really the case, is not only proved by the experiments above alluded to ; but all the observations which I have made during a considerable number of years tend to strengthen my conviction of its truth.

In the year 1823, sixteen men were employed, during four months, in a mine where the deficiency of air was so considerable, that a candle would not burn for any length of time, except when the wick was made so open as to allow the greatest possible quantity of air to come in contact with the ignited part. The candle was placed generally in a sloping position. Notwithstanding the deficiency of air, none of the miners had any inflammatory complaints, but all complained of lassitude, debility, and drowsiness, particularly towards the end of each day's work, sixteen hours ; and they all became gradually paler in the complexion.

In 1824, an equal number of men were employed in the same mine with nearly the same result. Thirteen were quite free from any particular complaint,—one complained for a few weeks of a slight pain in the stomach,—the other two for a few days of pain in different parts of the body from obstructed perspiration.

In 1826, sixteen men were employed five months in a mine where the quantity of air was still smaller than in the former, still the miners were free from any particular complaint. Only one complained of shifting pain from improper exposure when perspiring freely. In 1827, the same number of men were employed in the same mine for four months, and all remained free from complaint. Reasoning, then, from analogy, it seems fair

to conclude, that a person placed in a medium where there is a considerable deficiency of oxygen must become less liable to inflammatory action, and that this non-liability will be in direct ratio to the length of time he is confined in such medium. At least, this is no speculation founded on mere conjecture, but supported, in my opinion, by facts which have come under my own observation. From these, I draw the following inferences:—*1st*, That miners are not more liable to inflammatory complaints than any other class of the community. *2dly*, That a majority of them, at least in this district, remain free from any particular affection of the chest. *3dly*, That hydrothorax among miners is rather a rare disease, only two cases having occurred to me in the course of fifteen years' practice.

With regard to the first of these conclusions, I may merely mention, that a majority of the inflammatory affections of the chest which have come under my notice, arose from exposure to sudden vicissitudes of weather, as in the cases of engine-keepers, lead-washers, carters, &c. and as to the second,—of sixteen miners, each sixty years of age or upwards, and still connected with the works, four have been invalided; while the other twelve continue to follow their occupations as usual. The united ages of the miners invalided amount to 329.

I may also observe, that from a professional observation of fifteen years in this mining village, I have been led to the conclusion, that phthisis is not more prevalent among the miners here, than among any other description of people who are constantly inhaling pure atmospheric air.

As a proof of this, during the above-mentioned period, cases have occurred as frequently among females as among males; and even of the latter, there were several individuals who had never been employed in the mines at all, so that, with reference to this disease, the balance seems to be in favour of mining as an occupation; the deaths having been, according to my computation, in the proportion of six miners to nine others. I infer from this also that the effect generally attributed to the inhalation of noxious vapour and fine mechanical particles, namely, the irritation of the mucous membrane of the bronchia, and the inflammation thereby induced, has been much overrated; and that the conclusions drawn from this supposed effect are founded rather on analogy than on experiment or observation. The idea, that fine mechanical particles may be suspended in the atmosphere, and, being inhaled along with that fluid, may produce the irritation alleged, I am inclined to receive with considerable distrust. Mechanical particles, to occasion any serious injury, must be of such a magnitude as would preclude the possibility of their being retained in suspension; and, on the

other hand, such as from their extreme minuteness would admit of being so suspended, may either be inhaled with impunity, or must do their mischief in some other mode than the one assigned. It appears to me, therefore, that, if consumption does occur more frequently among miners than among some other classes of the community (a position which I think questionable) it must arise chiefly from the laborious exercise necessary in their daily avocations, which, by accelerating the current of the blood through the lungs, may occasion some injury to that delicate organ, especially if any part of the vascular system was predisposed to disease. But to this I would consider them no more liable than any description of labourers on the surface whose stated exercise is equally severe. I am aware that this view of the subject differs from that of many medical gentlemen of established name; yet it has not been hastily or carelessly adopted, but is founded on long observation and experience; and, unless it can be invalidated by opposite experience, I flatter myself that the liberal and enlightened practitioner will hesitate to pronounce it altogether erroneous.

Wanlockhead, 19th June 1830.

ART. IX.—*Case of Excision of the Elbow-Joint.* By JAMES SIMSON, M. D. Fellow of the Royal College of Surgeons Edinburgh, and Surgeon to the New Town Dispensary, &c.

IF we are to judge of the opinions of the French and English surgeons as to excision of the elbow-joint; from a paper by M. Roux in the January number of the *Revue Medicale*; or from Mr Lawrence's recent lectures, we must be convinced that it is not a popular operation either in Paris or London; and in Edinburgh there are surgeons of considerable reputation who maintain that this operation is only applicable to young persons, and never to be advised in cases where the individuals are advanced in life. I hope, therefore, that the following case may be of use in showing, that a tolerable joint has been made, and a very useful arm and hand preserved to a woman pretty far advanced in years, and where circumstances occurred not the most favourable to the completion of the cure. The manner in which the operation was performed is different from the method generally recommended, but is one in which, if the soft parts are in a proper state, it can be easily accomplished.

Mrs Rodgers, æt. 46, November 20, 1829.—The left elbow-joint is increased in size, and the integuments have a soft and puffy feel. There are four distinct openings discharging