Mr. T. J. Britten, one of the oldest mining engineers in South Africa, for his water drill and atomizer to allay the dust and gases during blasting and shovelling. Britten's atomizer was found to allay 75 per cent. of the dust and was also successful in allaying the nitrous fumes after blasting. There is not the least doubt that by using water-spray drills and the atomizer and by better ventilation a considerable reduction in the death-rate from miners' phthisis will occur in South Africa.

There is no medicine or combination of medicines that I know of that will check the onward course of the disease once it is fully established. Cod-liver oil, nux vomica and pot. iodi, liq. strychniae, calcium glycerophosphates or the hypophosphites will help to maintain the general health, but the best treatment of all is for men not to work too long at rock drilling, to work fewer hours per day than they have been doing, and on the first indications of failing health and strength to give up the work and seek for a life in the open.

PULMONARY ATELECTASIS IN ADULTS.

By WILLIAM R. HUGGARD, M.A., M.D.(R.U.I.),
F.R.C.P.LOND.

ATELECTASIS, or imperfect expansion of the air cells, in so far as it affects a small portion of lung in adolescent or adult life, receives very scanty notice in most textbooks of medicine. It seems to be considered a rare condition except at the base, and as a result of hypostasis. As a matter of fact, however, it is an extremely common condition at the apex, but is overlooked owing to the ordinary method of examining the chest. Only within the last few years have I become myself acquainted with the frequency of its occurrence.

Nearly every practitioner has, as a student, been well drilled into method in the examination of the chest; and to see a man deviate from the orthodox order of inspection, palpation, percussion, and auscultation causes a feeling akin to what we should have if we saw a man trying to fix the crupper on the head of a horse and the bridle on the tail. We inevitably think that he does not know much about what he is doing.

A change from the orthodox order, however, is not merely justified but is indispensable for the ascertainment of the facts. The hitherto usual method requires a little modification. The deep breathing that we call for during inspection frequently clears away or diminishes the evidence of atelectasis. If percussion is employed both before and after the patient breathes deeply, dullness—slight, medium, or pronounced—will often be observed over the apex of the lung at the first percussion, while a clear note will be elicited after deep breathing. In very early apical tuberculosis this is common—I had at first written "almost invariable." In slight bronchial catarrh of growing young people, also, it is extremely frequent.

The usual physical signs in the form of atelectasis now described are dullness on percussion with feeble breath sounds, the dullness diminishing or passing off after a few deep breaths, the breath sounds at the same time becoming more distinct. A few sticky or viscid râles can often be heard towards the end of the first two or three deep breaths, but they get gradually fainter, and then disappear.

The signs of atelectasis may reappear with extraordinary rapidity. In a case where the patient was systematically doing deep breathing exercises every hour, and where the physical signs usually disappeared completely with the deep breathing, I have on more than one occasion observed dullness within an hour after a deep breathing exercise was said to have been performed.

In some cases the dullness does not disappear so quickly. Sometimes it may remain for months, or may even become permanent; and I have seen retraction of an apex—distinct falling-in—occur from this cause in the course of a few days. Such cases are apt to be ascribed to infiltration with tubercle or with the products of inflammation, all the more so as a patch of tubercle or a patch of inflammation may be present as a nucleus. Indeed the presence of apical atelectasis justifies a suspicion of tuberculosis, and may be an aid to diagnosing the disease in an early stage.

The most frequent seats of pulmonary atelectasis in the adult, according to my observation, are, first, from the apex to the second interspace in front; next, the suprascapular, and then the interscapular region.

It is obvious that, in order to find out whether atelectasis

is present or not, we must percuss in front and behind before the patient begins to breathe deeply, and again at the end of the examination, when he has ventilated his lungs to the utmost.

The limited form of atelectasis here described does not give rise to any symptoms apart from those due to the primary disease.

As to treatment. The primary ailment must be attended to. For the condition itself systematic deep breathing must be employed; for example, deep respirations for a couple of minutes every hour. If there are no contraindications, exercises to develop the chest muscles are advisable. The patient must be careful to avoid anything, whether clothing or a cramped position, that might interfere with the free expansion of the chest.

TRACHEOTOMY UNDER LOCAL ANAESTHESIA.

By STOLAIR THOMSON, M.D., F.R.C.P.LOND.,

F.R.C.S.ENG.

Physician for Diseases of the Throat, King's College Hospital; formerly
Physician to the Throat Hospital and Surgeon to the Royal
Ear Hospital.

THE last nine cases of tracheotomy I have had to perform have been carried out quite easily under the local anaesthetic action of cocaine (Schleich method).

It is always well to avoid the usual drawbacks and risks of a general anaesthetic when an operation can be done as satisfactorily without one. But this avoidance is still more desirable in the condition for which tracheotomy is generally required—namely, considerable obstruction to the air-way. This may be so marked that the patient cannot assume the horizontal position without choking. Breathing in such cases is sometimes only maintained by the use of the accessory muscles of respiration. If their action is arrested by the administration of a general anaesthetic, the patient's narrow margin of breathing capacity may be lost. Many a death has occurred "on the table," not always because the operation has been deferred too long, but often because the anaesthetic has induced complete asphyxia before the trachea was opened. In any case the increased stridor and congestion add greatly to the anxiety and difficulty of the operation. As pointed out by Sir Frederick Treves, "the hurry and excitement of the operation, and the fear that the child is ceasing to breathe, are in the main answerable for the accidents which so often occur during tracheotomy."

The patient may be only semi-conscious, and his restlessness, the rapid movements of the trachea with every struggling breath, the increased vascularity, and the imminent fear of some false move or of complete cessation of breathing, only too often lead to a scene which the elder dramatists would have described as one of "wild excursions and alarms."

Besides, tracheotomy is an operation which any practitioner may be called upon to carry out, not infrequently at short notice, and without the help of a skilled assistant to administer a general anaesthetic.

With local anaesthesia these drawbacks are avoided. Respiratory difficulty is not increased, congestion is lessened, the patient is always able to assume a comfortable position and remain quite passive; his retention of consciousness may be of use for the purpose of coughing, or so that he may hold his breath in order to leave the trachea quiet for a few seconds at any stage of the operation. The surgeon is relieved from the special anxieties attending a general anaesthesia in respiratory stenosis, the operation is practically bloodless, and it can, therefore, be carried through more deliberately, rapidly, and satisfactorily.

The following is the method I have adopted. The first and most important point is to limit the amount of cocaine employed. I have never exceeded 1 cg. ($\frac{1}{2}$ gr.), and have never seen the slightest toxæmia from this dose. In many cases half the quantity has sufficed. A tabloid containing cocaine hydrochloride $\frac{1}{2}$ gr., morphine hydrochloride $\frac{1}{20}$ gr., and chloride of sodium $\frac{1}{2}$ gr., is dissolved in 56 minims of sterilized water. To this adrenalin chloride of full strength (that is, 1 in 1,000) is added in the proportion of 1 drop to every 15 of the solution, so that 4 minims of adrenalin would be contained in 60 of the prepared liquid.

The skin over the trachea having been purified, a drop of pure carbolic acid is deposited on it at the two extremities of the proposed incision—that is, for high tracheotomy, over the centre of the thyroid cartilage and over the situation of the

thyroid isthmus (see figure); and for low tracheotomy, at the level of the cricoid cartilage and over the manubrium sterni. The slight eschars produced are useful guides in indicating the situation and extent of incision through the skin, and they render it so insensitive that the first prick of the needle is hardly felt. Or chloride of ethyl may be sprayed on the skin at the points indicated. I have used the usual needle of an ordinary hypodermic syringe, about $1\frac{1}{2}$ in. in length. It is always at hand in emergency, and a good length of skin can be threaded on to it; or the antitoxin syringe, with its 2-in. needle, can be employed. The needle having been thrust a very short way into the cutis, through the spot stained with the pure carbolic, a drop of the lotion is extruded and a pause made to allow of its local action. This permits of the needle

Tracheotomy under local anaesthesia. Semidiagrammatic drawing, showing the spots on the skin where the drop of pure carbolic acid is deposited. The needle is inserted through these points, and the cocaine-adrenalin solution is slowly injected.

being painlessly pushed a little further and of another drop being expelled. The process is repeated at short intervals until the whole length of the needle has been introduced. The proceeding is then repeated from the other carbolic spot (see figure). This injection should be carried out slowly, to allow of absorption and so avoid the painful feeling of distension.

It is important to give sufficient time for the cocaine-adrenalin solution to act, and disappointing results are frequently encountered by those who are impatient. At least twenty minutes are required to obtain satisfactory analgesic and haemostatic effects. The track of the injection is then generally blanched, as if frozen, and it will be found that all the incisions are perfectly painless, particularly if a very sharp knife is used. The only discomfort experienced is in any dragging or tearing movements during blunt dissection of the layers of fascia. These are sometimes inevitable in pulling down the deep fascia detached from the cricoid cartilage so as to expose the trachea bloodlessly; but the incisions through skin, fascia, and muscles, the insertion of the hook, and the opening of the tracheal rings, are all quite painless. No patient has ever complained afterwards of anything except "the dragging," or "the pushing" when the opening in the trachea

was somewhat small for the cannula employed. The haemostatic effect of the injection is remarkable. Unless the thyroid veins or the thyroid isthmus itself are cut across, no vessel requires clamping, and sponging is hardly needed. The adrenalin also appears to remove any remote chance there may be of such a small dose of cocaine producing any depressing action, and as never more than 4 drops of it are used, there is no possibility of excessive vaso-constrictor action.

Although I prepare 60 minims of solution, the whole amount of it is not always required. On one occasion only 30 minims were necessary, and hence $\frac{1}{10}$ gr. of cocaine and 2 drops of adrenalin was the total amount injected. The patient immediately afterwards walked upstairs.

These tracheotomies have been performed for the following conditions: Cancer of the larynx, cancer of the oesophagus, tuberculous laryngitis, lupus of the larynx, tertiary syphilis of the larynx, and malignant disease of the thyroid gland. In the latter case—in which I was assisted by Dr. Style, of Moreton-in-Marsh—the disease had descended so deeply on each side of the trachea, and had pushed it so far back, that the lowest possible tracheotomy was required, and Messrs. Mayer and Meltzer had specially to make the longest tube they had ever manufactured. The operation was a very deep one—the horizontal branch of the cannula measuring $3\frac{1}{2}$ in.—yet it was practically bloodless and painless.

Although in some cases the dyspnoea was intense, it was never increased by the local anaesthesia, and in every case the patients were quite willing to dispense with chloroform. They were told they might feel a very little. If they winced at any dragging during blunt dissection they were told that it would soon be over, but that if it became intolerable they might ask for chloroform. They never did this, although in one or two instances a few drops were scattered on the towel which had been placed below the patient's chin so as to conceal the sight of the instruments. Doubtless it acted chiefly by suggestion. A confident and encouraging manner does much to remove any apprehension and minimize anxiety. In every instance the patient said afterwards that the pain was nothing, and that he would never want chloroform if he had to undergo the operation again. Indeed, all my cases appeared only too glad to escape a general anaesthetic, possibly an instinctive feeling consequent on the dyspnoea for which they sought relief.

My youngest patient was a boy of 14. He appeared an intractable subject of the "coster" class, yet in his case the method was most successful. I have not had an opportunity of trying it in small children, and I hardly imagine that with them it would be entirely satisfactory. I would suggest, however, that it might diminish the risk of complete general anaesthesia in laryngeal stenosis in young subjects, if a "mixed" method were adopted—that is, if chloroform were given only to a sufficient degree to quiet the child, so as to allow of the cocaine-adrenalin injection being made.

My attention was first drawn to the possibility of performing tracheotomy under cocaine by an article by Professor B. Fraenkel,² and the method is becoming generally employed by laryngologists. But I have not noticed that tracheotomy is mentioned as particularly suitable for local anaesthesia by those who have devoted articles to the subject, and I trust that this description may help to make it better known.

PS.—The above notes were written, and most of the cases observed, before the publication of Mr. Arthur Barker's Notes on Local Analgesia in the BRITISH MEDICAL JOURNAL for December 24th, 1904. I am pleased to see that his much wider experience of the method confirms my favourable conclusions. His article reminds me that I omitted to mention that it is advisable for the patient to have a light meal, with a little stimulant (brandy, tea, or coffee) shortly before operation, and that a preliminary hypodermic of morphine would help to soothe a nervous patient.

In view of Mr. Barker's warm commendation of beta-eucaine as equally effective, I feel inclined in future to substitute it for cocaine.

REFERENCES.

- ¹ *Manual of Operative Surgery*, vol. ii, 1892, p. 141. ² *Berl. klin. Woch.*, 1898, No. 23, 6 June, S. 505.

BEQUEST OF A BRAIN.—General Isaac J. Wistar, of Philadelphia, who died recently, bequeathed his brain and right arm, which is said to be a good specimen of gunshot ankylosis, to the Wistar Institute of Anatomy and Biology, which he founded. He leaves to the institution the bulk of his fortune, which is estimated at £400,000.