are attached to these pillars, and a weak battery (say one or two Daniell's) and two telephones are put in circuit.* Such an arrangement, if carefully made and adjusted, is very sensitive; and, although the wings of imagination have carried some writers much too far as regards the possibilities of the instrument, still many of the results described may be obtained by anyone with little trouble.

To hear the cardiac sounds, the best arrangement I have devised is the following. The microphone is fixed on the membrane of one of Marey's tambours placed vertically, and connected by India-rubber tubing with the cardiograph, also of M. Marey.† Thus the sounds may be transmitted to a distant telephone. It is important to note, however, that their character is altered. They have a resemblance to the cardiac sounds, but they are different in *timbre*. This effect may be well observed by fixing the microphone to the key-board of a piano. The sounds heard in the distant telephone, when the piano is played gently, are sharp and tinkling, like the sounds produced by a musical box, and without the resonance of the ordinary sound of the instrument.

Respiratory sounds can also be heard. When the cardiograph is placed over the larynx, a whisper is transmitted quite distinctly.

So far as my experience goes at present, the combination of the microphone with the telephone does not reveal to the ear of the auscultator new sounds with which he was previously unacquainted; but it can effect the transmission of sound to a great distance. I can conceive it quite possible that even such feeble sounds as those produced by the heart and lungs might be transmitted for many miles and be correctly interpreted by an educated ear. There is a limit, however, even to the capabilities of the microphone. The intermediate piece of carbon must be free to move, and any vibration communicated through solids, liquids, or gases must have energy sufficient to move the carbon, or, at all events, to exert a strain upon it. If it be too weak to do either, then the telephone will make no response.

In these days of rapid progress, when facts are observed which startle even our most learned physicists, it is unwise to predict or conjecture; but the success hitherto obtained by others is a stimulus to every one to be up and doing.

A CASE OF CHOREA TREATED BY THE SUBCUTANEOUS INJECTION OF CURARA.

By DAVID DRUMMOND, M.A., M.D.,

Physician to the Newcastle-upon-Tyne Infirmary, and Children's Hospital.

A BRIGHT intelligent girl of seven years was brought to the Children's Hospital as an out-patient about the middle of October last, two or three weeks after the commencement of an attack of chorea. She was seen at the out-patient room several times, and treated with bromide of potassium and arsenic, for general chorea. On November 12th, no abatement of the movements having taken place, she was admitted into the hospital about six weeks subsequent to the first appearance of the disease—a period when many children suffering from this affection begin to improve. I had been for some time anxious to try the effect of curara, or woorara, as some name the drug, in chorea; but, as a rule, as is well known, the attack only lasts about eight weeks, and, consequently, any experiment is apt to be fallacious; for what influence in the cure is ascribed to the therapeutic agent is most probably due to the *vis medicatrix nature*. But, in my present case, the disease was evidently not going to run its most usual course, therefore I resolved to try the poison, known for a long time to experimental physiologists, but only recently, I apprehend, to therapeutists; the fact that it has been recommended in hydrophobia having brought it prominently before the profession. With some trouble, I procured two drachms of a one per cent. solution—all the curara that was to be obtained in Newcastle. I commenced with five minims by the mouth, about one-twentieth of a grain of curara, three times a day, and in a few days increased this dose to one-tenth. This was continued for nearly a fortnight, but by this time no improvement had taken place, and all the curara was used. Whilst getting some more, I put her upon a mixture containing three grains of croton-chloral and ten grains of bromide of potassium for the dose, three times daily, which in a few days was doubled—that is, six grains of chloral and twenty of the bromide

* I have not had the opportunity of seeing any microphone made by Mr. Hughes. The first one I saw was in the laboratory of Dr. Burdon Sanderson, about three weeks ago. Those I have worked with were made in my own laboratory.

† Marey's cardiograph is an instrument designed for transmitting cardiac movements to a recording tambour; but it is so suitable for auscultation, that I am surprised it has not been used for that purpose. By attaching an India-rubber tube of suitable length to it, one may auscultate with precision at a distance of many feet. The advantages are obvious.

three times daily. This treatment was continued for about ten days, but without effect, the choreic movements becoming more exaggerated. I now received a second supply of curara, as before, in solution, but this proved to be quite inert; even a quarter of a grain administered subcutaneously produced no physiological effects. I was about to give up trial as hopeless, when Mr. Bolam, chemist of this town, procured a few grains of the solid curara, and made a solution himself for me. It was now about fourteen weeks since the origin of the attack, and still there was no appearance of the choreic movements subsiding. Of this solution I commenced, on January 5th, injecting one-fortieth of a grain subcutaneously, only giving one injection in the day. On the 7th, I injected one-twentieth, next day one-tenth of a grain. On January 9th, one-eighth was used; she was by this time very much quieter; on January 11th, one-fifth, after which she was nearly steady. Two days afterwards, she got a quarter of a grain; after this, it seemed unnecessary to push the administration of so potent a poison any further.

It is very unfortunate that the specimens of curara vary in their strength and quality. Curara found in commerce is a brown-black resinous mass, soluble in water, but very slightly so in alcohol. The best solution for hypodermic injections is an aqueous one; it keeps well, and is, I imagine, less painful when used than either the alcoholic or the water and glycerine solution. One grain to twelve minims of water makes a good solution. The curara should be left in the water for forty-eight hours, and then filtered. The dose seems to be about one-quarter to one-half of a grain, though, owing to the uncertainty of the specimens, it is probably well to commence with a much smaller quantity. Of course, the rationale of the treatment of such affections as chorea, rabies, etc., by curara, depends upon the researches of Bernard, who, in 1844, discovered that the poison paralysed the ends of the motor nerves; and Schiff observed that the sensory nerves have to some extent their conducting power destroyed and reflex action much diminished, but that they are less affected, and after a longer interval, than the motor nerves. Death would eventually occur through paralysis of the respiratory centres, the circulation remaining almost normal. Sir Benjamin Brodie managed to save animals apparently killed by curara, by keeping up artificial respiration until the poison was eliminated.

Curara administered by the mouth seems to have very little effect, but should be injected under the skin; Ludimar Hermann explained this fact by showing that, when the kidneys were cut off from the circulation, physiological effects could be produced as well, though more slowly, through the stomach as by direct introduction into the circulation, the poison being very rapidly eliminated by the kidneys. A curious fact, and one which was well exemplified in my case, is that, even after the muscles are pretty well curarised, they react to electrical stimulus as perfectly as normal muscular tissue does. I compared the electrical reaction of the muscles of the forearm of the child, the subject of the present case, with that of a healthy child, and there was no difference. Bernard laid stress upon this fact, and showed that the muscles of a curarised frog, stimulated by the galvanic current, reacted perfectly; but such was not the case when the current was applied to the nerve itself, the muscle supplied by it refusing to react.

CASE OF LITHOTOMY, IN WHICH AN ENLARGED MIDDLE LOBE OF THE PROSTATE GLAND WAS ACCIDENTALLY REMOVED.*

By CHARLES WILLIAMS, F.R.C.S.,

Assistant-Surgeon to the Norfolk and Norwich Hospital.

THE specimen which I have the pleasure to exhibit to you represents an enlarged middle lobe of the prostate gland, accidentally removed from a gentleman on whom I performed the operation of lithotomy.

The patient was a tall thin man, aged 72, living about ten miles from Norwich. He had had symptoms of stone in the bladder for upwards of twelve months. A few months before I visited him, he had passed, on one or two occasions, a large quantity of blood in his urine. Of late, he had suffered much from the presence of the stone. He had been greatly disturbed during the night, and had become low-spirited. His urine was found to be quite healthy and free from albumen. His feet were in nowise oedematous; and he could eat freely. There was a loud systolic *bruit* heard over an extended area of the chest, giving rise to no inconvenience. Five years previously, he fractured the neck of his right thigh-bone; ankylosis of the hip-joint resulted from the injury, and he now walks with a perfectly straight and stiff, but shortened, limb.

On July 6th, with the assistance of Messrs. Morton, surgeons, of

* Read before the Norfolk and Norwich Medico-Chirurgical Society.