the heart's action may be powerfully influenced, so much so as to cause apparent death. In the first place, by means of as deep and as long retained inspiration as possible, with the mouth and nose closed, the pulse may be made completely to disappear. Secondly, by forcibly expelling air, after a deep inspiration, with the glottis closed, circulation may be likewise impeded, and even brought to a standstill. In the first experiment, the negative pressure of the lungs is largely increased, and thereby the power of the heart so diminished that it can no longer act; in the second experiment, the negative pressure is changed into a considerable positive pressure, and thereby the flow of blood from the veins into the heart is completely checked.

The pneumatic apparatus enables us to make use of the mechanical effects of the increased and diminished pressure upon the heart and the vessels for therapeutical purposes, and the power to be applied may be exactly regulated according to weights or mercurial pressure. I have obtained the following results with it.

1. *Inspiration of Compressed Air.*—By this the pressure in the lungs is increased; it becomes less negative; or, with a sufficient degree of compression, is converted into a positive pressure. The necessary consequences of this are the following. *a.* The pressure in the aortic system is raised; the pulse becomes more resistant, even hard. *b.* The flow of the blood from the heart into the aorta is increased; the pulse becomes fuller and larger. *c.* The flow of the blood from the veins into the right side of the heart is checked; the jugular veins are plainly seen to become turgid. Inasmuch as more blood streams into the aortic system, and less flows from the veins, there arises an increased fulness of blood in the greater circulation, while the heart and lungs are disburdened of blood. Expiration into compressed air works in a like manner, only more energetically; this is, however, on account of the disturbance of respiration, less capable of being therapeutically utilised.

2. *Inspiration of Rarefied Air.*—The effect of this is quite the reverse: the pressure of the lungs becomes still more strongly negative, with these results. *a.* The pressure in the aortic system is diminished; the pulse loses in tension, and becomes soft. *b.* Less blood flows out of the heart into the aorta; the pulse becomes smaller and less full. *c.* The diminished pressure connected with a widely expanded thorax draws the blood more forcibly from the veins into the right side of the heart; the jugular veins collapse visibly. *d.* Inasmuch as less blood flows from the left side of the heart, and more blood is drawn into the right side, there follows an increased fulness of blood in the chest, and a diminished fulness in the remaining parts of the body.

Similar, only less energetic, is the effect of expiration into rarefied air. The indications, according to these physiological premises, are clear. I will only give here the principal ones. Inspiration of compressed air is indicated where the flow of blood from the lungs and the left side of the heart is impeded, especially in insufficiency or stenosis of the mitral valve and of the aortic valves. In several cases of insufficiency of the mitral valve, with alarming symptoms, I have obtained the most brilliant results from the application of compressed air. Furthermore, compressed air is indicated in chronic inflammatory processes in the lungs, as in phthisis, in bronchial catarrh, and in chronic hæmoptysis. Compressed air works in all these cases like a venesection which is confined to the organs of the chest.

Inspiration of rarefied air is, on the contrary, indicated where there exists an impediment to the flow of blood in the veins, especially in stenosis, or insufficiency in the valves of the right side of the heart. It is further to be employed to bring about a greater fulness of blood in the lungs, especially as a prophylactic means in persons with a consumptive habit,* where at the same time it serves also as the best gymnastic exercise for the strengthening of the muscles of the thorax. In these cases, however, from the grounds at first alluded to, inspiration of compressed air should be combined with it. The contraindications are also suggested by the physiological premises. Rarefied air should not be used in hæmoptysis or disposition thereto, nor in erethic inflammation of the lungs. Compressed air is contraindicated in abnormally increased pressure in the aortic system; in congestion of the brain, where the coats of the vessels are not intact, giving rise to the apprehension of ruptures, and especially in the so-called apoplectic habit.

This may serve as a short sketch of the indications and contraindications for the application of the transportable pneumatic apparatus. I have up to the present time treated about a hundred patients for the above-mentioned affections, and been very well satisfied with the results of the treatment.

* This agrees with the theory long advanced by me and others concerning the etiology of phthisis, according to which the insufficient fulness of blood in the lungs disposes to cheesyification. Vide my work, *Die Tuberculose, die Lungenschwindsucht und Scrophulose*. Berlin, 1869. Aug. Hirschwald.

CASE OF POISONING BY CODEIA.*

By A. S. MYRTLE, M.D.,
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LAST summer I had a run of cases of saccharine diabetes. One female and eight males consulted me, during August and September, suffering from this complaint. Every kind of treatment had been put in force, from skimmed milk to creasote; every system of diet had been adopted with apparently very little success. At last, one gentleman presented himself who had been ill for eighteen months. During that time, he had gone through the faculty at home and abroad; he had visited mineral springs innumerable, and finally arrived at the conclusion that the only remedy which gave him relief, and checked the progress of the disease, was codeia, prescribed for him by Dr. Pavy. He assured me that all other preparations of opium had been tried, and found useless. This was the first time I had heard of codeia being used therapeutically; I asked him how much he took; he did not know; his London chemist had his prescription, and supplied him with pills as required. Of these, he took one night and morning. I thought I had got an useful hint, and determined that the first case which turned up should be put under the influence of this new remedy.

Soon, an old patient came from the North to see me; he had become alarmed, as a physician had told him his urine was wrong. On inquiry, I found he had been subjected to much anxiety, watching, and grief—first, by the long-continued illness and death of his mother from epilepsy, and, secondly, from the death of his brother from diabetes, which had ran its course with unusual rapidity. Since then, he had perceived little wrong with him, except that he felt very much depressed in spirits, disinclined for active exercise, and had periodically been attacked with what he called “the strangest pissing fits”. These came on suddenly when in church, whilst out walking or riding, and the amount which he passed at a time was very great. He had not observed any change in appetite; had no thirst, and was, he thought, of his average weight. He did not know under what medical treatment he had been, and ate and drank moderately of anything which came in his way. On examining his urine, I found it of a pale lemon colour, having a fruity smell, and a specific gravity of 1038; it contained a large amount of oxalate of lime in octohedral crystals, and showed abundant evidence of the presence of sugar with the usual tests. I thought of a trial of codeia. I wrote a prescription for pills, each containing four grains of codeia and one-twentieth of a grain of sulphate of strychnia; the patient to take one night and morning. The diet and everything else were as usual. The chemist to whom the prescription was sent very properly called on me, saying that he feared I had made a mistake, as the dose seemed to him excessive; but, as Dr. Gregory (quoted in Squire's *Companion*) had not found it so, I asked if he obtained his codeia from a reliable chemist; and, learning that he got it from Messrs. Smith of Edinburgh, I told him to make up the pills as ordered.

On the following morning, at 10 o'clock, I found my patient standing at his hotel door. He asked me if he might accompany me in my round, and away we went. I began to think codeia in four-grain doses must be a very mild agent indeed; but, on questioning my friend, I discovered that the pills had arrived too late for him to take one the previous evening, and he only had swallowed his first half an hour before I found him that morning. By and bye, he said, “I feel uncommonly jolly, as if I were up to anything. I have such a genial glow all over me”. We walked together for two hours. He then left me to write letters. As soon as he began to write, he observed he did not see the letters distinctly. Suddenly, his sight failed him; he felt the room going round with him, and he made for the door, got into the open air, feeling very bewildered, but directing his steps to my house; he knew he met two ladies, recognised their voices, but could not speak to them. At 1.30, I found him in my study, just four hours after he had taken the pill. He was standing, holding on by the back of a chair; he had a terrified look; was exceedingly pale; sweat was standing in large beads on his forehead; his pupils were slightly contracted; the pulse at the wrist was scarcely perceptible; the surface of the body was cold and clammy; his voice was reduced to a whisper. I asked, “Have you vomited?” “Only a mouthful.” “How do you feel?” “Sick as death.” I at once gave him a tumbler of hot water with brandy and ammonia; this he at once ejected. I repeated the dose in five minutes, and made him lie flat down, wrapping him in warm rugs. In half an hour, he showed signs of improvement, said he was in no way sleepy—just terribly sick, as if he had smoked a lot of bad tobacco. He remained in this state till ten at night; during all this time, if he attempted to move, he began to retch violently. I got him to bed, applied hot

* Read before the Leeds and West Riding medico-chirurgical Society.

bottles to the feet, and covered him well over with blankets. He passed a wretched night, slept none, and was slightly delirious. He got up next morning at nine o'clock, feeling still very sick and ill. His pulse was 56; the surface was cool; the face pale; the pupils much contracted. He had passed about six ounces of urine. He could eat nothing all day. Late at night, he took a cup of tea and some dry toast, and went to bed, slept well, and rose, feeling quite himself, in the morning. I examined his urine of the previous night and morning; he had not passed much. Its specific gravity was 1018; there was no sugar; oxalates were still plentiful.

I told him of the mistake I had made; that I wished him to give codeia a fair trial, and that I would reduce the dose to one grain; this proved too much, so I had to reduce it to half a grain. This he has taken night and morning for two months. There has been no return of glucosuria. About the end of December, he wrote:—"Since you nearly did for me, I have only had one slight attack of diuresis, and that, I think, was brought on by exposure to cold. I consider myself quite well now." His medical attendant, Dr. Wilson of Alnwick, has since written me, confirming the above report, and stating that, in his opinion, the case was one of those transient forms of glucosuria which we occasionally meet with, arising from some disturbance of the nervous system. In this I fully concur, at the same time as his brother had so recently died from diabetes, I thought it right to persevere with the treatment for a considerable time after the sugar had disappeared.

In the discussion which followed the reading of this case, I was struck with the general opinion held, that codeia depended solely on the presence of morphia for its effects. Is it so?

The symptoms I observed lead me to infer that, as a therapeutic agent, it forms a connecting link between morphia and nicotine. First, we had a short period of decided vascular excitement, with consequent increased nervous activity and power common to both; then followed a period of depression, with symptoms equally common to both—dimness of sight, nausea and sickness, cold clammy skin, muscular debility, and a manifest and persistent "slowing" of the vital functions. On the other hand, we had no stupor, not even drowsiness; no headache, as with opium; no vomiting, no increased alvine, vesical, or salivary action, as with tobacco. In thirty-six hours, the patient had completely lost all his disagreeable feelings, and was free from all signs of having been poisoned by codeia.

A NEW METHOD OF ADMINISTERING THE MINERAL WATER OF THE ROYAL LEAMINGTON SPA.

By JAMES THOMPSON, M.B.

THE visitors to a spa are comprised in two classes: those who can frequent the different pump-rooms, and there drink their quota of water direct from the spring; and those whose personal circumstances, or the nature of their maladies, prevent doing so. There is also a third class, who never come to the spa, but have the water supplied to them in bottles of the ordinary character.

It has often been noted, that the visitors derive much more benefit from the use of the water; and I think this is mainly due to their having the water as soon as drawn. Something must also be allowed for the change of air and scene, and the pleasure resulting from a visit to a town where every surrounding object is a thing of beauty. There must be benefit in exchanging the smoky dusty air of a city for the clear, bright, and health-giving atmosphere of such a town as Leamington, which is a town of gardens, and its sanitary condition closely looked after by competent authorities.

The water of the Royal Pump-Room Well, when drawn fresh from the well, contains nearly four inches of gas in each pint; it consequently is bright, clear, and sparkling, and by most people can be drunk without any feeling of nausea. When it has stood for some time, it loses its clearness and sparkle, and becomes dull, insipid, and somewhat unpalatable.

Now, if it be possible, the invalids ought to be sent to the pump-room for their supply; but if not, what are they to do? Hitherto the custom has been to send over-night for a portion. Sometimes it is carried in a bottle, oftener in a jug; and, when they drink it in the morning, they find it most unpalatable, and a larger quantity to produce normal effect is required than when fresh water is used. The quantity of bottled mineral water now used in England is enormous; and, from information I have received from good authority, I greatly fear that a large quantity of it is spurious.

There is in Leamington a mineral water manufactory on a large scale. The former owner prepared what he called the Leamington

Seltzer Water; and, although there was a considerable sale, yet it did not answer, as it was prepared with the water of our weakest spring, and was further reduced in strength by adding distilled water. The present method of preparation was suggested by me to Messrs. Kinnard, and it is likely to prove a great success. The water of the Royal Pump-Room Well, our strongest water, is allowed to stand for forty-eight hours in covered vessels, and is then filtered through flannel; it is then placed in a machine, and carbonic acid gas is forced into it under pressure; and French syphon bottles are filled; these contain sufficient for three days, and remain charged with gas to the last drop. By this treatment, the water becomes most palatable, and can be drunk almost without any perception of its strong saline taste. It will keep good for any length of time, and retain its medicinal qualities. They are most reasonable in price, and can be obtained in any quantities from the chemists. I recommend that a small quantity of hot water be put in the glass before the dose be drawn off into it. A London physician, Dr. Granville, in his work on the *Spas of England and Germany*, laid the seeds of the present disregard of English mineral waters, and drove numbers to the continent. This was suicidal policy—killing the goose that laid the eggs. Now London men praise German springs, and send numbers thither in search for health, which they might with advantage find nearer home. If they cannot come to us, by this method we can send mineral water to them, with the certainty that its virtues are preserved, and that the great medicine of Nature is supplied to them in a pure and unadulterated state.

CLINICAL MEMORANDA.

SIMULTANEOUS EXTIRPATION OF THE EYEBALL, AND OPERATION FOR CATARACT AND HARE-LIP, IN A MAN FIFTY-EIGHT YEARS OF AGE.

I AM induced, by a perusal of Sir William Fergusson's interesting paper on hare-lip and cleft palate, to place on record a case in which I operated five weeks ago.

William Briggs, aged 58, of New Whittington, Derbyshire, was brought to me on February 26th, suffering from blindness from cataract in the left eye, the right having been lost from an operation for the same disease some time ago. In addition to this, the patient had an extensive gap about an inch and a half across in the upper lip, which invaded the left nostril, and was continued into a corresponding fissure in the upper jaw and hard and soft palates, the uvula being divided into two symmetrical halves. I at once, with the assistance of my friends Dr. Beverley Morris, physician to the General Hospital, and Mr. Fullagar of Leicester, who happened to be present, administered chloroform, extirpated the right eye, which was painful, removed the cataract in the left, and, after carefully paring the edges of the fissure, brought the two sides of the cheek into apposition by the insertion of long needles and sutures. The strain on the needles was very great; so much so, that my friends expressed great fears as to the result. The patient, however, made an excellent recovery; first-rate vision was restored, and the deformity completely removed. The integrity of the probium was perfectly maintained by preserving the lower edges of the flaps and bringing one over the other. The patient is now growing a moustache; and, with a glass eye in the left orbit, is scarcely to be recognised as the deformed sightless creature that he was a few weeks ago.

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THERAPEUTIC MEMORANDA.

TREATMENT OF TETANUS BY CALABAR BEAN.

IN reference to a "Case of Traumatic Tetanus successfully treated by Calabar Bean", reported by Dr. John Cunningham in the *BRITISH MEDICAL JOURNAL* of April 4th, I should like to ask one question. Dr. Cunningham gives us very careful notes of this interesting case, both as regards the symptoms, the dose of the bean given, and the general effects produced; but he unfortunately omits to mention whether the physiological effects of the drug were noticed, and if so, as soon as they were produced, whether the spasms were diminished both in frequency and severity. I think that it would be interesting to know this; as, if contraction of the pupils were produced, and, when this was so, the spasms became less intensified or ceased altogether, it would tend to teach us that the drug should be administered so far; but when the contraction was produced, and the tetanic condition not lessened, then the bean should be laid aside as not suitable for that case.