more thirst; the tongue whiter; the urine of low specific gravity (1008), and highly acid.

July 14th. She had taken wine freely, and appeared altogether better. The throat was cleaner; her spirits were good, she swallowed with less pain, and enjoyed her food.

Since the above entry was made, the patient has rapidly progressed towards a perfect cure; and, the throat being quite clean, no further notes of the case have been preserved.

REMARKS. Allusion was before made to the supposition that the morbid poison which produced such havoc in this family, had been generated by putrefying matter in the neighbourhood. The action of such poison, from whatever source it may have sprung, appears to have been extremely various on the different members of the household. In the mother, true parchment-like membrane was deposited in abundance on the fauces; and the same appearances were observed in two, at least, of the three children who died at home; whilst, as before stated, in the little girl who came under our notice, the disease assumed the form of regular sloughing throat, accompanied by great depression and restlessness. This depressed condition was akin to that of the patient E. F., notes of whose case were given a week or two since. In the case now before us, there was none of that prostration, and the throat was that of the (so-called) true diphtheria. Seeing that in these five individuals such marked difference occurred in the symptoms (although all were exposed to the same causes of infection, whatever they might be), is it not reasonable to conclude, that there has been too great a disposition to over refinement in the classification of these throat affections? Is it not much better to take a broader view of the subject, and to rank all under one category? Given the morbid poison, we believe it is impossible to predicate the exact nature of the effects which will follow its introduction into the system. In one patient there may be sloughing throat and a typhoid state; in another, deposition of parchment-like membrane, with or without marked depression of the spirits and system. This membrane may extend some distance into the larynx, occasioning urgent dyspnoea, which, in children, will bear a strong resemblance to croup. We append brief notes of a case of this character.

CASE II. S. R., aged two years, was admitted on the morning of July 11th, with what was supposed to be croup. Her face was perfectly livid, and, of course, her respiration was accomplished with very great difficulty. She had been ill three days before admission. About half an hour after her arrival, tracheotomy was most successfully performed. Scarcely a drop of blood was lost, and the tube was easily introduced. Calomel and antimony were given every two hours, and at 3.30 P.M., two leeches were applied to the throat. The child was remarkably comfortable, according to the nurse's account, and sat up in bed and tried to feed itself during the evening. At 8 P.M. there was a return of the intense dyspnoea of the morning. Her strength was kept up with port wine, but she rapidly got worse. At 4 A.M. one convulsive struggle occurred about a minute before death.

At the *post mortem* examination a good deal of false membrane was found deposited on the lining membrane of the fauces, and in the larynx; but it did not extend below the inferior vocal chords. The heart and lungs were healthy.

Strictly speaking, the limitation of the deposit of false membrane to the larynx would compel us to call this case one of laryngitis. It was considered by those who witnessed the *post mortem* examination, that the greater part of the membrane resembled that found in diphtheritic cases. The operation having been so readily performed, and no bleeding having occurred to exhaust the child, it is, perhaps, fair to conclude, that had pure laryngitis or tracheitis alone been present, the fatal issue would have been warded off. And hence objections may be raised against the adoption of operative proceedings in these mixed and doubtful cases. But the admission of air to the lungs by tracheotomy, aerates and purifies the blood which is being rapidly poisoned; and such renewal of its vital functions may impart to the system a measure of vigour sufficient to enable it to throw off the effects of any morbid poison which had struck down the powers of life. Apart from all hypothesis, sufficient justification for surgical treatment of cases similar to the above suggests itself to any one who considers for a moment that frequently the prolongation of life for a few hours is of the utmost importance, more especially in private practice; and surely any means which will accomplish this end, even with no hope of ultimate benefit (though this is not altogether improbable), ought not to be left unemployed.

Original Communications.

THE APPLICATION OF CARBONIC ACID GAS TO THE INTERIOR OF THE BLADDER.

By T. SKINNER, M.D., Liverpool.

[Continued from page 551.]

III. *Advantages.* 1. *Safety.* By using a fixed volume of four ounces of the gas, allowing for rarefaction, over-distension of the bladder is perfectly impossible. I have fixed upon four ounces as the maximum; as in most cases of enuresis of long standing, the bladder is incapable of great distension. This quantity is much within the healthy standard; and it is the result of many experiments on different individuals. In every other respect, the method I have described is as safe as that of Dr. Johns.

2. *Simplicity.* The only comment required on this point is to refer to the double catheter of the other method, which requires to have one of the limbs plugged and opened, according to the sense of over-distension complained of by the patient, and which, according to my method, is never complained of. By the double catheter a current is produced which is by no means necessary; I should rather say it was detrimental. All that is wanted is contact of the carbonic acid, pure or diluted, as thought necessary, with the vesical mucous surface, for a longer or shorter period, with the removal of every source of motion or irritation, which currents of the gas, and unnecessary dilatation and contraction of the viscus, are certain to produce. As my instrument and method in every respect fulfil all those conditions, and as the injection or operation, if so it may be termed, occupies only a few seconds of time, I think I have given ample proof of its simplicity, compared with any other method.

3. *Portability.* The look of the instrument will speak for itself. The gazogene may be left at home; and the instrument may be taken in a carriage or the coat-pocket for many hours to any case, without the slightest detriment to the properties of the gas.

4. *Efficiency.* By Dr. Johns' and Professor Simpson's methods, the application appears to be temporary, lasting only while the double catheter remains in the urethra; whereas, by my method, the carbonic acid is locked up in the bladder for any length of time, being retained there by the sphincter vesicae, its partial or entire expulsion being at any moment under the control of the patient, so far as my experience goes. On evacuating the contents, the urine, by its gravity, comes first, the carbonic acid last. Some of my patients allow the urine to pass; and when the gas comes, which they know by the noise generally produced, they cease to micturate, the bladder being eased of the urine, but retaining the gas; in some cases the gas seems to be partially absorbed by the urine. One patient, Mrs. B., retained the gas nine hours; and, if examined at the end of this time, I doubt not it would be found to be carbonic acid by the ordinary chemical tests.

5. *Economy.* In the materials for the generation of the carbonic acid, one-eighth of the quantity used by other methods is all that is required for mine. Besides, by the methods of retaining the gas alluded to in the foregoing paragraph, the materials are still further economised, and the local anæsthetic and sedative effect is greatly enhanced, with perfect safety.*

IV. *Cases.* CASE I. February 1857. M. S., of North Berwick, aged 19, unmarried, a stout healthy farm servant, was obliged to give up work on account of what was thought to be obscure uterine disease. She was labouring under the generally recognised symptoms of irritable uterus, with irritability of the bladder, marked by frequent desire to pass urine. Every kind of treatment was tried, locally, in the form of chloroform and carbonic acid douches to the vagina and os uteri, pessaries of morphia and belladonna, etc.; counterirritation to the sacrum and loins by various means, Corrigan's cautery, mustard cataplasms, etc.; also belladonna plaster; and constitutionally, by tonics, particularly arsenic. The local means always relieved, but only during their application. On her way, in walking home, the symptoms always returned. Three times, at intervals of two days, I injected the gas into the bladder, the third

* Since writing the previous part of this communication, I find that *b* of the diagram is most durable and equally efficient made of wood, ivory, or metal, slightly hollowed; and the eye of the catheter *d* is preferable at the side than at the extremity.

time causing her to retain it till night, about six hours. After this there was no return of the symptoms whatever; she was sent home, and recommended to continue Fowler's solution in doses of three drops thrice daily. I heard from a friend of the patient's, residing in Edinburgh three months afterwards, that she remained quite free from all her symptoms, and was then engaged in service as a farm servant.

This was my first case. I used a common beer-bottle, with an elastic tube and single elastic catheter, No. 8, my thumb acting as a stopcock on the mouth of the bottle.

CASE II. Mrs. P., aged 32, married, thin and emaciated, had old standing uterine disease, with retroflexion, and constant inclination to micturate, from vesical catarrh. I did not keep very close notes of this case during the first months of the treatment, as it seemed to be one of a most unpromising nature, and very likely to disgust a practitioner, so far as a successful result was anticipated. Mucus, epithelium, and copious deposits of urate of ammonia, were the principal pathological products contained in the urine. Constitutional means were useless in abating these conditions, and the symptom of frequent micturition. At last, local injections of oil and balsams, and mucilage with narcotics, together with the use of tonics and attention to diet, improved the condition of the urine. For months it was kept healthy; but there was no relief to the frequent micturition. Suspecting that the retroflexion was at the bottom of the mischief, and as there was no tenderness or chronic metritis present, nor adhesions of any kind, I replaced the uterus, and kept it there for a fortnight by Simpson's uterine supporter; but still there was not the slightest change any way, for the better or worse. There was no lack of trial of the most approved means in this case; but the result was total failure, so far as the symptom of enuresis was concerned, until I tried the injection of carbonic acid into the bladder. The first injection was retained, with the urine, three hours; the second, two days afterwards, was retained five hours; on one occasion, she retained the urine eight hours. I injected this patient very often for nearly two months. She was decidedly improving, and apparently permanently, when, from some cause or other, she discontinued her visits, and I have never again heard of her.

CASE III. Miss K. S., of Liverpool, aged 25, of strumous habit, had laboured under disease of the genito-urinary organs for five years, of which the following are the leading symptoms and pathological conditions. Enuresis was so frequent as every ten minutes, night and day, sometimes almost involuntary, so that the patient had not time to get out of bed, making the patient's life no sinecure. Dysuria amounted to scalding; menorrhagia was present to such an extent that a nurse, knowing no better, shaved the hair of the pubis, to prevent the matting caused by the clots and flow. Strumous vaginitis of the most intense description, without any discharge, rendered an examination of the vagina and os uteri perfectly impracticable without the aid of chloroform. Uterine neuralgia had been, for two years, sometimes so intense as almost to drive the patient to seek relief in suicide; sometimes it appeared at stated hours, but most usually was irregular. There were intense hyperæsthesia and pruritus of all the external genitals; and, to the above symptoms was added, incessant vomiting of almost every meal for four or five years. There seemed to be strumous inflammation of most of the mucous surfaces, more particularly the genito-urinary; the labia majora were red and torn, from the scratching caused by the fearful pruritus; the nymphæ, clitoris, and external genitals were very red and irritable looking; the meatus urinarius appeared almost like a vascular tumour of the same; the hymen was entire, and the vagina much contracted and so sensitive as to preclude any possibility of an examination. Chloroform being administered, I found the vagina, os and cervix uteri, dry, and distinctly increased in temperature, though as smooth and round, but much larger and firmer, than was to be expected in a virgin where the hymen was entire. This latter aperturane of the virgin state still remains entire, even although my forefinger freely examined the os and cervix uteri, showing the value of chloroform in such cases, as regards the feelings of the patient and the relaxation of the tissues. The urine was loaded with mucus and epithelium; it was deficient in urea and its saline constituents, and ultimately showed the presence of albumen, which latter condition was checked by change of air, benzoic acid, and opium.

In this intensely interesting case, the injection of carbonic acid into the bladder was of the greatest value, giving relief at once to the violent paroxysms of the womb and to the enuresis, reducing the latter to two or four times a-night, instead of

twenty times and more, and ultimately very nearly to a healthy standard. In regard to the safety and efficacy of my method of injecting the bladder, this patient is a living memorial. She was injected many times twice a-day, and sometimes three times, and made to retain the carbonic acid as long as possible. No means (chloroform excepted) could have relieved the intensity of the paroxysm of neuralgia of the womb so quickly and effectually as the injection of carbonic acid into the bladder, and allowing it to remain. Doubtless, other means were adopted, as opium, heat, etc.; but the good effects of the injection of carbonic acid were so self-evident that I cannot, nor could the patient, help attributing the speedy abrogation of the pain to the injection; more particularly as the same result always speedily followed every injection.

CASE IV. Mrs. B., married, aged 43, of nervo-bilious temperament; has had no children. She had been treated for ulceratio uteri, and a variety of other conditions, by other physicians, to relieve enuresis, without the slightest benefit. One obstetrician ordered the injection of carbonic acid gas into the vagina, to be continued some months, with change of air: this, after some time, palliated her miseries; but they all immediately returned, and would not yield to it again. He also injected the bladder with nitrate of silver, in the proportion of five grains to an ounce of mucilage, three times, with some alleviation; but still the symptoms returned. The urine in this case had always been loaded with uric acid, urate of ammonia, and oxalate of lime, sometimes alternating with abundance of phosphates. In the former condition, the urine was highly acid and of high specific gravity; in the latter, it was the very reverse,—this was independent of treatment or regulation of diet. Pus or blood was never present. The urine was brought to a healthy standard, and kept so for many months, without any alteration in the symptom of enuresis, the bladder all the time requiring to be emptied every half hour or hour, and every three or four hours when the patient was in bed. This morbid symptom, and a pain referred to the neck of the bladder and shooting up the groin and round the pelvis, were always increased by warm injections into the vagina, by carriage-exercise or much walking, by a sudden noise or appearance, by the presence of society, or of a gay assembly or concert. Wine, and other stimulants, had a similar effect; and, by their impression made on the stomach, the bladder began to expel its contents, leading the patient to suppose that "wine, or such like, ran straight through her." All her pains, and even the enuresis, were relieved during the catamenial period, leading one to believe that the symptoms were no way allied to inflammation or congestion; and as pus or blood was never observed and the urine was kept natural, there was no reason to suspect ulceration of the bladder. The uterus and rectum were all right; there were no ascarides, but only trifling hæmorrhoids. I concluded the case to be one of hyperæsthesia of the internal coat of the bladder. There was an intensely sensitive spot in the canal of the urethra, about an inch from the meatus, making the passage of a catheter, even No. 3, very painful; and pressure on the spot from the vagina was almost equally unbearable. This case is still under treatment. The patient has been ordered to the south of England, at her own request, to recruit her health previous to having the super-sensitive spot of the urethra cauterised.

I have given the details of this case in order to show the specific power of carbonic acid gas in regard to pelvic pain, when injected into the bladder; more particularly, as showing its specific action in regard to the symptom of enuresis, which the following observations will prove. All constitutional and local means failed to relieve the enuresis with effect, until the bladder was injected with carbonic acid gas. Previously to its exhibition, the bladder was forced to expel its contents every half hour or hour of the day; and this for several years, three or four. On the first or second injection, the urine as well as the gas were retained five hours. The sympathetic pain passing up the groin and round the pelvis disappeared within fifteen or twenty minutes after each injection, and remained away for many hours. Immediately after each injection, the patient experienced a glow of warmth or burning almost amounting to a feeling of discomfort within the pelvis; this was shortly followed by a remission of every pain, and a feeling of real comfort that the patient had been a stranger to for four or five years, with the exception of trifling periods of natural remission. The first five or seven injections relieved the enuresis; but ultimately this symptom became aggravated, in consequence of the irritation produced by the passing of the catheter through the urethra, causing *ardor urinæ*. Smaller catheters were used, down to No. 3; still this small tube increased the

sensibility of the urethra to such an extent as to force me to stop the injections until the urethra was canterised; which gives additional proof, if such were required, of the folly of specifics. I have no doubt in the slightest that the enuresis in this case chiefly depended on the hyperæsthesia of the spot I have alluded to; and I may add, that I would not have given any of my incomplete observations on this subject to the profession, unless Dr. Johns had given his, as my observations and cases are far from being so satisfactory as to be considered properly digested, the subject being only in its infancy.

I have chosen those cases from among many, not that they are the most curative and successful, but as the best to illustrate the subject of my paper.

[To be continued.]

MALARIOID REMITTENT FEVER IN CHILDREN.

By C. HANDFIELD JONES, M.B., F.R.S., Physician to St. Mary's Hospital.

THERE is a form of febrile disorder occasionally met with in children, which does not correspond to the description given by our best authorities of remittent fever, and is further differentiated by the effect of remedies.

A child of 2 to 6 years old (I sketch the limits of which I have notes) has been gradually losing health for several days or weeks; it is languid, drooping, emaciating, and, without appetite, more or less thirsty. The night is the time of most disorder; there is considerable cerebral disturbance, quite amounting to delirium in some cases, in others marked by "horrible dreams", talking in sleep, and great restlessness. In some there is at night also copious perspiration. The child may be apyretic during the day, but becomes feverish at night. The bowels may be costive or much relaxed. The tongue is clean in some, in others coated. In these cases, I have found quinine of decided curative efficacy; improvement taking place, under its use, in a way that could not be referred to the unaided *vis medicatrix*. A child of five years old has taken eight, and another of four years has taken six grains daily, with great benefit. Cod-liver oil and steel wine may sometimes be given also with advantage.

I am much inclined to consider these fevers as of malarious character, using the term in a rather wide sense, as applicable not only to marsh miasmata, but to other ill defined poisons which may be generated even in cities. I do not think the disease in question is typhoid fever; it does not appear to tend to a spontaneous termination, or to have a definite period. Its pathological affinities, as far as I can judge, are in the direction of neuralgia and dysentery or diarrhœa.

Transactions of Branches.

CAMBRIDGE AND HUNTINGDON BRANCH.

ON DIPHTHERIA: WITH THE RESULTS OF THREE HUNDRED AND FIFTY CASES.

By THOMAS STILES, Esq., Pinchbeck.

[Read July 8th.]

It would be presumptuous on my part to trespass on your time by dwelling on the controversy whether "Diphtheria" is or is not a new disease in this country. I prefer limiting my observations to facts derived from my own experience.

To me, diphtheria is a new disease, requiring new remedies, the routine commonly adopted in the treatment of other affections of the throat proving valueless, if not highly injurious. Allow me, however, to draw your attention to the points of difference between the epidemic as it has presented itself to me, and "the putrid sore throat" of Dr. Fothergill; connected with which, he assures us, "the whole habit suffers, as if by a stimulus of a peculiar nature, and although the throat is always more or less affected, yet it is sometimes the least part of the patient's complaint." "Again," he observes, "this disease is accompanied by fever of an intermittent character; by a greater tendency to delirium than either a common angina, or almost any other distemper we are acquainted with." Purging and vomiting too frequently occurred. Now, the most remarkable characteristic of the form of diphtheria I have met with is, that the constitutional disturbance is not at all in proportion

to the local mischief. Indeed, in the majority of cases the patients have pursued their usual avocations, complaining only of soreness of the throat and stiffness of the neck; yet, on inspection, the tonsils would probably be found to be excavated and covered with an exudation of plastic matter. The disease appeared entirely local, and unaccompanied with any "discoloration of the skin in the face, neck, breast, and hands," which Dr. Fothergill assures us is an "obvious and distinguishing characteristic of the putrid sore throat."

Diphtheria has shown itself in my practice in various degrees of severity.

The first class of cases has been characterised by stiffness of the neck, soreness of the throat, swelling of the cervical glands, and a sense of rising in the throat not unlike *globus hystericus*. On inspection, the tonsils have been found much enlarged; the pharynx, indeed the entire fauces, the soft palate and uvula, of a uniform red colour, without either ulceration or exudation.

In the second class, the tonsils have been enlarged with an abrasion of the epithelium, more or less coated with a pelticular membrane; or there would be distinct spots resembling ulceration, which gradually coalesced and formed an excavation in one or both tonsils, the floor of which exhibited an ash-coloured slough, not unlike leather, and surrounded by elevated edges of a violet colour.

In the third class of cases which have come under my care, from the very first the fauces have been filled by a fibrinous exudation, which seemed to cover an ulcerated surface; occasionally, there has been extensive sloughing, accompanied by the foulest fœtor of the breath, probably more the result of the decomposition and putrescence of the faucial exudation than from actual gangrene. Fever of a typhoid character, headache, drowsiness, extreme prostration, and sudden depression of the vital powers, have been the symptoms.

During the last six weeks upwards of 350 cases have occurred in the district in which I reside, which contains 3,000 inhabitants, and extends over an area of 15,000 acres. An ancient drain, called the Hammond Beck, divides that portion of the parish which formerly constituted the "Fen" from the old enclosed lands: and in the vicinity of this drain, and of some offensive pits not very distant from it, the epidemic has prevailed with the greatest virulence, extending, however, with great rapidity to all parts of the parish. It equally affected both sexes; and though some men of advanced age were attacked, yet the age of those who have been chiefly sufferers was between two years and twenty-five; no infants, and only one female exceeding thirty; and it is worthy of remark that the well fed, and those who enjoy the advantages of a comfortable home and free ventilation, have escaped the severe forms of the disease.

CASE I. The epidemic commenced on March 1st. A child, eleven years of age, first fell a victim to the disease on the sixth day. When my attention was called to the case, the throat presented the frightful condition I have described in the third variety. Death in this case appeared to result from the exudation of false membrane extending into the larynx and trachea. This was the first case I had witnessed. During forty-five years professional experience I had never met with an affection of the throat bearing any analogy to it; but on referring to the statistical nosology, I did not hesitate to return the cause of death "Diphtheria."

CASE II. On April 13th, six weeks afterwards, I was summoned to see a child five years of age, reported to be dying of croup. The glands of the neck were enormously swollen: there was a distinct gurgling in the throat, but there was a total absence of the stridor, so characteristic of croup. On inspection, the pharynx and surrounding parts presented one entire mass of membranous exudation, in a putrefactive state, occasioning the foulest fœtor. Death occurred a few hours afterwards; caused, I have no doubt, by the deposit closing the glottis.

CASE III occurred on May 14th, a month later, in a girl ten years of age; it terminated fatally on the eighth day. This case was remarkable in consequence of the extension of the disease along the Eustachian tube, occasioning deafness and extreme pain in the ear.

CASE IV. May 21st. A female, aged fourteen years, sank on the sixth day, in consequence of sudden depression of the vital powers. It was at this time that the disease began to spread with frightful rapidity.

CASE V. May 24th. A young man, aged eighteen. Death, which was the result of depression of the vital powers, took place on the seventh day.