REMARKS

ON

THE APPLICATION OF SIMPLE COLLODION TO
THE MEMBRANA TYMPANI IN THE TREAT-
MENT OF VARIOUS DISEASES OF
THE EAR.*

By WILLIAM A. MCKEOWN, M.D.,

Surgeon to the Ulster Eye, Ear, and Throat Hospital, Belfast.

THE subject of the paper, as noticed in the JOURNAL of the Association, is "The Treatment of Relaxed Membrana Tympani". My experience, however, has so extended since I furnished that title to the Secretaries of the Otological Section, that a very comprehensive title would be necessary to give an adequate idea of the scope of this paper. I purpose, in fact, to deal with many of the questions of aural surgery, as, for example, the treatment of relaxed membrane; the prevention of the adhesion of the membrane to different structures within the tympanic cavity; the rupture of adhesions; the maintenance of the normal relation of the membrane to the ossicles, and of the ossicles to each other; the prevention and relief of labyrinthine pressure; the prevention of the shortening and retraction of the tensor tympani; and the mode of keeping a perforation of the tympanic membrane open for a time more or less long.

At first sight, it may seem strange that so many of the evils met with in cases of aural disease should be classed together; but I trust to show that they are closely linked together in cause, and equally so in treatment. It may, I think, be laid down as fundamental, that almost all the evils specified arise directly from a drawing in or pushing in of the membrane of the tympanum, during the course of catarrhs of the Eustachian tube and drum. The first object of treatment, therefore, should be to keep the membrane in its position, and replace it when it gets out of it. This has been practically recognised for some time; but the means employed are frequently inefficient and sometimes injurious. The inflation of the drum by Valsalva's method, by Politzer's, by the Eustachian catheter, suction on the membrane by the air-pump, and air-tight occlusion of the meatus, as recommended by Politzer, all aim at this. We all know how often the improvement on inflation is of very short duration, perhaps for a few minutes, a few hours, or a few days; and how often it is totally useless. I question whether any of us have an idea how often violent inflation brings about more or less relaxation of the membrane, and disarrangement of the delicate balance normally existing between the ossicles and the structures with which they are connected. Further, when changes have existed for some time, and the ossicles have taken up a new and faulty position, in which they have become settled, what influence can a momentary insufflation have on parts which have become the subject of structural changes of a more or less permanent character? If the membrane have been too much depressed for months or years, and the tensor tympani have become, as a consequence of the prolonged approximation of its origin and insertion, shortened and retracted, will insufflation have the slightest chance of lengthening it? Experience answers in the negative. We really require some powerful slowly acting agent, whose influence will be exerted for long periods. This we find in collodion. Applied on the membrane, it adheres tenaciously, contracts considerably, diminishes the concavity of the membrane, pulls it with the handle of the malleus outwards, increases the resistance of the membrane, and exercises a far-reaching influence on the middle and inner ear.

Whilst experimenting some time since on sound, I required fine membranes made very tense. I found it occasionally difficult to have the membranes free from wrinkles and depressions. It occurred to me to apply collodion; and I found that, by its aid, I secured perfectly smooth and tense membranes. Afterwards, reviewing the cases which came before me daily, for which aural science so far had done nothing, I thought I might at least relieve one class, viz., that in which relaxation of the membrane was a prominent sign. Surely a relaxed membrane could be tightened up, just like the lax membranes with which I had been experimenting. On my first trial of the collodion, I used it too sparingly, and the improvement which resulted did not last long. On the 2nd of May last, I tried it thoroughly in a case which had been under my care

for three years, and for which I had ceased to do anything but give a placebo. As this case brings out a number of points in a striking manner, I will give a short statement of the most salient.

CASE I.—Jane H., aged 41, spinster, was under my care from time to time for three years for catarrh of the drum and its results, and treated by me according to recognised methods. With the left ear, she heard my voice (moderate tone) at a distance of three feet, but hearing varied much. The noises in her ears were of the most distressing kind. At times, the noise was like that of a thunderstorm; again like that of machinery; sometimes like the blowing of a horn. The sounds of other persons' voices were greatly confused ("entangled", as she put it). Her own voice seemed to her to have a most unnatural tone. She formerly sang in church; but since she became deaf, her own voice seemed to her so inharmonious that she was obliged to cease singing. At times she was quite bewildered; and she told me that she believed her noises would have made her mad, had she not been obliged to earn her bread. On examination of the membrane, I found a number of depressions between the upper part of the handle of the malleus and the posterior wall of the meatus. All these depressions became bulgings on inflation of the drum by Valsalva's method. I applied collodion freely. Her hearing was immediately improved, and continued steady. She came to hear my voice (moderate tone) at the distance of eighteen feet, and the noises in the ear ceased. The confusion of voices and the unnatural character of her own voice also disappeared. Now she can sing as she used to do. The depressed part became quite flat. On July 29th (that is, about three months after the application), I thought the layer of collodion was loose. I syringed, and found that the loosening was only partial, and it did not come away at all readily. The hearing remained good, and the depression had disappeared, probably owing to the long-continued bracing up. The membrane seemed too lax, however, and I put on another coat two days afterwards.

I shall only add another case out of many of a similar kind.

CASE II.—Sarah H., aged 44, a widow, came to me on July 28th. With the right ear, she could hear a moderate voice at the distance of two and a half feet. There was no noise in the ear. I found a depression behind the handle, and the incus quite close to membrane. There was a distinct flap on insufflation. The depression disappeared, showing that I had to deal with simple relaxation without adhesion. I applied collodion. On July 31st, she heard a moderately toned voice at a distance of nine feet. The membrane behind the handle was at this time flat.

And now I will endeavour to detail, step by step, the important results which have followed from my primary idea. For the sake of clearness, I will now put aside the flapping membrane, and deal with other forms of depressed membrane. We have, then, firstly, the uniformly depressed membrane, with or without adhesion, at or near the tip of the handle, the change being mainly an exaggeration of the natural concavity of the membrane; and, secondly, the irregularly depressed membrane, with adhesions. I thought that, if collodion would brace up a flapping membrane, it would surely tighten up a membrane depressed and tense, and restore the ossicles either quickly or slowly to somewhat of their normal position and relations.

Collodion does not act at all uniformly in these cases. It has brought about the following results in my hands.

1. It has torn through an adhesion of the membrane to the promontory, leaving a perforation.
2. It has pulled the membrane and handle outwards, diminishing the concavity generally, and restoring mobility to the membrane and malleus.
3. It has demonstrated adhesions by pulling the non-adherent parts outwards, leaving a well-defined depression at the seat of adhesion.
4. It has ruptured the dermic and fibrous layers of the membrane, leaving the mucous membrane exposed.
5. It has improved the hearing in the majority of cases—in some instances remarkably.
6. It has sometimes diminished, and at other times removed, noises and other unpleasant subjective sensations.

I will now endeavour to prove what I have said by the reports of cases.

It may tear an adhesion, and leave a perforation.

CASE III.—John C., aged 35, consulted me on June 19th. He stated that he had been becoming gradually deaf for four years. With the right ear he heard at the distance of one foot a moderately loud voice; with the left at a distance of two feet. He had a constant throbbing in the ears, and always heard a noise like that of a loud storm at a distance. His ears felt plugged. His family doctor recommended him to use Valsalva's method, but it was only with the greatest trouble that he had been able to inflate the drum. I asked him to try, and I found that he did not succeed till he had blown repeatedly. By Politzer's method, I inflated the drum at once, and there was a distinct flap of the membrane.

* Read in the Subsection of Otology at the Annual Meeting of the British Medical Association in Cork, August 1879.

On observing, whilst he inflated the drum by Valsalva's method, I found the tip and handle were quite unmoved, whilst the posterior part of the membrane moved well. Suction relieved his noise temporarily. There was too great concavity of the membrane, and a white spot was noticed anterior to the tip of the handle, and a whitish reflex through the membrane from the inner wall of the tympanum. The usual treatment brought no improvement. On June 22nd, I applied a coat of collodion on the right membrane, and sent him home. On June 29th, he returned. I syringed and removed the collodion, and found that there was a round perforation at the white spot previously observed. He could blow air through it easily. I injected medicated fluids through the tympanum from the meatus twice daily, every day, except the first. On the fourth day, the perforation was closed. I applied collodion to open the perforation. On July 4th, the membrane was open again, and remained open till the 7th inclusive. I repeated fluid injections as usual, sometimes once and sometimes twice daily. No inflammation occurred. On June 3rd, I put a coat on the left membrane. On the 5th, I found a linear tear at the lower part of the membrane, and, when he inflated the drum, a bulging of a reddish colour took place. No doubt this was the mucous membrane of the tympanum which had not been ruptured. I did not complete the perforation. On July 10th, I noted that there was still a bubbling sound in the right ear on inflation, and that I could observe air-bubbles inside the tympanum. He could hear me with that ear at a distance of three feet as well as he used to do at one foot. As regards the left ear, there was no change whatever in the hearing; but the membrane and handle moved, and he experienced no trouble whatever in inflating the drum. There was no improvement whatever in the noises at any period of the treatment, except momentarily during suction.

The following is another case of rupture of the dermic and fibrous layers of both membranes, pulling these and the handles outwards.

CASE IV.—James S., aged 29, came to me on June 14th. He stated that he had been deaf for fourteen years. He heard a moderate voice at one and a half feet off the right ear, and one foot off the left. Upon insufflation, the membrane of the left ear moved, but the handle remained stationary. The membrane was too much depressed. On June 23rd, I punctured the right membrane, applied collodion peripherally to keep the puncture open, and injected a weak solution of caustic potash afterwards from day to day. I kept the puncture open for a considerable time, but I have not noted the exact number of days. I applied collodion also on the left membrane; it contracted so much that it caused a long slit through the dermic and fibrous layers. The hearing was improved in the right ear to the extent of three feet, and in the left to two feet. The mobility of the membrane and that of the handle of the malleus was restored and the concavity diminished.

CASE V.—Mary R., aged 31, was with me in February 1876, when I noticed that the membrane was much depressed, particularly anteriorly. The short process was prominent, the long process foreshortened. I saw her again on the 1st of August last. She could hear me speak close to her ear. She experienced a constant singing noise; the membrane was depressed, at the tip of the handle especially. Insufflation made no change. I could not say whether or not there was an adhesion of the membrane to the promontory. I applied collodion. When it dried, I found the handle of the malleus standing out; but in front there was a deep depression, which evidently indicated adhesion. The hearing was improved up to a distance of about four feet, but the noise remained unchanged.

CASE VI.—Mary S., aged 40, consulted me on July 25th. She heard with the left ear a moderately toned voice at a distance of four feet, and with the right at a distance of two and a half. She had experienced a singing noise as long as she could remember. Both membranes were much too concave. Air passed in slightly by Valsalva's method. By Politzer's method, the drums were inflated, and the hearing was thereby increased to a distance of seven feet, but the improvement began to diminish immediately. I found that the membranes moved when she used Valsalva's method, but still remained too concave. I applied collodion to both membranes on her first visit. On July 30th, she heard with each ear at eighteen feet distant, but did not think the noise was lessened. The improvement in the hearing continued. On August 1st, she reported that the singing had never been so slight.

The next case illustrates the improvement in hearing, with total cessation of noise, though with adhesion of the membrane to the promontory in one ear not ruptured.

CASE VII.—Eliza M., aged 67, consulted me on July 22nd. She stated that she had been deaf for nine months. With the right ear she heard my voice (moderate tone) at a distance of one and a half feet; with the left ear she heard at three feet. A noise like that from a seashell had subsisted for six months. I found the right membrane opaque and depressed. In front of the tip of the handle there was a dimple. The left membrane showed a considerable depression, affecting the

whole space in front of the handle; while the handle itself was foreshortened and its short process prominent. The Eustachian tube was patent. Inflation improved the hearing distance of the right ear up to six feet. In the left ear, the hearing remained at three feet. I applied collodion. On July 24th, she heard with each ear a low voice at fourteen feet, and subsequently the hearing improved still further, and the noise disappeared. The depression of the left membrane was very considerably reduced in extent, and the handle was pulled out. I have not a note of the state of the right membrane.

The next two cases illustrate an extreme degree of collapse, localised at the posterior part of the membrane—the membrane being pushed in so as to clothe, as it were, the incus and the inner wall of the tympanic cavity.

CASE VIII.—John H., aged 25, consulted me on July 28th. The left ear had been deaf four years. He never suffered from any discharge from the ear. He was troubled with a constant singing noise. He heard my voice (moderate) at a distance of one foot and a half. There was a remarkable depression behind the handle of the malleus. The membrane was actually pushed in in such a way as to clothe the incus and articulation with the stapes. Below, it was in contact with the inner wall of the tympanum, as shown by touching with a probe. On insufflation, air passed slightly, but no change in the hearing ensued. I applied collodion freely on July 28th. On July 30th, he thought he was only a little improved. The membrane was lifted up between the incus and malleus. There was still a depression below and one behind the incus. On July 31st, he heard a moderate voice at a distance of four feet. On August 1st, the noise was less. I used the Eustachian catheter, but no change ensued.

CASE IX.—Mary P., aged 40, had been under my care in 1874. I noted at that time depressions in both membranes. She came again on my invitation on August 2nd. She stated that even when a young girl she could not hear well, but she had been pretty much as she was now for fifteen years. When she was with me five and a half years ago, I gave her acetic ether to inhale and blow into her ears; but she did not think it did her any good. Afterwards, she used some popular remedy, with negative results. She heard a noise like that of rushing waters when with me previously, but she had had none for some time. She heard my voice (moderate tone) with each ear at a distance of two feet. The left membrane showed a deep depression of the whole membrane behind the malleus. The membrane was bright posteriorly, but showed anteriorly a white patch, as if from a deposit on the inside of the membrane. The depressed part lay upon the incus, and there were two deep depressions between the incus and the posterior wall of the meatus. The right membrane behind the handle was depressed, but was not quite in contact with the incus. There was some depression also anteriorly. On insufflation, there was a flapping of each membrane. These depressions of both membranes were generally reduced, but the part of the membrane behind the incus in the left ear was unchanged. This was evidently a case of relaxed flapping membrane, with adhesion behind the incus in the left ear. I applied collodion to both membranes. The right ear heard at six feet of distance, whereas previously it could hear only at two. The greater part of the depressions of the left membrane were elevated, but there was at first no change in the hearing. I believed that I had applied too little collodion to the left membrane. I applied more just before leaving for this meeting, and have not had an opportunity of ascertaining the result definitely. [See "Addendum".]

And now, gentlemen, I come to a question which has exercised the ingenuity of aural surgeons for a considerable time: viz., how to keep a perforation of the membrane open for a longer or shorter period. You are aware that even considerable sections of the membrane heal with such facility, that artificial perforations are seldom resorted to. Healing, in fact, takes place in from one day to four or five days, and surgeons have found it inexpedient to repeat the process. I leave it to the future to determine in how far the method I have already indicated in the reports of some of my cases, and which I will now describe, may replace all former methods of intratympanic medication. If we can, as I shall endeavour to show, keep a perforation open for a considerable time, and use injections, or pump through the ear vapour, not once every few days, but once or twice daily, surely, if intratympanic medication be of any value (and I may express my conviction that there is a great future before it), we will be able to carry out treatment much more efficiently through an opening in the membrane than through the Eustachian tube. But, it may be asked, how can collodion effect this object? Its action differs in no respect from that in the case of relaxed membrane. When a section is made, and collodion applied on the membrane peripherally, the contractile action makes the margins of the wound gape; and applications renewed from time to time may keep up this gaping for a considerable period, and perhaps render the opening permanent. I put

the plan to the test in one of the worst cases under my care. The following are my notes.

CASE X.—John M., aged about 70, had been deaf for very many years, after a severe cold. He had been coming to me for some time, but I observed no change from treatment. I was obliged to shout close to the right ear to make him hear. The membrane was depressed generally, and so changed in character that not a single part of healthy structure was to be seen. I could not recognise the malleus. He was unable to inflate the drum; but, by Politzer's method, I succeeded in passing a very little air into the drum, and I found a part of the membrane, about a line in diameter, moved slightly. I perforated it, making an opening of not a line in length, and I found it was not easily made. I applied collodion peripherally, and for eleven days injected medicated fluids. Although he had such difficulty in inflating, fluids passed from the meatus through the nose in a regular stream from the very first. No improvement in hearing had taken place when I saw him last; but the Eustachian tube had become so open that he could inflate easily, and the anterior segment of the membrane moved.

In another case, I tried what collodion would do in keeping open a mere pin-hole perforation in a thickened membrane.

CASE XI.—John C., aged 73, deaf of the right ear for very many years, has been under my care for some time. I was obliged to speak close to the ear to make him hear. The membrane was rigid looking, thickened, and rather flat. I inflated the drum very imperfectly. He was troubled with a constant noise resembling an escape of steam from a loose joint. I punctured the membrane on July 21st, and injected for several days, with no improvement. I did not carry out the collodion treatment as efficiently as I might perhaps have done; but at any rate the opening was on July 28th a mere pin-point, and I thought I would give up the injection and try to keep this point open. I applied collodion on the membrane, and from day to day injected through the ear, by Politzer's method, vapour of iodine, chloroform, and acetic ether. The ether and vapour whistled through quite freely. The peculiar noise from which he had suffered so long entirely disappeared during the treatment by injection with vapours. On August 2nd (the day I left Belfast for this meeting), I found the pin-hole point still open. N.B.—On my return, two weeks afterwards, the small opening was closed, its site being indicated by a little clear depression, and a little noise had returned. It will be observed that this small opening was kept patent for at least twelve days. I trust I have given sufficient data to secure for this method of intratympanic medication at least a fair trial.

The possibility, by means of collodion, of rendering an opening permanent has been already hinted at. I have not yet met with a case in which that could be considered a desirable object, and therefore have not put it to the test. It is obvious that, for this purpose, the opening should be considerable (indeed, a circular or oval piece should, perhaps, be removed); that intratympanic injections of fluid should not be used; that the ear should be allowed to have comparative rest. If the margins can be made to gape widely enough for some time, the cut surface may cicatrise, and thus a permanent opening be secured.

I may remark, in passing, that all the methods hitherto adopted are violent methods; and, in fact, quite opposed to the dictates of our experience in other branches of surgery. Who ever heard of the margins of a wound on the skin being kept open by pressing into it a foreign body? If we cut across a cicatrix from a burn in the neck, we do not try to prevent union by pledgets of lint in the wound, but by keeping the margins widely apart by traction, exerted by keeping the shoulder down and the head to the opposite side, and so in other parts of the body. When a bougie of whalebone, or Politzer's eyelet, or any other contrivance, is put into a perforation in the membrane, irritation is kept up, the margins are kept raw, contraction takes place, and the foreign body must either be removed, or the membrane ultimately casts it off. The plan I suggest is founded on a principle totally different from anything hitherto adopted in aural surgery, viz., peripheral traction.

But, if the contractile power of collodion will do so much to remedy the evils resulting from tympanic affections, can it prevent them? May it be applied in cases in which there is catarrh of the Eustachian tube and drum? The following case bears on this point.

CASE XII.—Owen C., aged 40, consulted me on July 28th. He stated that he had been ill one month; that his left ear was deaf; that he felt stupid, and had a feeling of great weight on the left side; and that he experienced a constant noise like that of a waterfall. He heard my voice (moderate) at the distance of two feet with the left ear. The membrana tympani was vascular in parts, dull at others, and in particular depressed posteriorly. It was quite dry. He could not inflate the drum by Val-salva's method, and there was no sound heard on swallowing. The air passed in with much difficulty by Politzer's method, and I heard a bubbling sound. The hearing was improved to a distance of eight feet. There was a good deal of pharyngeal catarrh. I applied collodion to

the membrane to prevent collapse and adhesion. The depressed part was rendered tense. On July 29th, though he could not inflate the drum, the feeling of weight and the noise were almost completely gone. He heard me read in a very low voice at the distance of ten feet. On insufflation, I did not detect any bubbling, but there was quite a musical sound, probably from some obstruction. On August 2nd, he heard a whisper at ten feet distance. Of course I employed other treatment, directed to the pharynx and Eustachian tube; but the case shows that collodion may be used as an auxiliary without causing any pain or inconvenience, notwithstanding a catarrh of the drum with free exudation.

I have had many other cases, more or less interesting, but I cannot further extend the paper. I may add that you must not take the cases as in any respect exceptional. The employment of collodion has come to be with me a matter of daily resort. In fact, on July 28th and 29th, I applied it in eleven cases, some of them already described, which came before me in the ordinary course of public and private practice—once in subacute catarrh; six times for regular depression; once for extreme collapse of the membrane; once to keep a perforation open for tympanic injection; twice to flapping relaxed membrane.

It now only remains for me to refer to the prevention of the retraction or shortening of the tensor tympani, and the relief of intralabyrinthine pressure. If we accept, and I think there is no ground for disputing it, that the depression of the membrane and handle of the malleus approximates the points of origin and insertion of the tensor tympani, and if the in-pushing of the handle leads to pressure of the stapes in the fenestra ovalis, then it can hardly be open to discussion that the maintenance of the normal curve of the membrane will prevent both these consequences, and the evils resulting therefrom, immediate or remote.

I, therefore, claim for collodion an extensive use. There seems to be an analogy between its action on the ear and that of atropine and iridectomy on the eye. As atropine prevents adhesions and breaks them up, and thus saves the eye from repeated attacks of iritis, may not the tightening of the tympanic membrane at the period of the attack save the ear from future danger in a similar way? As atropine and iridectomy save the optic nerve from injurious pressure, may not collodion prevent tension on the acoustic nerve by easing the stapes in the fenestra, and thus keep the nerve safe till the tympanic or Eustachian disease disappears? I am much pleased, gentlemen, to have had the opportunity of submitting my observations to the criticism of this the most important meeting of aural surgeons ever held in these kingdoms.

ADDENDUM.—Since the publication of the abstract of the foregoing paper in this JOURNAL, I have had several inquiries regarding the mode of application of the collodion. Some supplementary remarks may, therefore, be acceptable.

It is prudent to have an idea of the contractile property of the particular specimen to be used, by pouring a few drops on the back of the hand, and taking the dimensions of the patch by compasses, both before and after contraction takes place.

In case of relaxation and depression of part of the membrane, the whole of the depression and a rim surrounding should be painted. If the whole membrane should be too much depressed, then a rather free coat should be applied over, at any rate, the lower three-fourths of the membrane.

I may note that cases characterised by immediate improvement after inflation and quick relapse are almost certain to be greatly relieved at once by collodion. I commonly paint it on with a camel-hair brush. It must be done quickly when several touches are necessary. Sometimes, when the case is so bad that rupture of the membrane or of adhesions may be desired, I pour a few drops on the membrane through a speculum, and then turn the head with the ear downwards, so as to allow part to run out. In fact, if it were at all easy to apply a drop on the membrane, that plan would be preferable to painting with a brush. For two or three minutes after the application, patients complain of a burning heat, and, after contraction takes place, a feeling of constriction is experienced. A little pain is occasionally felt.

The collodion does not adhere to the walls of the meatus. After the application, it is usual to find membranous patches of collodion in the meatus, obstructing the view of the membrane more or less. These may be removed. Sometimes, however, a patch standing out may be connected firmly with the coat on the membrane. In such case it must not be removed, as traction might be exerted to an injurious extent on the membrane, and the membrane would either be ruptured or the dermic layer pulled off with the collodion.

If it should be desired to remove the collodion, it is not at all easy to do so, even after the lapse of a long time. To effect its removal, I syringe gently with warm water, having some sulphuric ether added to

it. More trust must be put in time than force—indeed the utmost gentleness must be used. I usually succeed in a few minutes.

APPENDIX.—The result in the case of Mary P., on whose membrane I applied collodion on August 2nd, is so interesting that I think it well to complete the history. After returning from Cork, I saw her on August 18th. She stated that, after the application, she had had pain in the ear; that on August 7th (that is, five days after the application), she had a slight discharge, which had since continued. On examination, I observed an irregular rupture of membrane at the postero-inferior segment, with some discharge. The opening was considerable. Air whistled through when she inflated the drum. I thought it well to inject weak solutions of iodide of potassium, carbonate of soda, and caustic potash. This I did for a week, but without improvement. I ceased the injections, and resolved to try how long I could keep the perforation open. I applied collodion on the membrane, so as to exert traction on the margins of perforation, and ceased further treatment. The ear has been perfectly dry ever since and free from pain. On September 8th, the perforation was round, and at least three-quarters of a line in diameter. For some time the hearing had not improved; but, on the date mentioned, she could hear a very moderate voice at ten feet, whereas she had formerly only heard at the distance of two feet. The important fact to be noted is that, from August 7th till September 8th, a perforation was kept open by the very simplest means.

THE PRESENCE OF FAT IN THE URINE.

By THOMAS OLIVER, M.B.,

Physician to the Infirmary, Newcastle-upon-Tyne.

ON reading a foot-note in the chapter on Chylous Urine, in Dr. Roberts's *Handbook on Urinary and Renal Diseases*, I see that, while he is fully aware of the occurrence of cases in which the fat which is present in the urine is globular and not molecular, he is unwilling (and I think rightly) to regard them as belonging to the same series of cases as those comprised under chyluria. And certainly they differ in a few respects. As the two cases I am about to report resemble a case published by Dr. Bramwell in the *Edinburgh Medical Journal* for 1858, p. 714, about which there seems to have been some doubt, I may be excused for thus bringing forward a paper to substantiate what has already been observed. In speaking of the characters of chylous urine, Dr. Roberts says: "On standing awhile, it sets spontaneously into a trembling coagulum, which, after a time, redissolves and breaks up into flaky clots. Not unfrequently, this coagulation takes place within the bladder, and occasions serious pain and difficulty in micturition. The milky appearance of chylous urine is due to the presence of a finely divided fatty or oily matter. This is thrown up as a creamy layer after the urine has stood for some hours. When chylous urine is agitated with ether, the fat is dissolved, and the secretion assumes the transparency and colour of healthy urine... Chylous urine is invariably coagulated by heat and nitric acid. The specific gravity is generally below the average. When examined microscopically, chylous urine is found to contain a variable number of granular nucleated corpuscles, like those of mucus or chyle, and generally, but not always, red blood-discs. The fatty matter almost invariably occurs in the form of excessively minute granules (resembling the molecular base of the chyle), which are not resolvable into visible globules under the highest powers of the microscope." With these characters before us, we can easily see wherein the two cases hereunder mentioned differ from those of chyluria. In the first case, there was, on one or two occasions at least, observed a gelatinous-looking coagulum occupying the centre of the glass of urine and suspended all the way through it. This spontaneous coagulation, so to speak, was not constant; nor was there any precipitate with heat and nitric acid. On the addition of nitric acid to some of the cold urine, no opalescent line was appreciable, owing to the intensity of the milky colour of the urine; and the same remark applies to heat. Heat only intensified the colour of the urine without producing any precipitate. Occasionally, after standing for a few days, a creamy layer was found to occupy the surface of the fluid. Microscopical examination revealed the presence of myriads of fat-globules of various sizes; the appearances observed being not unlike that got in a similar examination of milk. Agitation with ether, while it dissolved the fat-globules, did not remove the milky colour of the urine altogether; and the average of the specific gravity of the urine collected at different periods was higher than that of chylous urine. There was a resemblance to chyluria, however, in the course of the disorder. The presence of fat in the urine was not persistent: its presence was interrupted for days, only to reappear again; its existence was often unknown until the urine was examined; occasionally, however, it was preceded or accom-

panied by a general feeling of *malaise*, headache, or pain in the epigastrium. In both of the cases that fell under my observation, there were epileptic fits, and the urine which was examined after these seizures was sometimes milky, and rich in fat-globules.

CASE I.—On February 3rd, 1877, while in practice in Preston, I was called to see Caroline F., aged 27, who was said to be in a fit. When I arrived at the house, I found that the fit had passed off. She had recovered consciousness, and now complained of extreme pain in the head and of being very tired. The patient was a well-developed muscular woman, of sallow appearance. She was pitted with the marks of small-pox, and had a goitrous swelling of the neck. The heart and lungs, on careful examination, were found to be healthy. Pulse 72. The skin was moist; the bowels costive. I asked her friends to let me have some of her urine for examination; meanwhile giving her a smart dose of compound jalap powder and a mixture of bromide of potassium and chloral.

February 4th. She felt rather better. The bowels had acted well; the tongue was clean and moist. She had passed urine freely, and without pain; but, as it was mixed with that of her friend, I did not see it. The fits had not been so severe nor so frequent. She was still languid, and complained of pain in the epigastrium and loins. She told me that she had small-pox eight years ago, when in Bolton, and that she had not enjoyed good health for the last two years. Since this last period, she had been subject to fits, of the approach of which she was sometimes aware. The pain in the head, of which she said she was seldom free, was increased. There was a peculiar feeling in her legs, which moved upwards. She uttered a scream, and fell unconscious on the ground.

February 5th. She was somewhat improved since yesterday. The fits still continued. The specimen of urine received this morning, and which was passed without difficulty, resembled milk in appearance. It was the urine first voided this morning; it was acid, of specific gravity 1014. Heat only tended to increase the opacity without producing coagulation. There was no reaction appreciable with nitric acid; for, from the opacity of the urine, no distinct line of opalescence could be made out. On allowing the urine to stand for some hours, there appeared suspended in it a gelatinous-looking coagulum of a somewhat flocculent nature at its sides. This substance, when examined microscopically, was found to consist of an enormous number of fat-globules of various sizes; the appearance of the field being not unlike that got in an examination of human milk. No tube-casts were seen. There were a few epithelial cells and mucus-corpuscles.

February 6th. She continued to improve. The urine was to-day of a light yellow colour, clear, of acid reaction, and had a specific gravity of 1018. It bore no resemblance to the milky urine of yesterday. Under the microscope were seen a few fat-globules, octohedral oxalates, mucus-corpuscles, and epithelial cells. She was ordered to take liquor ferri perchloridi dilutus.

February 7th. She had only had two fits since yesterday. She told me that she had, when living in Bolton about a year ago, an attack somewhat similar to the present, and at that time she passed milky urine. The blood examined to-day gave negative results. Urine acid, clear, specific gravity 1031.5, with a copious deposit, presenting to the naked eye the appearance of oxalates with a dark hood resting on its surface. No albumen nor sugar was present. Examined microscopically, it was found to contain caudate cells, octohedral oxalates, squamous epithelium, and fat-globules in greater abundance than in the specimen of yesterday. (Dr. Marshall kindly confirmed the presence of fat in this urine.)

February 14th. She had continued to improve until to-day, when she came to my house complaining of great pain in her head. She had been taking the iron with benefit. She was ordered croton-chloral-hydrate.

February 15th. She was, if anything, rather better to-day. She did not send any of her urine for examination, as she began to menstruate yesterday.

February 18th. The urine sent to me to-day was of a light straw colour, of specific gravity 1019; it contained a soft downy deposit not unlike mucus; no albumen nor sugar. Under the microscope, fat-globules were seen in abundance, a few crystals of uric acid; large squamous epithelial cells, many of which were studded with fatty points, while one or two contained fat-globules.

February 22nd. She had had headache to-day, but felt able for her work in the mill. Occasionally she felt sick when at her work. In reply to questions, she stated that she had never had scarlet fever nor dropsy, and had never taken cod-liver oil. She suffered at times from leucorrhœa. I again examined her carefully, and found all the organs normal.

February 23rd. The morning urine was of a very light straw colour, specific gravity 1018, with a faint mucus deposit, which was loosely sus-