the healing art towards that symptom. It was the custom at King's College in the days of our great master, Dr. Todd, to look at isolated symptoms from a clinical standpoint. In the summer of 1850 he gave (in the theatre of King's College Hospital) the memorable lectures on Delirium and Coma, which drew audiences from every medical school in London; and my pencil notes of those lectures are among my most precious relics. Following Dr. Todd's precept, let us take dyspnoea, and examine it partly to discover the harm which may be done by a wrong therapeutic scheme. We may literally shorten life (or put it into peril) in our anxiety to save it; and the road along which we ought to go is not always easy to determine.

Whether the comity of heart and lungs be upset by disease or by an exaggeration of what may be called physiological dyspnoea,† the result is pretty much the same. With lapse of time the secondary static changes become fixed and practically irrevocable. It is the companion neuroses which concern us now; those neuroses which cry with appalling force for relief. The bronchial neurosis of asthma is a serious trouble; but the cardiac neuroses have a grave danger besides, as they connote stress and storm in the very citadel of bodily life. How far can we be assisted in our battle with these neuroses by the administration of any medicine in comparatively small and frequent quantities?

The anginoid pangs which haunt the chest of the cardiac sufferer may be alleviated by specific remedies; this is well known. But long before the virtue of these remedies had been established by Sir Lauder Brunton and others, two papers by Professor Clifford Allbutt in early numbers of the *Practitioner* (1870 or 1871) made a deep impression. He showed the value of hypodermic morphine in soothing a starved and worried heart; in granting peace to a heart turbulent with too much blood; and in quelling the riot of eddies and currents which have lost their way from damaged valves. But all this set me thinking—might not an equal benefit be done by giving morphine through the mouth in very tiny and repeated doses? For, in the most cautious hypodermic medication there are conceivable risks which a prudent man is glad not to encounter.

Imagine a case like this. A young man or woman has had one or two attacks of rheumatic pyrexia at an early age; endocardial disease has been started with more or less abiding consequences. If life be of a quiet and sedentary kind, those consequences may be so latent as almost to elude notice; but the family doctor knows by auscultation all about the lesion, and he keeps his ear on the weak spot. If life, however, be a continuous physical strain, with the excitement of a laborious business, it is easy to foretell the issue. And one of those issues is the searching and piercing pain, which comes and goes one can hardly say why or whither; existence becomes crippled and wretched from the bare fear of what may happen; and the patient is an invalid before the joy of middle years has begun. One of these invalids, a woman, aged 30 (maiden daughter of a country clergyman; I am drawing from my private records), is seized with sudden faintness. She writhes and groans: the face is a sheet of blue pallor: the arms are thrown about; and the respiration is irregular. The medical attendant is luckily close at hand. He puts his patient semi-recumbently on a sofa, throws a rug over her, and enjoins absolute silence in the room. He pours 16 minims of the hydrochlorate solution of morphine into a fluid two-ounce bottle, fills it with cold water, and places his watch on the table. Every minute he

administers one fluid drachm of this mixture, so that at the end of a quarter of an hour one-eighth of a grain of morphine has been taken. And what happens? Calm succeeds tempest, lethal coldness and whiteness yield to warmer hues, the rhythm of breathing returns, and there is thanksgiving all round. The same dose is given every third minute during another quarter of an hour. The patient is then left for a while, with the instruction that if sleep should come it is not to be broken; otherwise the dose is to be repeated every fifteen minutes until the next medical visit. It is assumed that there is every help in the shape of warmth and fluid food; but for the moment alcohol would be a poison.

No therapeutics can alter or mend a textural flaw; but tiny and frequent morphine steadies cardiac nerves, and quietly readjusts cardiac function. Step by step the work is done; there is no hurry, no shock of narcosis, no fear that the medicine will bring another peril. The plan is as safe as it is gentle; and the fundamental treatment (if any) can be resumed in due order and at the proper time.

In prescribing morphine for any disorders which are subacute and may become chronic, the prudent physician never forgets the possibility of a morphine habit being formed, working an ulterior mischief more devastating than the original disease.

There is extant a prayer by a mediaeval physician (Dr. James Horst, 1537-1600), a clause of which may be thus rendered: "O God, open Thine eyes and behold the poverty of our art." In a relative sense, this "poverty of our art" is always with us. But we submit that our aim should be not so much to acquire new remedies as to gain a more exact knowledge of those we have, and to win a more complete mastery in the use of them. Our official materia medica is a storehouse of good things; but how does it profit us if we lack the skill to employ those things to the best advantage? There is no royal way to this knowledge. Severe clinical study is the only road; personal experience is the only school.

The therapeutic method of which a sketch has now been drawn has not had (so far as I know) any recognition in authoritative books on the practice of Medicine. It may be said to be still on its trial. But during thirty years it was my trustworthy ally; seldom did it fail in a great emergency; it relieved some anxious burdens; and my farewell words can speak of it with enthusiasm. And so I commend it to the candid attention of my medical brethren.

ON THE TREATMENT OF DEAFNESS OF MIDDLE-EAR ORIGIN.

A PRELIMINARY COMMUNICATION.

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THE object of the present paper is to give a preliminary note of a method of treatment which I have pursued during the past nine months, and to indicate its results in a series of cases. The basis of the treatment is the use of a preparation of bone marrow, and in a later communication, when dealing with the *rationale* of the new method, I shall indicate the line of research which led to its adoption. It will then be seen that the use of this preparation in cases of chronic non-suppurative middle-ear disease has been a particular application of a general theory regarding the function of the bone marrow.

In broad outline my theory is that the bone marrow produces an internal secretion of vital importance in the economy: that this substance is a powerful prophylactic against the injurious action of various bacteria which in health are present as saprophytes in different tissues; and that defects in this active ingredient are liable to be followed by pathogenic action of these same micro-organisms. The results of this pathogenic activity vary much in different subjects, in accordance with the all-important factor of individual reaction. As the main sites of these bacteria are the respiratory tract, alimentary canal, the skin, etc., it follows that disease will be more or less directly associated with one or other of these channels as the main place of infection. This preliminary communication deals with chronic non-

† People who went to Switzerland thirty-five or forty years ago may remember that before the railway was made to the top of the Rigi boys attended the mules which carried travellers. The animals went at a steady pace of about three and a-half miles an hour up a steep ascent, and of course the boys were always "out of breath." This daily agony, going on all through the four months of summer, worked early mischief in heart and lungs. The poor fellows were pale and bloated; the face was often stained with ecchymoses, and dropsy sometimes appeared in the lower limbs. Their lives were short and sad. Many English servant girls endure a like painful discipline on stairs. In both cases there is a too long or too frequent draw on the "reserve forces" of Nature, and then follows disease—perhaps incurable.—The central idea of this paper came into my mind on one afternoon in August, 1863, when I was in a boat on the Lake of Lucerne. A wave of therapeutic scepticism had been spreading for some years, due much to the narrow resources of the *Ph. Lond.* of 1851 (published in Latin). The *British Pharmacopœia* (in English) appeared for the first time in 1864; but its chemistry and pharmacy were so faulty that the edition was soon withdrawn, and republished in 1867.

suppurative middle-ear disease; in a later one I shall record the results of observations in cases of psoriasis. At present I am making a similar investigation on chronic rheumatic conditions.

In order to test the validity of any therapeutic result that might be obtained, it appeared advisable to make introductory experiments along the following lines: (1) To investigate the action of a substance such as olive oil, which might be expected to have an effect as a mechanical lubricant; and (2) to investigate the action of a combination of rectified spirits and glycerine. This was used on account of its stimulating effect on the circulation in the membrane and middle ear. The result of these preliminary investigations is given in the text record of Cases I and II.

Having satisfied myself regarding the effects of mere lubrication, I proceeded to apply a substance derived from the bone marrow which, in my view, was calculated to produce a beneficial result in certain joint affections and other conditions, and the present record gives the results of the first 20 cases submitted to the new treatment. Every one of these, with two exceptions, had previously been treated by well-known experts along the recognized lines, and had been given to understand that their condition was practically hopeless, that there was little or no hope of improvement, but, on the contrary, an almost certain prospect of a gradual and unarrestable increase. These results will be summarized, a detailed record only being given of two of the earliest cases that were under the critical observation of independent experts.

The tests employed included [the watch; the whisper, low and loud; and the ordinary voice. The first was soon abandoned as of no practical value. My experience with the whisper test showed that there was no definite relation between the perception for whispering and the perception for conversation in an ordinary tone (*vide* Table II). I found, moreover, that when a low-pitched voice showed an improvement in the hearing distance of a few inches only (*cf.* Table III), my tests with the ordinary voice at medium pitch showed a gain of from 7 to 8 feet. This point is one to which I draw special attention.

As the ordinary voice alone gives the measure of hearing power in practical life it was mainly used as the test. Each ear was tested separately, and the combined hearing distance of both ears for speech was also usually investigated. As it is admittedly impossible to regulate speech with perfect accuracy, all figures possess merely a relative value, and due attention must be paid to the patient's report, and probably even more to the statements made by members of the same household.

CASE I.

Chronic Non-suppurative Middle-ear Disease.

Miss I., aged 21, came under my care at the Aural Department of Marshall Street Dispensary on October 22nd, 1900, suffering from advanced chronic non-suppurative middle-ear disease of three years' duration. She gave a history of having attended the out-patient department of the Royal Infirmary for five months in the early part of the year, and of having undergone the routine treatment, including the use of an alkaline lotion for the nose, Politzer's bag, Eustachian catheter, and general tonics, but without appreciable benefit.

The points of general medical importance learned were: Miss I. was decidedly anaemic, and apparently had always been so. The digestion had never been robust, although never seriously impaired. A defective state of the blood was also manifest in a sister frequently seen by me.

1. The first treatment consisted in the instillation of 3ss of warm olive oil into both ears once a day. This was continued for five weeks, during which time the patient was seen twice weekly. At the end of a month no change had taken place, but during the fifth week the patient was conscious of a slight improvement.

2. On November 29th the treatment was changed to 3ss of equal parts of warm rectified spirit and glycerine. This was applied daily, and careful attention was paid to the position of the head, in order that the fluid might get ready access to the upper part of the membrane, and an endeavour was made to promote absorption of the fluid by manipulation of the pinna and preauricle—the friction and movements used including that of intermittent pressure advocated by Lucae.

As it appeared to me on anatomical grounds that the circulation and tissue change in the middle ear might be favourably influenced by jaw movements, I directed that the mouth be widely opened and sharply shut repeatedly during the application. At the end of a week the patient was conscious of improvement in both ears, and after three weeks of this treatment—December 20th—the improvement was quite apparent to all her friends. I satisfied myself on this latter point by personal inquiry at the patient's house and at her place of business.

Thereafter I continued the treatment for nearly eight weeks. On several occasions in this part of the course the use of the catheter was accompanied by a feeling of clearness in the head and also a subjective improvement in hearing which were not present at an earlier stage, and which had never been experienced during the previous course of catheter treatment in the Royal Infirmary. After January 15th the patient was not conscious of any further improvement, and on February 11th the treatment was discontinued.

Three weeks later (March 1st) the hearing had deteriorated, the impairment having been first observed seven days previously. The treatment with rectified spirits and glycerine was resumed. No improvement was apparent at the end of a week. The instillation was then increased from 3ss to 3j, but eight days' application of this measure produced no result. The dose was then further increased to 3j, and this was followed by slight but distinct improvement at the end of a week. Six days later, however—March 28th—that improvement was lost, and it did not reappear, although the treatment was continued to April 14th. On May 26th, after an interval of six weeks without any treatment, the patient reported that her hearing was as bad as it had ever been. This opinion was fully corroborated by her friends.

The results so far obtained were as follows:

1. The olive oil had been of little if any value.
2. The rectified spirits and glycerine had been decidedly beneficial; this treatment (a) improved the hearing and (b) appeared to induce alterations in the middle ear, whereby the use of the catheter was made more efficacious.
3. The benefits obtained from the spirits and glycerine soon passed off, and were not restored by a repetition of the treatment.

At this point I began a course of treatment with a product of bone marrow, to which I have given the name of "myelocene." My preliminary investigations had sufficiently proved that the condition of the middle ear would not yield to mere lubrication. Therefore, if any benefit were obtained from the use of myelocene, it could not be explained by reference to lubricating properties in the preparation. This fact is important in view of the physiological theory on which my treatment is ultimately founded.

On June 3rd the state of hearing was as indicated in Table I. The ordinary voice was not audible at 3 in. from either ear. The "loud whisper" used in objective examination was my loudest possible whisper—a test which probably allows less room for error than the raised voice. The new treatment was begun on June 3rd. It consisted in instilling into the ear 3ss of equal parts of warm rectified spirits and glycerine, and in applying the same quantity to the skin of and around the ear. This was followed by a similar application of myelocene, 10 drops being the amount used internally. This treatment was repeated every night for six nights. At the outset the right ear only was treated, and immediately after the first application the patient was aware of an improvement in that ear. On the following day she was told by her companions at work that she was hearing better, and this improvement was accompanied by a diminution in the tinnitus in that ear. When tested the same evening a distinct improvement was found in the right ear only.

On the second and third days, while the improvement in this ear increased, an improvement also manifested itself in the other ear—as yet not directly treated. Both ears were then treated from June 6th till the 11th, with a gratifying increase in the improvement. By June 9th the whole outward appearance of the patient had undergone a striking change. The dull, heavy, apathetic look characteristic of the very deaf had given place to a look of brightness and alertness. On the evening of June 9th the patient felt sick and vomited. The following day she looked paler than usual,

and complained of having felt weak and sleepy at her work, and the noises had increased. Treatment was withheld for a day. On June 11th she had quite recovered from this attack, and the hearing power was as shown in Table I:

TABLE I.

		June 3rd.	June 11th.	June 17th.	June 24th.
		Inches.	Inches.	Inches.	Inches.
Loud whisper	R. ...	5	30	24	90
	L. ...	6	24	16	96
Raised voice	R. ...	9	204	180	—
	L. ...	10	168	96	—
Ordinary voice	R. ...	—	—	—	144
	L. ...	—	—	—	144

At this stage the patient was so satisfied with the improvement, that of her own accord and against my recommendation she ceased the treatment, but returned on June 17th, stating that her hearing had deteriorated a little, a statement that was corroborated by her sister and confirmed by myself. The deterioration was first noticed on the previous day.

The treatment was resumed on June 18th and was immediately followed by improvement.

On June 23rd the Eustachian catheter was passed, and immediately afterwards there was a very striking subjective and objective improvement. The patient was now quite satisfied with the amount of her hearing power and again ceased treatment.

On July 1st, however, eight days after its cessation, she and also her friends were aware that she had lost a little of the improvement, and on examination I found this to be the case.

By this time I had formed the opinion that a complete cessation of the treatment in this case would be followed by a diminution in the hearing power, but that this loss could be regained by a subsequent course of treatment, and at my suggestion Dr. Logan Turner kindly undertook to observe and record the case with the view of determining the accuracy of this belief. The subsequent course justified the opinion formed.

On July 1st, after the slight initial loss already referred to, the patient came under Dr. Turner's observation. An examination on July 15th showed no material subjective or objective change. On September 23rd the patient reported that her hearing power had continued very good till about September 8th; it had then begun to diminish and had continued to do so. An impairment is clearly indicated by Dr. Turner's figures.

Treatment was resumed on September 23rd, and between that date and October 9th the patient had the ear treated internally on three occasions only and externally on five. As on former occasions, an improvement was noted at once by the patient and by her friends, and it increased with each successive internal treatment until October 9th, when the patient was again quite satisfied with her state of hearing, and the treatment was stopped at her desire.

Dr. Logan Turner found that an improvement had taken place (Table II).

TABLE II.

		July 1st, 1901.	September 23rd.	October 9th.	Jan. 26th, 1902.
		Inches.	Inches.	Inches.	Inches.
Watch	R. ...	1½	1½	1½	1½
	L. ...	1	2	2½	2½
Whisper	R. ...	11	7	4	6
	L. ...	12	7	6	8
Ordinary voice	R. ...	84	48	60	17
	L. ...	72	42	96	36

His record furnishes evidence against the reliability of certain voice tests. While for all practical purposes, for example, hearing ordinary conversation or the casual sounds of the street the patient was conscious of great improvement, the whisper test showed no trace of this, but appeared to indicate

an actual loss of hearing power. This patient was not seen again until January 25th, 1902, when she reported that the improvement was maintained until about three weeks prior to this, when an impairment set in, and has steadily increased. Dr. Turner found an impairment for the ordinary voice, as recorded in his figures. It is advisable to state that the patient's hearing power is still distinctly greater than before the original treatment in June, 1901. (*Vide* Table I).

Some time after I had obtained a positive result from the use of rectified spirits and glycerine I mentioned the fact to my friend and former teacher, Dr. McBride, and he arranged to try it in a suitable case. I was interested to hear from him some time later that the patient whom he had selected had reported himself slightly improved at the end of a week's treatment, but that a week later the improvement noted had disappeared. This, so far as it went, corroborated my own observation already recorded.

CASE II.

Chronic Non-suppurative Middle-ear Disease.

At a later date Dr. McBride kindly arranged to provide me with a case suitable for treatment with myelocene. It was thought advisable that a man should be selected, in order, if possible, to eliminate all chance of the results being vitiated by a neurotic element. The same patient, Mr. S., was chosen, and (as a preliminary) was subjected for ten days to daily treatment with the catheter before being handed over to me. There was no indication, either subjective or objective, of improvement by this treatment. The patient, aged 26, gave the following history: He was a cycle maker, and for years went in for cycle racing. His deafness was of four years' duration, developed shortly after marriage, and was first noticed after a severe cold. He was treated a year ago at the Royal Infirmary, Edinburgh, which he attended for four weeks, but without appreciable improvement. He presented himself again on May 14th, 1901. While his general health was at this time excellent, he had been for long subject to "bowel attacks," being suddenly seized with vomiting, pain in the region of the umbilicus, succeeding one or two days loss of appetite and constipation. There would come on suddenly and apparently causelessly, and were sometimes severe in character.

On June 23rd he came under my care, and was treated daily with myelocene, etc., as in Case I. From the outset there was a marked improvement, the test employed being the ordinary voice of medium pitch. On June 24th the patient reported that on his way home from my house on the previous day (within half an hour of the first application) he heard the footsteps of people more distinctly than usual; further, that on June 24th his fellow workers had seemed to be roaring at him unnecessarily. During treatment on June 24th, when in the act of opening and closing the jaws in the way previously referred to, the patient was conscious of the right ear clicking in a way it had not done for years.

On June 25th while at work he was hearing noises of repairing, etc., which he had not previously heard, and a comrade who did not know that he was undergoing treatment remarked on his improved hearing. On the same day he expressed the opinion that he was hearing better than he had done for at least three years, and objectively I found considerable improvement for the ordinary voice test, but no improvement for the watch.

On June 27th I saw his wife and she corroborated his report, stating that she had noticed a very great change for the better. When visitors were present, her husband could now readily follow and take part in their conversation, whereas formerly he would often start a new topic of conversation when some one else was actually speaking.

On June 28th the patient for the first time reported that he was not conscious of any further gain. He was seen by Dr. McBride on June 30th, and his hearing tested by the low conversation test—that is, the lowest voice, just above a whisper. Dr. McBride found that this test showed no improvement, while the watch test showed an actual deterioration. But the general hearing power of the patient had suffered no diminution since June 27th.

On July 1st the patient was aware of further gain. He also reported that for years he had been troubled by a roaring

shell-like noise in the ears after exposure to the slightest draught either in room, omnibus, or train; that a similar noise was heard if he chanced to open his mouth on a hill; but that now these symptoms were entirely gone. On July 3rd the patient voluntarily told me that his general health was now much better. He no longer felt dull and low-spirited as he had done for years. The tinnitus also was much improved. The next day he reported further improvement, and stated that the previous night he had been much impressed by hearing footsteps behind him in a quiet street. He turned round, and the nearest person was a lady about twenty yards away.

He was seen by Dr. McBride on July 7th, and on that date there was an increase in the figures, as shown in Table III. In order to test the reliability of that objective improvement, faradism was applied for two minutes or so round the ear, after which the record was found to be increased rather than reduced.

TABLE III.

		June 16th.	June 23rd.	June 30th.	July 7th.
		Contact	Inches.	Contact	Inches.
Watch	R. ...	Contact	$\frac{1}{4}$	Contact	$2\frac{1}{4}$
	L. ...	1 in.	$\frac{3}{4}$	Pressure contact	$\frac{1}{2}$
Low ordinary	R. ...	14 in.	14	14	$15\frac{1}{2}$ - $21\frac{1}{2}$
	L. ...	16 in.	16	16	$20\frac{1}{2}$ - 21

Treatment for the next three days produced no further subjective improvement, nor did I on examination find any further improvement for the ordinary voice. The treatment was then discontinued.

When seen on January 22nd, 1902, fully six months after cessation of treatment, Mr. S. expressed the opinion that the improvement had been maintained, and in this he is supported by his wife, his family, and his employers. I found confirmatory evidence of this on my objective examination. He also reports that in the course of these six months, the occasional colds to which he is subject have given him only very slight inconvenience, whereas formerly a cold was accompanied by a marked increase in his deafness and considerable general discomfort.

SUMMARY OF RESULTS.

Of the 20 cases treated, 4 were of a mixed type, the tuning-fork conduction being greater by air than by bone. One case was of post-suppurative origin. The results may be summarized as follows:

Of the 15 cases of apparently pure dry middle-ear disease, 11 showed a record of improvement fairly comparable to those already detailed, due allowance being made for the different degrees of deafness when the patients first came under observation. Two showed a marked improvement in one ear only, but as this improvement took place in the deaf ear, the practical benefit was slight; 2 cases, male patients aged 46 and 60 respectively, were quite uninfluenced by the treatment.

Of the mixed cases 3 showed a practical improvement and one did not. The post-suppurative case improved.

In some cases the improvement has been fully maintained, as in Case 11, in others deterioration has set in slowly, and has progressed, as in Case 1. Observations are at present being made on means of maintaining the improvement in the hearing power.

MYELOCENE.

It is advisable to give a brief note on the manner of preparing the substance which is the basis of the treatment. It is derived from bone marrow, and I have given the name of myelocene to the preparation, partly because it suggests the origin of the substance, and partly because the name will be suitable to any active principle which may yet be isolated.

Perfectly fresh bones are obtained from the butcher. In these bones the epiphyses are present, for the custom of that trade is to kill feeding stock when about two years old.

The first task is to select bones in which the marrow will be suitable for the internal treatment of the ear. When examined with the naked eye the marrow is found to vary in appearance and consistence within wide limits. I have examined hundreds of bones and, in the majority of instances,

I found it presented a faintly yellow appearance, fairly vascular throughout, and of a fair consistence both on inspection and on handling. (There is no differentiation into red and yellow marrow.) In other instances the marrow was very pale, even lard-like in appearance and consistence; while yet again in others it presented a dull, sodden appearance quite unlike healthy marrow. As regards the epiphyses, too, I frequently found bones that were strikingly different from the normal—not only in the vascularity and general appearance of the epiphyseal line and the tissue in its immediate neighbourhood, but also in the epiphysis itself. It is hardly necessary to say that those bones must be selected in which both marrow and epiphyses are normal.

The mode of preparation is as follows: The marrow is extracted with ether, and the ethereal solution is evaporated down at first in the open, and later over the warm bath. The fat is then rubbed up with 1 per cent. chloretone for preservative purposes. It now appears as a whitish or faintly yellow fat with a strong odour, partly of ether, partly of chloretone. The melting point of the fat so obtained varies very widely. For example, one yield of fat would never become perfectly clear even when submitted for a long time to a very high temperature; another would only become clear at a melting point of 120° or 130° F., while yet another lot would rapidly clear at from 70° to 90° F. The same supply of bones has sometimes yielded samples of fat with different melting points; in the first 130°, in the second 110°, and in the third 90°. This order, again, has sometimes been reversed. The fat with the low melting point is the only one that has proved satisfactory in use; the others I have found to be unsuitable, and in some instances prejudicial.

This paper has been restricted to a statement of facts from which I draw the conclusion that in this treatment we have a means of increasing the hearing power in many cases of deafness of middle-ear origin (non-suppurative type), to a degree considerably beyond that obtainable by present methods.

It will be convenient to discuss the *rationale* of this treatment at a later date, after further facts have been presented from a different field of medicine, indicating the existence of a therapeutic agent in this substance, myelocene.

I have much pleasure in expressing my indebtedness to Drs. M'Bride and Logan Turner for kindly observing the cases referred to, and also to Miss Watson, L.R.C.P. Edin., for invaluable assistance in these investigations and other work bearing on them.

HAY'S REACTION FOR BILE SALTS.

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In the second edition of Landois and Stirling's *Textbook of Human Physiology*, 1886, Professor Matthew Hay published in a short note the fact that, when powdered sulphur is sprinkled on a fluid containing bile, it gradually sinks. He further showed that this reaction depends upon the presence of bile salts alone, and that when 1 part of pure bile salt is dissolved in 120,000 parts of water the reaction is still given; he also stated that this reaction depends upon the power of bile salts to reduce surface tension. Professor Hay published no further account of his extensive experiments, which he informs us began in 1882, and his useful discovery escaped general recognition.

Recently two papers dealing with this reaction have been published by Frenkel and Cluzet,¹ and another by Chauffard and Gouraud,² in all of which the test is ascribed to "Haycraft" instead of to Hay. And we, in ignorance of the previous work and only knowing the test as the "sulphur test" have again covered some of the ground for the third time.

Our object in writing this note is to correct the partial misunderstanding as to the name of the investigator who discovered the test, and further to draw more general attention to its clinical value.

The fluids in which a delicate test for bile salts would be most useful are vomit, faeces, and urine. Hay's test, however, is less reliable in the case of vomit and faeces than in that of