their force when that abuse has been subdued by more exact knowledge to a legitimate use.

At the end of his paper, Mr. Savory alleges that the sum of his argument is, after all, not to suggest that instruments are never to be employed, but to affirm that they have been and still are grossly abused, and that, in a word, instruments of any kind should never be employed in any way except as a last resource. With much of this everyone must agree; but the statement, that instruments should never be employed except as a last resource, needs some qualification. In many cases, it is impossible to ascertain what is the matter without using instruments, and any treatment under such circumstances might be "routine," but certainly would be useless. Were the comparatively modest position at the end of the paper the only one taken up by the writer, it would not call for special remark; but there is more. There is confusion, under the term "stricture," of conditions that are now currently held to be not strictures at all, and are expressly distinguished from organic obstructions by all leading authorities in this department of surgery.

Mr. Savory says, "Any advanced student or young surgeon, if asked what he understands by the term stricture, would reply, a constriction of a portion of the canal due to thickening and deposit in its walls." And the student would be right; it is Mr. Savory who makes the error of calling spasm and inflammatory swelling strictures. These misleading names, given at a time when the distinctions in nature and requirements of treatment were ill understood, are yet employed by some, it is true, but without thereby intending to imply that these temporary obstructions are similar in nature to organic obstruction; and the surgeon who still looks upon spasmodic contraction, inflammatory swelling, and organic stricture as simple physical conditions to be treated only by physical means, had better take the advanced student, whose acquaintance with the subject is, nevertheless, second hand, for his teacher without delay. Certainly, more exact knowledge of the differences between these obstructions is current in standard treatises on urinary diseases, and the mischief that may be caused by using instruments in spasm and inflammatory swelling is carefully pointed out. So far from instrumentation being directed as routine treatment, to the neglect of other means, even in organic stricture, such writers as Civiale and Thompson, to mention no more, warn their readers against hastily using bougies, which those masters strongly insist are evils even when most needed. And, whatever old-fashioned or obsolete books may direct, in no standard treatise of the present day is the use of instruments given as the sole or most important means of treating anything but organic obstructions.

Next, the reproach is made against instruments, that they do not afford a cure; that, though the passage may be widened to the normal extent for a time, it ultimately shrinks back to its dangerous constriction, and no permanent cure is effected. This is true, doubtless. There is no cure for stricture, if, by cure, we mean putting the urethra into such a condition that no further attention is necessary. A system of treatment that procures such a result has yet to be found. But, if by cure be meant restoration of the canal, so that it can be easily maintained at its full calibre throughout, the use of instruments does cure stricture, and it has yet to be proved that any other plan will do the same for organic obstructions. Apparently, one of Mr. Savory's objects in writing was to lead the profession to suppose that organic obstructions can be dissipated by his plan of treatment—that rest in bed for an indefinite time, with warmth and other adjuvants, can cause the absorption, either wholly or in part, of organic obstructions. Undoubtedly—and this is also current knowledge—the remedies on which Mr. Savory relies are efficient to remove the spasm and inflammatory swelling that often aggravate the inconvenience or suffering of an organic obstruction sufficiently to induce the possessor to seek surgical aid; but, when this is done, is any further progress made towards widening the canal? To ascertain this, the canal must be gauged by the hated bougie after spasm has subsided, and again when a week or a fortnight, or any time thought requisite, has been passed by the patient in his bed, and the measurements compared. If Mr. Savory have done this, and find the organic thickening gone, he has made a discovery of the highest value; but this is not told us in his paper. Otherwise, which patient will take leave of his surgeon with the most satisfied mind—he who has learnt to pass with ease along his urethra a bougie as large as the natural size of his canal, and has simply to do this, from time to time, to maintain the full patency thereof, or he who, having spent a fortnight in bed, finds he can pass his urine comfortably now his passage is somewhat widened by the subsidence of spasm or inflammatory swelling, but has still a tough and narrow part that will be tightly closed the next time spasm sets in, or a cold is caught? The one man knows that, if temporary irritation attack his urethra, there is still room for the passage of his urine while the attack lasts;

the other knows he must be constantly on his guard against accident, and live by rule, that his narrowed urethra may suffice for his daily needs.

It is useful to lift up the voice against the rash employment of instruments in urinary diseases; there are always too many inducements to employ the bougie or sound; but this may be done without depreciating the current teaching and knowledge of these diseases, and casting mischievous prejudice on a valuable remedy.

THE DEPRESSANTS OF THE CIRCULATION AND THEIR USE.*

By J. MILNER FOTHERGILL, M.D., M.R.C.P.

THE aim of medicine, indeed its practical utility as an art, is to do good to the suffering and the sick. It has often been alleged that the scientific study of medicine has done little or nothing to further this end, at least comparatively little; and we not seldom hear that modern therapeutics directed by science are, as regards results, inferior to the empirical practice of our predecessors. That there is any truth at all in such statement, is and must be a matter for regret. It is certain, however, that all attempts to apply science to the elucidation of our every-day practice meet with ready and indeed warm appreciation. If we can make modern physiology or chemistry explain to us the manner or the mode of action of remedies with whose use we are familiar, it will go far to convert the special knowledge acquired by one shrewd observer and successful practitioner into a heir-loom for his successors, instead of being, as of old, an individual property which too commonly died with its possessor.

By observation and patient comparison of cases, our predecessors have arranged remedies into classes, and have described the peculiarities of each agent in a manner which must elicit our admiration: and the practical skill with which certain of them wielded their remedial agents still evokes our warmest praise. For instance, Graves laid down, with consummate skill, rules for the combined administration of opium and antimony in varying proportions, according to the circumstances of the case. Ringer's abridgement of it runs thus: "Each drug appears to assist the action of the other; and the relative doses must be determined by the circumstances of the case. In furious delirium, the tartar emetic must be given in full, and the opium in small quantities; while, if wakefulness is the chief symptom, the delirium being not very boisterous, the dose of tartar emetic must be reduced and the opium increased."

The exquisite correctness of these directions will become more apparent as we proceed. But this acquired skill could not be communicated, even to those who were familiar with the practice of these empirical masters of the past; an occasional pupil might be able to comprehend his master and imitate him, more or less perfectly; but usually only disconnected bits of his art were retained, and these soon lost all traces of the pattern which characterised the whole, of which they were fragments.

Recent scientific work, and especially physiology, is now stepping in to remedy, to some extent at least, this condition of matters; and, by explaining how the different agents achieve their results, is throwing a ray of light along the difficult and broken pathway of empirical therapeutics. To attempt to take even a bird's-eye view of the position of therapeutics at this moment, would be alike futile and impossible here; and the section to which I propose to draw the attention of the Society to-night is that connected with the circulation by means of its innervation. We all know that the nervous supply of the circulation is now attracting the attention which its importance merits, and that much has been done in this subject recently, both at home and abroad. From being an obscure fact in anatomy, the vaso-motor nerves and their allies are rapidly taking a prominent position in physiology, and they will ere long occupy an equally important position in therapeutics. These nerves are found running along the blood-vessels, the arteries especially, and control or regulate their calibre. By them the muscular coat is kept in a state of semi-contraction normally, and through them the calibre of the smaller arteries is lessened as in the cold stage of ague, or enlarged as in the full but soft pulse of dilated vessels in ordinary pyrexia. By their means the arterial system is kept at its normal tension, and the blood, pumped in by the heart, is restrained from at once escaping again into the veins. Thus the elastic arteries are kept gently on the stretch, and the intermittent current from the heart is converted into an even steady stream in the peripheral capillaries. But this pressure in the arteries, or the arterial tension as it is

* Read before the Medical Society of London.

termed, is not always alike, and varies with certain conditions; for instance, in ordinary pyrexia the dilated peripheral vessels permit the rapid escape of the blood through them, and thus the blood-pressure is low, though the heart is contracting with abnormal rapidity; while in cirrhosis of the kidney there are commonly contraction of the arterioles and a high blood-pressure, with a ventricle contracting but slowly. By the beautiful arrangement of its nerve-supply, the circulation is controlled and regulated, and a norm maintained most fitted to our necessities; and in disturbance of this equilibrium we find the commencement of many of our commonest maladies. Not only so, but in their action over the vaso-motor nerves we find the explanation of the beneficial effects of many of our remedies. Thus, in ordinary catarrhal fever, we have the cutaneous vessels contracted, and consequently hyperæmia of the internal parts; the result of which is that there are increased heat-production in the interior, and imperfect radiation of the heat by the vessels of the dry burning skin.* No more efficient remedial agent for such a condition do we possess than antimony. This agent acts upon the circulation by lowering the heart's action, and dilating the peripheral vessels, especially of the skin. When given, then, in the above condition, it lowers the action of the heart, and with it the circulation of the blood, and so, probably, the chemical interchanges are diminished upon which the temperature depends; while at the same time the cutaneous vessels are dilated, and a freer stream of blood flows through the skin, with the effect of radiating off the heat, and by this defervescence a normal temperature is regained. This is the history in its rise and fall of an ordinary febrile cold treated by antimony; when left alone, the defervescence is slower and more gradual.

In precisely the same way is the temperature ordinarily kept at its norm. When the surrounding temperature is low, the skin is dry and cold, *i. e.*, the cutaneous vessels are contracted and the blood-flow through them is small, and so the heat is but slowly radiated off and the body-temperature is maintained.† If the cutaneous vessels were not so contracted, we should perish in low temperatures, as men do after taking larger doses of alcohol, which dilate and even paralyse the cutaneous vessels, the body-heat being rapidly radiated off, and so the alcohol-drinker perishes of cold—frozen to death, while the abstainer, though uncomfortably cold, survives. In hot weather the cutaneous vessels normally dilate; the warm blood is brought freely into contact with the surrounding medium, and so is cooled; when this is insufficient, still further dilatation goes on, and free perspiration ensues, and the cooling effect of the evaporation of the watery constituents of the sweat is called into action.

Recently, Traube has taken up a view of fever almost essentially the same as that held by Cullen, viz., that fever is due to a "diminished giving off" of heat rather than an increased production; and in this he is followed by Senator. Leyden opposes this view, stating that the loss of heat is greater in fever than in health, and that therefore there must be increased production of heat. The loss of heat is greatest in the crisis, where it amounts to twice or even three times the normal loss, and so a return to the normal temperature is obtained. The defervescence always occurs with well-marked perspiration and exhalation of water; while in increasing fever no evaporation of water can be demonstrated, even under an impenetrable covering. Leyden's view has much to recommend it, and is probably most in accordance with facts.‡

This physiological introduction, though obviously and necessarily imperfect, will serve to introduce the more especial subject-matter of this paper. In dividing the subject into halves, and only regarding here

* In febrile diseases, while the temperature of the body is raised by the activity of the destructive processes going on in the economy, the cutaneous exhalation is diminished—according to the old expression, by "a spasm of the capillary vessels of the skin"; and the sensation of heat in this texture, as well as in the internal organs, becomes a source of much suffering. The subsidence of the excitement and tension is usually accompanied with more or less perspiration. (Stille's *Therapeutics*, vol. ii, page 517.)

† Rosenthal, *Zur Kenntniss der Wärmeregulierung bei den Warmblütigen Thieren*. 1872.

‡ Wunderlich sums up the causes that increase the general temperature after the following arrangement, an abstract only being given here (chap. viii, sec. 10). 1. An accumulation of heat caused by deficient abstraction of warmth. 2. An increase of temperature from an overplus of heat in different centres or foci, as in local inflammations. 3. A general elevation of temperature may arise from increased activity of the normal processes for the production of heat. 4. A rise of temperature may also occur from an over-production of heat, resulting from chemical processes unknown in the healthy body. 5. Alterations in the degree of activity of the vaso-motor nerves must almost necessarily have an influence upon temperature, and that in more ways than one, and quite as much by altering the conditions of production as by affecting the giving off or loss of heat. 6. Elevation of temperature may occur in consequence of a morbidly increased action of the spinal centres. 7. The rise of temperature is doubtless brought about by several of these conditions combined, or in varied succession. The reader may also refer to chap. v, sec. 4, 15, 17, 20, 21; chap. vi, sec. 2, 10, 13, 20; chap. viii generally, especially sec. 8, 9, 12; and chap. xiii, sec. 4, *Medical Thermometry*. On a full consideration of Wunderlich the view of fever given above is founded.

th agents which depress the circulation, I have been guided by the consideration that the effects of the opposite class of agents had been discussed in my essay on *Digitalis*, and so need not be repeated here.

Ere proceeding to describe the agents we already possess which act upon the circulation, either by inhibiting the vaso-motor centre, or by acting on the vagus or the cardiac ganglia, and so either increasing the vascular area or lowering the heart's action—agents which in fact "bleed the patient into his own vessels," it may not be out of place to review the practice of the past, and so to see how far our ancestors had learnt to recognise empirically the rules which apparently must ever guide our practice. The best illustration probably is to go back to their treatment of inflammation. This usually consisted of bleeding, the application of leeches, and the administration of calomel and antimony (both cardiac depressants), both being locked in the system by accompanying doses of opium.* A spare diet was enjoined; and under this treatment a fair proportion of patients recovered. Now, before we sit too severely upon this treatment, let us consider the pathology of the disease and the action of the measures adopted, and see how far these men had a reason for the faith that was in them. When an organ is inflamed, we can exercise no direct effect upon the inflamed part by any agent with which we are acquainted; and our only indirect means of acting upon it is by controlling the blood-supply to it. The effect of this is most perfectly illustrated in the plan of arresting inflammation in a joint, by tying the artery above the articular branches. In the case of inflammation of a viscus, such treatment is impracticable, and the blood-supply can only be partially controlled through the circulation generally.

Our forefathers recognised this fact plainly enough; and if their measures were not of the happiest, we must not blame them too severely for resorting to the only means with which they were acquainted. Whether there be a change of type in disease or not; or whether there be only a change in our ideas as to remedial measures, it is no part of my plan to enter into here: what does interest us, is the question how our predecessors grappled with the difficulty presented to them. They recognised the fact that there was an organ in a state of inflammation; they knew well enough that they could exercise no direct control over it; but they knew that indirect control could be exercised by bleeding, etc. So marked an effect could be thus produced, that many believed that an inflammation could be cut short, or even cut down—strangled, by active measures. Nor is such faith extinct. Bouchut, in an article in the *Bulletin Générale de Thérapeutique*, of April 15th, 1873, takes up this position.

What was the effect of this treatment? By the direct abstraction of blood, either by general bleeding or by leeches, the effect was to reduce the amount of blood going to the part—to starve it in fact.

The nutritive changes going on were influenced by such measures, and the inflammatory action was arrested or modified. The reduction of the bulk of blood affected the chemical interchanges, and the calomel and antimony aided in producing such effect; while by their action upon the skin they increased the radiation away from the body-heat, and so lowered the temperature. So far, so good: but the results went to show that the remedial measures were often as lethal as the disease, if not more so.

The disastrous consequences of this heroic treatment led to the abandonment of a line of practice not altogether irrational in itself. Nor can we permit our condemnation of such practice to be unqualified, if we desire to be just. These men acted up to their light—such as it was: and the failure of their treatment was the first step towards something else—sometimes better, sometimes doubtless worse than that which it had supplanted. This new line of practice was the waiting and watching plan, called "the expectant treatment."

The objections to the old plan were obvious enough. The consequences of the loss of blood were often very serious; and if the blow aimed at the disease failed at once to cut it short, the loss of blood frequently led to such debility as to cause the patient at once to quickly succumb, or ultimately to wreck him in the convalescence. The secondary effects of the calomel and antimony were also often very undesirable. But the discarded measures were efficient means for producing the desired effects: and Bouchut speaks warmly of their apyretic action, especially with relation to the quickness with which they produce a fall of two or three degrees in the temperature.†

* Tartar emetic and bleeding, with opium, were considered by Hufeland the basis of all therapeutics (1820-30).

† The effect of loss of blood is to lower the temperature, according to Marshall Hall and Bärensprung; but Fresco found it to rise again in a few hours. Bauer found the amount of urea and carbonic acid increased by bleeding, in which respects his experiments agree with those of Voit and Rauber. According to this it would appear that bleeding should be accompanied or followed by the administration of depressants. Wunderlich thinks that the time of bleeding is the most important matter.

Blood-letting will never perhaps be generally revived; but nevertheless it may be our readiest or even only means at hand, especially with the general practitioner in rural districts. It sometimes materially aids the action of other remedies (see Watson, *Practice of Physic*, art. Enteritis). I well remember one case, where a stalwart dalesman had bronchitis, to which he was subject. The first or congestive stage was always troublesome; and when he came into my hands, after trying antimony, ipecacuanha, and iodide of potassium in vain, he had to be bled, as before, by my late father. On two different occasions had this to be done by me—each time with perfect success. At another time recently, I had an opportunity of watching the effect of general bleeding over pericarditis in its earliest stage; its effect was most satisfactory. My experience of bleeding is, however, almost confined to watching it in the practice of my late father, who often resorted to it with excellent effects.

In 1800, Rasori brought forward the use of tartar emetic alone in large doses in the treatment of inflammatory conditions, especially pneumonia. In many cases the good effects of this treatment were marked; the fever, the bounding pulse, the thirst, and the inflammatory processes, all were relieved, and the patient was easier and cooler, in free perspiration and with a softer pulse. The heart's action was depressed and the peripheral vessels dilated, especially those of the skin, permitting of a large flow of warm blood through them, and so exposing it to the cooling influence of the surrounding medium. But tartar emetic in full doses is a very active agent, and only suited to the cases called sthenic; its depressing effects rendering it unsuitable to asthenic cases and to children, except in very moderate doses. But to Rasori must be awarded the credit of originating the valuable idea of bleeding a patient into his own vessels—and not into the blood-basin.

Another depressant agent or direct sedative was introduced for the treatment of inflammatory conditions, and especially pneumonia, by two Italians, Borda and Breda, namely, hydrocyanic acid, which affects the circulation much in the manner of antimony. But prussic acid in anything like free doses is an agent one uses but charily, and so it has been given up.*

Then free purgation had its day, especially under Hamilton, and combined with salines found favour with many. But this method was unpleasant and inconvenient, necessitating much disturbance, interfering with rest and sleep, and therefore objectionable. It still remains in a modified form, and is the first arrow fired at acute disease from the country practitioner's quiver. In a large number of less serious cases it makes a capital commencement; probably, however, rather by its unloading the intestinal canal than by any direct action upon the circulation.†

The saline treatment is still in common use, and over many patients potash exercises a powerful sedative influence. The effects of acetate of ammonia over the cutaneous vessels in inducing perspiration with its apyretic consequences, render it a favourite remedy with many; and it is admirably adapted to domestic use, there being no room for doubt but that a dose or two of acetate of ammonia have arrested in its early stages many a threatening pyrexia. For we must remember, gentlemen, that the arrest of acute disease in its first manifestation is a much easier matter than the institution of recovery and repair after much injury has been done, when the affection has got strong hold of the patient.

While these general measures were being tried in their turn, and partially adopted partly discarded, other measures for affecting the circulation were being instituted. These were measures applied externally. Blisters, counter-irritants, dry cupping, etc., had long been in vogue, and were known to exercise in a smaller degree the same action as wet-cupping and leeches; viz., attracting the blood to the cutaneous vessels and so relieving the inflamed part beneath, according to the law of Schroeder van der Kolk. But for this to be successful it is necessary that the blood supply of the inflamed part, and of the skin operated upon, should actually be derived from the same arterial trunk. In costal pleurisy, where the pleura and the skin alike derive their blood-supply from the intercostal arteries the effect of this local treatment is much more marked than in pneumonia with visceral pleurisy. To the French school belongs the credit of first affecting the general circulation by efficient external measures. Junod invented a boot by which he could lock up a quantity of blood in a leg, actually bleeding the patient to the extent of the blood so imprisoned; and then when desirable, permitting the blood to once more rejoin the general current. But Junod's boots are long went the way of many ingenious but impracticable measures, namely, to oblivion, where, I am afraid, they

are likely to remain. But if this is the destiny of Junod's boots, a far different future is before another French method of affecting the general circulation by external appliances, viz., the jacket-poultice. The excellent effects of this application in thoracic affections are well known to us all, especially in pneumonia, and in the acute pulmonary congestion, commonly seen in the course of organic diseases of the heart. The application of moist heat to so large an area of skin, with its myriads of minute vessels, exercises a marked effect over the circulation. The vessels of an extensive area are dilated, and therefore hold more blood; the consequence of which is, that practically the vascular system is relieved of the bulk of blood retained in these dilated vessels, as effectually as if the patient had been bled to an equal amount. A considerable quantity of blood can thus be withdrawn from the circulation in a manner that admits of its being returned again when desirable—a matter of immense practical importance. The temporary removal of a mass of blood from the circulation without its withdrawal from the body, in a form at once practicable and effective, is one of the greatest steps forward in modern therapeutics. After this exposition of the action of a jacket-poultice, it becomes unnecessary and superfluous to insist upon the constant renewal of the hot poultice, and the absurdity of allowing it to remain on when cold is at once manifest. When the principle of the use of the jacket-poultice becomes more generally known, its adoption will be much more extensively resorted to.

[To be continued.]

THE CASE OF THE LATE DR. H. W. FULLER.

By WILLIAM FULLER, Esq.;

WITH AN ACCOUNT OF THE *POST MORTEM* EXAMINATION.

By W. H. DICKINSON, M.D., F.R.C.P.,

Assistant Physician to St. George's Hospital.

I WAS called to see my brother, Dr. Fuller, on the evening of Monday, December 8th, and found him suffering from an incessant short hacking cough, with expectoration of glairy mucus, and complaining of great pain in the epigastrium extending over the whole region of the liver, with severe intercostal pain of the right side. He was unable to remain for a minute turned on his left side. His pulse was very intermitting and irregular; his tongue coated but moist. The temperature 102. His urine was scanty, high-coloured, and very loaded. On examination, I found no physical signs of either pleurisy or pneumonia. The percussion-sound was equal on both sides; but there was inability to expand the chest and to inflate the lungs, apparently owing to the pain. He told me that, with the exception of some little trouble with his bowels and loss of appetite, he had been quite well till the previous day, when he had been forced to return home, feeling very poorly and short breathed, and was unable to eat his dinner. However, the next day he managed to see his morning patients, and went out to pay his visits, but was again forced to return home from the pain and irritating cough. His bowels had not been well-relieved, though he had taken a dose of pills in the night. Knowing his tendency to rheumatic affections, I diagnosed rheumatism of the diaphragm and intercostals, and insisted on some days' rest in bed. On Tuesday, the 9th, he was somewhat relieved. His pulse was less intermitting and irregular. Temperature 101. The urine was still scanty. The bowels had been relieved with dark bilious evacuations. Contrary to my wish, he got up and received his patients as usual at home, but did not leave the house. At 5 P.M., he went to bed again, thoroughly knocked up; and at 6 P.M. I found him much exhausted, but otherwise better. Temperature barely 100 deg. The urine was more free, the pain and cough less. There was more power of inflating the lungs. On December 10th, he remained quietly in bed, and was much relieved in the evening. The urine was free, less high coloured, and without deposit. The pulse was regular, soft, 88; his cough still irritable when lying on his back, but much better when on his right side. Whenever he took food, he complained of pain in the act of swallowing, and for some time afterwards in the epigastrium. On the 11th, he was much better, saw several patients in his bedroom, and held two consultations. After this he had a severe rigor, followed by profuse perspiration; but at night the temperature was 99; the tongue was cleaning at the edge. Pulse 84, regular, soft. His general feelings were improved. On the 12th, he was much better; he was taking quinine and acid mixture. Temperature natural. Pulse about 80. The urine was free, clear, and fairly abundant. He worked at correcting proofs of the new edition of his work on *Rheumatism* till 11 P.M., did not sleep; and on the 13th

* It seems strange that bleeding in its worse aspects should cling so tenaciously to the country where the earliest attempts to do away with it commenced.

† It is possible, however, that unloading the bowels may permit of distension of the abdominal veins, and so act like bleeding.