experiments, proved efficacious in preventing the infection of the plague. In order more fully to ascertain its virtue in that respect, it was determined towards the end of the year that ten malefactors under sentence of death should, without undergoing any other precautions than the fumigation, be confined three weeks in a lazaretto, be laid upon the beds and dressed in the clothes which had been used by persons sick, dying, and even dead, of the plague in the hospital. The experiment was accordingly tried, and none of the ten malefactors were then infected or afterwards became ill.* The chief ingredients in the fumigating powder were nitre and sulphur.

Acetic acid has also been long used as a disinfectant. It is related that Cardinal Wolsey was in the habit of carrying a sponge soaked with this substance and various aromatics, in an orange-skin, when passing through the crowds which his fame attracted, in order to preserve him from infection. The reputation of acetic acid as a disinfectant is said to have arisen from the confession of four thieves, who, during the plague of Marseilles, plundered the dead bodies with perfect security, and, on being arrested, stated, on condition of their lives being spared, that the use of aromatic vinegar had preserved them from the influence of the contagion. It is on this account sometimes called "Le vinaigre des quatre voleurs". Muratori, an Italian physician of the seventeenth century, advocates the use of vinegar as a disinfectant. This substance is also in great favour with the Arabians as such. The late Dr. Mead, who was somewhat sceptical regarding the benefits of fumigation and advocated the keeping of houses cool and airy, was nevertheless favourable to the use of vinegar and burning sulphur as disinfectants.

In the year 1773, Gayton Morveau brought forward hydrochloric acid as a disinfectant. The gas was to be made by pouring sulphuric acid on common salt, and was recommended as an efficient mode of disinfecting military hospitals, for which it was largely used, and undoubtedly with great success, as the Chancellor of the Legion of Honour in 1805 writes to him as follows, in the name of the Emperor Napoleon. "Europe and America know that since 1773 you have employed your discovery of the application of muriatic acid fume to arrest the effects of contagious and direful diseases."† So high was this discovery valued, that for it he was made brevet officer of the Legion of Honour, and a decree was passed by the National Assembly ordering its use in military hospitals where infection prevailed.

In 1780, Dr. Carmichael Smyth began to use nitrous acid fumes as a disinfectant. Fever had broken out among the prisoners in Winchester, which attracted the attention of Parliament. Several eminent London physicians were asked to take charge of the prisoners, but refused. Dr. Smyth latterly agreed to do so. One hundred and eighty of the prisoners, with most of the officers and servants, had already died, and the disease was daily increasing. In Dr. Smyth's own words, "When I arrived at Winchester, I found the hospital in the following state.

Table of Deaths.

Date of Weekly Accounts.					Number of Spanish Prisoners		
					In Custody.	Sick.	Dead.
March 26, 1780	..	..	..	..	1247	60	1
April 2, "	..	..	..	..	1243	106	4
" 9, "	..	..	..	..	1475	150	10
" 16, "	..	..	..	..	1457	172	18
" 23, "	..	..	..	..	1433	142	21
" 30, "	..	..	..	..	1412	171	21
May 7, "	..	..	..	..	1388	191	25
" 14, "	..	..	..	..	1351	197	27
" 21, "	..	..	..	..	1523	205	30
" 28, "	..	..	..	..	1494	226	31
					Total..	..	188

Immediately on the admission of the nitrous acid vapour, the deaths fell on June 17th to nine; on the 27th, to five; July 1st, to five; and July 8th, to one, when the contagion ceased. None after its admission caught it, and the disease immediately showed a milder aspect." A Dr. McGregor, of the 88th Regiment, having about this time lost from forty to fifty patients during an outbreak of fever, tried, on a subsequent outbreak of the same disease, nitrous fumigation, and, of sixty-four men seized, did not lose one. The results of Dr. Smyth's application of nitrous acid fumes, not only in Winchester Prison, but in hospitals and ships, produced such an effect on the public mind, that Parliament in 1802 voted him £5,000, and he was appointed physician extraordinary to the King.

[To be concluded.]

A NEW METHOD OF APPLYING A PLASTER-OF-PARIS JACKET IN THE RECUMBENT POSTURE.

By J. W. MILLER, M.D. Edin.,

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DR. SAYRE is entitled to the gratitude of the profession for having shown how by the use of plaster-of-Paris jacket it is within the power of every practitioner to employ the treatment by artificial support in cases of spinal disease, and for establishing clearly how great is the benefit thus conferred upon the patient. It would be difficult to say how many cases are now treated in this manner for one which 'was so treated previously to Dr. Sayre's publication of his method, and for this great extension of practical knowledge we are wholly indebted to him. While however we fully recognise this, it does not follow that his method must be adopted in every detail as always the best in every case, and I think there can be no doubt that there are at least inconveniences in the method by suspension. It is at all events desirable to have an alternative; and Dr. Walker's paper in the JOURNAL of March '81 was a gratifying contribution to our knowledge, in showing how the jacket can be applied in the recumbent posture, with good results. After alluding to the success of the treatment of these cases by artificial support, which he has proved during a seventeen years' experience, he goes on to say, "But, in order that such a jacket shall be effectual, it is a *sine quâ non* that it shall be applied when the spine is in such a position that the diseased vertebrae shall be free from all pressure, and the deformity, if any deformity exist, be reduced to a minimum. This condition is found, it is true, when the patient is suspended by the head and shoulders, as recommended by Sayre, but it also obtains in an equal degree when the patient is laid flat on his back; and the same result as to increase of height, diminution of the deformity of the spine, and relief to pain and functional disturbance follows the application of the bandage, when the patient is in the recumbent posture, as when he is suspended."

There is sometimes a difficulty, however, in Dr. Walker's plan, in getting the jacket completed before the plaster has begun to set; at least, I have found it so, even with the use of gum to delay the setting. Thinking by what means the procedure might be hastened, the simple expedient suggested itself to me which I am about to describe; of which the great advantage is, that so much can be done before water is employed, that about five minutes' time after the first wetting of plaster suffices to complete the jacket; this also renders unnecessary the mixture of any substance with the plaster to delay the setting. My method, it will be observed, is only a modification of Dr. Walker's.

The best material for the bandages is Victoria lawn, but not too close in texture; and four yards is a convenient length for them. The plaster should be well rubbed into the bandages, but it is desirable to have a considerable quantity besides loose on the surface of the bandages. Shortly before the jacket is to be put on, the patient should have a full meal, thus putting "a pad" of the correct size inside, instead of Sayre's "dinner-pad" outside. The patient, having put on a thin closely fitting woollen shirt, is laid on his back in bed, or on a table covered with a folded blanket, a waterproof under him, and his arms extended at right angles to his body. The requisite depth of jacket is marked on the bed by any appropriate means, such as pins inserted in the waterproof or blanket, two on each side, one opposite the axilla and another opposite a point about an inch below the crest of the ilium. The patient is now made to sit, and after doing so must be careful not to change his place on the bed, in order that, when he again lies down, he may resume exactly his former situation. The length of bandage having been ascertained, which is requisite to encircle the body and overlap in front to the extent of four or five inches, pieces of bandage cut to this length are laid down in succession across the bed, each piece overlapping the preceding by two-thirds of its breadth, as Dr. Walker directs, until a sufficient number are laid down to give the required depth of jacket. The first and the last piece laid down should, however, be about a third of their breadth beyond the marks, and should be then folded in, as otherwise the jacket at its upper and lower edges would be only twofold. The ends of the bandages are now fastened together by being fixed on each side between two slips of wood, which are clasped by three American clothes-pins. These slips of wood should be about fourteen inches long, one inch broad, and three-sixteenths of an inch thick, and the wood should be left in its rough state on one side, in order to grip the bandages more firmly. If any of these were to slip out after being wet, the whole operation would be spoiled; this could be effectually guarded against by one of the pieces of wood being pierced by a row of

* *Philosophy of Medicine*. London, 1799.

† *Travé des moyens de désinfecter l'air, de prévenir la Contagion, et d'en arrêter les Progrès*. 1805.

very small sprigs about an inch apart, so that their sharp points might project slightly on the rough side. I have not found this necessary, being careful when lifting the bandages to hold firmly with the fingers. By this means, the whole layer of bandages can be lifted between the two hands and dipped in fluid plaster; but before doing so, a second layer of bandages must be made ready in the same manner. No water having been as yet employed, all these arrangements can be gone about with perfect leisure, and it may be well to cause the patient to lie down on the arranged bandages to make sure that the correct size has been taken. If the jacket is to be strengthened with slips of tin, these should now be cut to the proper length and laid at hand. Everything being now ready, a thin mixture of plaster is prepared by mixing two pounds in forty ounces of water, and this is then poured on a flat tray broad enough to accommodate the depth of the jacket.* One of the layers of bandages is now drawn slowly through the plaster on the tray twice or thrice, care being taken that it is thoroughly saturated, by turning first one side and then the other down; which having been properly done, it is laid aside on any convenient place. The other layer of bandages, having been treated in the same manner, is laid on the bed behind the patient, being carefully placed on the spot previously marked, and the layer which was first dipped then laid upon it. By placing them in this order, the first dipped, and therefore nearest setting, will be first applied to the patient. The patient is now laid back carefully on the bandages, the arms extended as before, and, the slips of wood having been detached from the upper layer, each bandage in succession is brought round and overlapped in front. The slips of wood holding the ends of the bandages firmly between them having prevented the saturation of these portions with fluid, an assistant, while they are being crossed in front, pours on with a spoon some of the fluid plaster from the tray. The second layer is put on in the same way, pieces of tin being interposed where thought desirable. As much as may be necessary of the remaining liquid plaster is now smeared over the surface of the jacket, and smoothed with the hand as it sets. The whole procedure, after commencing to mix the plaster and water, occupies, with ordinary despatch, about five minutes; and on the last occasion, the patient being a child, the whole time occupied, after placing the patient on the bed till the jacket was completed, was fifteen minutes. I have only had four opportunities of employing this method, the last two being by the courtesy of the surgical staff of the hospital. The cases have not been suitable for ascertaining the effect of the recumbent position as compared with that of suspension in straightening the spine and adding to the stature, but Dr. Walker speaks decidedly on this point. The best opportunity of testing the matter would be, in the case of an adult patient about to have a jacket removed, which had been put on during suspension, his height being carefully noted before its removal, and again after the application of a new one in the recumbent posture.

THE PHYSIOLOGICAL EFFECT OF PILOCARPINE IN CONJUNCTION WITH THE ADMINISTRATION OF CHLOROFORM.

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ELIZABETH W., a married woman, aged 35, was a patient of the Guy's Hospital Lying-in Charity. She was subject to epileptiform convulsions, which, from the description given of them, appeared to partake in some degree of the hysterical character. These convulsions were usually increased in severity and frequency on any excitement. During her last labour, epileptiform fits had occurred. Assistance was sent for at 2.30 P.M. on September 6th, 1879, on account of the onset of repeated convulsions. She was then at about the full term of her eighth pregnancy. The fits appeared to be purely epileptiform in character, but without any violent clonic convulsion. During the fit, the eyes were widely open, conjunctivæ insensitive to touch, teeth tightly closed and ground together, with saliva flowing from the mouth; limbs rigid and semiflexed. Each fit lasted about two minutes, and ended in a deep inspiration, after which consciousness returned. Weak and infrequent labour-pains had occurred, and the os was found to be dilated to about the size of a florin. The obstetric resident, on visiting the patient at 3.30 P.M., found the pulse to be 120, temperature 100.6°. A small quantity of urine was withdrawn by the catheter, and found to be free

from albumen. Fifteen grains of hydrate of chloral, with the same quantity of bromide of potassium, were then administered every half-hour.

I was summoned to see the patient about 7 P.M. The fits had then diminished in frequency, three only having occurred within the last forty minutes. The patient in the intervals was not fully sensible, but could answer questions, although somewhat incoherently, and was able to swallow. The pulse had fallen to about 80. The membranes were ruptured, but the os uteri was scarcely so much as two-fifths dilated, and its edges were rigid and undilatable. Labour-pains had almost entirely ceased, and the body of the uterus was lax. A sphygmographic tracing showed the pulse to be regular, and of somewhat high pressure, the maximum good working pressure being six ounces, and the systolic summit somewhat broad, but without any distinction between primary and tidal wave.

The hypodermic syringe having been accidentally left behind, one-third of a grain of pilocarpine was administered by mouth. As scarcely any manifest physiological effect was produced, a second and a third dose of the same amount were given after intervals of twenty minutes each. Soon after the third dose, salivation commenced. A little later, violent vomiting came on; and, upon this, sweating, hitherto scarcely noticeable, became profuse. The salivation also became very extreme, and the condition of the patient generally very miserable. No labour-pains occurred, the uterus remained quite flaccid, and the os unrelaxed. A sphygmographic tracing was again taken, the pulse having risen from 80 to about 90. The curve had now become somewhat higher and more pointed, and a slight notch was shown between the primary and tidal (or predicrotic) wave. The maximum good working pressure, however, was only very slightly diminished, being now five instead of six ounces; still remaining, therefore, above the normal level. Thus some degree of diminution of arterial tension was shown as the effect of the pilocarpine, but much less in degree than that which may be easily produced by a moderate dose of nitrite of amyl, although the general physiological effects of the drug were developed in extreme degree.

With the object of facilitating digital dilatation of the os uteri, and the subsequent application of forceps, the administration of chloroform was now commenced. Before, however, anaesthesia had been fully produced, an alarming change took place in the pulse. Having been previously full, strong, and regular, at the rate of about 90, it ran up suddenly to at least 180, becoming at the same time extremely irregular and compressible, and fluctuating so much with respiration that, during the inspiratory period, it could scarcely be felt at the wrist. The chloroform was at once discontinued, since it appeared dangerous to prolong the administration. As soon as consciousness had returned, the pulse again became strong and regular, at its former rate of about 90. Chloroform was then again administered, in order to test whether the effect really depended upon its use. Again, before the stage of rigidity had passed, the pulse became rapid, irregular, and almost imperceptible, its rate going up to quite 200. As before, it returned to its original quality and rate as the effect of the chloroform passed off.

Digital dilatation of the os, which remained rigid, by means of the fingers of one hand in the form of a cone, was then continued for about an hour. After this, forceps was applied by the obstetric resident, Mr. Pedley, the diameter of the os having now reached a diameter of two inches and a half, and the head being still high up in the pelvis. A living male child was delivered, about half an hour being occupied in the extraction. No uterine action whatever occurred until the forceps was applied; but, under the stimulus of their use, some pains came on.

Since the effect of chloroform in labour is ordinarily to diminish the rapidity of the pulse, the effect on the pulse in this case must have been due, not to the chloroform alone, but to chloroform acting in conjunction with a large dose of pilocarpine. Since pilocarpine is known to have an accelerating effect upon the heart, it would seem probable that the chloroform paralysed some inhibitory mechanism by which this influence was kept in check so long as consciousness existed. As in this instance it did not appear safe to continue the anaesthetic, the case appears to suggest that there may be an inconvenience in treating puerperal eclampsia by pilocarpine, when it is likely that an anaesthetic will soon afterwards be called for in order to terminate the delivery.

No convulsion occurred after the administration of the first dose of pilocarpine, although fully three hours elapsed before delivery was completed, and notwithstanding the prolonged digital dilatation of the os, and the slow extraction by forceps, both which proceedings in a case of eclampsia would be likely to bring on convulsions in the absence of an anaesthetic. Some complication was introduced by the fact of chloral and bromide of potassium having been given previously; but, since there had been no interval free from convulsion longer than about fifteen minutes until the administration of the pilocarpine, there appeared to

* For hospital use, a modification of the machine, figured by Dr. Walker in his paper, would be a convenient appliance. It would be necessary to make it sixteen or eighteen inches long, without the spindles for carrying the bandage, but having the fan-roller.