The method is based upon the researches of Haldane and Lorrain Smith, who have shown by their carbon monoxide method that in chlorosis, although the percentage of haemoglobin in the blood is so much diminished, the total amount of haemoglobin in the body is fully up to the normal; that is to say the anaemia is only relative, being due not to a deficiency of haemoglobin but to an excess of plasma. Theoretically, therefore, it should be possible, if we can only diminish the fluid portion of the blood, to cure chlorosis without the use of iron. What one has to aim at, therefore, is a reduction in the fluids of the body, and the prevention of reaccumulation, and there are a variety of means which may be employed to this end.

The removal of water by the bowel has long been recognized as a valuable line of treatment in chlorosis, so that a small dose of magnesium or sodium sulphate usefully forms a part of any mixture employed. The secretion of urine should be encouraged; citrate of caffeine or diuretin may be employed, or theocin sodium acetate, which I have found the most reliable diuretic, in doses of 5 grains four times in the day. Whichever of them is used, it is well to give at the same time 5 minims of tinct. digitalis, since they may all prove ineffective unless the blood pressure in the renal glomeruli is properly maintained. Here, again, it is of interest to note that the empirical use of digitalis in the treatment of chlorosis has long been recognized. Loss of fluid by the skin may be encouraged by the use of jaborandi in some form, or by hot baths, vapour baths, or hot packs. I have never, however, found it necessary to resort to these measures, though in Germany, where hydrotherapy is more in vogue, some physicians lay great stress upon their use in chlorosis.

There is one other mode of removing fluid from the body which I have not so far made use of. That is the treatment, already alluded to, by small doses of zinc sulphate, by which repeated emesis was produced. Although Dr. Eustace Smith attributed the success of this line of treatment in his case to removal of fermenting food remains from the stomach, I am of opinion that the withdrawal of fluid from the body in this way played a part, if not the main part, in the case.

Not only, however, must this elimination of water by the bowel, by the kidney, or by the skin be encouraged, but the intake of water must be limited at the same time. In some of the cases in which I have asked the question, the patients have told me that they drank unusually large quantities of fluids, though in others I have failed to get this history. It is important to impress upon them the necessity of drinking less than they have been in the habit of doing; at the same time, I recommend them to take as little salt with their food as possible. The power of salt to retain fluid in the body is well recognized, and in persons whose kidneys are defective an excess of salt may lead to the appearance of oedema, and deprivation may lead to its disappearance. Indeed, it has struck me as a possible explanation of the origin of chlorosis, which is still wrapped in mystery, that the kidneys might be functionally incapable of secreting urine containing more than a certain proportion of salts, such as is well known to be the case in chronic interstitial nephritis, with resulting retention of salts and retention of fluids to keep the salts in solution. In this connexion I would refer to certain oedemas in young children. It is not uncommon to get sudden oedema, with pale, swollen face and puffy eyelids and swelling of the dorsa of hands and feet, which at once suggests acute nephritis. Examination of the urine, however, fails to reveal evidence of any organic kidney trouble; there is a complete absence of albumen and casts, and the condition appears to be due to a wholly functional inability of the kidney to excrete the normal percentage of sodium chloride, with consequent retention in the tissues and accompanying oedema. The rapidity with which the oedema disappears on a salt-free diet is startling, and fully bears out the suggested etiology of the condition. I have in prospect some experiments to determine the power of the kidneys in cases of chlorosis to get rid of excessive intake of salt, but so far, from my observations on the specific gravity of the urine in these cases, I do not get much support for my suggestion; it is not so constantly low as it should be if the explanation were correct. On the other hand, some observations of Moraczewski² though incomplete in certain ways, led

him to conclude that the excretion of chlorides in the urine was sensibly diminished in cases of chlorosis.

I have had the patients weighed from time to time, and as they improved by the elimination of their excess of fluid their weight steadily fell. In one case the nurse whose duty it was to weigh the patient was seriously perturbed at the steady loss of weight, since in her previous experience the result to be looked for in successful treatment was a gain in weight.

Theoretically, as I have said, the disease should be amenable on those lines without the use of iron, but in the few cases in which I have followed this course without iron the improvement, though present, has been very slow, to increase rapidly on the addition of iron to the treatment. Practical considerations, therefore, must be allowed to outweigh pure theory. I have tried it now on a considerable number of cases with, on the whole, very gratifying results, particularly in those cases in which the excess of fluid in the body appeared most evident, in which the face, and in fact all the loose tissues of the body generally, had a distinctly "puffy" appearance.

REFERENCES.

- ¹ BRITISH MEDICAL JOURNAL, 1908, ii, p. 1144.
- ² Virchow's Archiv, cxlv, p. 453, 1895.

CASE OF TETANUS TREATED WITH CARBOLIC INJECTIONS: RECOVERY.

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THE following case of recovery from tetanus may be of interest, since, in the absence of antitetanic serum, injections of carbolic acid proved of undoubted value.

A boy, aged 13, was first visited on June 22nd, 1909. His parents stated it to be then the third or fourth day of illness since the onset of spasms and difficulty in opening his mouth, and about the twentieth day from the date of injury. The seat of infection was a small cut on the left middle finger on the dorsal surface of the proximal interphalangeal joint. No attempt had been made to protect or clean the wound, and septic synovitis had resulted. His condition on examination was typical. His whole body, the arms excepted, was in a state of continuous rigidity; opisthotonos was marked and trismus severe. Paroxysms of increased rigidity occurred once in every thirty or forty minutes, sometimes oftener. In the intervals between the spasms his jaws could be separated for nearly $\frac{1}{2}$ in. The temperature and pulse were normal, but he was pale and exhausted from lack of food and sleep. He was at once given an egg beaten up with brandy, and his finger washed and treated with caustic carbolic. Amputation being refused, the wound was opened as freely as possible. He was then given a mixed draught of potassium bromide and chloral hydrate, 15 grains of each, morning and evening, the dose being increased later to 20 grains. His parents were instructed to feed him as liberally as possible. After his strength had been recruited by sleep it was soon found that there was no lack of appetite, which was in fact exceptionally keen. He was fed chiefly upon a diet of raw eggs and a Chinese gruel made of egg and flour. Aperients were administered frequently to keep the bowels freely open, and according to the usual routine in our practice he was treated for *Ascaris lumbricoides*. On one occasion eight worms were passed in his stools, but the condition is so universal here that it bears no special significance in his case.

As his parents were convinced that there was no hope of recovery, and the Chinese all prefer to die at home, they refused to allow him to be brought into the hospital, and as they had not the smallest control over him and were helpless in administering the medicine themselves, it was necessary to visit him twice daily for that purpose. These visits were continued for fifteen days. During the first three days of treatment there was a slight improvement in his general condition, owing chiefly to the nourishment and sleep obtained, but no abatement of the symptoms. As the days went on these seemed to be increasing in intensity, and on the eighth day it was decided, as a last hope, to try injections of carbolic acid, no antitoxin being available in these remote regions.

The first injection (1 c.cm. of a 4 per cent. solution) was given on the evening of June 30th, and from that time onwards repeated twice daily, more frequent injections being impossible at his own home. At first there was a distinct improvement in his condition, the spasms were less severe, and the intervals between them considerably prolonged, trismus being markedly relaxed, but on July 3rd there was a relapse. The boy, according to Chinese habit, had been lying quite uncovered on his bed, and must have contracted a chill. His temperature rose slightly, the voice became very hoarse, and coryza troublesome. He was irritable and refused both food and medicine. The paroxysms became again more frequent, and so severe and prolonged that asphyxia was threatened, and the pain caused beads of perspiration to appear on his brow. The parents, fearing the end

was near, had fastened a piece of red rag outside the door and scattered black beans upon the threshold, in accordance with Chinese superstition, to keep demons from entering to claim his soul. These proceedings are never resorted to until all hope is gone, the Chinese being seldom at fault in their prognosis on these occasions. He was given quinine and Dover's powder, and, as it was impossible to visit him more frequently, the amount of injection was increased to 2 c.cm., and the bromide and chloral discontinued. The next day his condition was greatly improved, and progress was from that day forward maintained uninterruptedly.

On July 9th, owing to severe illness amongst ourselves, it became impossible to continue the home visits, and the parents at last consented to his admission into the hospital. Upon admission, although he seemed in much pain, his condition was satisfactory, and he had borne the journey well. A more systematic course of the hypodermic injections was instituted at once, my colleague, Dr. Francis Cunningham, undertaking their administration. On the first two days after admission five injections were given, the dose being 1 c.cm. of a 5 per cent. solution, and after that four injections each day. No bromide or chloral was given. Every night for the first seven days after admission a grain of morphine c. atropine was added to the last injection of carbolic acid to ensure a sound sleep, for no injections could be given at night, owing to our insufficiency of staff. The morphine was then reduced gradually until the patient was able to sleep without it. The improvement was satisfactorily maintained, and on July 31st the patient got off his bed himself and walked a few steps alone. His condition seeming so favourable, and being a difficult subject for the injections, they were discontinued, the boy having received 103 injections in all. No toxic signs were observed at any time, but small, punched-out sores appeared at two or three of the hypodermic punctures. After discontinuing the injections he was given a daily dose of grey powder. The rigidity of his legs diminished by degrees, but persisted longer in the right leg than in the left, contraction of the tendo Achillis causing him for a time to walk on tiptoe; but this eventually relaxed also, and for the last two months he has been in full enjoyment of his normal health and strength.

This case from the very first presented several favourable features. The late onset of the disease (about the fifteenth day), the seat of the injury on one of the fingers, and the trifling nature of the traumatism itself, all pointed to a hopeful prognosis. The patient, moreover, was at a vigorous age, his appetite was good throughout, his pulse slow and steady, and temperature normal, except for a temporary rise on one occasion. Then, too, the Chinese temperament was probably a favourable factor, for being so much accustomed to all sorts of sounds and disturbances, the paroxysms were not so easily, if at all, excited by external stimuli as would be the case with a European subject.

As it was impossible to procure the antitoxin it was considered useless to give injections of magnesium sulphate, and owing to the extremely filthy condition of the patient's bed and home surroundings, spinal injections were abstained from altogether. The progress at first seemed so favourable that it was reasonably hoped that recovery would occur naturally, and it was only after the lapse of seven days, when the symptoms began to increase in severity and the paroxysms in intensity, and his life was despaired of, that recourse was had to the treatment by hypodermic injections of carbolic acid. There is no doubt that the effect of the injections was decidedly beneficial, as shown by the marked diminution in frequency and intensity of the paroxysms which followed immediately upon commencing the treatment, but it was not until it became possible to give the injections sufficiently often that a marked and permanent change for the better took place. One week after his admission the spasms had completely disappeared and his jaws could be separated widely and naturally, and mastication of food became possible. There remained only the rigidity of neck and limbs, and this diminished sensibly from day to day during a period of rapid convalescence. The Chinese, to whom the disease is a common, and, alas! too fatal one, regard his recovery as a miraculous manifestation of the agency of the devil! It is my intention, when again called upon to treat a case of tetanus, to begin the carbolic injections from the very first, though I do not think it can ever be necessary to administer enormous quantities or repeat the injection very frequently when a smaller dose can be found to suffice.

UNDER the auspices of the Ligue de Prophylaxie Sanitaire, the first hospital for skin and venereal diseases has recently been established at Cairo. The funds were provided by the State. The director of the hospital is Dr. N. Z. Joannides, a pupil of Professor Neisser.

CONGENITAL BLENNORRHOEA OF THE LACRYMAL SAC.

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THE subject of blennorrhoea of the lacrymal sac in the newly born has not received the attention it deserves. It is due to catarrh of the mucous membrane of the sac, which, owing to obstruction somewhere in the nasal duct, most probably where it opens into the inferior meatus of the nose, results in accumulation of muco-pus or pus in the lacrymal passages above the stricture; this leads to distension of the sac, which discharges its contents through the lacrymal puncta into the conjunctival sac when pressure is made over the region of the lacrymal sac. In the textbooks little is said about the pathology, and not much more about the treatment. Two decidedly different lines of treatment are, however, usually followed by ophthalmic surgeons: the one based largely on the results of the treatment and experience in individual cases, the other based in a great measure on the results of embryological findings. The first is the expression treatment, which may be briefly described as consisting of frequent emptyings of the sac by pressing that structure against the lacrymal bone, coupled with the employment of zinc chloride or other astringent drops to the conjunctiva afterwards; the second method consists in slitting up the canaliculus and passage of a probe down the nasal duct into the inferior meatus of the nose.

During the last eighteen months I have met two cases of blennorrhoea of the lacrymal sac in babies so placed socially that it was possible to have the expression treatment well carried out and to keep the cases under careful and even exact observation. The results have tended to strengthen the view I had previously held, that, given the circumstances, which are generally to be found in a good home, the expression treatment is, ordinarily speaking, quite sufficient to cure absolutely the great majority of cases.

As regards the literature on the subject, a careful search unearthed only two papers, to which I would recommend anyone who is interested in the subject: the first is by Mr. Donald Gunn, published in the *Ophthalmic Review*, February, 1900; the second and more recent by Mr. Stephen Mayou in the *Reports of Moorfields Hospital*, 1908. Mr. Gunn, whose article is entitled "Lacrymal Obstruction in the Young," publishes an account of seven cases of this condition, in which, if I read him aright, he ascribes the condition to obstruction of the lower end of the nasal duct, where it opens into the inferior meatus of the nose, and the consequent distension of the passages by the accumulation of epithelial waste, which should have been removed in due course if no such obstruction had existed; the dilatation of the passage he surmised from the large amount of pus and proved actually by the use of the probe. Mr. Mayou does not quite agree with this view, as he considers that the discharge accumulates in the sac itself, which is capable of much distension into the orbit without producing much outward and visible sign. In six of the cases seen by Mr. Gunn he slit the canaliculus and passed a probe; he found dilatation of the nasal duct with obstruction at the lower end in all the cases, and they were promptly cured by this slight operation; the expression treatment was not systematically tried.

Mr. Mayou's conclusions, the result of examination of the heads of several fetuses, are as follows:

- That throughout development the lower end of the lacrymal duct is extremely small, and remains so at birth, being partially occluded by the inferior turbinate bone.
- That the duct is filled with debris, both the sac and canaliculi.
- That at birth the duct is either not patent or only partially so.

Mr. Mayou is apparently a believer in the passage of the probe.

I would submit to those who deal largely with the newly born, and have occasion to see conjunctivitis in its many phases, that they should constantly keep in mind the possibility of lacrymal obstruction as a probable cause, more especially if the attacks of conjunctivitis are