REMARKS

ON A

CASE OF TETANUS TREATED BY THE ADMINISTRATION OF THE HYDRATE OF CHLORAL:
DEATH TEN DAYS AFTER ADMISSION.BY WAREN TAY, F.R.C.S.,
Assistant-Surgeon to the London Hospital.

I AM greatly indebted to Mr. Oswald Baker, Mr. Hutchinson's House-Surgeon, for the interest he took in this case and the care with which he noted the temperatures. They were all taken either by him or myself, and sometimes by both of us. The changes were only within certain limits, but they were so generally consistent that I cannot but accept them as trustworthy. The fall, as soon as the patient slept, was slight, but remained constant as long as she was not roused up. On the other hand, the rise of temperature when the severe tetanic spasms occurred is equally definite. The effect on the pulse was not definite. It would seem that in chloral we have an agent which will place a patient suffering from the agonies of impending suffocation owing to tetanic spasm in a position of calm sleep and muscular relaxation. That it will consequently tend to prolong life is highly probable, as I think it did in this case. The woman certainly appeared to me very near death's door when she was admitted, and I scarcely expected her to live through the night. That she lived for ten days must, I think, be attributed to the calming influence of the enforced sleep. As to whether she would have lingered on longer, or even have recovered, if the chloral had been pushed more at the last, it is impossible to say. She had taken a large quantity of beef-tea and milk, and did not die of want of nourishment, as far as one can judge. I regret that she was not seen, and her temperature noted, just before death. The nurse reported that no further spasms occurred after the last dose of the chloral.

Notes were taken on many other occasions than those specified here, but I have selected the more important. Small doses also of chloral, for the sake of experiment, were tried; but, as they produced no appreciable effect, they are omitted.

A woman, forty years of age, was admitted into Mr. Hutchinson's ward, London Hospital, February 5th, 1870. She had well-marked trismus, and spasms of the muscles of the throat, so much so that she was dusky in the face and seemed in imminent danger of suffocation. She could give no history of any accident, nor could her friends. The lock-jaw set in eight days before, and for three days she had only swallowed liquids, and had not slept. Her pulse was very feeble and unequal. The jaws were quite shut; but she opened them a little, to enable her to breathe better, by inserting the handle of a spoon between the teeth and forcing them apart. She had done this for two days before admission, and she brought the spoon in with her. At 3.30 P.M., a dose of a drachm of chloral, in solution, with sugar, was given by teaspoonfuls by the mouth. In half an hour the dose was repeated. A good deal was lost, and at 4.15 half a drachm was given. Probably she had a full dose in all of two drachms of chloral. After the last dose, she became a little excited in her manner; she put the spoon on one side, as she could breathe without it; the aspect of her face became quiet; she lost the risus sardonicus; she remarked to a friend, "I am so tipsy"; and, in a quarter of an hour, was fast asleep. The muscles were fully relaxed; her mouth was open, and she was snoring loudly; the pulse became full and bounding. The temperature, before any chloral was given, was 99.6 deg.; her pulse, 104., very weak and irregular; her respirations, from 30 to 40 per minute. They were chiefly abdominal, her chest seeming rigid. When asleep, after the chloral, the temperature had fallen to normal, 98.4; her pulse was full and steady, but not altered in number of beats; her respirations were exactly those of a person during sleep, quite easy and regular. For fourteen hours she remained either asleep and snoring, or in a very drowsy condition. She would rouse up, if spoken to, or when the thermometer was put in the axilla.

At 6.30 A.M., Feb. 6, a decided spasm occurred. A drachm of chloral was given by the mouth. The temperature when she was fast asleep was normal; during the night, on three different occasions, it was noted as 97.2, 97.4, and 97.8. The pulse fell to 88 and 90, and the

respirations to about 20. In the morning the temperature was 98, the pulse 100, and the respirations had quickened to 38. The pulse varied a good deal. At 6.45 A.M. (in 15 minutes) the temperature was 97.5. She was fast asleep.

For the next twenty-six hours she remained either asleep, or in a drowsy condition for the most part. She would wake up now and then and ask for milk or beef-tea, and drink it when given to her. Once or twice she had slight spasmodic movements, but none of any degree of severity. The temperature several times was normal, but at the end of the time (7.30 A.M., Feb. 7) was 98.9. A second full dose of a drachm and a-half was given by the mouth, and in a quarter of an hour she was fast asleep, and the temperature had again fallen.

Feb. 8, 10 A.M. For twenty-six hours she had remained in a comfortable condition, taking liquids freely, free from all but slight spasm when disturbed, and no chloral was given. At this time the temperature had gradually risen to 99.0, and the pulse to 115. Half a drachm of chloral was given by the mouth. She would not take more, and it was not insisted on. In another five hours the temperature had risen to 99.7. Half a drachm was given by the mouth, and then (as she refused the rest) half a drachm with an enema. She was then left for seventeen hours, till

Feb. 9, 8 A.M., when half a drachm was given by the mouth (she refused more). She was then left for four hours. At twelve noon (fifty-two hours after the last effective dose), she had a very severe spasm. She could not put out her tongue. The temperature was higher than it had been since she was first admitted. It was 100.4. One drachm of chloral was given by the mouth, and, in a quarter of an hour, she was fast asleep, snoring, the muscles relaxed, and the temperature was normal, 98.4. At two o'clock half a drachm was given, and at 3.30 another half drachm; at five o'clock she was fast asleep and snoring. The temperature, when she was fully under the influence of the chloral, was on three occasions below normal. At 10 P.M. one drachm was given by the mouth. From 12 noon, Feb. 9, to 5 P.M., Feb. 10, twenty-nine hours, she remained fairly under the influence of the chloral, and the temperature, tested a number of times, remained below normal (97 and 6, 7, or 8 tenths). She now had spasmodic movements, and she refused to take any more chloral by the mouth. The temperature had risen to 99.6. Injection beneath the skin of the arm was tried to the extent of twenty grains. Only slight effect followed. The temperature sank for a time to 98.6, and she became quiet. In three hours forty grains were injected, but in another two hours she had a severe attack of tetanic spasm, and the temperature was again 99.6.

Feb. 10, 11 P.M. Two drachms were now given by the rectum; and in fifteen minutes she began to be a little excited, the muscles relaxed, and she was soon asleep. The temperature then registered 98.0. She then slept almost continuously for twelve hours. At the end of that time (12 noon) two drachms were given by the rectum.

After this no more was given by the mouth, as she obstinately refused to take it. Doses of a drachm and a half and two drachms were given in nine and twelve hours till 10 A.M. Feb. 12, when she appeared better than she had done at any time since her admission. She had had no further spasm; she drank fluids, seemed sensible when awake, but appeared weaker than before, and the temperature was 99.4. Two drachms in an enema were given. In twenty-one hours there was a rather severe attack of spasm; more chloral was given, and repeated about every nine hours till Feb. 14, 1 P.M., when the temperature was 99.6, but, though she had not had a large enough dose to send her to sleep, she had had enough to keep her quiet. In five hours (6 P.M.) she had a considerable spasm. She seemed much exhausted, and three ounces of brandy were given in an injection. An hour later, she was noticed to be very restless and uncomfortable, but the muscles did not seem rigid, the skin was hot, the temperature 100.0, the pulse 150, and the respiration 45 (as a consequence of the brandy enema?). Three drachms were given by the rectum; she soon became quiet and the muscles relaxed. In four hours she was much the same, apparently asleep, not really sound and snoring, temperature 99.5.

At 8.30 A.M. Feb. 15 (eight hours later), she died.

At the *post mortem* examination no important changes were detected.

REMARKS.—It will be seen that in this particular case a dose of a drachm by the mouth, or two drachms by the rectum, produced certain definite effects; first of all a feeling of excitement, as if she were intoxicated, gradually passing on into muscular relaxation, and deep sleep with contracted pupils and stertor. In this condition the patient was as easily roused as if she had been asleep in a perfectly natural manner. When roused, she would take milk and beef-tea very freely and easily, even asking for it when she awoke naturally. In this respect there was a marked contrast to her condition when no chloral had been given for some time. It seemed to me that when a stimulant (wine) was injected

at the same time as the chloral, the effect of the latter was less marked. On several occasions when I tried to give her a dose in milk, it seemed to disagree, and on one occasion she vomited it up again; the only time she was sick. The subcutaneous injection did not answer, the quantity to be injected being too large.

On another occasion I should begin with a drachm dose in sugar and water every half-hour till sleep ensued, and then continue drachm doses by the mouth every twelve hours (or half a drachm every six hours) regularly. If it be administered by the rectum double the above dose, at least, must be given. A note of ten other patients on whom the influence of chloral was tried will be found at p. 437 of this JOURNAL, Oct. 23, 1869.

THE THERAPEUTIC USES OF CHLORAL.

By STEPHEN MONCKTON, M.D.,
Physician to the West Kent Hospital, Maidstone.

SEVERAL short papers on the subject of chloral have appeared in the different journals. I would here give an account of my little experience.

I have given perhaps fifty doses, among about ten different patients, in the last three months—often with remarkable success; sometimes with partial effect; never with mischievous results, beyond a little delirium lasting an hour or two, resembling that of the second stage of chloroform, and proving (though not pleasant for the time to those around the patient) very transient and innocuous.

The drug, being pungent and unpleasant to take, should be freely diluted. Not less than an ounce and a half of water should be the vehicle for every dose of twenty grains or upwards. A little sugar or syrup is also desirable. Though disagreeable, the draught has never caused vomiting, over which, if already existing, it seems to exercise a remarkable control. When it is swallowed, the effect is generally speedy. It is well, therefore, that the patient should not take it till actually in bed. Less than ten minutes will sometimes suffice to send him fast asleep. One man (in the hospital with subacute rheumatism) became delirious—*i. e.*, noisy, irrational, and rather cheerfully excited—after a twenty-five-grain dose; and twice in the female wards the good effect has been very partial, perhaps from the light and movements surrounding the patient through the night. This suggested to me the practice of bespeaking darkness and quiet for every patient for whom a night-dose is ordered.

The soporific effect is sufficiently prolonged; five, eight, and ten hours' sleep, with generally a short break and semi-consciousness in the middle, being common enough; while a decided but not unpleasant sleepiness sometimes pervades the following day.

In the short series of cases on which alone I profess to base this paper, it has not once happened that headache, vomiting, or fever, harassed the patient on waking up. On the contrary, it has seemed to me clear that chloral, in doses of from twenty-five to fifty grains, is a very effective anodyne, antispasmodic, and hypnotic; that it possesses many recommendatory qualities and few drawbacks; while some of its partial failures are doubtless due to surrounding interferences and insufficiency of dose. It is very certain that twenty or twenty-five grains will sometimes give a strong man a wakeful and excited night, when forty or fifty grains would have secured sound sleep.

The following three cases, of different types, seem worth giving very shortly in detail.

CASE I.—Mr. C., a grocer, aged 76, came in October last with symptoms which led me to seek and find a recent left inguinal rupture, of only a few days' standing. He was recommended to procure a truss, and returned no more. Three months afterwards, his daughter sent an urgent summons at 7 A.M.; and I found him in the agonies of intestinal obstruction, symptoms having existed about twelve hours. No external hernia could be discovered; in fact, it had never come down since the first application of the truss. But there was a hard, globular, painful tumour, between the internal abdominal ring and the umbilicus on the left side. His pain was great, vomiting incessant, and belly rather distended. I ordered half a drachm of chlorodyne immediately, half as much to be repeated every two hours; and fomentations without measure. Twelve hours afterwards (7 P.M.), he was worse; the pain, sickness, and restlessness were most distressing. By care, he sipped down and retained forty-five grains of hydrate of chloral in an ounce and a half of water, with a few grains of sugar. At 10 the next morning, he had had a quiet night, with several hours' sleep; and had only retched once. The abdominal condition was unchanged. His countenance was good; his tongue moist; his head comfortable. Hesitating to credit the chloral with such power for good, I assumed that a quiet resolution of the intestinal difficulty had

occurred. But, in a few hours, pain and vomiting returned; the abdomen was more swollen; and the ejecta became distinctly stercoraceous. So it was proved that, in spite of unrelieved obstruction, the chloral had commanded quietude when strong opiates failed, without inducing that parched, stupefied, and miserable state which opium brings about, and never more surely than in the case of old people unaccustomed to its influence. On each of the next three nights, a fifty-grain dose of chloral was given, with satisfactory effect. Soon a liquid trickling *per anum* set in, passing gradually into natural defecation. Within a fortnight, the old man had fairly recovered.

CASE II.—Mr. D., an acute and sprightly old gentleman of 72, had been going wrong for some weeks with heart-symptoms, probably dilatation of the right cavities. There were dyspnoea, tumultuous action, no *bruit*, feeble and very irregular pulse, with some cough and expectoration. By February 1 his countenance had become rather livid, his dyspnoea urgent, and his legs swollen to the knees. After several nights of short and broken sleeps, from which he awoke in distress, his daughter begged permission to give him some opiate pills then in the house. Instead of them, he took thirty grains of chloral at 10 P.M. He was asleep in five minutes, roused and spoke to his daughter at 3 A.M., then slept again till 10 A.M. without disturbance, stupor, or dyspnoea. I found him comfortable, but sleepy, at 10.30; unwilling to remain in bed because of a mutton-chop that was waiting on the breakfast-table. He has taken a few more doses, and is in greatly better condition. Although the slumber was long and sound, he quite recollected waking and talking at 3 A.M. The sleep was therefore non-comatose in character.

CASE III.—Miss H., a tall slender girl, aged 20, with a large cavity at the right apex, in fact dying consumptive, was much worn with night-cough and nervous insomnia, expectoration not very profuse. She took thirty grains of chloral a month ago at bedtime, and slept more than eight hours, without being at all overwhelmed. She then rose to breakfast, and slept afterwards for the greater part of the day on a sofa. Since then she has taken eagerly the same dose four or five times a week with the happiest effect; and no constipation, headache, or impeded expectoration has ever appeared to follow.

Possibly, this homely record of my little experience may induce others in hard practice to lay aside natural and honourable misgivings and try this medicine for themselves. I shall watch for opportunities of giving it in acute rheumatism, chorea, neuralgia, spasmodic asthma, anæmic insomnia, and even inflammation.

CASE OF TRAUMATIC TETANUS SUCCESSFULLY TREATED BY BROMIDE OF POTASSIUM AND HYDRATE OF CHLORAL, ETC.

By EDWARD R. DENTON, M.R.C.S.Eng., L.S.A., Leicester.

GEORGE B., aged 18, fell from a cart January 31st, 1870. I was called in on the 16th February, six days after the first appearance of the tetanic symptoms. The patient was of the sanguine temperament, rather spare, short in stature, and of temperate habit. On examination, I found that he was unable to open his mouth or protrude his tongue; the lips were elevated from the teeth and gums, causing the characteristic "tetanic grin." The head was thrown back, and opisthotonos was well marked; the abdominal muscles being excessively tense, and the back arched and raised from the level of the bed. He was able to swallow only in very small quantity, even then appearing to suffer much from the spasm of the muscles of deglutition. The face was flushed and the skin hot; pupils dilated. The pulse was 120, small, hard, and wiry. Respiration 35. The bowels had been constipated for two or three days, and he had not slept for five or six nights.

The patient seemed to be aware of his precarious condition, but, as well as he could, expressed his readiness to die if nothing could be done for his relief. The wound presented a dry and unhealthy appearance, but was limited to the dorsal surface of the first phalanx of the second finger of the right hand. The nail had been removed three days previously, the back of the hand was swollen and inflamed, and an occasional shooting pain was felt extending along the posterior surface of the fore-arm and the anterior surface of the arm into the axilla.

The bowels were first relieved by a calomel and jalapine purge followed by a stimulant enema. Morphia, nepenthe, and chlorodyne, were administered every night from February 16th to 21st, with little or no effect in procuring sleep or relief from pain. I then procured some of the syrup of hydrate of chloral, of which small (three drachms) but repeated doses were given till sleep was procured, which at first lasted only a few hours. For the first three days ice-bags were placed in con-