

in the course of operation; and if the moment when we ought to discontinue the chloroform has been well observed, or if the stages are regularly shown, we shall be able to say, with a certainty almost mathematical, whether the death ought or ought not to be attributed to etherisation. If these rules had been well established, M. Gorré would not have proscribed the use of chloroform in so many operations.

For myself, who have employed etherisation in a very great number of painful but slight operations (as cauterization and moxas,) I am not at all disposed to give it up, for I have always been able to arrest its action in time. I am about to give the result of my experience. There is, doubtless, nothing new in what I am about to say, but I believe that there will be found, in the following *exposé* a little more precision than in the usual descriptions; and it is exactly this precision that is important. It is with the employment of chloroform as with the administration of certain very active poisons: we ought, before giving them, to know exactly what phenomena they produce, so as to stop just at the moment when the therapeutical action ceases and the poisonous begins, otherwise we are liable to the most serious results.

Ether and chloroform produce exactly the same phenomena, only the latter acts with an incomparably greater, sometimes an extreme, rapidity. But, even in these latter cases, we may observe three marked stages.

In the first stage, the phenomena of suffocation first show themselves, and then of stupefaction. The patient struggles, but his movements are still subject to his will: thus we often see him carry his hands to the apparatus to withdraw it from his mouth, and push aside those engaged in the inhalation. He still answers questions, and usually complains of a humming noise or sound like the wheels of a water-mill. Sensibility remains.

In the second stage, he can still speak, but he no longer answers questions: he speaks of very different things, which have no relation to surrounding objects; it is a true delirium, absolutely like that of drunkenness. Sometimes there are neither cries, nor songs, nor loquacity; but we notice a phenomenon which is never absent,—it is a stiffening of all the limbs; sometimes, also, violent efforts are made by the patient to escape from those who hold him.

Finally, the beginning of the third period is marked by one or several deep inspirations, and the rapid relaxation of the limbs.

Experience, then, has shown me that while the patient is in the two first stages there is nothing to fear for him; but, on the contrary, when he arrives at the third stage, we must immediately discontinue the inhalation: bad effects may come so quickly at this moment, that we may find it difficult to bring the patient to himself. This occurred to me several times formerly, but not since I have been accustomed to watch attentively for the moment I have pointed out.

What renders this surveillance difficult is, as I have said above, that the progress of the two first stages may be excessively rapid; I have seen it scarcely half a minute.—This time is so short, that one might believe the first stage not yet passed, although the third has already arrived. This is the danger. A very attentive examination is necessary to recognise this point.

I think that medical men who have not yet practised etherisation, ought at first to study these stages from the action of ether. It will occupy them some minutes longer, but they will see the stages succeed each other very distinctly, and they will easily recognise them during the action of chloroform.

It will necessarily lessen the danger, if the operation be commenced before the third period manifests itself. We know that this produces no inconvenience, for if the patients

do cry, they have but a very indistinct consciousness of the pain they undergo; they suffer as if in a dream, and that can have no injurious influences.

As to slight operations, if there be any fear, it is only needful to perform them during the second period; the trifling concern of the patient after the operation—on the contrary, his air of gaiety—prove, in fact, that he has experienced very little pain.

Finally, in great operations, etherisation ought to be confided to some one who will not allow his attention to be distracted by the operation, or it may be well to wait until the beginning of the third stage, and then remove the inhaling apparatus before beginning the operation.

What makes me think that, in the case related by M. Gorré, there was some special cause of death, is this, that insensibility supervened immediately, and while the patient was in the act of speaking, that is to say, in the first stage. Sudden and unexpected death is more frequent than is usually supposed; and not only may it be produced by very slight causes, but it may occur without any assignable cause. MM. Roux and Velpeau have acted wisely in throwing doubt on the fatal action of chloroform in this unfortunate case. The employment of this substance is become more precious, since, by statistics, we have learned that the results of operations are markedly more favourable when they are performed under its influence. We ought only to admit, after the most attentive examination, and after having submitted them to the most severe criticism, those cases which would tend to make us reject from the practice of surgery this, the so precious discovery of our day.

VALLEIX,
Physician to the Hotel Dieu.

From M. Vallex's letter, it appears that the successive stages of chloroform, so thoroughly understood here, have not yet been recognised in France, where this communication will be of service.

M. Vallex's first stage is evidently the combined effect of chloroform too suddenly administered, and of the want of a proper supply of air. It is very seldom observed here that the patient feels suffocated, complains of tinnitus aurium, or attempts to push aside the inhaler. It appears that French inhalers admit an imperfect supply of air, like the early English ether inhalers; and that, in France, the chloroform is given of the full strength at first; hence the sense of choking, and the attempts to withdraw the apparatus.

M. Vallex's second stage corresponds exactly to our second and third stages of chloroformisation. The first, with us, being the stage of excitement; the second, that of intoxication; the third, that in which there is unconsciousness, stiffening of the limbs, and, in most instances, contraction of the pupils. The latter part of this third stage, that of sopor, is the proper time to commence operating.

M. Vallex's third stage is our fourth, being that of complete muscular relaxation, dilatation of pupil, and, in fact, coma; it is, in truth, the stage of danger, and ought only to be reached in attempting to reduce hernia or dislocations.

The successive stages pass gradually one into the other.

If chloroform is to be used in the severe minor surgery of cauterization and moxas, so seldom resorted to here, it is well that the exhibition should only be pushed to the state of semi-consciousness, as M. Vallex advises. This will not, however, answer in dental and minor operations: in minor operations, the patient should be quiet; and in dental surgery, the chloroform must be pushed to the stage of relaxation or that of danger, as the stiffening of the muscles of the jaw must be overcome before the operation can commence—an insuperable objection to chloroformisation in such cases.

M. Vallex, and the French surgeons generally, do not