

reach twenty centigrammes (three grains), for twenty-two centigrammes (three and two-thirds grains) have caused death. The strength of the solution used in this particular instance was not given, but I fancy it must have been a concentrated one. However, I do not mean to argue the point, I simply take the fact as I find it, and I maintain that in order to avoid all danger, the total quantity of one per cent. solution injected should on no account be such as to represent twenty centigrammes of cocaine. This is of little consequence, however, for it is very seldom that it is found necessary to inject more than fifteen centigrammes (two and a half grains) of cocaine. For my own part, I have never injected more than seventeen centigrammes (a little under three grains), a dose which is perfectly consistent with safety, even in such important operations as amputation of the fore-arm, wiring of the patella or laparotomy. Therefore, to recapitulate, one and two per cent. solutions should alone be used, and the dose of cocaine injected should not be larger than from fifteen to twenty centigrammes (two and a half to three grains). The degree of anæsthesia produced in this way is quite sufficient even for severe operations. The operation should always be performed with the patient in the recumbent posture. In this way syncope, which is of such frequent occurrence in dental practice, is almost certainly avoided.

*As regards the injection itself*, let us take as an illustration a simple case, for example, the removal of a subcutaneous tumour, lipoma or sebaceous cyst. Having decided upon the exact site and length of the incision to be made, I plunge the needle at the point where I mean to enter the knife. If the needle has penetrated to the subcutaneous cellular tissue, it is withdrawn a little until the point is again in the true skin. A few drops of the solution are then injected, the injection being followed by a slight swelling of the skin, and from that time the pain should completely disappear. If the patient complains of pain, it is the surgeon's fault. The needle must be introduced slowly, and as the cocaine is gradually injected as the needle travels in the thickness of the corium, all sensibility has already disappeared from the tissues when the needle passes through them. The needle must not pass deeper than the true skin, and in

this the surgeon is guided by the swelling produced by the fluid and by the resistance encountered by the point of the needle. The disappearance of this feeling of resistance indicates that the needle has passed into the loose subcutaneous tissue. It should then be withdrawn until the resistance is again felt. The true skin is so thin in the eyelids and prepuce that it is difficult to keep the point of the needle therein, but this is of little consequence in operations on these parts, for the tissues are rapidly permeated by the cocaine solution.

If the needle is too short to be carried at once along the whole line of the future incision, it is taken out, the syringe is refilled if necessary, and the needle introduced again at a point a little above that which it had previously reached, and where the skin is now completely anæsthetized. I may be excused if I insist on the necessity of injecting the fluid gradually, and, as far as possible, without removing the needle instead of by a series of punctures. In this way the patient complains of no pain except when the needle is first introduced, the cocaine solution is equally distributed throughout the tissues, and the degree of anæsthesia is the same all along the line of injection. Lastly, and this is important, the risk of injecting a large quantity of cocaine into a vein is avoided, for since the solution is continuously injected as the needle travels in the substance of the corium, even if a vein is punctured, the needle soon passes through it, and the dose of cocaine, which finds its way directly into the circulation, is then too small to give rise to any accident. Such a danger is not, it is true, to be apprehended in the case of the skin, which contains no large blood vessels, but the injection should be performed with the greatest care in such parts as the lips, tongue, cervix uteri, anus, and in certain forms of nævi. Hence, I am in the habit in these cases of first introducing the needle as far as it will go, and of injecting the fluid as the needle is withdrawn; the piston is driven home as the needle is drawn out of the part.

When the injection is completed, I allow three or four minutes to elapse if the two per cent. solution is used, and five or six if the one per cent. solution is the one employed. During that time the part is shaved and bathed first in hot water, then in ether, alcohol and corrosive lotion. The