

in the alimentary canal during the digestion of various remedies. 3. Far greater permanence of effect, in many cases, than can be produced by medicine swallowed. 4. Much greater rapidity of action. One most important conclusion from these facts is this: *that anodynes and hypnotics ought never to be administered by the mouth in acute disease attended with anorexia.* Regular and systematic nutrition is the great necessity and the great difficulty in those diseases, and the avoidance of any treatment tending to interfere with digestion of simple food is a cardinal duty.

As to the question of *danger* of this method, he says, that there is *absolutely none* if the injector will remember two cautions—first, that the physiological activity of nearly every substance which can be thus used is *three if not four times greater when it is given by the skin than when it is swallowed*; and secondly, that the liquid injected must not be either markedly acid nor markedly alkaline, nor in any way obviously irritant to tissue.

Morphia, Dr. Anstie says, should be used in the form of the acetate, dissolved with a minimum of acetic acid in hot distilled water five grains to the drachm. One minim of this will represent one-twelfth of a grain, a very useful minimum dose in cases of slight neuralgic pain. Two minims ( $\frac{2}{3}$  grain) is the best commencing dose for relief of severe pain, and as a hypnotic in states of nervous irritability. Three minims (or  $\frac{1}{2}$  grain) is an *unsafe dose to commence with*; dangerous and even fatal results have been known to follow its use.

The salt used in this manner is at least three times as powerful for every therapeutic purpose as when swallowed, and the majority of the unpleasant symptoms which opiates, when given by the mouth can produce, are entirely absent when administered hypodermically. The fact seems to be, that in the gastric digestion of morphia much of the salt becomes decomposed, and its specific effect on the blood is lost; but during the digestive process it acts depressingly upon the gastric nerves, and *pro tanto* disorders the functions of the stomach.

Atropia is an extremely valuable hypodermic agent for the relief of local pain and spasm. It should be employed in the form of solution of the sulphate; four minims containing 1-60 grain; two minims will be the proper commencing dose in adults, unless the pain to be relieved is very severe. It should be cautiously increased to 1-60 or 1-50 grain; more can seldom be needed, and poisonous effects may be produced if pushed to higher doses. Atropia is incomparably the best of all medicinal remedies for every kind of pain in the pelvic viscera. Nothing can approach it in this respect.

Strychnia, Dr. Anstie has found to be a most valuable remedy in gastralgia. It should be administered in solution, two grains to the ounce of distilled water, and the proper commencing doses is two minims (1-120 grain).

**ON CHOPART'S AMPUTATION.** By W. F. McNUTT, M.D., M.R.C.S.E., L.R.C.P.E., &c.—As a rule, the history of a case after Chopart's amputation is about as follows: A tilting downwards of the stump; a tedious, painful process of ulceration of the cicatrix; perhaps division of the tendo-achillis (which produces no good whatever); and, after months of suffering and impairment of constitution, the patient

is obliged to submit to Syme's or Pirogoff's operation, or possibly to amputation above the ankle, when the patient generally soon recovers his health and with an artificial foot the limb is restored to almost its normal functions. Every surgeon who has had any experience with Chopart's operation—with the chances of having a tedious, painful process of ulceration of the stump—perhaps the division of the tendo-achillis—probably re-amputation when the constitution is in a condition anything but favorable to a good result—must feel that his patient runs a greater risk to life than though he had been subjected to Syme's or Pirogoff's operation, or amputation above the ankle. As to the comparative usefulness of the limb after the respective operations, either with or without an artificial foot, I am quite willing to submit the question to the unfortunate individuals who have been subjected to the different amputations, to the very high authority of Drs. B. F. Palmer and E. D. Hudson, our celebrated patent limb manufacturers, and to the surgeons who have followed the history of the cases after the different operations.

In a letter that I received from my venerable and respected friend, Prof. Willard Parker, dated New York, June 23, 1868, in reply to a letter that I had written to him on the subject, he says: "In my opinion Chopart's operation should be abandoned. I have never seen a good and useful stump the result." He also states that he has never seen any "abiding good result from the division of the tendo-achillis." He says: "Hey's operation is both practical and useful; but instead of Chopart's, I should always recommend Syme's amputation."

Having stated that Chopart's amputation should be abandoned, and having cited authorities to substantiate the statement, we will next proceed to show that, considering the foot as a piece of mechanism, Chopart's operation must naturally fail, according to the laws which govern the mechanical construction of the foot.

Take the foot as forming an arch. The os calcis is one base, the cuneiform and cuboid bones form the other, and the astragalus is the key, upon which comes the weight of the body. The tarsal ligaments prevent the arch from spreading, when the weight is upon the key. Perform Hey's amputation on the foot—viz., remove the metatarsal bones—and the anterior base of the arch is not disturbed; consequently, Hey's amputation is both a practical and successful one. But when Chopart's amputation is performed, the anterior base of the arch is removed, so that when the weight comes upon the key, the stump must necessarily tilt forwards and downwards, which brings the cicatrix in contact with the ground. At the same time the heel is tilted up—not drawn up by the contraction of the gastrocnemius muscle, as is stated in the books. Hence the reason why the division of the tendo-achillis in no way prevents the tilting up of the heel.

Again: take the foot as a lever. The gastrocnemius is the power, applied to the os calcis, or posterior end of the lever; the ground under the anterior extremity of the lever, or foot, is the fulcrum; while the body, the weight to be raised, comes upon the line between the fulcrum and power, making a lever of the second order. Now remove all that part of the lever anterior to the weight, as