

support and guide, 10 per cent. cocain solution is injected between the two layers of foreskin, anterior to the clamp—no danger of cocain poisoning occurring, since both clamp and rubber constrictor lie between it and the general circulation; 4, after effective anæsthesia has been secured, six double length (ten inch) catgut sutures are run clear through the clamp-fenestra and the four layers of foreskin; 5, with strong scissors the latter is cut off at one sweep; 6, tractor and clamp being removed, the double length sutures being divided, and two additional sutures being placed at the dorsal and frenal sites, previously occupied by the tractor; 7, the vessels are secured and sutures tied all around, making a circumcision that is at once symmetrical, precise and admirable, leading to prompt union and a satisfactory result.—*Jour. Amer. Med. Assoc.*

LOCAL ELECTROLYSIS AND ZINC-AMALGAM CATAPHORESIS IN MALIGNANT AND NON-MALIGNANT TUMOR.*

By G. BETTON MASSEY, M.D., Physician to the Gynecological Department of the Howard Hospital, etc.

Before reporting the three cases on which this new treatment of morbid growths is mainly based, I must explain what I mean by local electrolysis and zinc-amalgam cataphoresis, and also advance reasons for my belief that these methods, either separately or together, present important advantages over cutting operations in certain cases of benign vascular growths and incipient cancers.

Local electrolysis means simply that the electrical decomposition of the tissue salts is confined to a localized area by the approximation of the poles. If both poles of a galvanic current be placed in the morbid tissue, quite near each other, the bulk of the current will be concentrated within the portion of tissue immediately between them, and but little will traverse the outside healthy parts. In practice they should not be further apart than from a half to one inch, though this depends entirely on the strength of current to be used and the size of the growth. So placed, an enormous current may be employed to dissolve a morbid tissue without affecting surrounding tissues, the parts having been chilled by a spray, or otherwise rendered anæsthetic, if sensitive. The surgical possibilities of such currents are quite remarkable. All the salts and liquids of a given growth lying between the points become a prey to such a current, the watery contents being turned into oxygen and hydrogen gases, and the complex salts into solutions of acids and alkalies. This is, of course, attended with a material rise of temperature, but nothing like charring. If the

tissue subjected to the process is soft and vascular, or juicy, there will be very little left between the poles after the gas has been given off. but the acids and alkaloïds dissolved in a turbid liquid remainder. If the tissue is tougher and more fibrous, a gristly residue will be found which can be detached or left to be detached by nature.

The strength of current required to destroy tissue in this way depends altogether on its concentration at the active spot. A minute reproduction of the process occurs when we apply but two or three milliamperes to the papilla of a hair sheath, or to a mole on the skin; but to completely dissolve tissues between two or more needles a half inch apart requires at least four hundred to seven hundred milliamperes.

Whether this portion of my method has any advantages over a cutting operation in removing malignant or non-malignant external growth depends upon circumstances. It is clearly inapplicable to any growth within the body, unless it is situated in a drainable natural cavity, as a considerable quantity of detritus must drain away. It also presents the disadvantage of not permitting healthy tissues to be united at once over the seat of the removed growth, a procedure, however, that is often of doubtful utility, as it frequently covers up portions of the disease that failed to be removed. The advantages of the method over the knife are, on the other hand, by no means inconsiderable. It is absolutely bloodless, no matter where applied, thus enormously conserving strength after operations notoriously bloody; the edges of the undestroyed tissue remain non-absorbent, lessening risk of sepsis; and finally there seems to be some property in the galvanic current to cause a retrogression of the whole of a benign growth even when but a portion is directly acted on, as in the Apostoli treatment of fibroids and the ordinary treatment of moles and other small skin tumors.

If the growth be a benign one, the application described will probably cover the whole of the active treatment. If it be malignant, on the contrary, the second portion of the method—zinc-amalgam cataphoresis—is employed, a procedure of great value in radically removing all remaining traces of a still localized cancerous growth.

Zinc-amalgam cataphoresis is electrically monopolar, the single active electrode, which is always positive, being applied to the cavity left by removal of the greater portion of the growth, while the indifferent or negative electrode, in the shape of large conducting pads connected together, is placed on any convenient portion of the body. The active electrode is a freely-amalgamated zinc surface of one or two square centimetres area, which is held successively against all portions of the bottom and edge of the excavation. From 150 to 300 milliamperes are

* Read before the Philadelphia County Medical Society, Jan. 9, 1895.