

cedures on the trunk and extremities which are easily and most satisfactorily done with the aid of a local anaesthetic. The great advances made in recent years along these lines have been made possible by improved anaesthetising fluids and improved technique. The former is by far the most important and will be taken up first.

The greatest improvement in the fluid has been the addition of Adrenaline solution to our formulæ. This material easily quadruples the time of anaesthesia, materially increases the diffusability of the fluid and this more than doubles the area rendered insensitive, and last but not least very greatly reduces the toxicity of the anaesthetic.

The bleeding is also very materially decreased, which is an incidental but nevertheless a great advantage where the operation is in the mouth, nose or throat.

The advantages derived from the addition of adrenaline to the solution, are all based on and explained by the powerful vascular contraction this substance produces.

Capillary circulation is more or less abolished and even smaller arteries become occluded. This great but local vascular disturbance necessarily materially retards the absorption of the injected fluid, which being aqueous, is absorbed by the vascular system and not by the lymphatic as was at one time thought.

By this delayed absorption the tissue fluid have time to act on and destroy the toxicity of the fluid before it is absorbed and carried to the brain to produce toxic symptoms. A few minutes in the tissue suffices to destroy or at least very greatly reduce the toxicity of cocain. By delayed absorption the anaesthetic has time to act locally and thus produce a more profound anaesthesia, while the temporary reduced vital resistance of the tissues allows a wider distribution of the agent. The toxicity of cocain is also reduced by employing diluted solutions, as less is absorbed and plenty is present to produce the local effect. One grain injected in a 10 p.c. sol. is a very dangerous dose, while three times that amount can be safely used if a 1-10 p.c. solution is employed. If the frequent supposed idiosyncrasies to cocain be investigated in this light, many if not all will disappear.

Another and great advance was made when we recognized that the injection pain and after pain are not caused by the