for routine preparation of human cadaveric material and will lead to a better concept of structures in many parts of the body. We have adopted it as our routine mass.

It's a pleasure to again acknowledge my indebtedness to Dr. Phillips for having first introduced me to this material, and I should also like to express my thanks for the great consideration given numerous queries and small orders by the various members of the firm of the Vultex Chemical Company.

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LIQUID LATEX AS AN INJECTION MASS FOR BLOOD-VESSELS

NUMEROUS substances have been used in injecting the circulatory systems of laboratory specimens to enable students to trace the course of blood-vessels with greater ease. Gelatin and corn-starch masses in various colors have been used for many years, but both of these have serious faults. Gelatin tends to stain tissue by "jumping" the capillaries and has the added disadvantage of becoming excessively brittle in formaldehyde. Starch mass does not set well if used too thin, and when made thick enough to prevent the running of the mass when a blood-vessel is accidentally cut by the student, it will not fill the smaller vessels.

Recently, plastics have been used with some degree of success, but the polymerization to the solid substance after injection presents such formidable obstacles that it is not yet practical to use for laboratory specimens.

Mr. William Kruse, of Ward's Natural Science Establishment, first suggested the use of latex as an injection mass in March, 1939. Since that time experiments have proven that latex is the perfect substance for this purpose. It will enter the smallest vessels without staining tissue; it may be diluted with water to give the proper consistency; it is used cold, and solidifies to form a tough, flexible solid which forms a perfect cast of the circulatory system. Latex will replace all other substances previously used for filling blood-vessels, and in addition has untold possibilities for use in research on the circulatory, respiratory and excretory systems.

Latex solution of heavy consistency and high pH value, colored with fast, soluble dyes, has proven most practical in this work. The latex may be thinned to any desired consistency by adding distilled H_2O. In larger vessels and ducts the mass should be thicker than for use in smaller cavities and thinner when it is desired to fill blood-vessels to their smallest branches. Syringes with glass cylinders and rubber pistons must be used since it was found that contact with the lubricants used for smooth operation of an all-metal syringe set the mass around the piston, causing it to stick. All-glass syringes were unsatisfactory because rubber solution filled the tiny cavities in the ground-glass piston and set under pressure, making the piston immovable.

The material is injected in the ordinary way through metal hypodermic needles inserted into the cavity it is desired to fill. It sets into a tough, flexible solid almost immediately in animals that have been previously embalmed with solutions of phenol or phenol derivatives or preserved in formaldehyde. When injected into larger spaces in freshly killed animals it is difficult to set. When freshly killed animals are used they must be fixed immediately either in alcohol, embalming fluids containing phenol or phenol compounds or in solutions of 5 to 8 per cent. formalin containing 1 or 2 per cent. glacial acetic acid. If the latter fixative is used it must be injected internally so that it will come into close contact with injected vessels and organs and the animals should also be immersed in the fixative. To prevent the latex from escaping when the needle is withdrawn, a drop of 1 per cent. glacial acetic acid or 95 per cent. alcohol may be applied at the spot where the needle was inserted. A clamp or tie should be used on larger vessels.

Dr. Oscar V. Batson, in the current issue of SCIENCE, describes the use of an emulsion of latex sold under the trade name Vultex. He states that he has experienced difficulty in causing the material to flow into the very finest vessels and further expresses the opinion that latex emulsion will never be suitable for the injection of fine vessels.

Dr. Batson undoubtedly refers to vessels of almost capillary size. We have found that our material, which is a rubber solution in contrast to an emulsion, will pass through capillaries if diluted sufficiently and can be used with the finest of cannulae.

D. L. GAMBLE
WARD'S NATURAL SCIENCE ESTABLISHMENT, INC.
THE FRANK A. WARD FOUNDATION OF NATURAL SCIENCE OF THE UNIVERSITY OF ROCHESTER

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