The benzene-toluene layer was run into a flask, brought to a boil with 1 g of decolorizing charcoal, and filtered. The solvents were evaporated by a jet of nitrogen. The anthracene was then crystallized from 15 ml of toluene and was obtained as colorless, fluorescent flakes, mp 215° C. Yield was 1.3 g of anthracene having an activity of 0.9 μc/mg. When observed in a photographic dark-room after one's eyes are dark-adapted, this anthracene is seen to glow with a greenish-blue light.

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Applications of Nylon Catheters in Physiology of the Circulation[1]

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Recent years have seen the introduction of plastic materials into all phases of biological research. Of the innumerable plastics available, polyethylene (*1, 2, 3, 4*) and polyvinyl resins (*5, 6*) have been most widely used for catheters in circulatory research. As a result of extensive use of plastic catheters designed to be in-dwelling in blood vessels of various diameters, it was felt that an ideal catheter for vascular work should possess: flexibility; relative noncompressibility under manual pressure; ductility; suitability for chemical sterilization; translucency; suitability for use without special preparation; a nonwetting, smooth surface; radiopacity; nonirritability; availability; and low cost.

With the exception of radiopacity, which is seldom required, nylon catheters[3] have been found to possess all the desirable characteristics of the ideal catheter. Nylon catheters can be sterilized in cationic detergents prior to use, with no impairment of their desirable properties. They are translucent, and one can therefore easily follow the flow of blood or perfusing solutions. In addition, they are ready for immediate use and require no special preparations. They can be stretched to any specified length on a lathe, and their diameters thereby adjusted to pass through smaller-diameter needles if desired. In striking contrast to nylon, polyethylene tubing has been completely unsatisfactory for arterial work in that it is too soft, can be completely compressed, cannot be easily stretched, and does not yield a satisfactory pulse wave because of its flexibility. Polyvinyl is also inferior to nylon in that it requires special baking procedures to attain desired stiffness and it is usually not translucent after baking.

Nylon catheters have been used in experiments on unanesthetized dogs in which it was necessary either to draw repetitive arterial blood samples of 10–50 ml or to take continuous blood pressure recordings over a 4–5 hr period. The catheters were threaded up into the femoral artery through a 17-gauge needle used to make the initial arterial puncture. A wire stylet (type 302, spring temper) was inserted into the catheter to afford additional rigidity during insertion and was subsequently removed to permit the drawing of blood samples. To prevent extensive extravasation of blood through the puncture hole in the artery, intense manual pressure must be maintained over the area after insertion of the catheter. Even with removal of the wire stylet, no degree of direct manual pressure over the bleeding point can compress or kink the nylon catheters. Following insertion of the catheter into an artery, a blunt 20-gauge needle was threaded over the wire stylet and gently forced into the catheter with a slow rotary motion. It is essential that a catheter be somewhat elastic to permit the insertion of this needle adapter. With manual pressure maintained over the puncture area, the wire stylet was removed and a rubber-capped, modified luer-lock adapter (*7*) was attached to the 20-gauge needle and taped securely to the animal's leg. The nonwetting smooth surfaces of the catheters discourage platelet breakdown and coagulation of blood. Catheters have been left indwelling within arteries for up to 5 hr without significant plugging by clotted blood. The catheter assembly described is illustrated in Fig. 1. Catheters[4] with an outer diameter of 0.95 mm (0.037 in.) and an inner diameter of 0.51 mm (0.020 in.) were found to be most useful for both drawing of blood samples and recording of blood pressure. With repeated intra-arterial use of the catheters, there has been no evidence of tissue toxicity in a series of some 10 dogs. Arteries have healed adequately without obliterative thrombosis.

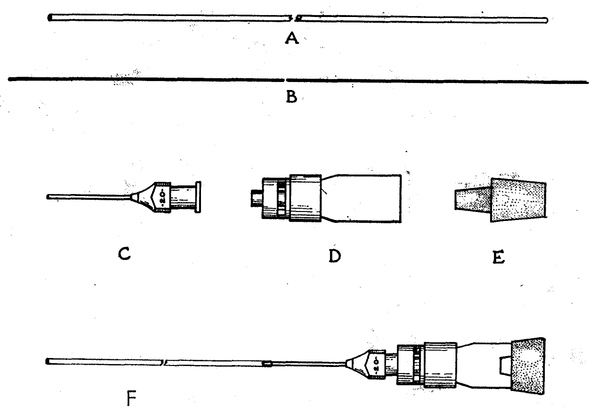

FIG. 1. Nylon catheter assembly. *A*, nylon catheter; *B*, wire stylet; *C*, blunt-end, 20-gauge needle adapter; *D*, short luer-lock glass adapter; *E*, serum cap; *F*, complete assembly.

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[3] Generously supplied by Elmer E. Mills of the Elmer E. Mills Corporation, Chicago, Ill.

[4] Can be obtained from John P. Marbarger, University of Illinois College of Medicine, Chicago.

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Prevention of the Phytotoxic Action of Sodium Orthophenylphenate on Citrus Fruits by Hexamine[1]

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A serious limitation to the use of sodium orthophenylphenate (Dowicide A)[2] solutions as dip treatments for the control of decay in citrus fruits is their tendency to cause chemical peel burn. When concentrations of the fungicide high enough to prevent stem-end rot and mold infections are used, severe burning of the fruit peel may be caused. Although this does not affect the internal quality of the fruits, their unsightly appearance renders them unmarketable. For this reason concentrations of the chemical greater than 1.2% have seldom been used in such treatments, and even this concentration is not always safe. In fact, even when the fruit was rinsed following treatment, peel burn on lemons has been reported (*1*) with concentrations as low as 0.5%.

In searching for a means of overcoming this difficulty, the authors have tried additions of a wide variety of materials to Dowicide A solutions. Some of these substances, such as vegetable oils, soap, waxes, and certain synthetic detergents, were found to have an effect in reducing the severity of injury to the fruit peel but were not reliable counteractants under all conditions, especially in the early part of the fruit season, when the fruit peel is more sensitive to chemical action. The experimental work reported here shows that hexamine (hexamethylenetetramine) is effective in preventing peel injury in citrus fruits by Dowicide A.

The incorporation of hexamine in fruit wraps, along with orthophenylphenol, to prevent scalding of the fruit peel, has been reported previously (*3*), but, so far as the present authors are aware, its use in fruit dips with Dowicide A has not been suggested. The addition of formaldehyde to Dowicide A solutions has been said to prevent peel burn in citrus fruits (*2*). However, in simultaneous tests made on the same lot of oranges, 100% of the fruit was badly burned when formaldehyde was tried as a counteractant, whereas no trace of injury occurred when hexamine was used.

It was found that the addition of a certain amount of hexamine to the Dowicide A solution entirely eliminated injury to fruits very sensitive to chemical peel burn. Following this discovery, some 45 experiments were carried out with Hamlin, Parson Brown, and Pineapple

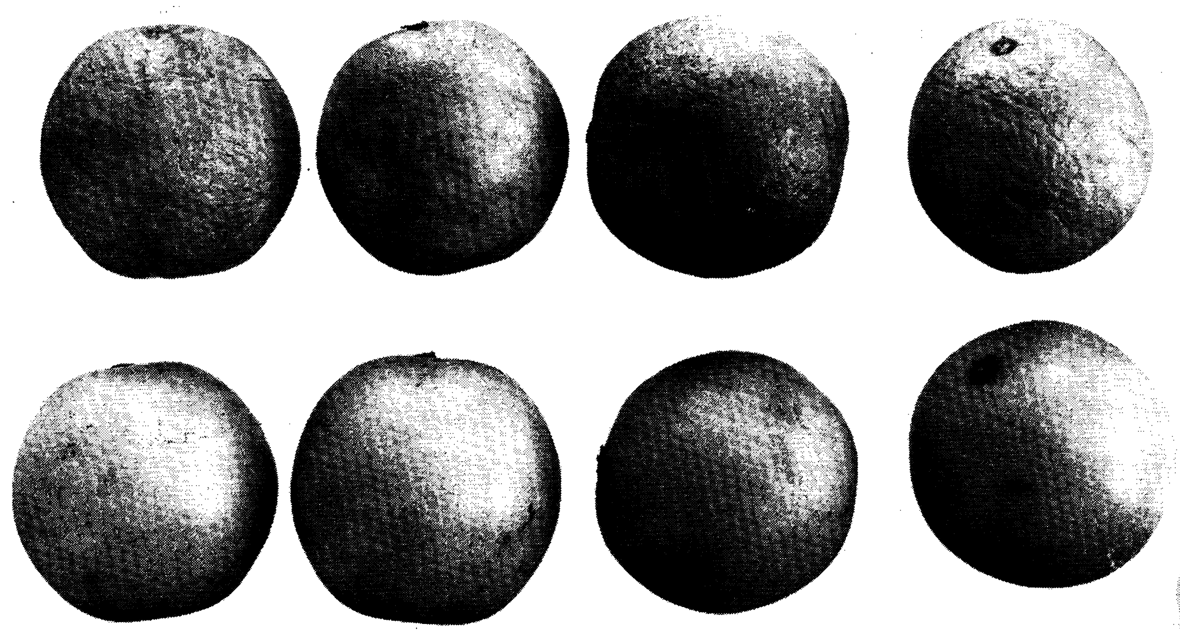

FIG. 1. Counteracting effect of hexamine on peel burn of oranges by sodium orthophenylphenate (Dowicide A): Above, 2% Dowicide A, 2 min at 100° F; below, 2% Dowicide A plus 1% hexamine, 2 min at 100° F.

[1] Cooperative investigation by the Citrus Commission and the Citrus Experiment Station.

[2] Acknowledgment is made to the Dow Chemical Company for kindness in furnishing samples of Dowicide A for this work.