and blood pressure determinations in the dog showed that the toxic and vasopressor effects of the smoke from this tobacco was proportional to the amount of nicotine present and relatively independent of the nornicotine content of the tobacco. On man the smoke from these low nicotine cigarettes produced very much less pronounced effects on blood pressure and pulse rate than that produced by ordinary cigarettes. These results indicate that this type of tobacco is sufficiently low in nicotine to make it practically deserving of much further study.

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# SCIENTIFIC APPARATUS AND LABORATORY METHODS

## DRY STRIPPED REPLICAS FOR THE ELECTRON MICROSCOPE

THE use of the electron microscope to study the fine structure of the surface of etched metals or other materials has been shown to be a fairly simple process[1,2] when the direct replica method is used. A still simpler process than those previously described for removing the replica film has now been devised by the writer. It lends itself to a study of practically any flat surface which is free of re-entrant angles or other structure that might prevent the removal of the replica film. The method should be particularly adaptable in permitting the microscopist to make a comparison of identical structures as seen in the optical and electron microscopes.

The replica film of polyvinyl formal dissolved in dioxane is formed on the specimen in the manner previously described. A standard electron microscope, 200 mesh nickelscreen, is then centered above the region to be studied. This positioning process may be carried out with a jig which slips over the objective of the light microscope used for obtaining a photomicrograph. With the screen in place a bit of moist air is applied to the coated surface and immediately a piece of scotch tape is pressed into light contact with the screen and the surrounding film. Holding the scotch tape against the specimen, on one side of the positioned screen, the tape is held rigidly and lifted away from the surface. When this is done the replica leaves the specimen and will be found in contact with the under surface of the screen ready for mounting in the specimen holder of the electron microscope.

The scotch tape is easily removed from the mounting screen by placing the tape holding the screen in contact with a flat surface. The tape is then turned through 180°, a finger placed on the sticky surface and the tape slowly peeled from the surface until the edge of the screen becomes visible. A razor blade or similar thin flat object held against the screen prevents it from becoming bent as the tape is peeled away from it.

The entire process of replica formation, removal and mounting may be carried out in less than two minutes. Perhaps the most attractive feature of the process described is the fact that the specimen is not injured in any way. For example, from a specimen of 1.1 C Steel (used for developing the technique) at least fifty replicas have been obtained without injuring the surface in any way.

In preparing surfaces of metals for electronographic study it is important that the distance in elevation between high and low spots on the sample does not exceed 400–600 ÅU. To obtain this property and still have a uniform metallographic etch it was found that the standard solutions (such as Nital) should be diluted from four to ten fold, and applied with a swab.

Some evidence has been noted which indicates that conditioning metal surfaces with surface active molecules such as tricresyl phosphate and oleic acid greatly facilitates the removal of replicas. Not more than a monolayer is needed for this purpose. Excess molecules and other contaminations are readily removed by coating the specimen with a film three or four times thicker than that used for making replicas and peeling it off with scotch tape. This thicker film also affords excellent protection to the prepared surface against corroding vapors and moisture.

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[2] V. J. Schaefer, *Phys. Rev.*, 62: 495, 1942.

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