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A SIMPLE TECHNIQUE FOR MAKING VERY FINE, DURABLE DISSECTING
NEEDLES BY SHARPENING TUNGSTEN WIRE ELECTROLYTICALLY

by

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The use of fine needles made from tungsten wire has been known to experimental biologists for several years (e.g. Tindall, 1960), but does not seem to be widely known among malaria entomologists.¹

Tungsten dissecting needles can be made finer than the finest entomological pins and have the great advantage that they are very resilient and strongly resist bending. Fixed in a mounted needle holder and used regularly in dissection they outlast entomological pins used similarly many times over. They can, moreover, be made to any desired thickness or sharpness - Figure 1 compares examples of the types of points that can be produced with that of a very fine entomological pin. It is in fact easy to make needles much finer than it is practicable to work with in unaided manual manipulations.

These needles can be used to advantage in many dissections performed under magnifications greater than about 20 X, but they become invaluable above 40 X. An obvious indication for their use is the dissection of mosquito ovarioles to determine the presence of "dilatations" in current age-grouping techniques. A sophistication is to braze two such needles to the tips of a pair of steel forceps, these can then be used in many semi-micro operations, either as forceps or scissors.

¹ I am indebted to Dr J. A. Ramsay of this laboratory for introducing me to the technique.

A simple method for making these needles electrolytically, using a low voltage alternating current power source, is described below, and is illustrated diagrammatically in Figure 2. It is also possible to sharpen tungsten wire using direct current from a car battery or by dipping in fused sodium nitrite; both of these methods, however, are much more laborious and time-consuming than the procedure which follows.

Materials

Tungsten wire - 0.25 to 0.50 mm (0.010 to 0.020 inches) diameter is suitable.

Mounted needle holder - preferably with a metal handle.

Aqueous NaOH (or KOH) solution at 10 per cent. w/v - in an open glass vessel.

Electric wire - light gauge and flexible.

Carbon electrode - e.g. from the centre of a torch battery.

Four "crocodile" clips.

Electric power source - A.C., three to 12 volts, e.g. the output terminals of a microscope-lamp transformer.

Use of an electric grindstone (e.g. at local garage).

Method

1. Cut off lengths of tungsten wire (two to four cm is convenient) and mount one in the needle holder (Note - tungsten wire can be cut most rapidly on an electric grindstone but it frays very easily on violent bending or shock so that care must be taken. If the fraying is not too bad it will be removed during sharpening).
2. Attach the four crocodile clips, one to each end of two bits of electric wire.
3. Using the crocodile clips, connect the metal handle of the needle holder to one output terminal of the transformer and the carbon electrode to the other.
4. Place the carbon electrode in the NaOH or KOH solution and switch on the transformer.

5. The tungsten wire can now be sharpened to the desired point as follows:

(a) Hold the tip of the wire just immersed in the alkali solution until the frayed end has been eroded away.

(b) With the mounted needle held vertically, immerse one to two cm of the wire in the NaOH and move it slowly up and down. Since the tip will be longer in the electrolyte than its stem it will have more metal electrolysed from it and a tapering point will be produced (a parallel-sided needle is made by holding the wire stationary).

(c) A variety of points may be produced: moving the wire rapidly up and down produces a coarse point and moving it more slowly a finer point.

Using a six volt supply it takes from two to five minutes to sharpen a needle in this way, depending on the type of point required. Once made, such a needle will last indefinitely for normal dissection, but should it accidentally become bent or damaged, the point can be touched up in a few seconds by connecting up again and re-dipping in the electrolyte.

REFERENCE

Tindall, A. R. (1960) Stain Techn., 35, 105

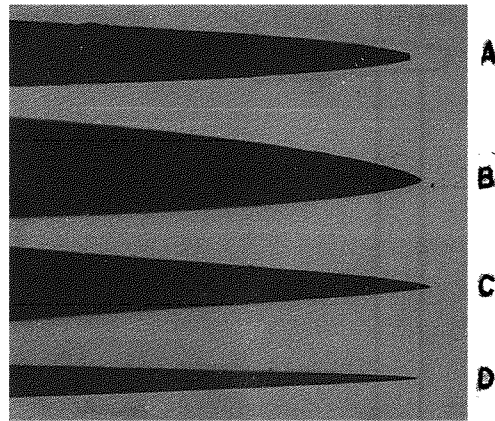
RESUME

Description d'un procédé qui a déjà été exposé, mais reste peu connu, pour faire des aiguilles à dissection très fines et durables en aiguisant un fil de tungstène par électrolyse.

On peut obtenir par ce procédé des aiguilles de tous les diamètres et de toutes les finesses désirés qui sont particulièrement pratiques pour les travaux exigeant des grossissements de plus de 40 fois.

FIG. 1

PHOTO-MICROGRAPH OF SAMPLE NEEDLE
POINTS, APPROX X 75



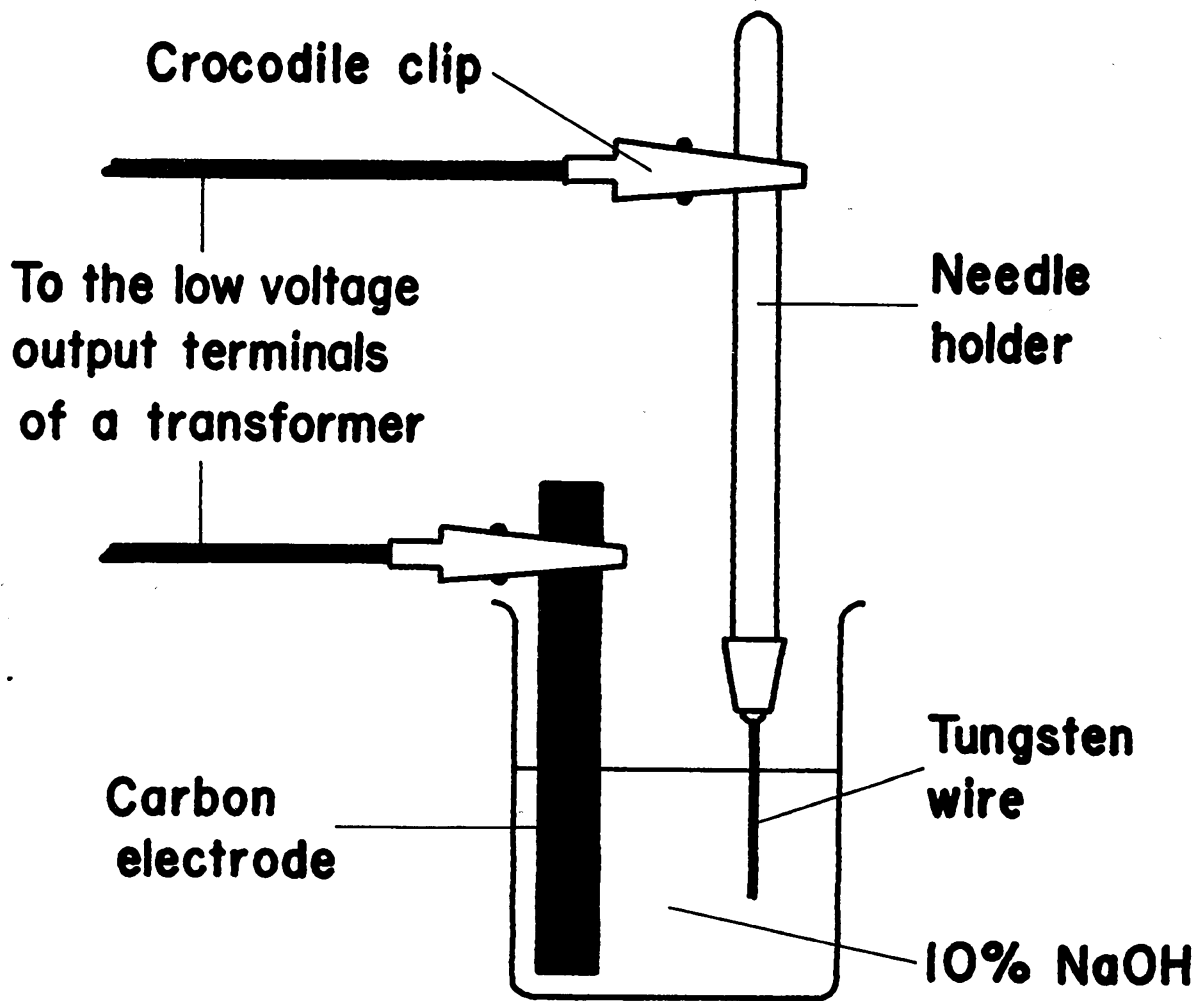
┌───┐ 0.2 mm.

- A. The tip of a very fine entomological pin.
- B, C, and D. Examples of the tips of needles made from tungsten wire.
- B. and C. from 0.50 mm. wire, and D. from 0.25 mm. wire.

WHO 4788

FIG. 2

DIAGRAMMATIC REPRESENTATION OF THE APPARATUS FOR SHARPENING TUNGSTEN WIRE NEEDLES ELECTROLYTICALLY



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