AN EFFICIENT INSULATING MATERIAL.

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WITH many others interested in electrical methods of treatment, I have been searching for an efficient insulating material particularly for zinc. Mr A. Blagden has been experimenting for some months with cellulose acetate solutions. However, although latterly satisfactory, these entailed much labour in treating wires, needles, etc., and a serious drawback was that the solution could not be used during the rainy season. This has a special significance in Bengal.

Our researches covered a fairly wide field and included collodion, shellac varnishes, liquid rubber, etc. All fail in being at once efficient insulators, readily procurable and easily worked. Sealing wax we discarded many years ago as being most unsatisfactory. Thin rubber tubing, although suitable in some situations, is too bulky for needles such as are used in the nose; further, it deteriorates rapidly.

Dissolved cellulose acetate was the nearest approach to the solution of the problem until we found that it acted on zinc and ultimately became separated from it. The coating appears to become over-stretched and to crack by the formation under it of zinc chloride. An antacid coating, prior to the application of the cellulose solution, arrested this corrosive action, but still the application of the solution requires much time and care, although, as I have said, the ultimate results were good.

This train of investigation led Mr Blagden to use some of the nitro-cellulose lacquers used on motor-car bodies, and he coated several wires for me. This insulation is very efficient and will withstand quite hard usage when it has thoroughly dried.

I understand that there are several British and American lacquers of similar composition. They can be had in various colours, and, when the solution becomes too thick owing to evaporation of the volatile solvent, a thinning solution may be used. We prefer dark colours, since they are more easily seen against the tissues than light ones. The lacquer is applied to car bodies by means of a fine spray, but for needles and wires a camel-hair brush can be used.

We usually apply two or three coats and allow the needles

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to dry for about twenty-four hours before use, although, if urgently needed, a few minutes suffice. If the needles have one end stuck in a shallow tin, which has been filled with plasticine and allowed to dry, a fine even coat results. The finest wires may be treated in this way and their diameters are not appreciably increased.

Where one is preparing needles or wires for a specific purpose, then one only coats that part of the needle or wire which is not to be used, further exposure being effected by scraping with a knife. The lacquer is very tough, does not become brittle and adheres firmly to zinc which is a difficult metal to coat with any varnish. Wires may be bent at any angle and the coating will not crack even on reversal of the bend. One may boil the coated needles for half an hour without impairing the efficiency of the insulation. The coating is slightly softened but becomes hard as the needle cools.

Alcohol should not be used to sterilise the needles on account of its solvent action. The lacquer does not act on zinc in any way, the wire remaining bright so long as the coating remains.

The fact that these lacquers are closely allied to aeroplane "dope" does not concern us, since we only use small quantities and for short periods. However, all doors and windows should be widely opened when using the lacquer, or unpleasant symptoms, such as headache, may be experienced.

This would appear to be only one of a multitude of uses to which nitro-cellulose lacquer can be put, but it has certainly solved a problem which has worried us for the past five years.

I have to thank Mr Blagden for all the work he has done in this investigation and for finally solving the problem of an efficient insulator.

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