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A BLOWPIPE DART POISON FROM NORTH BORNEO

BY

D. A. H. TAYLOR

From the National Institute for Medical Research, The Ridgeway, Mill Hill, London, N.W.7

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In a recent paper Robinson and Ling (1953) have described the pharmacological examination of a dart poison used by the Pĕnan tribe of North Borneo. Their results showed that the activity of the preparation was due to the presence of cardiac glycosides, the crude material having 20% of the activity of ouabain in the rabbit, and it was suggested that the toxic principle was perhaps antiarin, a glycoside obtained from the upas tree, *Antiaris toxicaria* Lesch (Moraceae) which is widely used as an arrow poison throughout the Malayan archipelago and Indonesia, although its use has not apparently been reported previously from North Borneo. Through the courtesy of Professor J. H. Burn, the remainder of the poison (8.2 g.) was made available to the present author for chemical investigation.

RESULTS

The poison was received in the form of brown resinous lumps, which were powdered. The following method of extraction was found to yield the best results. The powder (5 g.) was digested with water (50 ml.) on the steam bath, when it dissolved readily and almost completely. The solution was acidified with a few drops of 0.1 N-sulphuric acid, filtered with the aid of a little Celite to remove a small amount of suspended matter, and extracted with ten portions of a 2:1 mixture of chloroform and ethanol (750 ml. in all). The combined organic layers were then washed with a little sodium bicarbonate solution and with water and evaporated. A solution of the residue (1.79 g., 36%) in a small volume of aqueous methanol, after standing for some time and seeding, deposited a crystalline solid, m.p. 210–220° C. (162 mg., 3.2%) which was filtered off and after several recrystallizations from the same solvent had m.p. 237–239° C., $[\alpha]_D^{21} = -3 \pm 2°$ (MeOH). This substance gave a red colour in the Legal test and showed the ultra-violet absorption maximum at 218 mμ characteristic of the cardiac glycosides; also a few mg. with a drop of concentrated sulphuric acid gave a yellow solution, slowly becoming green. These properties are in accordance with those described for α-antiarin.

An authentic sample of α-antiarin, m.p. 238–240° C., kindly provided by Professor Reichstein, showed no melting-point depression when mixed with the present specimen, and the colour reactions and crystalline form of the two were similar.

Further to confirm the identity of the substance with α-antiarin, the benzoate was prepared, which after crystallization from methanol had m.p. 240° C., $[\alpha]_D^{21} = +3 \pm 2°$ (acetone). Doebel, Schlittler, and Reichstein (1948) give m.p. 240–241° C., $[\alpha]_D^{21} = +2.4$ (acetone) for α-antiarin benzoate.

The mother liquors from the crude crystalline antiarin gave an intense Legal test, and must still contain a considerable amount of antiarin or other cardiac glycosides, and it is probable that higher glycosides of antiarin may be present, as di- or triglycosides of cardiac aglycones are usually much more plentiful in plants than are the simpler monoglycosides.

SUMMARY

It has been shown, in agreement with the pharmacological results of Robinson and Ling (1953), that a dart poison used by the Pĕnan of North Borneo contains α-antiarin as an active constituent.

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