

### Detection of Fingerprints by the Ninhydrin Reaction

IN connexion with some recent legal proceedings, a new method for detecting fingerprints has been discovered by one of us (S.O.). The method involves the well-known ninhydrin test for amino-acids, often used in chromatography. In this method, fingerprints on paper have always been considered a great nuisance, and one is often recommended to use forceps "to avoid fingerprints". In our opinion, the new method will be most suitable for detecting fingerprints on paper and similar materials. Some of the results have a wider interest, and a brief report on the new application of ninhydrin is therefore presented.

When handling a paper, a person may leave his fingerprints on it, depending on many factors such as physiological conditions, time of contact between the fingers and the paper and other unpredictable circumstances. A spontaneous fingerprint contains 98.5-99.5 per cent water, the rest being organic and inorganic compounds. Normally, the water will evaporate, leaving the rest as a fingerprint pattern containing fats, salts, amino-acids, etc. The last group of substances gives the well-known reaction with ninhydrin. Since perspiration contains water-soluble amino-acids (at least ten amino-acids have been found<sup>2</sup>) a moist finger or a moist paper is necessary if fingerprints on paper are to be made visible by the ninhydrin reaction.

Fingerprints are developed by spraying the paper with a 0.2 per cent solution of ninhydrin in acetone, followed by heating the paper in an oven at 80° C. for a few minutes. This initiates the process, and the strongest marks become visible. The pink colour becomes more intense with time, and new marks appear as the developing process matures. Details seem to have a maximum distinctness a day or two after the ninhydrin treatment.

After treating a paper with ninhydrin, it must not be touched by hand; otherwise new fingerprints will develop even if the paper is dry. This is a fact well known to everybody working on the paper chromatography of amino-acids and similar substances. In the presence of a solvent, for example water, contact with fingers gives soft pink spots with no clear lines. Even on dry paper the papillary lines become clearly visible.

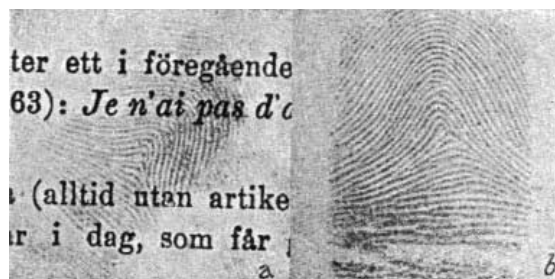


Fig. 1. (a) A twelve-year old fingerprint in a French grammar; on almost every page fingerprints could be developed by ninhydrin. (b) A fresh print is reproduced for comparison

We have been able to develop fingerprints on many kinds of paper, some of which had not been touched for a long time. Fig. 1 shows part of a page of a French grammar which had not been used for twelve years. The owner's fingerprint can be compared with a fresh print developed on sized paper.

We are investigating the ninhydrin reacting compounds in fingerprints and perspiration. Fingerprints have also been made visible with *Amido-Schwartz* (Bayer) or other reagents used for the localization of protein spots in paper electrophoresis. This indicates the presence of proteins, probably keratin.

All the details and applications of the method have not been worked out yet; but a full account of problems related to it will be published elsewhere.

Part of this work has been carried out at the Institute of Biochemistry, Uppsala, and we are indebted to Prof. A. Tiselius for valuable discussions.

SVANTE ODÉN

BENGT VON HOFSTEN

Institute of Pedology,  
Royal Agricultural  
College, Uppsala.

Institute of Biochemistry,  
University of Uppsala.

Dec. 2.

<sup>1</sup> Levy, A. L., and Chung, D., *Anal. Chem.*, **25**, 396 (1953).

<sup>2</sup> Hier, S. W., Cornbleet, T., and Bergeim, O., *J. Biol. Chem.*, **166**, 327 (1946).