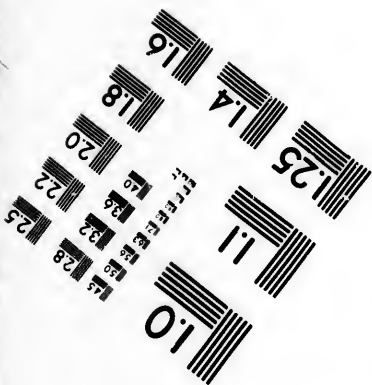
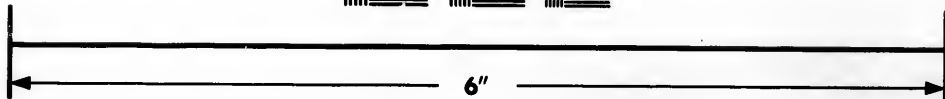
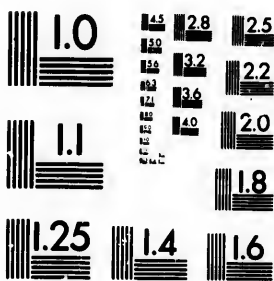


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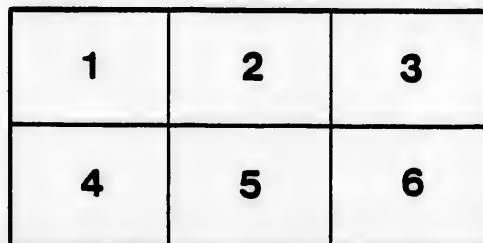
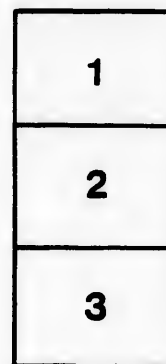
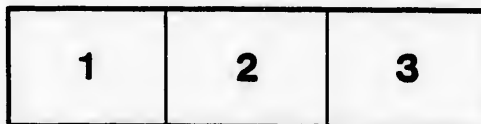
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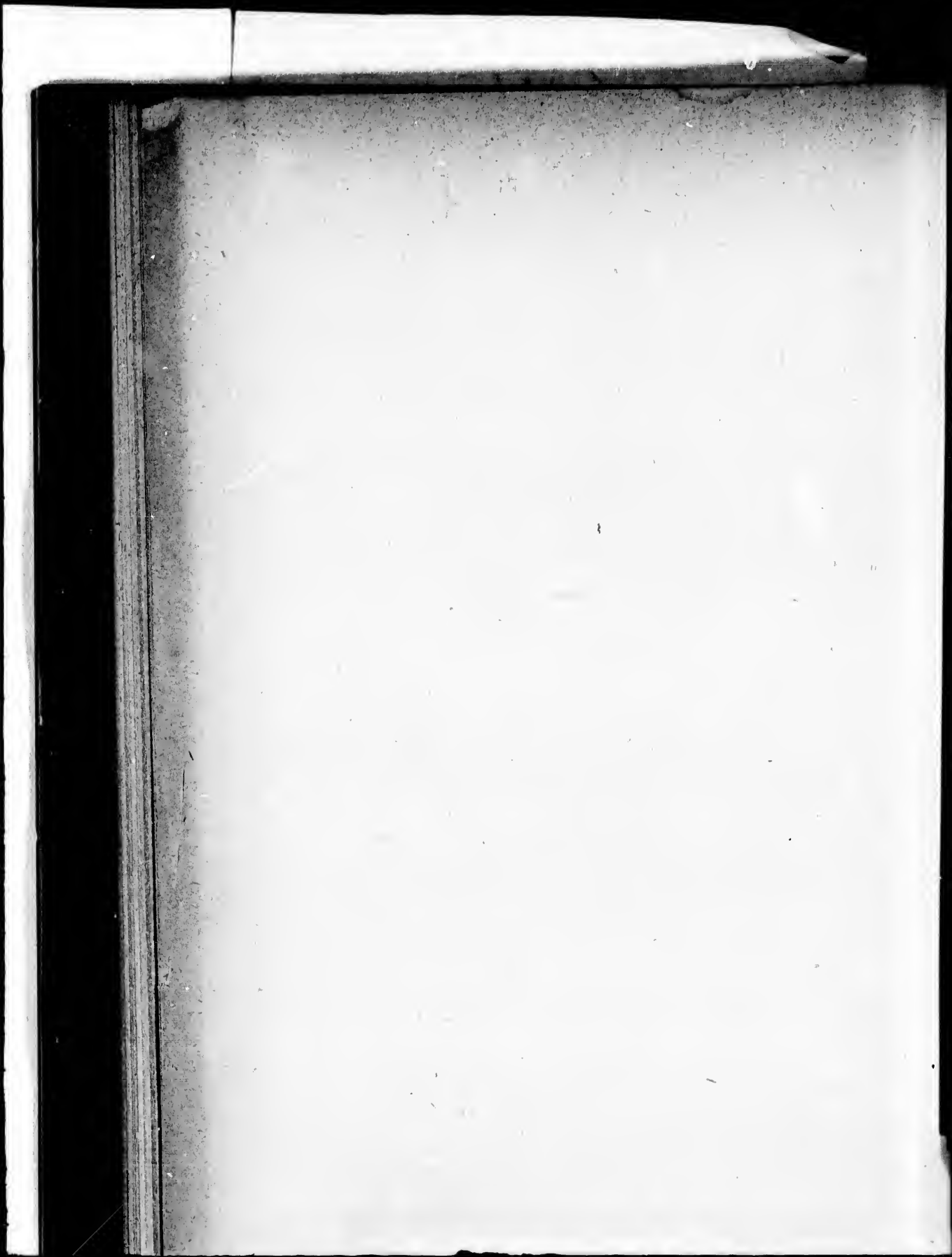
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[Reprinted from the Boston Medical and Surgical Journal  
of December 22, 1898.]

THE MEDICO-LEGAL SIGNIFICANCE OF THE  
PRESENCE OF SUGAR AND GLYCOGEN IN  
THE LIVER POST MORTEM.<sup>1</sup>

BY W. K. BROWN, M.D., AND WYATT JOHNSTON, M.D., MONTREAL.

In 1897 Lacassagne and Martin, of Lyons,<sup>2</sup> reported the results of two hundred cases which were tested as to the presence of sugar and glycogen in the liver at the autopsy. Their observations were made with a view of investigating the statement of the late Claude Bernard,<sup>3</sup> that the livers of persons dying sudden or violent deaths contained sugar or glycogen, and usually both, while these substances were said to be absent from the livers of persons dying of disease.

Until the subject has recently been re-studied and a practical method of performing the test was discovered by Lacassagne there were practically no observations, except some made in his laboratory by his pupils Colrat and Fochier in 1888, and Colomel in 1893. *omb*  
The technique recommended is to make an emulsion of the liver-substance (usually 100 grammes), by rubbing it up with water, boiling this in a porcelain capsule, filtering with animal charcoal, and testing the filtrate by Fehling's solution. If glycogen was present the fluid was opalescent. We find that smaller amounts of liver-substance suffice, and that the use of charcoal is hardly necessary.

<sup>1</sup> Read at a meeting of the Massachusetts Medico-Legal Society, October 5, 1898.

<sup>2</sup> Archives d'Anthropol. Criminelle, 1897, p. 446.

<sup>3</sup> Thèse de Faculté des Sciences, 1853.

Lacassagne and Martin recognized the medico-legal value of a test of this kind in deciding such difficult points as whether the injuries received by a person suffering from some serious disease are the immediate cause of death or not. They state that, in the main, their results are strongly confirmatory of the statements of Bernard, though they reserve for the present their opinion as to its significance in poisoning cases. They find that dead-born syphilitic children give a negative reaction, and children live-born or dying during parturition positive ones. On these points we have confirmed their observations.

As the matter seemed to us of practical importance we have made observations on a series of one hundred unselected cases, obtained from the coroners' court and hospital service, and about equally divided between violent and natural deaths. We wish here only to summarize the results obtained, and it is the intention of one of us<sup>4</sup> to report the observations more fully in a subsequent paper. The number of cases studied we do not regard as sufficiently large to serve as a basis for exact statistics. Our results were typical in eighty-eight cases and atypical in twelve.

(a) RESULTS IN CASES DYING FROM DISEASE.

Sugar and glycogen were found absent from the livers of those dying from disease except in two cases, in one of which cerebral hemorrhage and in the other brain abscess suddenly terminated the lives of persons apparently in fair health. One case of fatal gastric hemorrhage in hepatic cirrhosis gave a negative test, however. In cases of sepsis, of even a few hours' duration, the result of the reaction was always negative. In an elderly person dying of exhaustion ten days after the receipt of severe burns sugar and glycogen were

<sup>4</sup> W. K. B.

also absent. A negative result was obtained in a case of puerperal eclampsia fatal in twenty-four hours. A negative result was obtained in a case of diabetes dying from septic infection following gangrene.

(b) RESULTS IN CASES DYING FROM VIOLENCE.

Where the death was sudden and affected persons in vigorous health, sugar and glycogen were always present, provided that the processes of alimentation were proceeding in the ordinary manner. On the other hand, in three cases where death resulted within forty-eight hours of injuries (cut throat, fracture of vertebræ, fracture of the base of skull) the result was negative; in the last-named case there was a moderate catarrhal jaundice, from which the patient was convalescing, and the lungs showed traces of commencing aspiration pneumonia. In two cases where death was immediate and due to fracture of the skull, the liver showed neither sugar nor glycogen. In both of these cases there was evidence, both post-mortem and clinical, of acute alcoholism, while there appeared to be no food in the stomach or upper intestine, and in one of them scarcely any feces was found in any part of the intestines. Here it appeared that the individuals had been indulging in a long spree, and, as is common in such cases, had taken little or no food. In another case, where death occurred in the course of an attack of delirium tremens, a negative test was obtained. We think that this point is one on which further information is important, in view of the frequency with which an excessive use of alcohol forms an incident in the circumstances in deaths calling for medico-legal examination.

A case of suicide by carbolic acid also gave negative results to the test. Here, as the man was found dead locked in his room, we had no clear account of the



conditions affecting alimentation, but it was stated that his habits were intemperate and that he had recently been drinking heavily. The autopsy did not show that food had recently been ingested.

In two cases of drowning, where the bodies were in an advanced state of decomposition, the test gave negative results ; in two others the test was positive.

#### CONCLUSIONS.

We can confirm the results of previous investigators as regards the result of the test in healthy persons living under normal conditions of nutrition. From our experience so far we are inclined to regard the test as one of very considerable value where the conditions relative to alimentation previous to death can be established through the history or by the results of the post-mortem. It should be borne in mind that the information as regards the cause of death is indirect and that the direct information relates only to the glyco-genic function of the liver. We wish to emphasize the important influence of sepsis and of alcoholism with abstinence from food ; when these are excluded we find the results very constant.

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