

A NEW METHOD OF ANALYS- ING HONEY

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Translated from the French.

For the last five years the chemistry of honey has been partly obscured by thick clouds. In books of instruction, in legal chemistry, it has been affirmed and established that all natural honey causes the plane of polarization of light to deviate to the left, and that all honey deviating to the right, is adulterated, and should be the object of condemnation.

But in my scientific experiments to discover the nature of the honey which causes the plane of polarization to deviate to the right, and after fortunate and unexpected observations I have ended by discovering the solution to the enigma. Many experiments and proofs have been made, and all chemists who have taken up the question have agreed with me that no honey could be condemned for the single reason of its deviation to the right. But the discovery of this deviation to the right according to the place in which the honey is produced, was coldly received. The result is that chemists examining natural honey can no longer pronounce immediately upon the nature of the honey submitted to them, because glucose, the customary ingredient in adulteration, always polarizes to the right.

As my readers are aware, I have divided honey into two classes honey, derived from flowers, and honey derived from coniferous or cone-bearing plants. The former always deviates to the left the latter to the right. Formerly it appeared easy to distinguish an artificial honey from that which had been adulterated, now the distinction is made more difficult by means of this double deviation. I have taken the trouble, after a long series of about 150 experiments, to establish figures showing these deviations to the right. I have even published a formula for the approximate determination of the quantity of glucose employed in the adulteration. But the experiments have everywhere a theoretic character, and all theory ought to be done away with if it has not a practical value sure and decisive.

Following these principles I have sought other methods, based upon new theories, and then I arrived at certain results by the aid of dialysis made before polarization.

The dialysis, that is the separation, the disunion of different matters, by *osmose*, that is to say the reciprocal changes of two susceptible liquids mixed together, but separated one from the other by a membrane of parchment. The *dialyseur* is the apparatus which contains this membrane, and in which

the operation of the diffusion of liquids is made.

Honey is composed of grape sugar (dextrose) and fruit sugar (levulose). The grape sugar is the part that crystallizes; the fruit sugar is the part that does not crystallize—consequently a fluid.

On account of its frequent use in the industry, the manufactured grape sugar is produced from the sediment by boiling it for a long time in a solution of sulphuric acid and water. The sulphuric acid is separated by means of chalk. The result is then filtered by means of animal charcoal and reduced to a thick syrup. This is the production which, under the name of "glucose," is used in the industry to give adulterated Swiss honey its remarkable color and beautiful appearance.

This manufactured grape sugar (dextrose) is not, however, precisely identical with natural grape sugar; it is not completely pure, as can be proven. The artificial product notably contains matters which do not exist in natural grape sugar. These matters are found in the syrup on account of the incomplete transformation of the sediment into sugar. The chemist ought consequently to carry his examination in this direction: Polarization, fermentation, the reaction of the dextrine, the use of all these means has not given results that were absolutely certain.

As a matter of fact after five long years of research, I have been successful, and I have arrived at a result which authorizes me to say to you with conviction and certainty, that it is possible to distinguish in good faith the natural honey from the products adulterated with glucose, by the dialysis before polarization. I will cite these experiments: they authorize me to make this declaration so important to apiculture, and important precisely on this account that the greatest practical success in apiculture can not by itself force out the artificial honey which floods the country as if it were natural honey.

EXPERIMENTS WITH THE HONEY OF FLOWERS.

1st. Pure Alsatian honey dissolved in the proportion of one part honey to two parts water; the polarization of this solution is 28° to the left or -28° ; after 16 hours of dialysis, the polarization of the extract taken from the dialyseur and re-dissolved is 0° .

2d. 30 grammes of pure Alsatian honey dissolved in 150 grammes of water decolorized and dialysed; after 16 hours, the deviation has disappeared; the polarization is 0° . The liquid taken on the dialyseur has evaporated to 30 grammes; this time again no deviation appears. Evaporated to dry and put for two hours under a sulphuric acid dessicator an extract of a weakly yel-