A NEW METHOD OF TESTING HONEY.

By Dr. OSCAR HAENLE.

It is only about five years back that every expert would have condemned as adulterated any honey which was found to turn the ray of polarized light to the right instead of the left. About that time Dr. Haenle succeeded in finding, while traveling, some natural (wild) honey which polarized to the right. This was subsequently ascertained to be due to the fact that the bees fed upon coniferous products, while those feeding upon flowers produced levogyre honey. While the polariscope had, before this discovery, been generally used as a certain criterion to distinguish between genuine and adulterated honey, this instrument could no longer be employed for the purpose without some restriction. The author has now ascertained that if the honey be dialyzed before the polarization test is applied, the result is a certain indication of the character of the honey.

I. *Experiments with Honey Collected from Flowers.*—1. A pure Alsatian honey was dissolved in twice its weight of water. The solution polarized 28° to the left (—28°). It was then subjected to dialysis during sixteen hours, after which the residue remaining in the dialyzer was optically inactive (0°).

2. Thirty grms. of a pure honey were dissolved in 150 grms. of water, the solution decolorized and then dialyzed. After eighteen hours the residue was inactive.

3. Fifty grms. of a similar honey were dissolved in 250 grms. of water. The solution polarized at —11°. After sixteen hours' dialysis the residue was optically inactive. On further evaporating the latter and again dialyzing, its inactivity remained unaltered.

II. *Experiments with Glucose Sirup.*—A 10 per cent. solution of glucose sirup which polarized +100° was decolorized and then dialyzed. After sixteen hours it still polarized +5°. The residue was then concentrated, and in proportion as this progressed so rose the angle of polarization.

III. *Experiments with Honey Purposely Adulterated.*—1. Forty grms. of a pure honey, polarized in a 1 in 2 solution at —35°, were mixed in 10 grms. of glucose sirup. A 10 per cent. solution of this mixture was subjected to dialysis, and the residue was found to remain dextrogyrate at +4°.

2. Thirty grms. of a pure honey was mixed with 20 grms. of glucose sirup, dissolved in 250 parts of water, and the solution decolorized by charcoal. It polarized at +65°. After twenty-four hours' dialysis the residue retained a permanent polarization of +14°. After concentrating this residue to half its weight, its polarizing angle had increased to +60°.

3. Fifty grms. of a glucose honey were dissolved in 250 grms. of water. The solution polarized at +95°. It was then dialyzed and the liquid on the dialyzer examined at intervals of two hours. The following is the rate at which polarization decreased until it remained constant:

After 2 hours.....	+ 45°
" 4 ".....	+ 33°
" 6 ".....	+ 18°
" 8 ".....	+ 15°
" 9 ".....	+ 12°
" 10 ".....	+ 11°
" 11 ".....	+ 10°
" 12 ".....	+ 10°

Further dialyzation did not change the angle (+10°).

General Conclusions.—Any honey which, after having been dialyzed, does not turn the ray of polarized light to the right, is free from glucose. Any honey which, after dialysis, retains a permanent dextrogyre polarization, contains glucose.—*Amer. Drug. and Ph. Ztg.*

EXTRACTION OF BORAX IN CALIFORNIA.

In the report of the State mineralogist, Mr. W. Ireland, Jr., for 1890, will be found a full and exhaustive resume of the sources and methods of extraction of Californian borax.

One of the chief sources is the Searles' Borax Marsh, bearing its name from the first observer of the saline deposit, Mr. J. W. Searles, while he was prospecting for gold in 1802. It is situated in San Bernardino County, 500 miles southeast of San Francisco, and is very difficult of access. Searles did not attach any importance to the discovery till some time after, when borax became an important item in the chemical market; and he then observed the resemblance of the deposit he had discovered to some samples of borax which he was inspecting. He at once took means to develop his discovery.

The marsh is an irregular oval shape, situated in the center of a plain, 1,700 feet above the sea level, and surrounded with mountains. The basin would appear to be the bed of an extensive lake, now dried up, having left behind a deposit of mud, salt, a large proportion of volcanic sand and borax. The rocks surrounding this basin are chiefly of volcanic origin, and abound in the salts found in the deposit. They would appear to have been decomposed by the combined action of rain and sun, the water being removed by subsequent evaporation and the salt beds thus deposited. It must have been a lengthy process, as the climate is a very arid one, and even now, during excessively wet winters, the water collected in the basin does not amount to a depth of more than 3 to 4 inches. This water is colored darkish brown, and has a specific gravity of 1.2413, or about 48° Tw. On evaporation it yields salt, carbonate, and borate of sodium, and also a large amount of organic matter. The ground in the neighborhood of this partially submerged portion consists of a hard crust, some 9 to 12 inches in thickness, and contains, according to the analysis of Mr. C. N. Hake, sand, 50 per cent.; sulphate of sodium, 16 per cent.; chloride of sodium, 10 per cent. carbonate of sodium, 10 per cent.; and 12 per cent. of borax, which exists solely as borate of soda, no borate of calcium having been found.

The manufacturing process, after collecting the efflorescence, or crust of saline deposit, consists of extracting the soluble salts, by treating with a saline solution in dissolving vats, which are heated and ultimately raised to boiling by steam coils. These coils are perforated with holes, thus furnishing innumerable jets of steam which blow through the supernatant

liquor, a contemporaneous evolution of ammonia also taking place. When the extraction is complete, the mud and sand are allowed to settle and the clear liquor run off. This yields, on evaporating and crystallizing, a crude borax, somewhat discolored by organic matter. A further process of crystallization, with due attention to degrees of solubility, results in a high percentage of refined borax, with very little loss of the salt in the mother liquors. Borax Lake, Lake County, is another important deposit. It is stated that here the first borax ever produced in the United States was made.

The works were situated at a low level close to the lake, and much trouble and expense was incurred, owing to the overflowing of the lake into the works, and the undertaking is now abandoned. Little Borax Lake is close to the shore of Lake Clear. The water has a specific gravity of 1.0588, and the mixture of salts contains about 25–30 per cent. borax, 8 per cent. sodium chloride, and the remainder sodium carbonate. After first concentrating by means of the sun's action in large areas and further concentration in pans, the salts are allowed to crystallize. These are then washed with cold water, which removes the Na₂CO₃ and NaCl, but very little borax. After running off this liquor, the partially purified borax is again dissolved in hot water, concentrated, and slowly cooled in vats, in which rows of strings are suspended.

TO REMOVE TANNIN FROM TEA.

By H. GRIMSHAW.

The tannin present is absorbed by means of suitable animal substances, such as horn shavings, dried albumen, hide clippings, and the like. It is preferable to add the material to the tea in the dry condition before the infusion is made. But it may also be added to the infusion, or the infusion may be passed or filtered through a layer of the substance. The quantity of animal substance to be added to the tannin-containing material must be determined by the amount of tannin contained in it. In the case of tea the proportion may vary from one to two parts of animal substance to ten parts of tea.

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