

glass house), and filled with unripe honey, then covered and left to stand for two or three weeks, it will be found that the water incorporated with the honey will have risen to the surface—the honey and the water forming two stratum as distinct and as well defined as that of oil and water in the same vessel.

"The honey may then be drawn off through the faucet below, and the water left remaining in the tank, when it will be found to be no sweeter and no denser than the liquid usually employed in making honey-vinegar, and this is the use to which I put it. It may be dipped out or poured off the top of the honey.

"On several occasions I have found a body of water on top of the honey as much as three inches deep, and on passing one's finger down through it, the surface of the honey will be palpable and well defined.

"When honey is first extracted, it is in a liquid state, but under ordinary conditions it will in time change to a semi-solid form. It is then known as 'candied honey.' The length of time that elapses before candying takes place, differs materially in different seasons, and under different circumstances. The slowness with which honey changes from the liquid to the candied form, and the rapidity with which this takes place at other times, may be attributed to the presence or absence of water in quantities favorable or unfavorable to the transformation. So also will the grain be coarse or fine. The less water present the slower the crystallization, while its entire absence prevents it altogether.

"Grape sugar," of which honey is mainly composed, combines chemically with water in two proportions—mono-hydrate glucose ($C_{12}H_{22}O_{11} \cdot H_2O$) and bi-hydrated glucose ($C_{12}H_{22}O_{11} \cdot 2H_2O$); both of these hydrates lose their crystal water at 212° (Johnston). It follows that if honey be heated to the boiling point until its water of crystallization be expelled, the air then excluded and kept excluded by sealing it down, no crystallization can take place. This should be borne in mind and acted upon when desirable; by doing so the bee-keeper will be enabled to supply his customers with honey at any season of the year—spring, summer, autumn or winter.

KEEPING HONEY IN ITS LIQUID FORM.

"To preserve honey in its liquid form, then, it is only necessary to expel the water it contains by the application of heat (this is best done in a water-bath), bottling while hot, and hermetically sealing the bottles. The common preserve jars, with their rubber rings and screw tops are admirably adapted for this purpose.

"This is no vague theory, but one founded on sound chemical principles, and verified in my own practice and experience. At the International Convention held at Brantford, Ont., I produced a sample of liquid honey of the season of 1888, that had not been candied, and those who tasted it pronounced it excellent.

"A neighbor of mine never permits his honey to candy, by treating as above described, and I have known him to receive orders from people a hundred miles from his home, because they get honey from him in its liquid state, while at home they cannot procure it in other than a candied condition.

RETARDING HONEY GRANULATION.

"The careful observer will have noticed that granulation may be retarded by keeping in a uniform high temperature. I believe if honey be kept at say 90° , it will not crystallize so long as this temperature be maintained. The melting point of glucose-sugar crystal is 86° ; cold weather accelerates candying of honey—this is well known, but little understood. It is not the cold that does it, but the condition of the atmosphere incident to the cold. In other words, the point of atmospheric saturation is then low, in which state the air is in a condition favorable to its giving back its moisture to the honey, which has for water a strong affinity.

"Let the skeptic who cures his honey by causing it to flow over shallow troughs, or by storing it in shallow tanks, and who refuses to accept this theory, transfer his operations to a cold room, or to the cellar, and he will discover that instead of obtaining cured honey, he will soon have candied honey.

"A colorless syrup is sometimes found floating on top of a body of granulated honey. This liquid is almost pure levulose, and its presence is not an evidence of unripeness, but a proof that levulose is present in an undue proportion.

In reference to the analytical table given before (will show that it varies in quantities in various samples of honey. It is in itself uncrystallizable glucose, or from its co-constituent dextrose. When it is present in honey in abnormal quantities, a portion of it refuses to combine with the dextrose, and finds its way to the surface, where it floats in the form of the liquid well known to most bee-keepers. At least most of them have had an opportunity of seeing it.

R. MCKNIGHT.

Owen Sound, Ont.

* * * Please send us the names of your neighbors who keep bees, that we may forward copies of the BEE JOURNAL to them. A postal card and five minutes time will do it.