Binodal Curve, Tie-lines, Specific Gravities

In determining the points of the binodal curve, and in all other experiments of this paper, Kahlbaum's ether "über Natrium destilliert," and Kahlbaum's "ethyl alcohol 99.8 percent" were used; account was taken of the water added with the alcohol; the total weight of the liquids used in each determination of a point on the binodal curve was about 25 grams.

The liquids were weighed into the mixing tube from pycnometers of the Ostwald-Sprengel type, provided with a long fine exit-tube, suitably bent. The tube in which the liquids were mixed was about 10 cm long and 2.5 cm in diameter. Into the mouth was fitted tightly a cork through which passed a short glass tube of about 1 cm diameter, and over the end of this tube two overlapping pieces of thin sheet rubber were drawn and tied. This allowed the end of a pycnometer to be inserted with the least loss of vapor; and while containing the liquids and immersed in ice water, no smell of alcohol or ether could be detected, showing that the sheet rubber was an effective means of closing the tube.

A point on the binodal curve was determined by blowing over from the pycnometers into the tube the desired amounts of ether and water; then adding alcohol in quantity nearly but not quite enough to make all homogeneous, the tube being all the time immersed in ice water to keep the vapor tension as low as possible. The tube was then removed to an ice bath provided with a stirrer run by a small motor, and allowed to cool for about fifteen minutes more, being frequently stirred by giving the liquid in the tube a rotating motion. Then a little more alcohol was added from the pycnometer, mixed well by rotating and gently shaking, and placed again in the ice bath to see if it would separate into layers. The final addition of alcohol was made easy, however, without waiting long for separation to occur, by the fact that even when a long time would be required for separation to take place, a silky appearance of the liquid, when shaken, was seen; and then the alcohol was added, drop by drop, until the last drop just caused this silky appearance to dis-