The explanation for the separation of the liquid in the receiving-flasks into two layers as described is to be found in the different densities of aqueous solutions of ammonia and hydrochloric acid.

In subsequent work I have used delivery-tubes reaching to the very bottom of the receiving flasks, and contracted at the end to an aperture of but four or five mm. diameter. This insures considerable agitation of the contents of the receiving flask produced by irregularities in the boiling of the liquid in the distillation flask.

This loss of ammonia shown to have taken place from the very dilute solution in the receiving flask after cooling by an efficient condenser emphasizes the results of the preceding work on titration and the importance of avoiding a common error in that process.

A CONDENSER FOR EXTRACTION WORK.[1]

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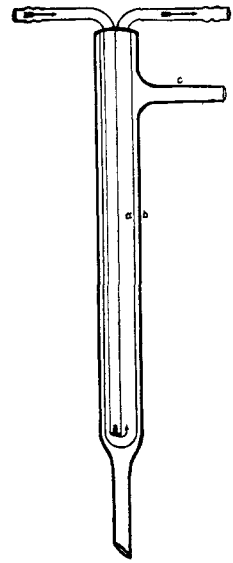
MAINLY to avoid the constant trouble of having atmospheric moisture condense upon the outer surface of a Liebig or Allihn condenser and run down over the extraction apparatus, the following form of condenser was designed:



This condenser is made entirely of glass, and consists of a *thin* glass tube *a* twenty-five mm. *outside* diameter and twenty-five cm. long, provided with two glass tubes about six mm. in diameter, one reaching to near the bottom of *a*, sealed in for water inlet and outlet. The tube *a* is surrounded by a stronger glass tube *b* of thirty mm. *inside* diameter sealed on at the top and narrowed at the lower end to a ten mm. tube which extends eight mm. below and is ground off obliquely at the end. About

[1] From advance sheets of the author's thesis, "The Chemistry of the Corn Kernel," for the degree of Doctor of Philosophy, Cornell University, 1898, which will be published as Bulletin No. 53 of the University of Illinois Agricultural Experiment Station.

three cm. from the top of tube *b* a side tube *c* is provided ; it is five cm. long and twelve mm. inner diameter, and is widened, as indicated in the figure, where it is sealed into *b*. The water tubes are cut off at a length of five cm., being blown as indicated to hold a rubber tube.

The outer tube of this condenser is not cooled to a temperature at which atmospheric moisture will condense upon it. This is its chief advantage over the ordinary form in fat extraction with anhydrous ether. The side tube serves to connect with a drying tube.

A few other important points may be noted. The condenser may be used in ordinary distillation by passing the vapor in through the side tube. The ordinary condenser frequently breaks in consequence of the extreme differences in the temperature of the inner tube just above and below the surface of the surrounding water. The new form is free from this objection. The water tubes are both at the top and very convenient for joining up a series of condensers. These condensers are more compact and yet much more effective than the ordinary form, the vapor being distributed in a *thin* layer over a very large condensing surface, the outer tube also acting as an "air condenser."

These condensers have been in almost constant use during the past year in the chemical laboratories of the University of Illinois and have given excellent satisfaction.

There are several condensers which have the water tube inside, but I have found none suited to the purpose for which this was especially designed except that recently described by Sudborough and Feilmann[1], which is certainly to be preferred to the ordinary form as a return condenser, though it cannot be used safely in distillation.

[1] *J. Soc. Chem. Ind.*, *1897*, **16**, 979.