per cent. solids without casein and albumen. If such milk contains twelve per cent. of total solids, then there must be 3.50 per cent. of casein and albumen, that is 3.50 per cent. of casein and albumen for three per cent. of fat, a relation of these compounds, which, as I have previously stated, I have not yet found in normal milk. Only in skimmed milk containing three per cent. of fat should we expect to find as much as twelve per cent. of solids.

General Summary.—We may briefly summarize our statements as follows:

(1) The relation of casein to albumen in normal milk is more or less a variable, and not a definite one.

(2) The amount of fat in normal milk is very rarely less than the amount of casein and albumen. On an average there are 1.20 pounds of fat for one pound of casein and albumen.

(3) Average milk contains about 1.50 pounds of fat for one pound of casein (excluding albumen).

(4) The removal of fat from milk reduces the ratio of fat to casein in the resulting skim-milk. When milk contains less than 1.30 pounds of fat for one pound of casein the milk has in all probability been skimmed.

(5) The legal minimum standard, which requires milk containing three per cent. of fat to contain twelve per cent. of total solids, does not agree with the composition of normal milk as found in New York State, since normal milk that contains three per cent. of fat will contain considerably less than twelve per cent. of total solids. The legal requirement would be met with only in skimmed milk.

IMPROVED UREOMETER.

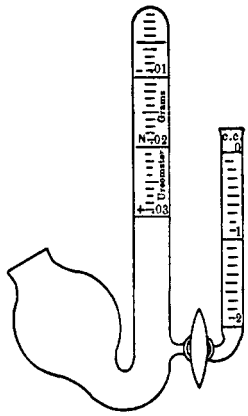
By Professor J. I. D. Hinds.

Received October 5, 1893.

IN using the ureometer designed by Prof. Doremus I have found two sources of considerable error. In the first place, it is impossible to run in from the pipette exactly one centimeter of the urine. In the second place, some bubbles of nitrogen almost invariably escape at the bulb of the instrument.

To remove these sources of error, I have devised the appara-

tus shown in the accompanying figure. A tube graduated to tenths of cc. is attached on the side opposite the bulb, and the two tubes are connected by a stopcock. The instrument is filled with the test liquid in the usual way and then the small tube is filled with the urine. Exactly one cc. is allowed to run in through the stopcock, and then the nitrogen is measured in the larger tube. The instrument gives as great accuracy as can be attained with the small quantities dealt with. The hole in the stopcock should be filled with the urine. This can be done by running in a drop or two of urine before filling with the test liquid.



The instrument is conveniently held with the left hand while the stopcock is being operated with the right.

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CHEMICAL CONSIDERATIONS ON THE POTTERY INDUSTRIES OF THE UNITED STATES.

BY KARL LANGENBECK.

Received Nov. 16, 1893.

PART I.

OUR pottery industries have developed so purely on an empirical basis, that very little of a chemico-technical character has found its way into English literature concerning them.

Our potters are, almost without exception, innocent of chemical knowledge, and American chemists have had little opportunity of working in their manufactories, or have not felt at liberty to publish their experience in such lines of work.

As, however, the diligence of our many geological surveys causes many thousands of clays to be annually collected, described, and analyzed, it is unfortunate that such extensive