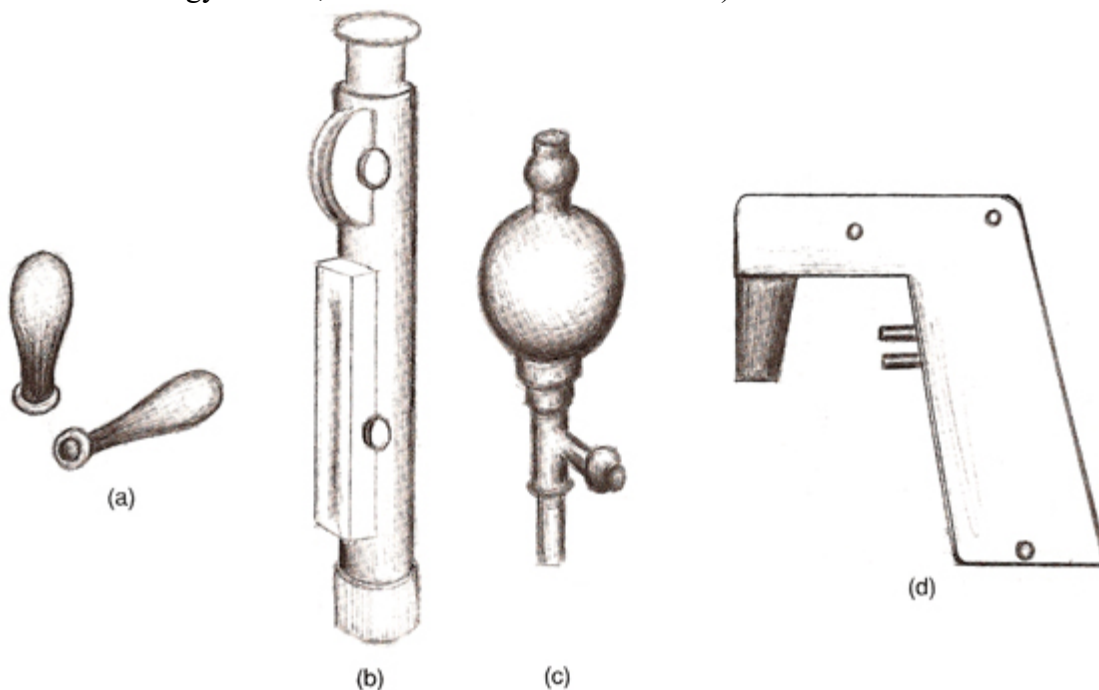


The proper use of Pipettes and Pipette-aids (Pipettors)

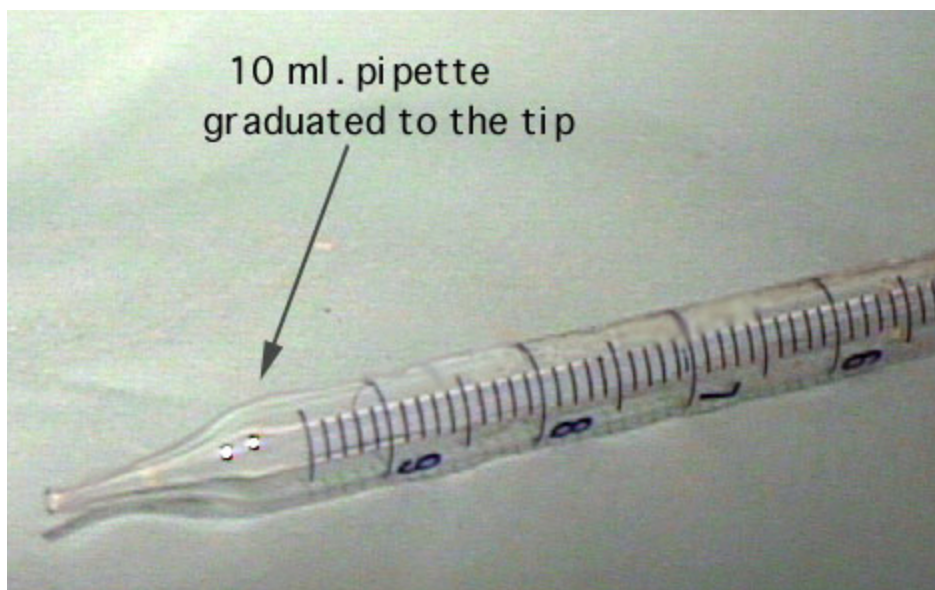
Images and some Text courtesy of this excellent, highly recommended book:

Basic Laboratory Methods for Biotechnology, Textbook and Laboratory Reference., By Lisa A. Seidman and Cynthia J. Moore, copyright 2000 Prentice-Hall, Inc.

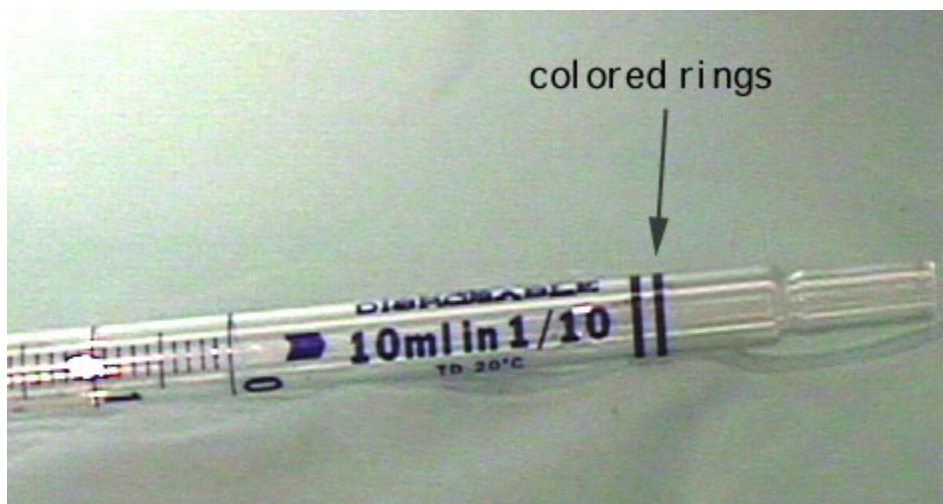
- In a way, pipettes work a lot like drinking straws in that they allow liquids to be 'sucked-up' into one end. They are used to accurately measure and transfer small volumes of liquids.
- Though they may work like drinking straws, never use your mouth to suck-up liquids into a pipette! Instead use a pipette-aide as described below.
- Pipette-aides or pipettors are suction devices that are used to either suck liquids into or expel liquids out of pipettes. For some types of measurements it may be necessary to expel, or blow-out, the total liquid volume from the pipette using the pipette-aid.
 - Types of Pipette-Aids. a. Least expensive type of bulb; not easily controlled. b. A pipette pump that can be used to take up and expel liquid. c. More expensive bulbs allow fine control of liquid. This type of pipette aid may be called a "triple valve" device because it has three buttons: The first displaces air from the bulb, the second is used to draw liquid into the pipette, and the third is used to expel the liquid. d. Electronic pipette aid that allows fine control and ease of use. (Sketches by a Biotechnology student, Seidman and Moore textbook.)



- Serological or 'blow-out' pipettes are calibrated so that the last drop of liquid needs to be blown-out of the tip to deliver the full volume of the pipette. (If you are not trying to deliver the full volume of the pipette, you may not have to blow these out.)
 - In our lab, all of the measuring pipettes will be of the blow-out variety.
 - Note that this type of pipette is calibrated all the way down to the tip:

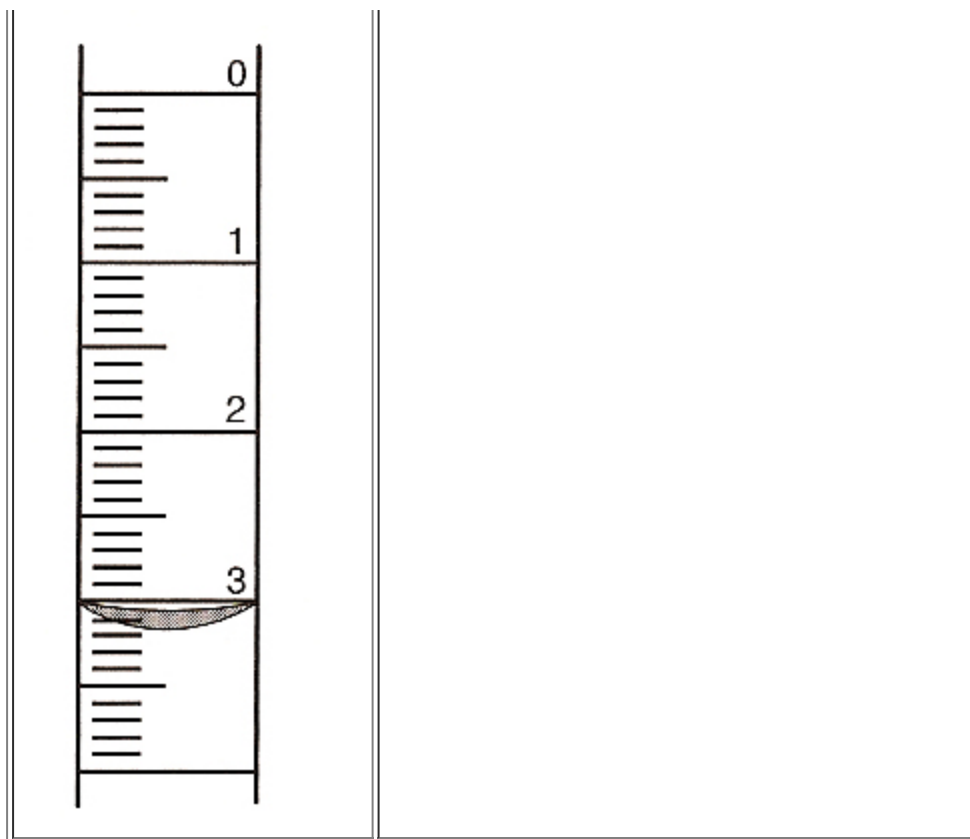


- We have three types of serological (blow-out) pipettes:
 - 1.0 mL
 - 5.0 mL
 - 10.0 mL
- Note that the markings at the top of the pipette include:
 - Rings to indicate that this is a 'blow-out' type of pipette
 - A label to indicate the size and measurement graduations of the pipette such as:
 - 10 mL in 1/10
 - 5 mL in 1/10
 - 1 mL in 1/100
 - TD 20°C, (or To Deliver 20°C) which indicates the pipette will deliver the measured amount of water if the temperature is 20°C.



- A pipette is calibrated with a series of graduation lines to allow the measurement of more than one volume. Measure using the bottom of the concave surface of the liquid in pipette. This figure illustrates how to read the meniscus on a measuring pipette.

	<p>Liquid was drawn up to exactly the zero mark and was then dispensed. Reading the value at the bottom of the meniscus shows that 3.19 mL of liquid was delivered.</p>
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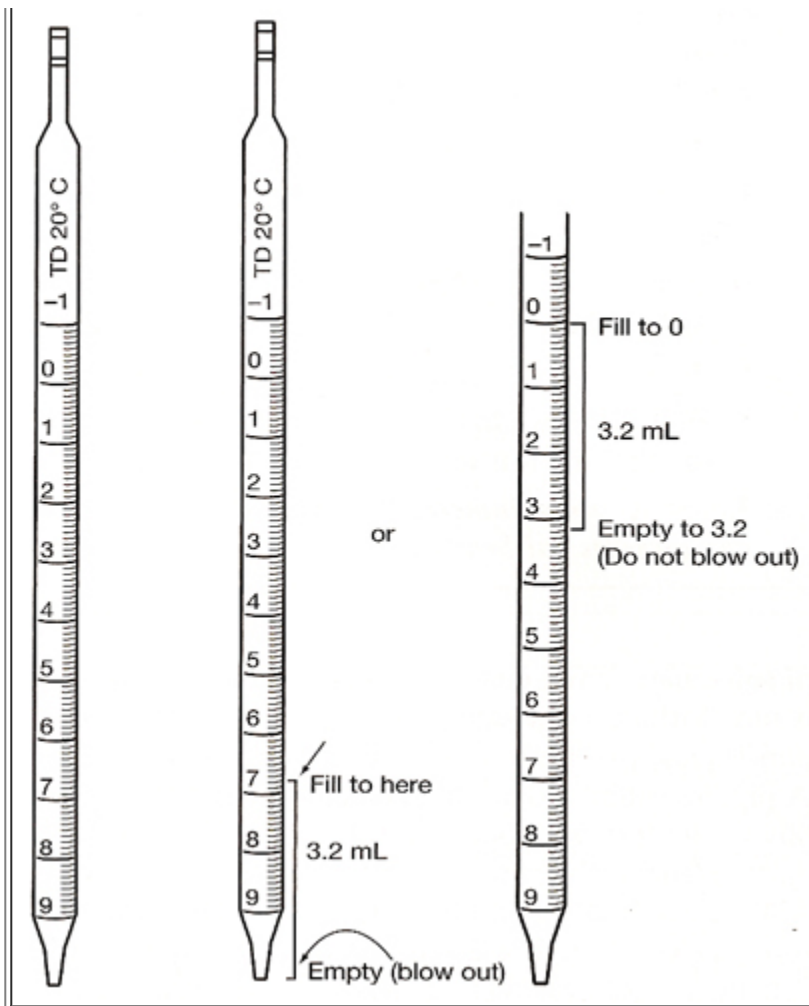
The Procedure for Using a Serological Pipette:

Most of our work is done with sterile pipettes and if so, the operations are done aseptically. When working with non-sterile pipettes it is a good idea to work aseptically anyway as a matter of routine in order to practice the technique.

1. Without opening the sterile sleeve, look through the wrapper and check that the pipette is calibrated as a 'blow-out' pipette. Also make sure that the tip is not cracked or chipped and check the wrapper hasn't been damaged in any way.
2. Open the wrapper and remove the pipette aseptically and insert the top, wide end into a pipette-aide.
3. Fill the pipette a bit above the capacity line desired and then slowly lower the meniscus to that capacity line.
4. Remove the pipette from the vessel, allowing the outside of the pipette to gently touch the inner lip of the vessel to remove any adherent liquid. Don't touch the tip of the pipette though to avoid introducing an air bubble.
5. Aseptically move the pipette to the receiving vessel and deliver the contents. If you are pipetting a volume between two measurement lines you will not have to 'blow-out'. However if you are delivering the entire contents of the pipette you will have to 'blow-out' the remaining liquid in the tip with a firm puff of air from the pipette-aide.
6. Remove the pipette aseptically and discard it into an appropriate discard container.

Using Serological Pipettes to dispense 3.2 mL:

This is a serological pipette calibrated so that the tip includes the last milliliter.



The bands at the top indicate that this pipette is to be "blown-out."

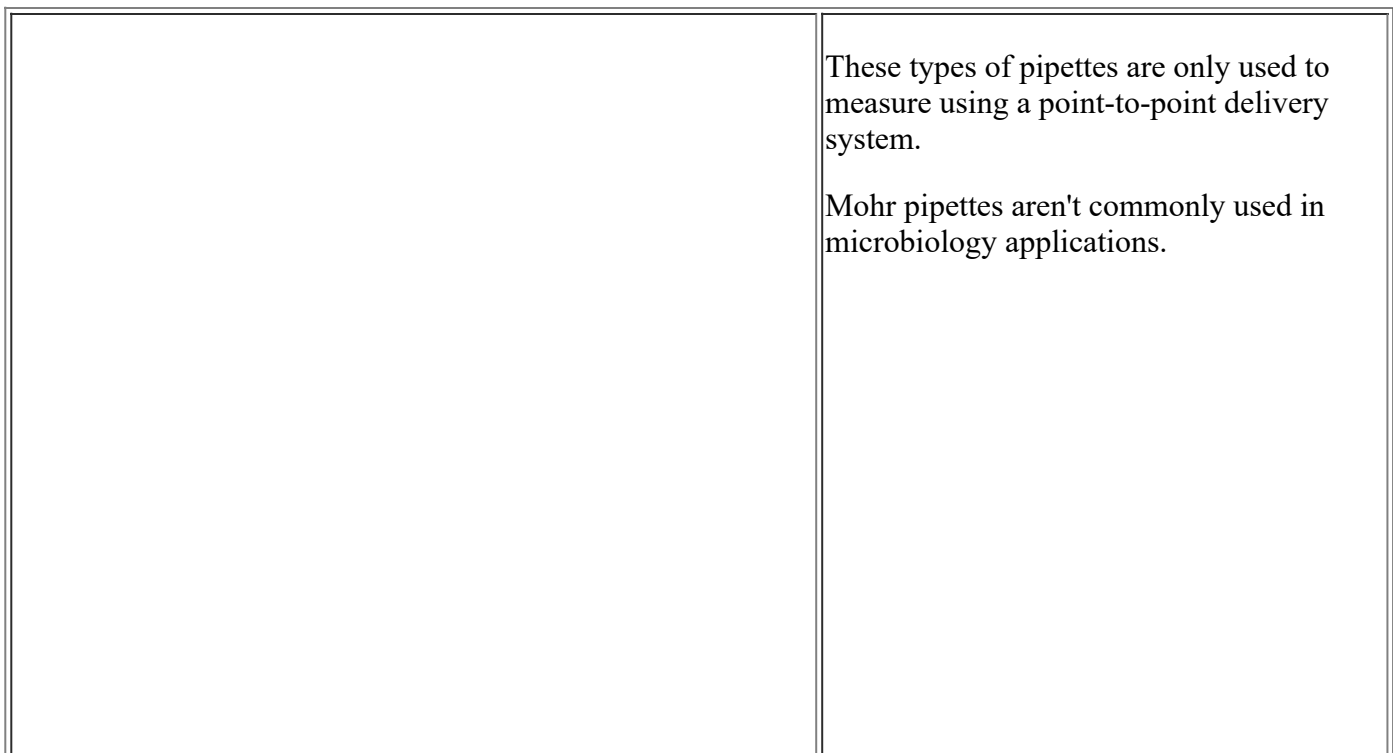
Note that this pipette has a scale that extends above zero to expand the calibrated capacity of the pipette. Thus, this is really an 11.0 mL pipette.

The center diagram shows how one would measure 3.2 mL using the 'blow-out' technique.

The diagram on the right shows how one could measure 3.2 mL using a point to point technique.

Both techniques equally accurate

Mohr pipettes are another type of pipette. Mohr pipettes are not 'blow-out' type, nor are the tips part of the measurement. Here is an example of how Mohr pipettes are used:



These types of pipettes are only used to measure using a point-to-point delivery system.

Mohr pipettes aren't commonly used in microbiology applications.

