boiling-points of the various samples listed; a comparison of the two will, therefore, indicate the probable purity of the different samples. It is obvious that such a card properly filled out will give the instructor at a glance all the information desired concerning his stock.

I think that I hear the reader saying to himself, 'All very pretty! but it must take an immense amount of time to get up such a list, and it would be perfectly hopeless to attempt to keep it up to date!' It is quite true that it does take some time to prepare such a list, particularly where the mass of material is great, but the time thus lost is very quickly made up by the time saved in the use of the index, and when once done it does not have to be done over again. I assume that every laboratory finds it desirable to take a complete account of stock at least once a year. As to the other objection—keeping such a list up to date, our method is as follows: Two sets of printed blanks are used, about 3″ x 5″, one printed on blue paper, the other on white. One is for stock removed, the other for new stock. On the blanks headed 'Removed' are the following items—substance, amount, maker, location, date, for; on the 'New Stock' blanks—substance, amount, maker, cost, location, date. Whenever any chemical is removed from stock for use in a research, to replenish a reagent bottle, or for whatever purpose, one of these 'Removed' blanks is filled out and put on file, and once a month or so these blanks are checked up and the index corrected accordingly. After correcting the index, the blanks are not destroyed, but are kept on permanent file, and at the close of the year an examination of the total blanks on file will show exactly how much and where the stock is most in need of replenishing, thereby furnishing the necessary information for the preparation of the annual import order. The 'New Stock' blanks should also be placed on permanent file after having been entered in the index. It will be found more convenient, in both cases, to use a separate blank for each separate bottle.

Such a general stock list is not only a perpetual inventory, but it may also do duty as a chemical museum catalogue, and be useful in other directions also. For example, it will show instantly any change in the market price of the chemicals listed, and perhaps thus lead occasionally to the correction of unintentional overcharges on the part of dealers. When once made, it requires only occasional attention, and the addition of new cards for new substances. Wherever possible, as in the chemical museum and general stock rooms, the stock should be arranged in the same order as in the index.

As the above method has appeared to interest so many of our brother chemists both here and abroad, I have taken this opportunity of making it available to all, in the hope that others may find in it something useful or suggestive. It has been in use in the department of organic chemistry of Columbia University for several years, and has been of very great assistance to us in our work.

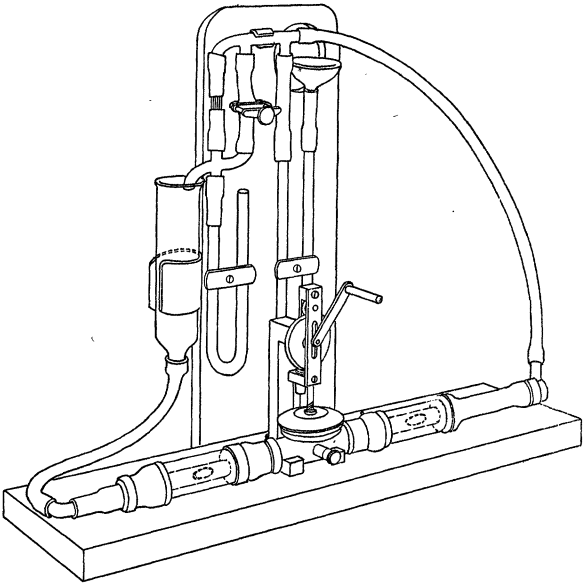
Marston Taylor Bogert.
Havemeyer Laboratories,
Columbia University,
March 30, 1905.

A QUANTITATIVE CIRCULATION SCHEME.

The artificial scheme (Fig. 1) to illustrate the mechanics of the circulation in the highest vertebrates consists of a pump, a system of elastic tubes and a peripheral resistance. The inlet and the outlet tubes of the pump are furnished with valves that permit a flow in one direction only. The peripheral resistance is the friction which the liquid undergoes in flowing through the minute channels of a piece of bamboo. To this must be added the slighter resistance due to friction in the rubber and glass tubes.

In this system the pump represents the left ventricle; the valves in the inlet and outlet tubes, the mitral and aortic valves, respectively; the resistance of the channels in the bamboo, the resistance of the small arteries and capillaries. The tubes between the pump and the resistance are the arteries; those on the distal side of the resistance are the veins. The side branch substitutes a wide channel for the narrow ones, and thus is equivalent to a dilatation of the vessels.

The pressure in the ventricle is varied through a tambour covered with rubber membrane. The membrane is grasped between two disks, one below and one above. The upper disk is screwed down upon the lower until the membrane is tightly held. To these disks is fastened a rod which ends in a yoke. The yoke rests upon a small wheel, which in turn is supported by a brass plate eccentric in form. This brass plate is revolved by turning a handle attached to the axle. As the plate revolves the small wheel bears upon the eccen-



tric rim and rises and falls with the rise and fall in the rim of the plate. The motion of the small wheel is transferred through the yoke, rod and disk to the rubber membrane and thus to the interior of the ventricle.

The rim of the eccentric brass plate reproduces the intraventricular pressure curve in the dog. In projecting this curve upon the plate the periphery is divided into fractions of a second and the radii are divided into millimeters of mercury pressure.

Each revolution of the eccentric plate reproduces in the ventricular tube both the time and the pressure relations of the ventricular cycle in the dog. The intraventricular pressure curve may be written by connecting the side tube with a membrane manometer, and clamping off the arterial mercury manometer to be mentioned shortly.

When the pressure rises in the ventricle to a sufficient height the contents of the ventricle will be discharged through the aortic valve into the aorta, and thus (through a convenient metal tube) into the arterial tube, leading to the capillary resistance. Here two paths may be taken: the liquid may pass either through the capillary channels in the cane, thus meeting with a high resistance, or this resistance may be lessened to any desired degree by unscrewing a clamp and thus opening the side tube. Both paths lead to the venous tubes, whence the liquid passes through the mitral valve into the ventricle. The mitral and aortic valves are of a modified Williams type. Metal tubes closed at one end conduct the liquid respectively to or from the ventricle. The liquid enters or leaves the valve tube through a hole covered by a rubber valve-flap, not shown in Fig. 1. Each valve is surrounded by a glass tube through which the working of the valve may be inspected.

Mercury manometers measure the pressure in the arteries and veins near the capillary resistance. The arterial manometer is provided with a glass thistle-tube to catch any mercury that may be driven out by a careless operator.

If the arterial mercury manometer be replaced by a membrane manometer, or if it be provided with a float and writing-point arterial pressure curves may be written, identical with those obtained from the carotid artery of the dog.

Normal sphygmographic tracings may be obtained by using a sphygmograph on the aortic tube.

Palpation of the arterial tube will give a pulse the 'feel' of which can not be distinguished from that of the pulse in the normal subject; the pressure waves in the quantitative scheme and in the living animal are identical in respect of both time and pressure.

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ROCKING KEY WITH METAL CONTACTS.

THE instrument illustrated by the figure serves as a simple key, short-circuiting key,