prevent the sublimed substance coming in contact with the iron hot plate. The bell jar is evacuated through the bottom, the crystallizing dish not being drilled in this case. The whole is mounted on a wooden base, cut out to allow the electrical leads and vacuum connection to pass through.

The advantages of this form of apparatus can be readily seen. It is convenient, since lifting off the bell jar renders all parts readily accessible. Most of the sublimed material drops into the crystallizing dish, from which it can be easily removed. This materially affects the speed. In most forms of sublimation apparatus the solid is condensed directly above the unsublimed portion, and all that drops must be re-sublimed, with no consequent gain in purity. The material comes in contact with nothing but glass and platinum. This is unimportant with stable substances such as naphthalene, but with easily decomposed substances such as salicylic acid it is important. The apparatus can be readily calibrated so that the approximate temperature can be determined by having an ammeter in the circuit.

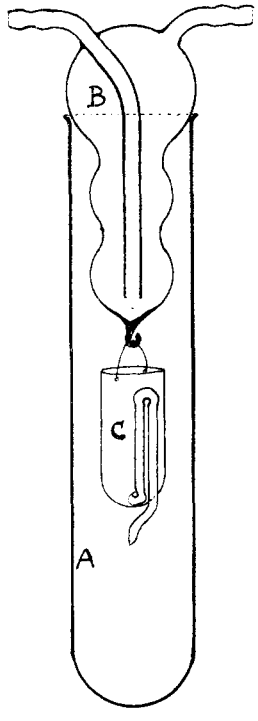
The above apparatus for vacuum sublimation has been in use at the Bureau of Standards for over a year, during which time it has given complete satisfaction in the last step in the purification of the naphthalene and benzoic acid issued by the Bureau as standard calorimetric samples. It is rapid and efficient, the process is under complete control, and the apparatus requires but little attention.

NOTES.

An Improved Extraction Apparatus.—The extraction apparatus here illustrated and described was designed early in the year 1909 for special use with a number of unusual solvents, but has since been employed quite extensively in the laboratories of this Bureau for general purposes. It represents the result of an attempt to combine in an all-glass device the principal advantages of the Wiley and Soxhlet forms. It was desired to make a compact, convenient apparatus free from stoppers, seals and ground connections, the separate parts of which should be simple and interchangeable as well as readily accessible for cleaning, alteration or repair.

It consists of three essential parts, a straight outer tube A, a condenser, B, terminating at the lower end in a small glass hook, and a suitable extraction tube, C, for holding the material to be extracted. The extraction tube (shown in perspective) is suspended from the hook on the condenser by means of a semi-circular wire bail of such a size that it may be swung out of the way when filling or emptying the tube. While it may readily be adapted to meet any special requirements, it is usually

provided with a siphon for intermittent drainage. The siphon, however, need not be an integral part of the tube, since a separate siphon of small bore hung over the edge of a plain tube is generally found to fill by capillarity and operate with entire satisfaction.



A convenient size of the apparatus for use with such solvents as alcohol, acetone, or chloroform consists of an outer tube 4.5–5.0 cm. in diameter and 24–25 cm. in length with other parts proportioned about as indicated in the sketch. Glass naturally presents a somewhat less effective cooling surface than metal, so that for the more volatile solvents the condenser, as illustrated, is rather short. In winter or when specially cooled water is available, however, even this very short condenser will retain ethyl ether without excessive loss.

If it is desired to weigh the substance removed by the extraction, it is convenient to rinse the contents of the outer tube into a tared dish of appropriate size for evaporation. Where the extract is to be treated further without weighing, the comparatively large mass and capacity of the tube are not found to be objectionable.

It should be noted that the contents of the extraction tube are maintained at a temperature but slightly below the boiling point of the solvent. This is generally considered to be an advantage, but has the effect of preventing the use of the apparatus as described with non-homogeneous solvents such as petroleum ether, since the more volatile constituents tend to collect and boil in the extraction tube, while the siphon is superheated by the vapors of the higher boiling components and thereby rendered inoperative.

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A Modified Jacket for a Victor Meyer Vapor-Density Apparatus.—When any considerable number of students are engaged in the determination of molecular weights by the Victor Meyer method, the breakage of outer jackets is a source of constant annoyance. These jackets are rather expensive, are easily broken, and the blowing of a new bulb is usually beyond the skill of the student. A simple device illustrated in the drawing has been found to be quite satisfactory as a substitute for these jackets