PARTING SHOTS

Of Beehives and Babo Generators: The Adventures of a Museum Curator

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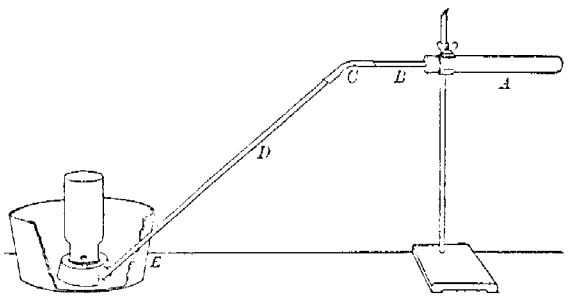
According to the old proverb, "all things come to those who wait", though in the case of the Chemical Apparatus Museum at the University of Cincinnati, a more accurate rendition would be that "all things come to those who search long enough". A surprisingly small percentage of the artifacts in the museum have been acquired through unsolicited donations and an even smaller portion through direct purchase from antique dealers. The majority has come from directly visiting chemistry departments throughout the country and actively going through their stockrooms and basement storage areas. Once an historically interesting item is found, the department is usually more than willing to donate it to the museum, since the alternative is often the trash barrel.

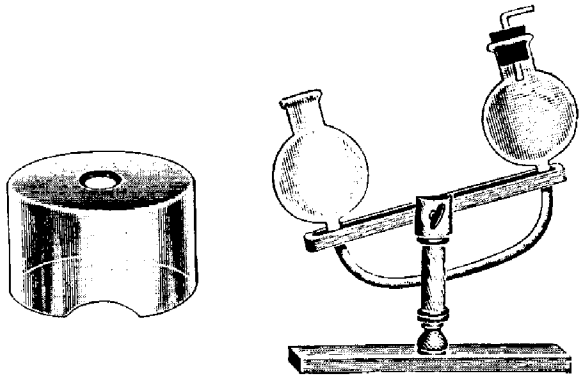
The occasion for these visits is normally an invitation to give a seminar on the history of chemistry and these, in turn, are often financed by the chemistry department at Cincinnati as part of its seminar program for graduate student recruitment. I mention this only because at times I vaguely wonder what impression my visits must make on perspective recruits. After all, if this guy travels the country begging for every piece of outdated, broken-down apparatus in sight, Cincinnati must be awfully hard up for equipment!

Given about an hour's worth of search time and a stockroom or a dimly lit basement storage area filled with hundreds of boxes, how does one decide which boxes to ignore and which to open? Generally I have found that the success rate is directly related to the ambiguity of the label on the box. Specific labels, such as "beakers", "bottles" and "distilling flasks", seldom yield anything unexpected, but adjectives such as "miscellaneous" or "assorted" and occasionally even "odd" or "old" quicken my pulse and have usually proven profitable.

The downside of this choice is that it can sometimes prove very difficult to identify just what it is that one has uncovered and I have at times come perilously close to ignoring objects



A beehive stand in use



(Left): A glass beehive. This example lacks the characteristic beehive shape. (Right): A Babo generator

which have later proved to be of interest because I did not immediately recognize what they were. Thus at DePauw University several years ago, while going through some boxes of antique equipment rescued from the old chemistry building by Dr. Donald Cook and tucked away in the basement of the new building, I uncovered a box of what appeared to be white porcelain dishes, each with a hole in the bottom and a groove cut in the lip. I also found a large number of small two-necked Woulfe bottles which, from the residues inside, had obviously been used as student hydrogen generators. Since I could not locate any pneumatic troughs to go with the generators, I surmised that the dishes might have something to do with the collection of the hydrogen and to be safe took a few for the museum.

While reexamining the dishes in my hotel room that evening, I dimly recalled reading in a 19th century textbook that high school teachers on tight budgets could save money by making their own student pneumatic trough stands from small flower pots by cutting a groove in the lip with a file. Once back in Cincinnati, consultation of the apparatus catalogs in the Oesper Collection quickly revealed that the porcelain dishes were in fact the commercial equivalent of the flower pot stands - a type of pneumatic trough stand known, presumably because of its shape and the location of the openings, as a "beehive". Interestingly, though I have located textbook illustrations of the beehives I found at DePauw, the only examples I have uncovered in commerical apparatus catalogs are made of glass or zinc rather than porcelain.

A similar incident occurred more recently at Eastern Michigan University, where I was shown a display case containing a wonderful collection of old lime-glass apparatus rescued by Dr. Bert Ramsay. Among the items were two examples of an object which looked like two glass leveling bulbs fused to an interconnecting U-tube. These I immediately recognized as part of a gas-generating apparatus, though the wooden stands were missing and they were in the case upside down. Bert donated one of them to the museum and consultation of the

catalogs quickly revealed that they were part of a solid-liquid gas generator known as a Babo generator, after its inventor, the 19th century German chemist, Clemens Heinrich Lambert von Babo (1818-1899). To operate, one bulb was packed with the solid reactant (e.g., iron (II) sulfide) and the other was filled with acid. When mounted on the missing wooden stand, the apparatus could be tilted in one direction to cover the solid reactant with acid or in the other direction to drain all of the acid into the second bulb. Intermediate tilt angles allowed one to vary the percentage of the solid in contact with the acid and so regulate the rate of gas evolution much more elegantly than in the more common Kipp generator. The 1914 catalog for the E. H. Sargent Company of Chicago lists Babo generators with a capacity of 1 liter, though it doesn't indicate whether this refers to one bulb or to both bulbs together (1). The generator found at Eastern Michigan, which is now mounted on a reproduction stand, has a capacity of only 250 mL (both bulbs) and was apparently intended for the use of only one or two students in a qualitative analysis laboratory.

Babo, by the way, was a prolific inventor of laboratory apparatus, including an ozone generator (2), a burner (3), an air bath (3), an absorption tube (1), a retort stand, a gas-oven, and an explosion oven (2). He is also credited with being the first to use the centrifuge in a chemical laboratory.

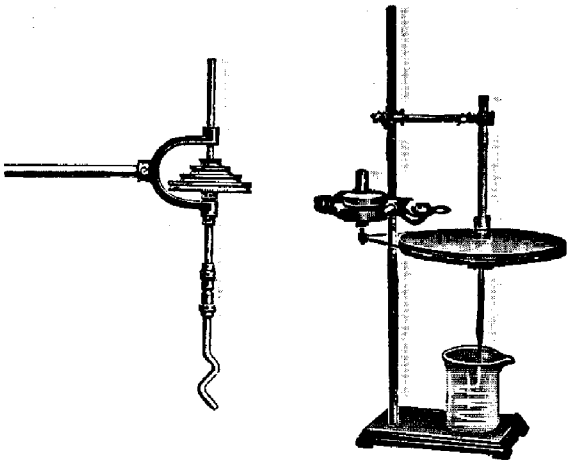
Even more satisfying is when one is able to assemble a complete piece of apparatus from parts collected from several sources over a long period of time. This December, for example, I found a clamp, with three wooden pulleys of increasing diameter mounted on it, in the basement of Macalester College. This proved to be the missing part to a water-driven laboratory stirrer and, when united with the cast-iron water motor found in the back room of the Ohio Mechanics' Institute in Cincinnati three years earlier, gave us a complete turn-of-the-century stirring apparatus, as well as elegantly illustrating the adage about all things coming to those who search long enough.

References and Notes

1. *Scientific Laboratory Apparatus, Catalog 20*, E. H. Sargent Co., Chicago, IL, 1914, pp. 176, 179, 290.

2. Anon., "Lambert Freiherr von Babo", *Berichte*, **1899**, *32*, 1163-1164.

3. R. Arendt, *Technik der anorganischen Experimentalchemie*, 4th ed., Voss, Leipzig, 1910, pp. 126, 307.



Turn-of-the-century laboratory stirrers. (Left): A stirrer with variable speed. (Right): A stirrer with the water motor attached.

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