AN INTERESTING COLLECTION OF MORTARS.*

BY CHARLES H. AND MILLICENT R. LAWALL.

Where and when did the mortar and pestle originate as a pharmaceutical utensil? Dictionaries digress in their definitions and encyclopedias entirely omit the subject or dismiss it in a few lines. It seems to be a forgotten or neglected subject, and yet from the crude woodcuts of the early incunabula to the literature of the 19th and 20th centuries, we find the mortar and pestle symbolic of pharmacy. We find actual examples of Arabian and even of Roman mortars but beyond them there lies an impenetrable mystery. We have found no reference to the mortar and pestle in the more ancient Egyptian pictorial writing nor even reference to these implements in the catalog of the British Museum. The translators of the Ebers Papyrus, which gives hundreds of formulas for dozens of kinds of pharmaceutical preparations makes no mention of the mortar and pestle, although they use the terms "casserole," "jug," "hennu-vessel" and "flask" to denote the kinds of apparatus directed.

Many formulas in the Ebers Papyrus call for pills and suppositories, and as the directions to crush or pound are frequently found, it may be that they employed the mortar and pestle; if this is so the fact has been carefully concealed. We know that mortar and pestle-like implements of stone and wood were used by primitive races in both the old and the new worlds for grinding cereals into coarse meal, but we cannot trace the connecting link between this household use and their employment in pharmacy.

When we come to Roman times and customs we find the mortar and pestle in a very advanced form. Whence did it come? Probably not from the Orient, at least not from China, for the Chinese grinding device corresponding to our mortar is still in the form of a boat-shaped trough in which a sharpened iron disc is rolled back and forth. Probably the popularity of the electuary and of the medicated fruit pastes called confections gave rise to a need that was quickly filled. Roman mortars have come down to us of marble, earthenware, stone, wood and bronze. The shapes are very much like the mortars of later times. One form of Roman mortar seems to have entirely disappeared, however, from practical use in later times, and is found only as a museum piece. It is the quern or metal mortar with a tightly fitting metal lid which had a hole in the top through which the handle of the pestle could pass. There were earthenware, stone and marble mortars, too, which were mainly employed in the kitchens of the Roman households. This culinary use of the mortar continued down to late Colonial times in America, the metal mortars being used for contusing spices, while the marble mortars were used for making almond paste and similar soft mixtures. The Arabs and Persians used the mortar in pharmacy, probably having learned its use from the Romans. It is toward the close of the medieval period and throughout the Renaissance that we meet the copper, bronze, brass and iron mortars in greatest numbers. The esteem in which mortars were held in pharmacy, and the important position which they occupied is attested by the fact that many of them were inscribed with the date of the origin and

* Section on Historical Pharmacy, Madison meeting, 1933.

frequently with the name of the owner and sometimes of the metal worker who made the mortar.

Perhaps the introduction of gunpowder into warfare had something to do with the rapid influx of metal mortars, for we learn that the mortars were frequently cast in gun foundries in the 15th and 16th centuries. We learn also that bell foundries frequently cast mortars. Here were two sources of mortars—diverse and antagonistic. It is interesting, too, to note that there was a period covering several centuries when a religious motif seemed to dominate certain phases of pharmacy and medicine. It is during this period that we meet with mortars bearing religious mottoes and precepts, such as "Lof Got von all" (Praise God above all) on Flemish mortars; "En Dieu est mon espoir" (In God is my hope) on French mortars and similar phrases on mortars cast in other lands.

The word "mortar" is derived from the Latin word *mortarium*, which is said to have come from the root word "*mordeo*," to bite (which also gives us the word "morsel"). This in turn, may have come from the Sanskrit word "*mrdi*" meaning to grind or to pound, and which is also used to denote the implement or vessel in which the pounding or contusion may be accomplished.

Plato makes mention of the mortar in his writings but whether as a culinary or pharmaceutical utensil, we are not sure. Juvenal specifically makes mention of the mortar as an instrument used in the trituration of drugs. Pliny also refers to it.

The oldest English reference to the mortar in the New Oxford Dictionary, of Murray, is in a Saxon Leech book of about 1000 A.D., in which the word is spelled "*mortere.*" When we arrive at Elizabethan times we find a contemporary writer commenting at some length on the particular uses to which mortars of different kinds were to be put. "Of morters likewise they ought to have divers sorts for all precious stones (that enter into electuaries) and corall ought not to be beaten in a brazen morter, but pearls and corall ought to be beaten in a morter of white marble; precious stones must be made or grinded into pouder upon a stone called in Latine, Lapis Porphirius, which is a kind of red marble. Also purgations or electuaries, pills or powders mingled with syrups ought not to be dissolved in brazen morters, but in morters of glasse, of stone or of fine wood; yea, and if they were of silver for great men of high degree, it were best. Also some ointments ought to be made in morters of lead."

There is a vessel akin to the mortar and pestle found in South America, called the "*metate*" which consists of a concave stone surface, over which a stone roller, tapering toward both ends is rolled. This type of grinding device has also been found in the ruins of the circular huts of the original Britons in North Wales.

The Romans had special manufactories for *mortaria* in Britain, from which the wares were exported to Rome and Gaul.

The collection of mortars which we are about to describe is at the Philadelphia College of Pharmacy and Science and includes specimens of many types of mortars of various periods and countries, some of them having interesting individual histories as well. Let us proceed to discuss them in the order of the accompanying illustrations.

No. 1*a* and No. 1*b* are examples of stone mortars and pestles of American Indian origin. The one on the left is very crude, being simply a piece of sandstone, irregular in shape, very crudely hollowed out, the hollow being very shallow. The

pestle is a crudely formed piece of similar sandstone. The specimen on the right is made from a large pebble, obviously water washed; the hollowed out portion is very regular in shape, and the pestle, which is of a finer grained stone, is well shaped and fits the concavity as well as the average pharmaceutical mortar and pestle fit each other. Unfortunately, the geographic locality from which these specimens came is unknown.

Figure 2*a* is an example of a lignum vitæ mortar and pestle, machine turned and polished. It is about 7 inches tall and about 5 inches in average diameter. It is 18th century English.

Figure 2*b* is an example of a wooden mortar and pestle, which is reputed to

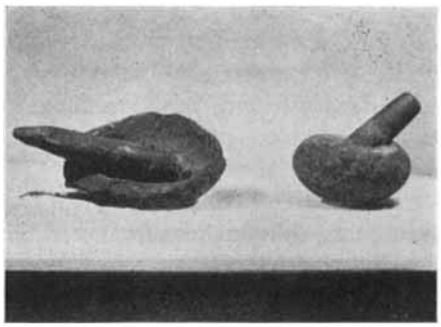


Fig. 1, *a*—Crude stone mortar of American Indian origin. *b*—Stone mortar of American Indian origin.

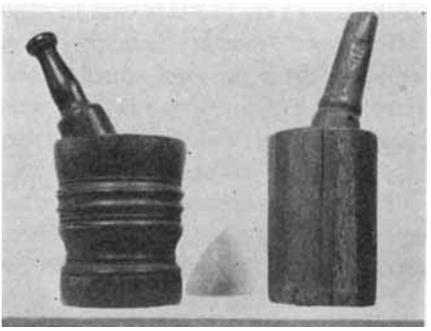


Fig. 2, *a*—Lignum vitæ mortar and pestle of English or Colonial origin. *b*—Crude wooden mortar of American Indian origin.

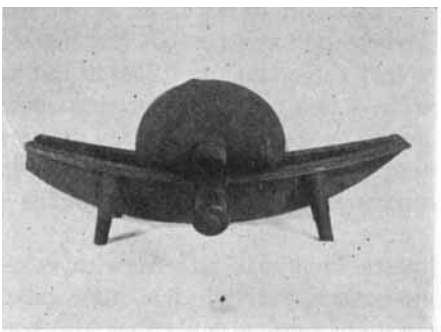


Fig. 3.—Chinese substitute for the mortar and pestle.

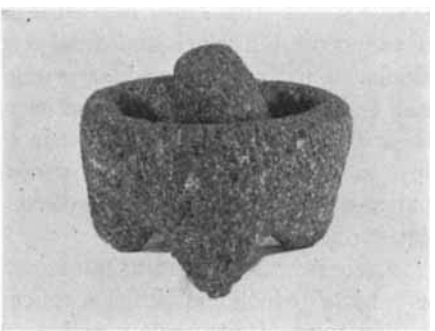


Fig. 4.—Stone mortar and pestle from Mexico.

have been made and used by a tribe of Shinnecock Indians, whose camp was on Long Island in Colonial days. The mortar is crudely formed from a small section of tree trunk of hard wood, and the pestle of hard wood of a different variety.

Figure 3 illustrates the Chinese substitute for the mortar and pestle. As a contusing and a cutting device, it is excellent, but for triturating it leaves much to be desired.

Figure 4 shows a small mortar and pestle of Mexican native origin. It is made of very coarse and very hard volcanic rock and is undoubtedly intended for household

purposes probably for grinding the red peppers of which the Mexicans are so very fond.

Figure 5 is a very interesting example of a Syrian mortar and pestle, such as is used in Syrian and Arabian households for contusing coffee. Coffee is an indispensable adjunct to hospitality in the near East. It is served not only at the close of a meal, but also when men meet on business occasions. To leave before coffee is served is considered an insult. The coffee is always freshly ground in a wooden mortar of this sort, with a very long wooden pestle. Both mortar and pestle are beautifully decorated by wood carving inlaid with light colored pigment. A shallow-bowled brass spoon for removing the coffee from the rather shallow and narrow hollow in the mortar, is attached to the mortar by a brass chain. In this particular specimen the Arabic inscription on the spoon is of more than passing interest. Translated, it reads "Made by planter Abi Kovzaza, May 27, 1327."

Figure 6 is an example of a mortar carved from alabaster, which is a fine-grained form of calcium sulphate. It is in an unfinished condition, and is probably intended for ornamental purposes rather than practical use.

Figure 7*a* is an example of a marble mortar of the Colonial household type, dating from the 18th century. Its companion, 7*b* is a smaller mortar of the same style. These marble mortars are sometimes found of a very large size, large specimens occasionally weighing more than 100 lbs.

Figure 8 is an illustration of a Chinese mortar and pestle made of porphyry. It is of a very unusual shape, being oval, about ten inches long and nearly four inches high. Both mortar and pestle are of a brownish pink color and beautifully polished. No definite date can be assigned to this mortar, but it is probably very old. The mortar and pestle are probably made from different lots of porphyry, as the grain and color of the two pieces are slightly different.

Figure 9 is a bronze pestle, very much corroded, which was found among some Roman relics unearthed in a street in Liverpool, England, some years ago. It is probably the oldest specimen in the collection, but its shape is identical with that of pestles made nearly two thousand years later.

Figure 10 is an unusual specimen of a mortar and pestle of solid ivory, beautifully turned and polished, and is said to be of Spanish origin, and to date from the 16th century. It was probably used as a "cosmetic" mortar.

Figure 11 shows two very interesting specimens, both of Arabic origin. That on the left came from a collection of mortars once owned by Enrico Caruso, the great tenor. It bears the following inscription in Arabic: "Made by Mohammed Kaghen 1570, and presented to Mohammed Bafr." This mortar is of iron or steel. Its companion (*b*) on the left is of copper, with a long-handled, flat-headed copper pestle; both mortar and pestle are very much corroded. This specimen is said to have been found in a well at Damascus, and dates from the period of the Crusades, or even earlier. It is equipped with a ring handle, the ring being frequently found on Arabic or Moorish mortars, furnishing a convenient method of carrying the mortar, when traveling by caravan.

Figure 12 is that of a bronze Arabic mortar, with very fine decorative tooling and an inscription in Arabic, which reads as follows when translated: "The owner of blessedness and gifts, Abbas Odesansen, member of Alnic Usac, 1226." There is also on another part of the mortar, the name of a woman—"Sahi Bet Ali," who was

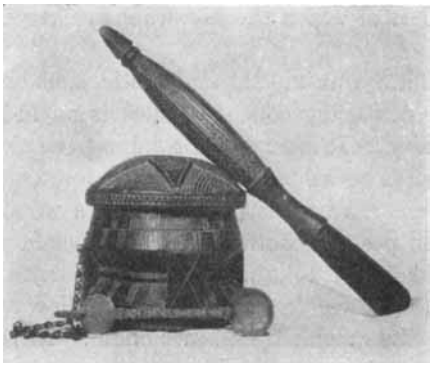


Fig. 5.—Syrian coffee mortar dating from the 14th century.

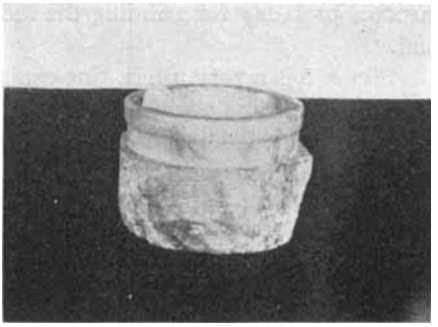


Fig. 6.—An alabaster mortar and pestle, unfinished.

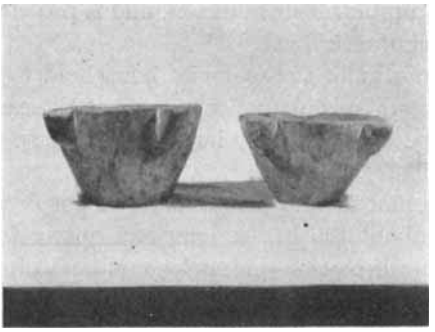


Fig. 7, *a*—A marble mortar of the "Colonial" household type. *b*—A marble mortar of the "Colonial" household type.

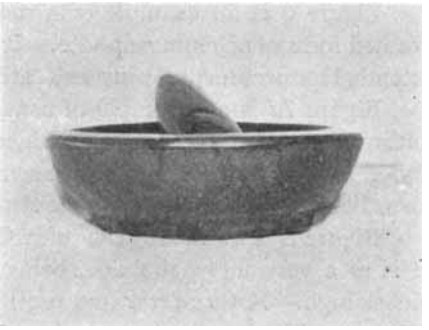


Fig. 8.—A Chinese mortar and pestle of pink porphyry.

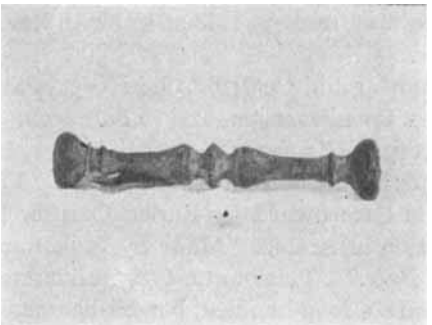


Fig. 9.—A bronze pestle of Roman origin, discovered in England.

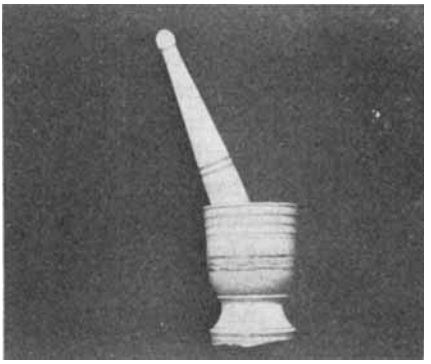


Fig. 10.—A carved ivory mortar and pestle of Spanish origin.

probably the original owner. It was purchased by a collector who brought it from Palestine.

Figure 13 is an illustration of a bronze mortar, with very fine inlaid decorations in a lighter colored metal. The shape of the mortar is very unusual. The inscription appeared to be in Arabic, but proved to be neither Arabic, Turkish, Syrian or Persian. The inscription was outlined in white pigment and photographed, and

the photograph sent to Constantinople, where it was deciphered. The report on it was as follows: "The inscription is in the dialect of a certain Persian sect of fire worshipers (Alevy), and the translation is: 'A mill made of a thousand stones.' No definite date can be assigned to this mortar, but it is probably very old. An expert who saw this mortar says that it is certainly of an origin not later than the 13th century, and may be much older."

Fig. 11, *a*—A 16th century Arabic mortar once owned by Caruso. *b*—A bronze Arabic mortar and pestle dating from the time of the Crusades.

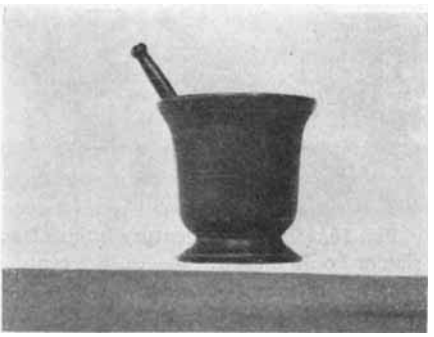


Fig. 12.—A bronze mortar from Palestine with an Arabic inscription. Dated 1226.

Fig. 13.—Bronze Persian mortar, with inlaid inscription. Probably not later than the 13th century.

Fig. 14.—Ornamental mortar made of anthracite coal.

Figure 14 is an ornamental mortar made of anthracite coal, highly polished.

Figure 15*a* is an illustration of a bronze mortar of the late 18th century of either Russian or Polish origin.

Figure 15*b* is an early American bronze mortar and pestle. Figure 15*c* is a brass mortar and pestle of German origin, probably 18th century.

Figures 16*a* and 16*b* are both 17th century Spanish mortars.

There are a number of Spanish mortars in the collection, most of them beautifully decorated. The Spanish mortars are distinctive in their being shallow and having vertical ribs or decorative ridges, and in the absence of handles, except in a few instances where ring handles are found. Figure 17*a* is a bronze mortar and pestle of Russian origin, probably dating from the 18th century. Figure 17*b* is that

of a beautifully decorated Italian mortar; the unsymmetrical location and size of the handles is noteworthy in this specimen.

Figure 18*a* is a bronze mortar from Toul, France, dating from the 16th century;

Fig. 15, *a*—An 18th century bronze Russian or Polish mortar. *b*—An 18th century bronze American mortar. *c*—An 18th century brass German mortar.

Fig. 16, *a*—A 17th century bronze Spanish mortar. *b*—A 17th century bronze Spanish mortar.

Fig. 17, *a*—An 18th century bronze Russian mortar. *b*—A bronze Italian mortar, probably 17th century.

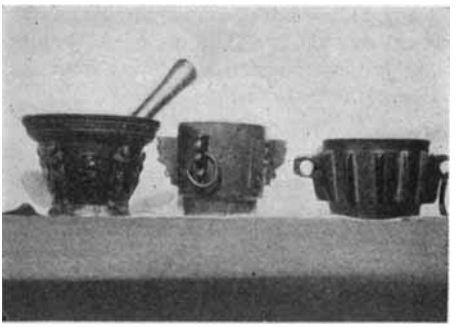


Fig. 18, *a*—Bronze mortar and pestle from Toul, France, 16th century. *b*—Brass Persian mortar with ring handle, 14th century. *c*—Bronze Spanish mortar, 17th century.

Fig. 19.—Brass mortar with dolphin handles and T-handled pestle, dated 1689.

Fig. 20.—Iron mortar and pestle with square handles, dated 1726.

Fig. 18*b* is a rare type of Persian mortar of brass, distinctively and handsomely etched, with the ring handles usually characteristic of mortars of Arabic origin. It is said to date from the 14th century. Figure 18*c* is that of a very early Spanish mortar showing the typical vertical ridges, and the Moorish influence in the ring handles.

Figure 19 is that of a brass mortar with dolphin handles, bearing the initials "I.B.B.Z.," and the date 1689. It was brought from Switzerland some years ago. The T shape of the pestle handle is unusual in this specimen. Figure 20 is that of

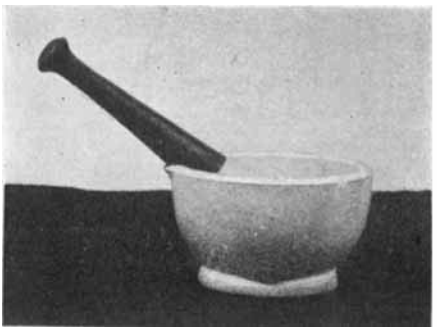


Fig. 21.—Wedgwood mortar and pestle, used in store of Christopher Marshall, Philadelphia, before the Revolutionary War.

Fig. 22.—Iron mortar, 1784, formerly used in the pharmacy of Frederick Brown, Philadelphia.

Fig. 23, *a*—Dutch bronze mortar with dolphin handles, dated 1638. *b*—Dutch bronze mortar with dolphin handles, dated 1607.

Fig. 24.—Dutch bronze mortar without handles. Dated 1638.

an iron mortar and pestle, with square handles, bearing the date 1726. This is either of Russian or Polish origin. Figure 21 is an illustration of a wedgewood mortar and pestle, which was used in the store of Christopher Marshall in Philadelphia, before the time of the Revolutionary War.

Figure 22 is an illustration of an iron mortar and pestle, bearing the date 1784 painted on the side. It came from the pharmacy of Frederick Brown which was originally located at Fifth and Chestnut Sts. in Philadelphia. Frederick Brown was one of the founders of the Philadelphia College of Pharmacy and Science, and was

originally an apprentice in the store of Charles Marshall, the first president of the College, and the son of Christopher Marshall just referred to.

Figures 23*a* and 23*b* are of two bronze mortars of 17th century Dutch origin. They were cast by the same workman or foundry, for 23*a* bears the inscription "Henryk Horst me Fecyt, Ao1638," while 23*b* bears in the inscription "Heinrick ter Horst me fecit, Anno 1607." Both mortars are elaborately decorated and have handles in the form of dolphins. Figure 24 is a third mortar coming from this same foundry. It bears a similar inscription with the date 1638, but unlike the two previous specimens it has no handles.

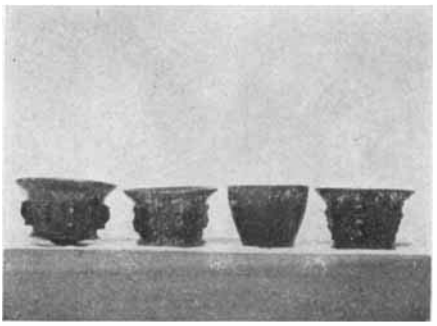


Fig. 25, *a*—A 17th century bronze Spanish mortar. *b*—A 17th century bronze Spanish mortar. *c*—An early American mortar of unusual shape. *d*—A 17th century bronze Spanish mortar.

Fig. 26, *a*—A cylindrical iron mortar, with molded decorations, originally in the Neergaard Pharmacy, New York. *b*—A graceful urn-shaped iron mortar from the Neergaard Pharmacy, New York.

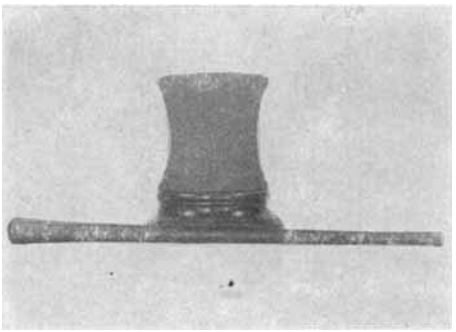


Fig. 27.—Large iron mortar with unusually long pestle. Early American with an interesting Philadelphia history.

Fig. 28.—Large bronze mortar, bearing date 1733, with reversible pestle.

Figures 25*a*, 25*b* and 25*c* are bronze mortars of the 17th century of Spanish origin. Specimen *a* has the letter M repeated four times in the decorations. The bottom of this mortar had evidently been worn through, for it has a new bottom riveted in place. Figure 25*c* is an iron mortar probably of American origin. Figure 26*a* and 26*b* are examples of early American iron mortars; *a* has a decorative design which is unusual on iron mortars; *b* is of a graceful urn-like shape, distinctive of mortars made in Colonial America. Both of these originally came from the Neer-

Fig. 29.—Very large bronze mortar finely decorated, dated 1704.

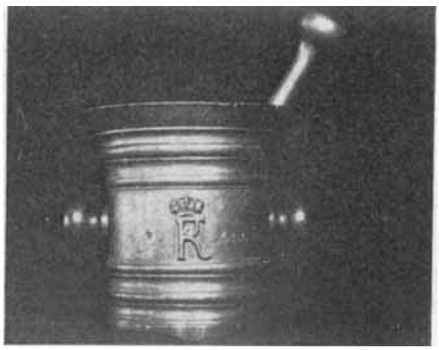
gaard Pharmacy in New York, now owned by Mr. David Costelo, to whom the College is indebted for the majority of the mortars described in this article.

Figure 27 is also that of an early American iron mortar of unusual shape and with a pestle of unusual length, the mortar being but $11^1/_2$ inches high. This mortar is known to have been used by the following apprentices and clerks in the pharmacy located at Third and Poplar Sts., Philadelphia: G. W. Bley, 1840, John Bley, 1844, Alex Bachman, 1848, Samuel Gerhard, 1849, Jacob H. Smith, 1853, Valentine H. Smith, 1853, Emil Herwig, 1854. During this period the proprietor of the pharmacy was George K. Smith. In 1856 the mortar was in the possession of John Ziegler, wholesale and retail druggist at Second and Green Sts., Philadelphia. In this same year Ziegler became associated with Valentine H. Smith, the firm name being Ziegler and Smith. In 1865 the firm name was changed to Valentine H. Smith & Co., and from that year until 1929, when this firm was merged with Smith, Kline and French Co., a number of well-known pharmacists in Philadelphia took their turns in using this mortar and pestle during their respective apprenticeships. Among these were Walter V. Smith, late president of the Smith, Kline and French Co., and Howard E. Smith, and Henry S. Godshall of the same Company. No. 28 is a handsome bronze mortar bearing the inscription "Soli Deo Gloria, Amsterdam Aº 1733."

No. 29 is a very large mortar, weighing nearly 150 pounds. It is very grace-

Fig. 30.—Finely decorated bronze mortar, with seated lions on handles and bearing the coat of arms of the Medici.

ful in shape and is elaborately decorated. The handles are in the form of winged angels. It is covered with elaborate scroll work, consisting of wreaths and angel heads. It bears the following inscription: "Filii Francisi de forinis pharmacis parandis fundendum curarunt. A. S. MDCCIV." This mortar was donated by Mr. Horatio N. Fraser of New York. No. 30 is a very unusual specimen, also donated by Mr. Fraser. It is of bronze with a glossy black patina. The handles are unlike those usually seen, being horizontal supports for seated lions. The design is that of a heraldic shield with a cherub on each side jointly holding a wreath over



Figs. 31 and 32.—Obverse and reverse of large brass mortar formerly owned by Frederick the Great.

Figs. 33 and 34.—Obverse and reverse of bronze mortar, elaborately decorated, formerly owned by Napoleon's pharmacist.

the center. The coat of arms is that of one of the numerous branches of the Medici family.

Figures 31 and 32 are the obverse and reverse of a large brass mortar and pestle which was once the property of Frederick the Great, or used in his imperial pharmacy. The front bears the imperial monogram of "Friederich Rex," surmounted by a crown. The opposite side bears the date 1767, and the stamped inscription "K No. 1" which was probably an inventory number. This mortar has an interesting history. During the World War the German government seized all brass for use in making munitions. A collection of mortars was seized just prior to the close of the war. Shortly after the war a large lot of all kinds of brass ornaments and untensils was offered for sale in New York, including some very fine

mortars, and among them was this one, which was purchased by David Costelo of New York.

Figures 33 and 34 are the obverse and reverse views of a veritable museum piece. It is a bronze or bell-metal mortar and pestle which belonged to one of Napoleon's apothecaries. The inscription around the top is as follows: "A Besançon-Beillemand-Pharmacien-Drogiste." Below this are laurel wreaths and imperial eagles. Below these is the name "Napoleon Empereur." Further below this are more laurel wreaths and robed figures. There is a double-ended pestle bearing the date "Anno 1802" elaborately engraved in bas-relief.

This mortar was at one time in the Rodman Wanamaker collection of Napoleana. The donors of the specimens just described are as follows: No. 4, Wm. L. Cliffe, '84, vice-president of the College. Nos. 7*a* and 7*b*, former president, Howard B. French, '70. No. 9, Joseph P. Remington, '66, one of America's pharmacists, and former dean of the Philadelphia College of Pharmacy and Science. No. 14, Ellerslie W. Davis, '16. No. 20, George B. Evans, '80, former member of the Board of Trustees of the College. No. 27, Walter V. Smith, '87, former member of the Board of Trustees of the College. No. 28, Horace B. Taylor, '57. Nos. 29 and 30, Horatio N. Fraser, '72, former member of the Board of Trustees. Specimens 2*a*, 2*b*, 5, 6, 8, 10, 12, 13, 15, 15*a*, *b* and *c*, 16*a* and *b*, 17*a* and *b*, 18*a*, *b* and *c*, 23*a* and *b*, 25*a*, *b*, *c* and *d*, 26*a* and *b*, 31–32, 33–34, were all donated by David Costelo, '79, of the Neergaard Pharmacy of New York. There are not many large collections of mortars in the United States, the largest collection at present being the one owned by E. R. Squibb & Sons. There is no collection to our knowledge, however, which possesses so many diversified, interesting and valuable mortars as the one we have herein attempted to describe.

ABSTRACTS OF PAPERS PRESENTED BEFORE SECTION ON PRACTICAL PHARMACY AND DISPENSING, A. PH. A., WASHINGTON MEETING, 1934.

"The Extemporaneous Preparation of Intravenous Solutions Saline and Dextrose," by Robert S. Fuqua.

The paper submitted attempts to outline simple procedures for the preparation of satisfactory intravenous solutions, containing such substances as Sodium Chloride, Sodium Citrate and Dextrose.

Beginning with the distilled water required, and emphasizing the necessity for purity of, and absence of bacterial contamination in this solvent, the relatively simple matter of making solutions considered and then stress the importance of proper filtration to insure freedom from mechanical impurities—especially filter paper shreds.

The thought in mind is to outline both the usual pharmaceutic procedure of preparing simple solutions, with filter paper being used as the filtering medium, and also a hospital method for preparing buffered solutions in small lots: using the Berkefeld candle type filters to clean.

Sterilization, and the temporary preservation of sterile solutions, are discussed briefly. The need for having such solutions as nearly neutral as possible is noted, and attention is directed to factors which affect the values of same adversely.

"A Note on the Assay of Reduced Iron," by Margarethe Oakley and John C. Krantz, Jr.

A comparison of the mercuric chloride and copper sulphate methods for the determination of reduced iron has been studied.
