Torbern Bergman (1735-1784)

Torbern Bergman published his *Dissertation on Elective Attractions* in 1775, which contained a table of chemical affinities of all the substances known to him. He states in his dissertation:

> I contend that almost all of Chemistry rests upon this doctrine of elective attraction like a solid base, and if we want a reasonable theory which conveniently and clearly binds things together in a single idea, this theory serves us well.

This was not the first table of elective attractions, but the most complete table of the time. Bergman states that

> "The tables which exist up to now are quite scanty with regard to the number of materials shown, and any substances which are included are compared with very few of the others."

In addition to the tables, Bergman used a number of four-cornered Schemes to represent chemical reactions. At the time, chemical equivalents were not established, so these schemes are not to be considered as balanced chemical reactions, but they were a systematic way of writing chemical reactions.

The following tables are reproduced from Bergman, Torbern, *Dissertation on Elective Attractions*, 1775, translated by J. A. Schufle, Johnson Reprint Corporation, New York, 1968.

The first two tables show Bergman's elective attractions, the third shows Bergman's schemes, and the fourth shows modern equivalents of some example schemes. Also included is a table of the symbols used by Bergman.

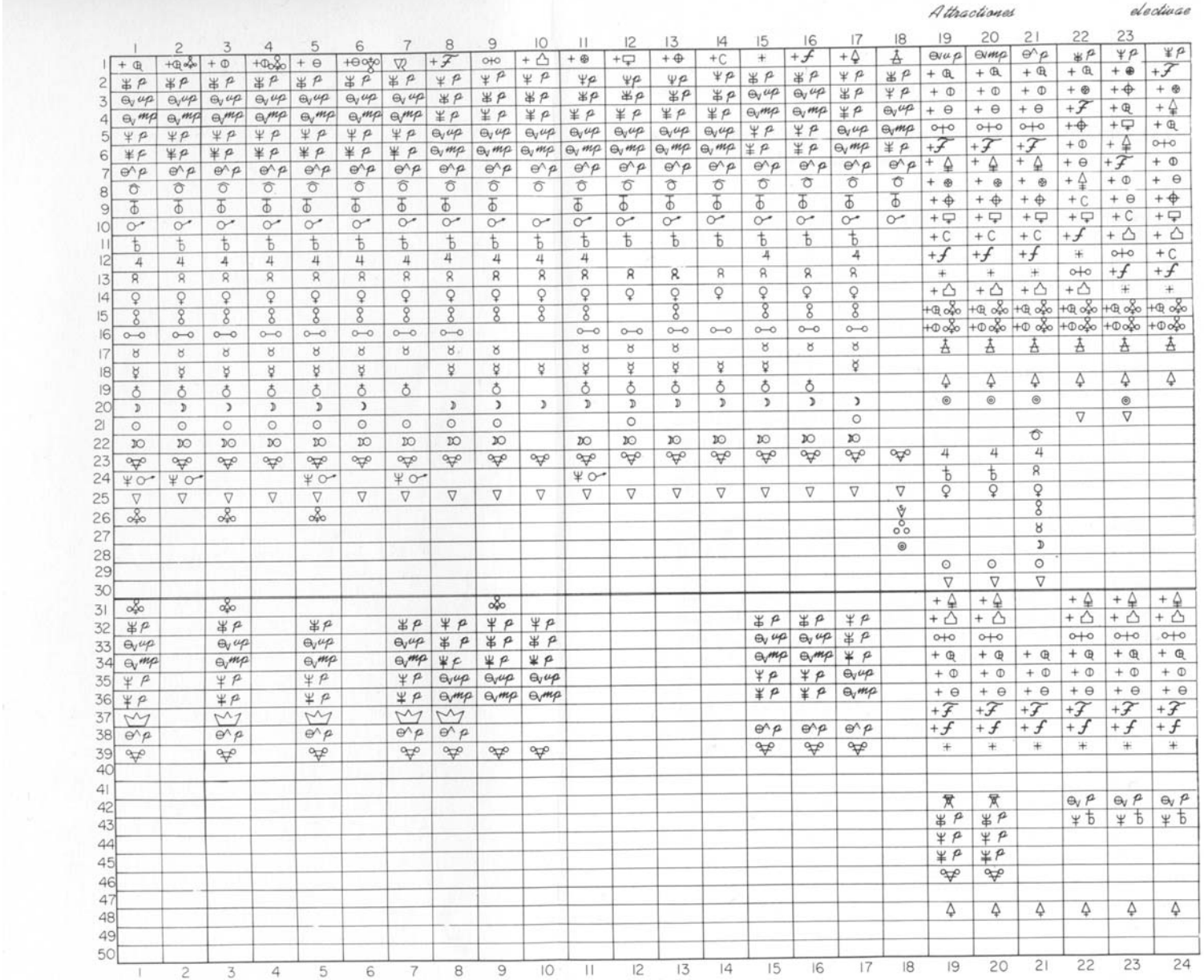


Figure 1a. Left half of Bergman's Table of Simple Elective Attractions (Tab. VIII). Each column is headed by an element for which the elements listed below it in the column have attractions. The most strongly attracted substances are listed at the top and the other substances are listed in decreasing order as their attraction decreases. The part of the table above the heavy horizontal line deals with attractions in *via humida*, i.e., in water solution. The lower part of the table, below the horizontal line, refers to attractions in *via sicca*, i.e., dry reactions such as those caused by melting substances together in a crucible.

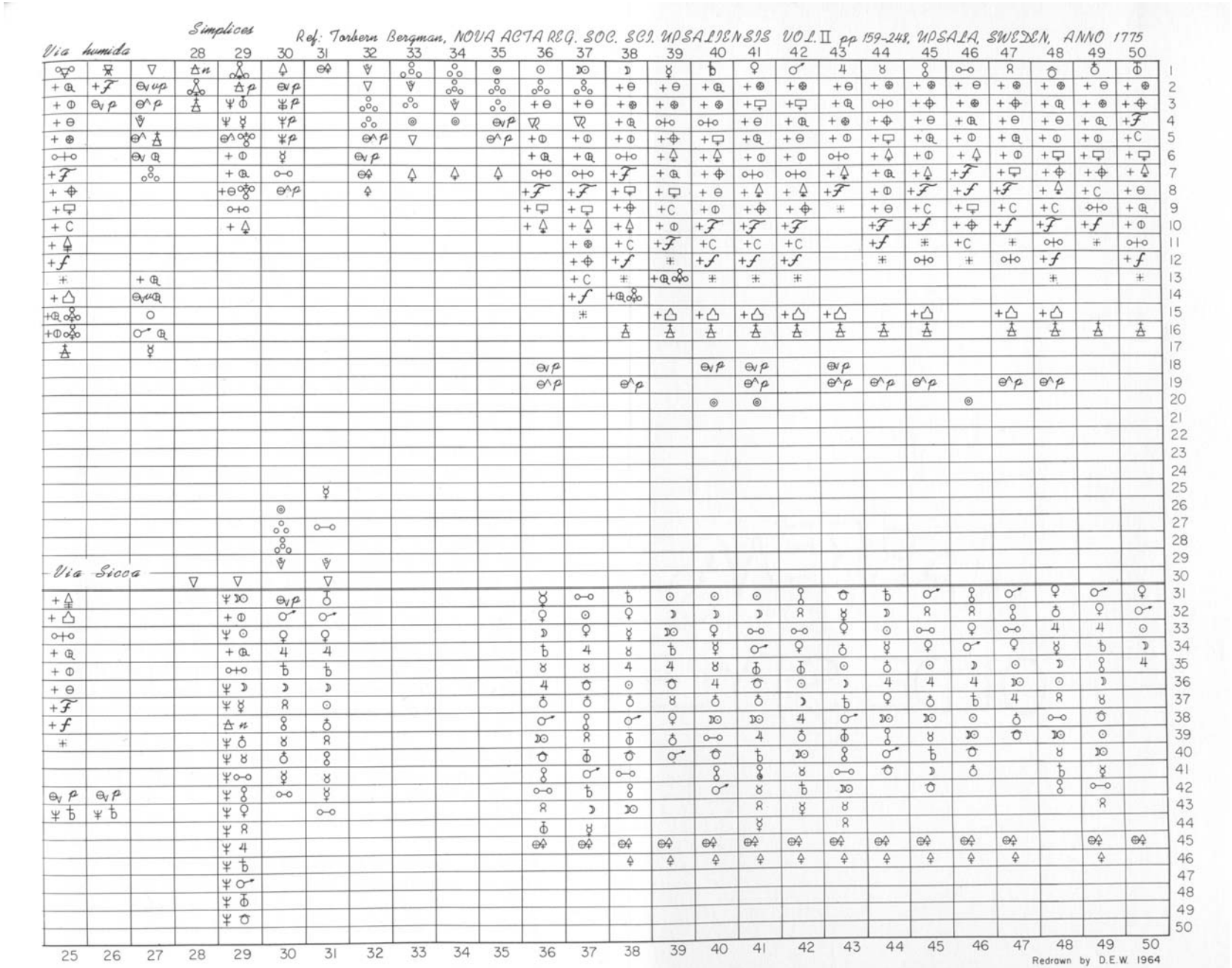


Figure 1b. Right half of Bergman's Table of Simple Elective Attractions (Tab. VIII).

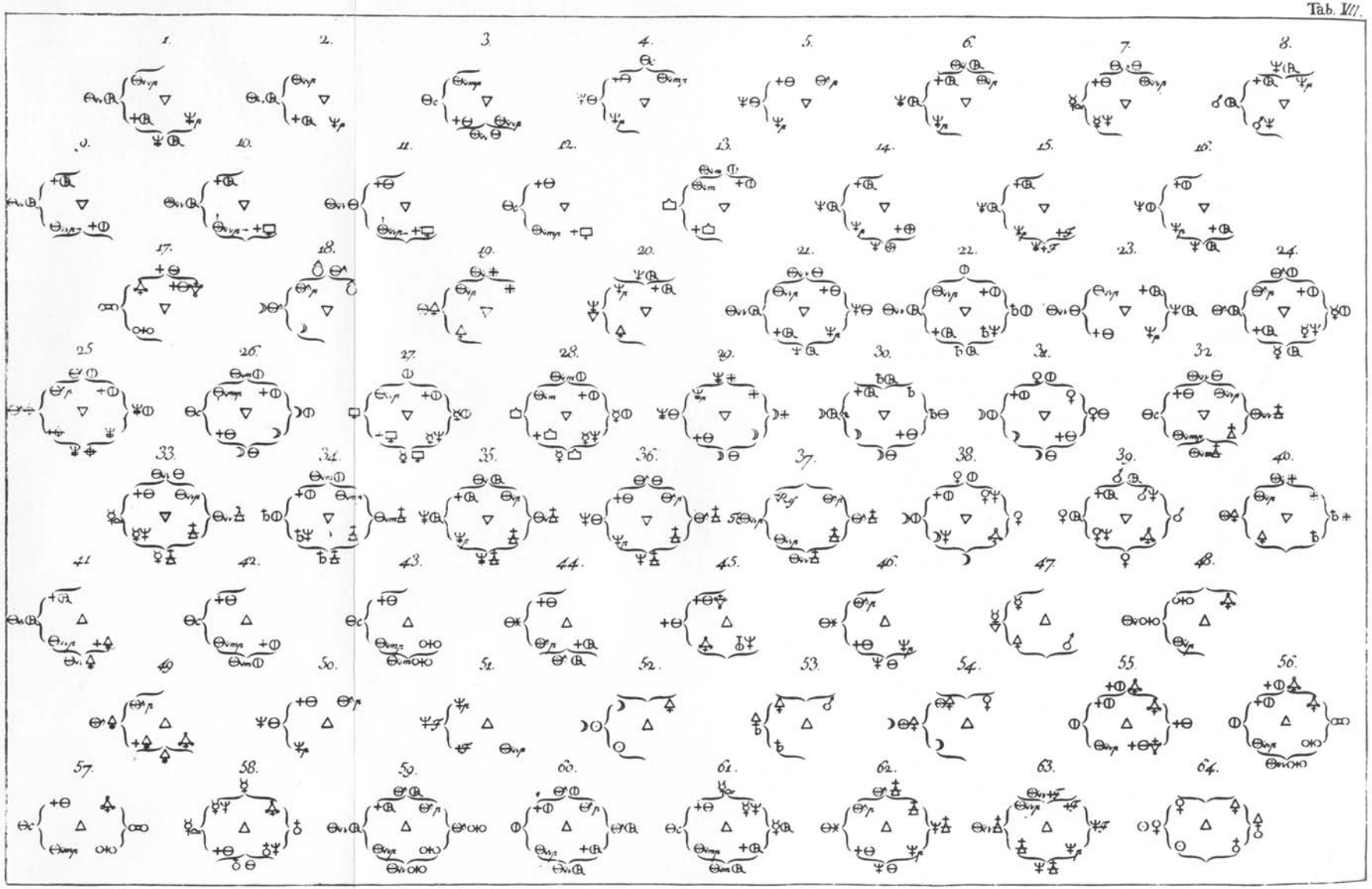
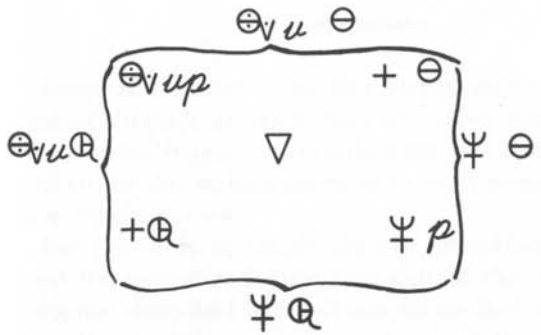
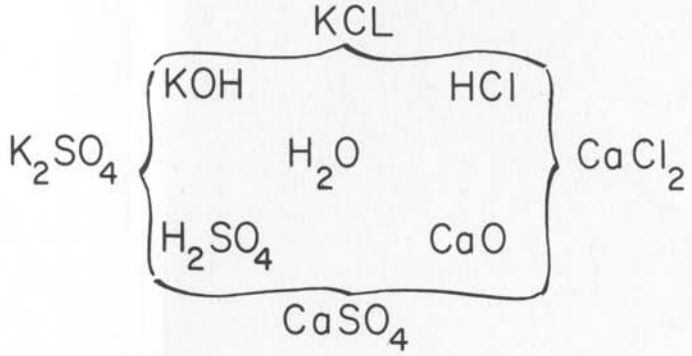


Figure 3. Bergman's "Schemes." Table VII in Bergman's manuscript. A summarization of the chemical reactions with which Bergman was familiar. Where the symbol for fire, an upright triangle, appears in the center of the "Scheme," the reaction was carried out in *via sicca*, usually by melting in a crucible. When the symbol for water, an inverted triangle, appears the reaction was carried out in *via humida*, in aqueous solution. The meaning of the other symbols is given in Figure 2.

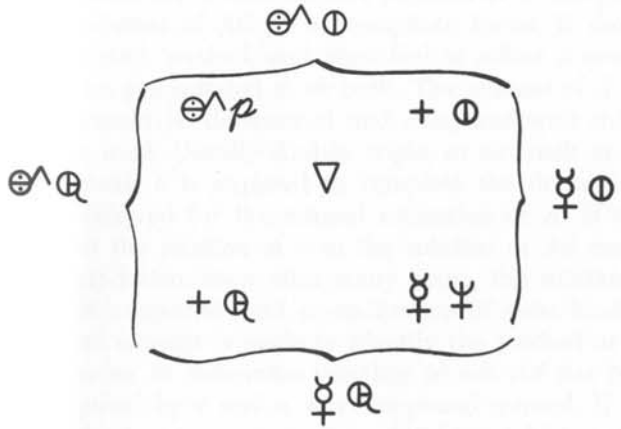


(Scheme 21)

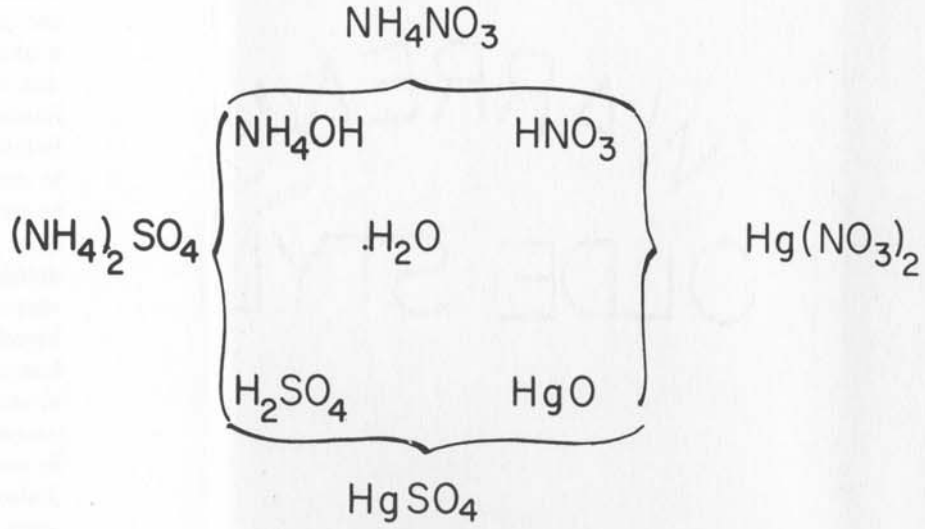


(Modern equivalent)

(a)



(Scheme 24)



(Modern equivalent)

(b)

Figure 4. Examples of Bergman's Schemes, and modern equivalents.

Figure 2. Table of chemical symbols which Bergman used, their Latin name and the closest approximation possible for a modern name.