A Discussion on the Metrology of the Sultanate Coinage of India

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General Notes

In our initial work on Shah Alam I and Jahandar Shah the metrology of the coins was a rather easy exercise. The weights followed a standard pattern set down previously. There was enough evidence certainly from early in the reign of the third Mughal Emperor, Akbar, to adequately describe the coins and the series that was based technically on the coinage of the Suri interregnum of Delhi.

In approaching our first work for the Sultanate era it was necessary to expand our coding system to take into account the regional nature of metrology in India. This discussion and the following table of coding explains the reasons and methodology behind the coding system. It recognises coins as items within their own particular system of weights and measures that can be measured and compared within themselves rather than to another system. Yes coins must be weighed but this is only to gain the knowledge to place them into the system themselves. Once this is completed each metal will have an evaluated single UNIT and coins of various weights within this Unit denomination weight (multipliers and dividers) will be expressed as a fraction (greater or smaller) than the nominated UNIT. Essentially coins thought to be issued first in a series will be the nominated UNIT if this is known.

Coins are a medium of exchange and as such within the common marketplace their use to purchase goods and services requires the practical necessity of providing the goods purchased as well as "change" to make up the difference between the negotiated purchase price and the coins tendered for the purchase.

Within much of the Sultanate coinage sits four metals. Gold was used very rarely within the day to day transactions. Silver was used in larger commercial transactions when available. Often the intermediate coin was billon, a mixture of silver and copper. The ordinary or daily use coin was frequently copper. However we also have humble money that was a common use item such as cowrie shells. Coins, especially the billon and copper, were produced in various weights. The obvious is that money has to be received as "change" if too much money is given.

1. **The purchasing value of coins of the same metal will be based on their comparative weights in proportion to those weights. The comparative weights were easy to obtain by a simple handheld balance in which the coin offered could be very quickly weighed against a known comparison. Scales could be corrected rapidly by changing the weights in the balance pan until an approximate balance was achieved.**
2. **Coins of different metals (and humble money) needed to be exchanged from time to time and the exchange rate was generally known in the common marketplace.**

The exchange rate was controlled within marketplaces by various trader's associations and government officials.

3. **The coins were inscribed with a language that was unknown to almost all of the population. The inscriptions in any case at this time almost certainly did not include a value or denomination notification. So therefore it was the weight and the metal that determined its purchasing value to the vast majority of users.**

Note: Purity (fineness) of the metal is another important consideration. This has been touched on in a previous paper and will be greatly expanded in its own right over time.

The Problem with the Rati Theory

There has been since European's have studied coinage of the greater sub-continent a desire by many researchers and cataloguers to reduce the denominations of the coins not only to a weight scale of their choice (grams, grains etc.) but also to the believed standard weight measure of the greater sub-continent, the rati. The rati is a seed. Seeds are used in many civilisations as a basis for weight measurement. Although very light, in general, multiples can be made up to various standard weights. However seeds vary in weight from season to season and with moisture content.

This makes them technically unreliable as a measure. As stated above it may be that a standard was made at one time. This does not take into account the simple fact that at this time the greater sub-continent was a patchwork of various kingdoms with changing alliances and borders.

In fact if we look at the early work of James Prinsep in his Essays on Indian Antiquities we are struck by the simple fact the various weights and weights had similar names across the length and breadth of the sub-continent but when compared to a known standard (grains, ounces, pounds etc. in this case) there were major variances despite similar names. This presented a problem for the British who, in their desire to rule over all, needed for their benefit and understanding a simple and consistent system.

When the various kingdoms are reviewed it can be found that these variances in 'native" weights and measures were frequently in use in the same kingdom. They had been in place for generations and the rulers found no real reason to change what was institutionalised.

The statement that a coin weighed at some stage of its development a specific number of ratis and the standard rati weight from one particular region was known is of no real interest. The salient fact is that rulers (real or assumed) would issue coins in metals and weights of their choosing. These would be used in their dominions and the comparative values between weights and metals would be known.

The variances in real weights for trade between various kingdoms would not pose a great problem. The weight of coins and their fineness could be easily tested. Even if the laws of one kingdom required that coins from another were to be recoined before being used in trade their was an orderly process for this to happen. Fineness of metal was adjusted if necessary by a known process and the new coins struck in weight standards current in that region.

The weight whether based on the rati or anything else could be infinitely adjusted at the will of the issuer. The major relationship was the weight within each particular metal type and the exchange rate between the metals (and humble money).

Once this is understood it becomes easy to analyse and report on the various issues of coinage in eras of uncertain basic understanding.

Coding in Our Forthcoming Sultanate Work

There was a necessity to look closely at coding for our initial sultanate work "The Coinage of the Jaunpur Sultanate". A review of the previous data seemed to show that the baser metal series seemed to rise slightly in weight over the period of the Sultanate. There is a natural variance within hand made coins simply because of the method of production. However close examination of previous data and our own collected data even taking into account natural variance agrees with this weight rise. A number of explanations have been given previously for this rise. The major one advises that the coins were adjusted in weight perhaps because of the change in the rati standard being used. That is to say from what is advised as the Delhi rati weight standard to, perhaps, a Malwar or similar standard. So there is acknowledgement that even at the smallest level of weight measurement there were variances that have been described above.
The simplest method of describing a coin series is to reduce the coins to a common and simple weight base, in our case grams, and to arrange the coins in a series selecting one coin as the base UNIT and coins will therefore be fractional (dividers) of that UNIT or multiples (multipliers) of that UNIT. Full information will be provided on the metrology of each coin issuer within a Sultanate. This will show and describe the various weights in grams and the relationship between coins with in each metal type. That is to say whether they are dividers (fractions of) or multipliers of the specified UNIT.

The broad coding is set out below:

There is also a necessity to understand fully the precious metal content of the billon type coins. Our alliance with one of the world's largest and most technologically advanced testing organisations has allowed work to progress on this and the results will be published in due course after an internal paper is completed on the procedures.

Dividers

100	#	080	4/5	060	3/5	040	2/5	020	1/5
099		079		059		039		019	3/16
098		078		058	7/12	038		018	
097		077		057		037	3/8	017	1/6
096		076		056	9/16	036		016	
095		075	3/4	055		035		015	
094	15/16	074		054		034		014	
093		073		053		033	1/3	013	
092	11/12	072		052		032		012	1/8
091		071		051		031	5/16	11	
090	9/10	070	7/10	050	1/2	030	3/10	010	1/10
089		069	11/16	049		029		009	
088	7/8	068		048		028		008	1/12
087		067	2/3	047		027		007	
086		066		046		026		006	1/16
085		065		045		025	1/4	005	1/20
084		064		044	7/16	024		004	
083	5/6	063	5/8	043		023		003	1/32
082		062		042	5/12	022		002	1/40 1/50
081	13/16	061		041		021		001	1/100

Example Code 100 = I UNIT. Code 050 = ½ of one UNIT and code 006 for 1/16

Multipliers

120	2
130	3
140	4
150	5

Example Code 120= 2 UNITS. There are sufficient intermediate codes between the multiplier codes to facilitate fractional multiplier UNITS.

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