

A FUNDAMENTAL CONCEPT: COINS AND MONEY IN THE ORDERLY INDIAN VILLAGE/TOWN MARKET PLACE.

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There appears to be in many writings a fundamental failure to understand the workings of the marketplace in the greater subcontinent throughout history. By marketplace in this instance it means the everyday trading place at any level from village to city where buyers of goods including food meet sellers in a designated area to purchase items for sale. It can also mean not only a marketplace where itinerant vendors may sell but also establishments that are the more permanent such as shops.

Within the greater subcontinent across history the marketplace for the common person has flourished for millennia. In the countryside where subsistence farming was (and in many parts still is) the key to existence there was still the need to buy and sell items, no matter how small in monetary value, from time to time. To do this we had money as a medium of exchange but while money as we know it today was available (coins) there was also the availability of humble money to facilitate very minor transactions. This humble money could be in the form of cowrie, bitter almonds or similar.

For interchange in money there was a need for a known routine of "change". So essentially we have (before fiat money) a series of metals one more valuable than the next. The standard system in Mughal times was gold the most precious, silver the next then copper. At the lower end we had the simple humble money.

In a transaction in a marketplace there was the need to understand the system whereby coins could be exchanged for goods and if the correct money was not available then the balance owed to the payer (change) could be easily calculated and agreed.

At times though it may appear that money became more complicated when various other metals were used to make coins and coinage was produced in a mixture of silver and copper (billon or potin). But in each marketplace the real transactional value of each coin was known as was the relationship between metals and therefore change and quantity of goods for a price could be calculated.

On the other side of the transaction was working out how much of or how many of the items wanted for purchase for an agreed sum of money. So essentially we have the standard barter arrangement of goods (services) for an agreed sum of money and that change could be given if the correct sum of money was not available.

We now need to look at the metrology of both sides of the transaction.

Here we can either turn to making the discussion highly complex or relatively simple. The degree of complexity according to many records by the Honourable East India Company (EIC), for example, in many writings was highly complex. There was confusion over various

weights and measures that held the same name across the vast regions of the greater subcontinent but when converted to the British (or European for other non-Indian traders for example) standard systems of weights and measures the converted weights or measures varied. For example the weight when converted of a measure called in common name a maund could vary substantially from one region to another. For the EIC this involved this became, as they expanded their control across India, a technical accounting nightmare.

Coupled with this was an apparent confusing array of money. If we fully believe the British the content of precious metal in the silver coins especially was reduced. So for the EIC and the later British government the problem seemed unsolvable because in an orderly society there must be order.

The approach by the EIC in India was essentially a new experience. The territory was vast and the population comparatively large. The Mughal Empire under Aurangzeb had expanded its territory greatly and had introduced or maintained various levels of government to cater for control of the empire. As new territories were added (whether it be the constant flux of previous empires over hundreds of years) the key factor was control and the inevitable collection of taxes. The regime of taxation under any rule in any district relies on a number of factors from the allocation of monies to be collected by various methods to be able to quantify the monies collected to ensure that the sums fixed were in fact accounted for.

We need now to come back to metrology.

Metrology of the Coinage.

In essence we have generally looked at the weight of the coin and the metal it was made from.

Weight can be checked easily. A simple balance scale can be used with a known standard weight made of any durable substance on one side and the item to be compared on the other. A balance in balance or close to it would prove the coin weight was acceptable. For precious metals we have other concerns. Gold was not for usual trade and in many places was more ceremonial than actual used money (the very small coin, the fanam, from the southern areas may have been different). However silver was in wide general use. The actual "value" was based on two things.

1. Weight
2. Purity of the metal (certainly for gold and silver) Billon was also in this category.

Weight as previously discussed was a simple measurement. Purity throughout the ages was also a comparatively simple calculation by the use of a standard methodology that was in use for millennia. We have a standard and known UNIT. The UNIT consisted of not only a weight (within a given manufacturing tolerance) but also of metal purity.

It is necessary to repeat two things.

1. The weight for production of standard UNITS was known.

2. The purity of the metal (especially precious metals) was known as a standard, could be manufactured in a mint and could be tested.

Clearly in testing organized by coauthor Arthur Needham at the Ashmolean Museum some years ago and subsequent large scale testing completed on a confidential basis in full quality control environment by using non destructive XRF technology the expertise in mints over hundreds of years in producing precious metal content of a known standard within known tolerances was exceptional. We therefore have confidence in all levels that a standard UNIT was available essentially for government payments but also for all trade.

The British became confused when it appeared that in certain areas a reduction in the purity of metal may have occurred. In the actual day to day marketplace this did not essentially matter. The actual tradeable exchange value of a coin could be assessed and things adjusted because of this. Here sits a fundamental problem in calling a coin by its common name. If we take the common name Rupee for example we can become confused as to what the exact meaning of this is over time and region. Fundamentally it is a coin of known weight and purity. But if the weight changes even by a small percentage value technically changes and more importantly the exchange rate between various weights of various metals may also change. For a tax collector demanding certain payments this can become a nightmare if you use the common term.

If instead you use the term UNIT (of any metal) and described the weight and purity noting that there can be multipliers and dividers of the standard UNIT and add mint (or region) and date the confusion of the common term disappears.

Within numismatics much time and effort has been undertaken to ascertain the weight of a common unit of measure in the Indian subcontinent known as the rati. It is advised to be the weight of a seed that has been dried. Like all seeds the weight can vary from region to region and season to season. The wish to try to find the standard weight of the so called rati has resulted in major coin series being placed in a series of weights based on the notional weight of a rati and frequently devised in parts of sixteenths. Whether that is correct or not is essentially not the issue. The issue is to find using a modern weight standard (metric) and working through the standard issues of coinage. From there the weight of the standard UNIT can be devised and the multipliers and dividers categorized as fractions or percentages or whatever. There is a known variance in production methods and this essentially removes the necessity of trying to fit into a preconceived notional system. We have also advised that the system of metrology for metals not only requires weight by actual precious metal content. That makes the second section of metrology. It should also be advised that recent advancement in XRF technology noticeably by Olympus allows for the accurate measurement of silver content in billon type coins. The uncertainty as to the accuracy of results of previous noninvasive testing is due to the, in a large range of silver/copper ratio content the heterogeneous nature of the alloy. The new Olympus technology resolves this issue.

In our work that is progressing we will use the term UNIT at a defined weight (in grams) and work through multipliers and dividers.

Purchasing of Items.

Within numismatics we have described the necessity of exploring the need to look at the other side of the transaction which is the purchase. Within the purchase it becomes simple is the goods are sold by the piece. One piece of X costs a certain amount and multiples cost multiples more although volume discounts might be given.

When goods by their very nature are sold by weight or volume problems then exist. It has already been discussed that the so called weight of the maund varies from district to district. It is also understood that purchases of grain, for example, may have been made on the basis of volume rather than a defined weight. But again the exact nature of the measurement is not, for our purposes, of importance. What is important in a buying and selling exchange is that the marketplace where the transaction takes place has:

- 1. A known and accepted system of weights and measures that are locally important but bear no real consequence outside a region, large or small.**
- 2. Types of money that are known and accepted for their metrology being weight for the base metal coins and weight and metal purity for the precious metal coins. Both purity and weight could be easily tested at all levels.**
- 3. That the system of money could be interchanged between metals to exchange between one metal and another (and to humble money) and that there were fundamental controls within the marketplace to ensure this orderly exchange.**
- 4. That monies needed to pay taxes (and other government charges) could be easily counted and accounted for in the process of collection.**

Here we come to a district or regional level where the actual weights (compared to for example the metric system of weights and measures) was unimportant as long as each measurement had a known and accepted UNIT for that region. Here now we have regional weights and measures UNITS as well as money UNITS.

For most of the time in the greater subcontinent the marketplace at all levels was regulated in a methodical and systematic way. That is to say that customs and habits were followed and regulated. Ultimately the need to pay government taxes and charges to the highest authority in an orderly way enabled for this control to filter from the top down through various levels of officialdom it was at the base level, the village, town or city, that the regulation held the key to an orderly existence in normal times. A happy peasantry made life much easier at all levels.

Within the money system there were various levels of expertise. We may have had the money changer who exchanged simple copper coins for humble money. The next step was the exchange of copper to silver and silver to copper. In reality in almost all the ages gold was not a UNIT of common exchange except perhaps in the south where the tiny gold fanam had some influence. Above this stood the large banker type operation (shroff) who maintained a high level of expertise in money exchange, the testing and weighing of coins and facilitating the exchange of coins between various regions. At the top level they could

issue bills of exchange that could be turned into cash at some far distant destination thus facilitating inter regional trade and commerce. The use of such bills of exchange in an orderly commercial way ensured that large quantities of coins or bullion did not have to be physically transferred

The production of the coinage then became a matter of prime importance. As, for example, the Mughal empire grew in size by swallowing up many smaller regions within the greater subcontinent there became a standardization of the money itself where, for the most part, the standard UNITS of coinage had a similar metrology whether or not the standard weights and measures UNITS differed from region to region. There were exceptions but within the structure the methods of understanding comparable value were well known.

The mints themselves, prolific in number, needed to have a high level of quality in both the weight of the coinage issued and the fineness of the metals. This was achieved by a strict process of metallurgy and a testing regime to ensure standards were met and maintained. It was known that output would not only be tested at the mints themselves but also within the marketplace. The mints were of such technical quality that any change in metrology (weight or purity of metal) could be adjusted on demand. So the metrology of the UNIT (not only weight but also purity) could be altered on demand but this altering could be immediately seen and checked at all levels within the region and adjustments made accordingly. Note: there were times of necessity when the technical exchange values of the raw metals did vary. This is for a further review at a later time on how the marketplace handled this. For example the lowering of the weight of the standard copper UNIT during the reign of Aurangzeb. There was also at times a lawful devaluation of coins based on a dating system (Mughal era) that would affect major transactions although at the lower level of small change transactions this was probably nonconsequential noting that within reason Gresham's law probably was utilized by money changers and shroffs.

If we view this coinage as we do now there are fundamental problems seen. The vast majority of the population was illiterate. What was written on the coins was unintelligible. From when the first invaders came from the Arabic lands and Islamic influence almost all coins had not imagery. The inscriptions on the coin including the dates was unintelligible. Due to the strong internal controls at all levels coins that could not be understood by the general population could be used with complete confidence within all levels of the regions.

Notes for Collectors.

For coins of the greater subcontinent there have been some interesting discussions over the years. The coins of the British influence era have been much remarked upon and the machine made coins especially held to great lengths of investigation and discussion making various levels of machine made die changes "collectible". On specific rupees for example the number of "berries" are counted and described and collected as different variances.

Hand struck coins have not been accorded the same reverence. In various series it can be seen that there changes in coin calligraphy placements or additions made to it. In fact over certain reigns we have a series of changes within the same mint from time to time and this makes collecting extremely interesting and challenging.

Recently major European collectors have commented that perhaps one coin from each ruler is sufficient for hand struck coins. This is a great disservice to the collecting community at large because in the greater subcontinent there are many variations available for collection from ruling eras, to kings, to mints, to regions and the list goes on.

In our work we display the legends clearly in colour coded overlays. This new technique allows each portion of the legend to be distinctly seen and understood. Legends can be compared for real variance (rather than mere normal hand engravers variances) and full sequences of changes can be followed not only within a mint but also across empires.

The advances in description do not stop there but also include comprehensive coding for each issuing mint, and rulers etc. So here we have an absolutely comprehensive system that can be followed step by step by collectors and researchers alike. The full mint list and coding will be published in the near future.

Within the total system and using modern technology under full quality control systems the nondestructive testing of coins fulfills the complete requirement for understanding and recording the full metrology of the coins.

We are therefore especially in pre-Mughal times able to carefully initiate the system of weighing various coins and deciding on the weight of each standard UNIT and their multipliers and dividers. Added to this for non-base metal coins the nondestructive analysis of the precious metal can now be comparatively easily completed. Therefore variances in the UNIT metrology can be now fully and simply extended to all coins. This provides exactly the same overall results that were available in previous eras. The precious metal content of the coins could be checked and the weight also simply checked.

The cycle is complete and researchers and collectors have the technology to complete levels of research unobtainable (except perhaps by destructive testing) in the past.

The advanced technical collecting of hand struck is now confronted with another problem. That is the grading (slabbing) of coins. It is our firm view that a coin that cannot be fully attributed cannot be graded technically. Hand struck coins often suffer the simple problems of production technique where they may be struck off centre or the coin flan maybe smaller than the die itself. Here the coin will be incomplete. If it is incomplete it may not be able to be fully attributed. With machine struck coin where coin flans are standardized the striking off centre by accident may become a collectible "error".

Collectors of hand struck coins should take note that full attribution is superior to "beauty" in a nonattributable coin.

Quick Summary.

- 1. The marketplace at village, town and city level within regions of the greater subcontinent has been for millennia a highly organized enterprise.**
- 2. The regional variances in both standard coin metrology and weights and measures metrology are no impedance to an orderly marketplace.**
- 3. The cross regional trading was not hindered by variances in coin metrology because there were adequate tests for weight and metal purity available.**
- 4. The mints were technically advanced and could produce coins of the desired standard in both weight and metal purity and these could be altered at will and reproduced accordingly. With the use of modern noninvasive technologies when used with standard quality control techniques and reporting the complete metrology of coins can now be undertaken.**
- 5. With the metal content able to be fully examined noninvasively the complete metrology is available and, therefore, hand struck coin series should be described across issue periods by the term UNITS. The weight and purity (fineness) of a UNIT can now be accurately tested and reported and the full and complete sequence of issues completed. Where there is a variance in metrology (noting that multipliers and dividers generally exist) in purity of the metal this changes the absolute metrology and should be noted accordingly. There are instances where technical metrology may not change. An example of this is where the purity of the metal alters but the weight is changed in direct proportion and therefore the real value does not alter. In our refined coding system this would be a new type only.**
- 6. The old methods of referring to coins by common names or older native weight systems such as the rati "standard" should be discontinued.**
- 7. For the coin collector and researcher the use and expansion of our carefully coded coloured overlay system describing coins showing the actual inscriptions form a complete base for both research and collecting.**
- 8. The system now in place has been tested using the colour coding for all coin inscriptions and can be used on all coins to aid in the recognition and understanding of the inscriptions.**