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Valuing Goods: The Development of Commensurability in Archaic Greece

Introduction

In modern societies, the ability to assign values to diverse items in terms of a standardised currency unit, e.g. the Macedonian Denar or Indonesian Rupiah, has become so habitual that it seems unremarkable. Even goods which have hitherto remained outside the realm of economic transactions can be quantitatively valued; the existence of prices for the services of a surrogate mother, places in queues, the citizenship of a country or the right to hunt endangered species makes it hard to resist the conclusion that everything has a monetary value.¹ Modern economic theory treats monetary valuation and the commensurability of goods associated therewith as a given part of social life. Yet our modern practices of valuation have not always existed as studies of the natural economy and its reckoning in kind amply show.² This essay illuminates the developmental history of valuation using a single unit in archaic Greece. Solon's archonship (594/3 BCE) and the laws and reforms he enacted form the historical context of my analysis. The theoretical context is provided by Aristotle's discussion of reciprocal justice in Book V of the *Nicomachean Ethics* in which he argues that currency provides a common measure with which exchangeable items can be valued. I review Aristotle's analysis of justice in exchange in the first part of this essay. His analysis is conspicuously ahistorical: he gives no indication about a historical episode, in a Greek city-state or elsewhere, which could serve as a counterpart to his abstract analysis of currency. The second section suggests such a counterpart, namely, the

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¹ The examples come from Sandel. *What Money Can't Buy*, 3-5.

² See Dopsch, *Naturalwirtschaft und Geldwirtschaft*.

reforms of Solon at Athens in the late sixth century BCE. This section examines the assessment of citizens' annual income as a means of determining the census class to which they belonged. This assessment required a unit of measure with which the diverse goods produced by Athenian citizens could be valued. Although scholars disagree about the unit, its use in measuring value promoted the habit of reckoning the value of different goods according to a single unit. Solon's constitutional reform was therefore a crucial fillip to the development of commensurability in ancient Greece.

The third section places Solon into the trajectory of valuational practices in ancient Greece and compares such practices in Solon's reign with those of Homeric society. This section also draws parallels and contrasts between late archaic practices of value in Greece and earlier Near Eastern administrations. Contrary to the impression to which Aristotle's analysis gives rise, namely, that the mere establishment of currency makes goods commensurable, I argue that citizens' habit of valuing goods according to a unit was the result of a process of learning which did not reach its conclusion in ancient Greece until the classical period. The fourth section of this essay enquires into the formation of quantitative values which attach to goods. In it, I argue that values like the unit of value itself, were also stipulated rather than being taken from pre-existing market values of the goods concerned.

Aristotle, Commensurability and the Function of Currency

Aristotle accords immense importance to the commensurability of exchangeable goods.³ Exchange, if it is to be just, requires equality (*ισότης*) which, in turn, presupposes commensurability (*συμμετρία*); commensurability, for its part, requires a unit with which the value of goods can be measured.⁴ Goods, Aristotle tells us, are not in reality (*ἀλήθεια*) commensurable; what makes goods sufficiently commensurable for the purpose of justice in exchange, he states, is need (*χρεία*) which currency (*νόμισμα*) represents. This representative function (*υπάλλαγμα*) of

³ A sample of scholarship on justice in exchange in Aristotle's work includes Brégianni, "Aristotle on money and on economy", Finley, "Aristotle and economic analysis", Gallagher, "Incommensurability in Aristotle's theory of reciprocal justice", Judson, "Aristotle on fair exchange", Meikle, *Aristotle's Economic Thought*.

⁴ More exactly, Aristotle ascribes to currency the function of making goods commensurable (*σύμμετρα*) or comparable (*συμβλητα*), *Nic. Eth.*, 1133a19-20, 1133b19-20.

currency is established by law/convention (*νομός*); hence the word *νόμισμα* which signifies the conventional aspect of currency.⁵ Being conventional, the currency unit can be altered and even made useless.⁶ This thought echoes those whom Aristotle cites in the *Politics* who hold currency to be a sham on account of its conventionality.⁷ Aristotle takes no issue with the claim that currency can be changed or made useless, though it is, for him, no mere sham, for currency exists by stipulation (*ἐξ ὑποθέσεως*).⁸

Aristotle does not divulge the form which this stipulation takes, as his analysis remains highly abstract, and he makes no attempt to suggest a historical example of such a stipulation. This might be because his interest is in the function of currency, *qua* measure of all things (*πάντα γὰρ μετρεῖ*), rather than the historical genesis of currency.⁹ He thereby engenders the impression that the mere establishment of currency makes goods commensurable: the unit, he writes, makes everything commensurable (*τοῦτο γὰρ πάντα ποιεῖ σύμμετρα*).¹⁰ The historical development of commensurability cannot be accounted for in such a manner, and the difficulty which Aristotle's investigation of justice in exchange has engendered prompts one to pose two questions:

- 1) Are there historical examples of a measure of value being stipulated, thereby enhancing the commensurability of goods and the human ability to place numerical values on them?
- 2) If so, might Aristotle have had some such example in mind when he penned his remarks on justice?

The answer to question 2) must, I submit, be "no", for although Aristotle often draws on temporally proximate historical examples in his writings, *Nic. Eth.*, unlike the *Politics*, is largely devoid of these; he, like his contemporaries in

⁵ For a discussion of the term *νόμισμα* and its connotations, see Eich, "Between justice and accumulation", 368-369.

⁶ *Nic. Eth.*, 1133a26-31. That making currency useless was not just an idle theoretical possibility but a practical reality may be seen from Aristophanes' allusion in the *Ecclesiazousae* to the withdrawal and nullification of bronze coinage at Athens which had been issued and validated at the very end of the Peloponnesian War when silver was too scarce to sustain a basis for minting coin. *Ecl.* 815-825. See Kroll "Aristophanes' *πovnnpά χαλκία*".

⁷ *Pol.* 1257b14.

⁸ *Nic. Eth.*, 1133b20-21. On the background of the term *ἐξ ὑποθέσεως* and its use in other parts of Aristotle's opus, see Striker, "Über Syllogismen „aufgrund einer Hypothese“", Strobach, "Schlüsse aus Annahmen bei Aristoteles", Upton, "Aristotle on hypothesis" and Wallace, "Aristotle and Galileo".

⁹ *Nic. Eth.*, 1133a20.

¹⁰ *ibid.*, 1133b21.

fourth-century Athens, seems to have been ignorant of many aspects of epochs of Greek history which preceded his own.¹¹ We must therefore content ourselves with a possible affirmative answer to question 1), and it is the task of answering question 1) to which the remains of this essay are dedicated. In what follows, I situate Solon in the development of commensurability and practices of valuation in ancient Greece. To clarify, Solon's reforms are to be understood as a *counterpart* to *Nic. Eth.* (Book V) but not as an implicit referent of that Book. I will analyse Solon's reforms from the viewpoint of their effects on commensurability and practices of valuation.

Solon's Census Classes

The *Constitution of Athens* (*Ath. Pol.*) and other ancient sources describe Solon's division of the citizenry into four census classes (τέλη) based on an assessment (τίμημα) of annual income of 500, 300, 200 and below 200 wet or dry measures per year respectively for the classifications of *pentakosiomedimnoi*, *hippeis*, *zeugitae* and *thētes*.¹² The latter three classes might have pre-existed Solon, though the first is of Solonian provenance. Dry produce, e.g. barley and wheat, was measured in the *medimnos* (approximately 53 litres), wet produce, e.g. wine and olive oil, in the *metrētēs* (approximately 40 litres). If wet and dry measures were used to assess income, were they mutually convertible so that the returns of a citizen who cultivated grain could be compared quantitatively with those of a citizen who cultivated wine? If these measures were not mutually convertible, it is hard to see how a citizen's class position could have been determined without a large degree of arbitrariness at least with respect to the assessment of his fellow citizens. Mutual convertibility – at whichever rate – entails commensurability of income from agricultural produce, whereby a landowner whose *oikos* produced so-and-so many *metrētai* of olive oil per year could be said to be of the same census class as a landholder whose estate produced a given number of *medimnoi* of barley. To income derived from wet and dry produce, we must add that obtained from agricultural products, e.g. livestock, which answered neither to the name “wet”

¹¹ Raaflaub, “Athenian and Spartan *eunomia*”, 409. Davis, “Dating the drachmas in Solon's laws”, 152. Mortimer Chambers ascribes an implicit view to Aristotle that Theseus first struck coin at Athens (“Aristotle on Solon's Reform of coinage and weights”). The view is propounded by Plutarch (*Theseus*, 25), but there is no basis for ascribing it to Aristotle.

¹² *Ath. Pol.* VII.4.

nor “dry”. Furthermore, there is the place of non-agricultural income and its role in determining the class position of a citizen whose income derived from manufacturing, trade or money-lending. The sources say nothing about such matters.

Some commentators hold that income from non-agricultural sources was not accounted for in Solon’s assessments, whilst others opine that citizens who derived income from non-agricultural sources were, by default, classed as *θητες*.¹³ Others hold that income from other sources was assessed.¹⁴ The first view is believed by the purported inclusivity of Solon’s reforms which were designed to overcome civil strife and unite *all* citizens into a coherent political community.¹⁵ The second view, that non-agricultural producers were classed as *θητες*, would have meant disadvantaging those who derived income from non-agricultural sources; a system which assigned wealthier citizens to the lowest class simply because they did not cultivate agricultural products would have lacked legitimacy in the eyes of such producers, and it does not cohere with Solon’s purported desire to encourage manufacturing and trade. As Gerhard Horsmann writes:

Sowohl der Gerechtigkeitssinn Solons als auch seine Aufgeschlossenheit gegenüber den sich damals neu entwickelnden Wirtschaftsformen des Handwerks und Handels sprechen eindeutig gegen deren Ausschluß von den für die Vergabe politischer Rechte maßgeblichen Einkommen, eine Regelung, die den betroffenen Bürgern kaum zu vermitteln gewesen wäre. Eine solche rückwärtsgewandte Maßnahme liefe zudem den Reformzielen Solons völlig entgegen. [Both Solon’s sense of justice as well as his openness toward the newly developing economic forms of manufacture and trade clearly speak against the exclusion of these forms of economic activity from the relevant sources of income from which political rights were conferred, a rule which would have been scarcely acceptable to the citizens concerned. A backward looking measure such as this would run utterly counter to the goals of Solon’s reform].¹⁶

Solon’s promotion of manufacture and trade, of which Horsmann writes here, suggests that citizens’ income from non-agricultural sources must have been included in assessments. The promotion of manufacture is manifested in Solon’s

¹³ Hansen, *The Athenian Democracy*, 43; van Wees, “Mass and elite”, 364.

¹⁴ Cf. Davis, “Dating the drachmas in Solon’s laws”, 151; Horsmann, “Athens Weg zur eigenen Währung”, 273; Rhodes, *Commentary on the Aristotelian Athenion Politeia*, 142; Thiel, “On Solon’s system of property classes”, 4; Waters, “Solon’s ‘price equalisation’”, 183-184.

¹⁵ Waters, “Solon’s ‘price equalisation’”, 182.

¹⁶ Horsmann, “Athens Weg zur eigenen Währung”, 273.

granting of citizenship to those who practised a trade (τέχνη) and were willing to settle in Athens; attracting such foreigners is likely to have been easier if their class status was commensurate with their income; assigning them to the class of δῆτες on account of the professions they pursued would make the acquisition of Athenian citizenship less coveted.¹⁷ Even if one interprets the phrase in *Ath. Pol.* ἐκ τῆς οἰκείας (from the land)¹⁸ in a narrow, agricultural sense, it would include values of livestock.¹⁹ Being assessable neither in wet nor dry measures, such items must have been valued in the construction of Solon's τέλη, and this requires quantitative estimation of the value of output beyond that which naturally lent itself to measurement in the standard wet and dry measures.²⁰ The foregoing discussion raises the question as to which unit was used to value annual income.

The two main contenders are the barley *medimnos* and silver *drachma*.²¹ It is not, in the present context, necessary to make a decisive case for one or the other, for the identity of the unit is less important than what it was used for, namely, to assess the value of diverse goods. Since the weight of evidence falls, in my estimation, more heavily, on a barley standard, I refer to the unit as the *medimnos* in the following discussion. Arguments for the *medimnos* gain plausibility from the name “*pentakosiomedimnos*” which appears to be of Solonian invention. The term implies priority of the *medimnos* over the *metrētēs* (the members of the wealthiest class were not dubbed *pentakosimetroi*).²² Peter Rhodes and Delfim Leão speculate that only the income of the *pentakosiomedimnoi* was assessed in terms of produce. I have argued above for a more capacious scope of the products assessed, but even if one grants their assumption, one would still, as Rhodes and Leão note, have “given an equivalent value in terms of barley” to non-dry agricultural produce.²³ This position implies a far-reaching commensurability of the values of agricultural goods, all of which were expressed in *medimnoi*. The *medimnos*, that is, was the unit which made agricultural goods commensurable, and so, if we are looking for a counterpart to νόμισμα in *Nic. Eth.*, the *medimnos* is the most conspicuous candi-

¹⁷ Plut. *Sol.*, § 24.4; cf. § 22.1. See Papachrysostomou, “Solon’s citizenship law”.

¹⁸ *Ath. Pol.* VII.4.

¹⁹ de Ste. Croix, *Athenian Democratic Origins*, 40, 42.

²⁰ See Thiel, “On Solon’s system of property classes”, 4.

²¹ Kroll, “The monetary use of weighed bullion in archaic Greece”, 14-17, makes a case for silver, as does Horsmann, “Athens Weg zur eigenen Währung”, 275-276. See also Kroll, “The monetary background of early coinage”, 36-37. Davis, “Dating the drachmas in Solon’s laws”, provides the most compelling case against a silver unit and, like de Ste. Croix, *Athenian Democratic Origins*, 38-40, argues for a barley unit.

²² Cf. de Ste. Croix, *Athenian Democratic Origins*, 34.

²³ Rhodes and Leão, *The Laws of Solon*, 129.

date. As I mentioned in the first section of this essay, the mere stipulation of a unit in which produce was to be valued is not sufficient to explain the process through which items of produce came to be treated as commensurable values in practice. This is a question which I take up in the following section.

The Development of Commensurability

If the *medimnos* was used to value annual yields of various products, the scope of commensurability at Solonic Athens transcended that of the earlier archaic period and its oxen unit. Homer's ox may lay claim to exclusivity as a unit of value, but his oxen valuations are sparse and apply to a limited number of items in specific contexts. Whereas Eumaeos tells of Odysseus' wealth with a headcount of various types of livestock (cows, sheep, pigs and goats), Demosthenes enumerates in currency units (*drachmae*, *minae* and talents) the value of his whole inheritance, which includes sword and furniture manufacturing plants, the raw materials and slaves associated with these manufacturing operations, as well as items such a jewellery and a furnished house.²⁴ In the first half of the fourth century BCE, then, Athenians were routinely reckoning the value of all goods exclusively in (coined) *drachmae*.²⁵ At about the same time as Demosthenes, Xenophon has Socrates enquire whether friends, rather like slaves, can be valued monetarily, and Aristotle insists that *everything* have its price.²⁶ Between Homeric society and the fourth century, then, habits of accounting developed markedly. The oxen unit was apparently still in use at the time of Draco (circa 620 BCE), though there is little evidence that such valuations had increased in complexity or scope compared to Homeric valuations. Solon's laws, however, bespeak a significant development in ancient Greek valuational practices, for they contain numerous fines, denominated in *drachmae*.²⁷ It is, however, to the *medimnos* which we return, for this unit represents the furthest-reaching scope of valuation commensurability. Our analysis will attempt to fill in the causal narrative in the development of commensurability which is missing in Aristotle's *Nic. Eth.*, which, to reiterate, offers little

²⁴ *Od.* XIV, 100-102; *Dem.* 27, 9-11.

²⁵ See Seaford, *Money and the Early Greek Mind*, pp. 100-101 for examples.

²⁶ *Xen. Mem.* II.5.2; *Nic. Eth.* 1133b14-15.

²⁷ Compare *Poll.* IX.61, which specifies a payment of 20 oxen, with Solon, Fragments 23a,d, 26, 30a, 32a. The *drachmae* units in Solon's laws are likely later additions to the original laws, though it is possible that they refer to weights of silver. Numeration of Solonian fragments follows that of Rhodes and Leão.

more than the statement that the stipulation of a unit of measure makes goods commensurable.

The *medimnos* was not a new measure in late archaic Greece. As a Mycenaean unit, it measured approximately 90 litres as opposed to 52.4 litres in Solon's time. The Mycenaean *medimnos* was only a measure of volume, not of value, and Mycenaean reckoning of value seems not to have been based on a single unit of account at all. Mycenae may thus be associated with a relatively rudimentary stage in the development of accounting habits of thought.²⁸ By becoming a general measure of value at Athens under Solon, the *medimnos* transcended its prior use which was limited to that of a unit of volume in which grain was measured. As the introduction of units of value in other historical epochs and locations shows, attaining proficiency in valuing according to a new unit requires a learning process during which citizens familiarise themselves with the use of a new unit with which to measure value. This learning process is apparent to anyone who has lived through a currency reform, e.g. the introduction of the Euro, which has existed as an accounting unit since 1999 and replaced national currencies as a means of payment in 2002. The habit of calculating Euro-denominated values into values denominated in a former, more familiar, national currency persisted for a many months after the Euro's introduction as the means of payment, during which time, as people became habituated to the Euro, incipient scepticism towards the new currency waned.²⁹ One can imagine something similar with the use of the *medimnos* in early sixth-century Athens, though, unlike Europeans prior to the Euro's introduction, Athenians were not accustomed to estimating the value of a multiplicity of commodities in a single unit, and so the idea of valuing annual income in the *medimnos* might have appeared decidedly odd.³⁰

The stipulation of a unit together with the requirement that values of income be expressed in that unit would therefore have given rise to valuations which were initially inexact and haphazard. As Martin Ostwald writes, Athens under Solon was at an "incipient stage" in the practice of valuing "qualitatively

²⁸ Was, "The Mycenaean units of measure"; Chadwick, *Linear B and Related Scripts*, 157; Killen, "Mycenaean economy", 174, note 38.

²⁹ See the public opinion surveys undertaken as part of the European Union's Eurobarometer. See also Roth and Jonung, "Public support for the Euro".

³⁰ Even in today's highly monetised world, when people are asked to assign monetary values to hitherto "unpriced" items, e.g., clean air, wetlands, the survival of endangered birds, they express uncertainty about the validity of their estimates and resistance towards the monetisation of these items. See Clark *et alii*, "I struggled with this money business".

different items ... [according] to a common denominator”.³¹ Contrary to what Aristotle suggests, the mere stipulation of a unit of value neither makes goods immediately commensurable nor citizens instantly proficient in the art of valuing in that unit. We may therefore suppose that the requirement that annual income be expressed in *medimnoi* resulted in a practice of valuation which itself developed, in the minds of those doing the valuing, the idea that goods were commensurable, at least sufficiently so to be valued in this way. The demand that income be measured according to a unit of value changes the way in which goods are conceived, thereby developing a conception of goods as bearers of value commensurable to the value of other goods. To capture the extended function with which Solon endowed the *medimnos* as a measure of the value of goods, let us consider Steven Johnstone’s remarks on the use of the *medimnos* as a measure of volume in the classical period at Athens, noting thereby that the *medimnos* had, by this period, been superseded by the *drachma* as the universal measure of value.

The *medimnos*, *qua* measure of volume, was not routinely used to describe quantities in day-to-day situations at Athens of the classical period; for quotidian purposes, the basket or container (*φορμός*) was the unit used to express a quantity of dry produce. The *phormos* was non-standardised and tied to uses concerned with carrying, transporting and storing dry goods; its size was determined by its amenability to carrying and storage. It was, Johnstone contends, a “customary unit” which rarely figured in more formal legal contexts.³² The *medimnos*, by contrast, was standardized and abstract. It, too, had typical loci of use. One was to quantify large quantities of grain the collection, oversight and allocation of which fell to appointed officials; the other was in retail trade in the *agora*. However, the *medimnos*, in contrast to the *phormos*, was also the unit for conceiving quantities of grain without actually measuring them and in the physical absence of the item to be measured; herein lies the abstractness or notional nature of the *medimnos* as a unit of volume.³³ Whilst the *phormos* was enmeshed in physical practices of transportation and storage, the *medimnos* allowed for the “intellectual manipulation of grain” *qua* notional quantity independent of its physical handling.³⁴

Geoffrey de Ste. Croix captures the learning process involved in estimating

³¹ Ostwald, “Public expense”, 376.

³² Johnstone, *History of Trust in Ancient Greece*, 40; Figueira, ““Sitopolai” and “sitophylakes” in Lysias’ “Against the graindealers””, 156. Lysias’ oration “Against the grain dealers” is an exception to the absence of the *phormos* in legal contexts.

³³ Johnstone, *History of Trust in Ancient Greece*, 45, cf. 40.

³⁴ *ibid.*, 60.

volumes when he comments that the Greeks were “very slow to begin thinking in volumes in terms of cubic units based on linear measures”; only when the “average educated Greek became used to doing this” could the dimensions of containers be specified in a way which would ensure accuracy.³⁵ As de Ste. Croix writes of Greeks’ measuring practices, so one may contend of their practices of valuation: not until de Ste. Croix’ average educated Greek had become accustomed to estimating value in *medimnoi* would such valuations have become less “hit and miss” and attained something approaching the status of “objective”. It was through a process of being required to make such valuations that Greeks became accustomed to reckoning value in *medimnoi*, and this habituation to making valuations extended the scope of commensurability beyond that reached by their Homeric forebears.

Valuations of produce would have been far from precise, being made, as they were, not after physical inspection of the produce being valued or of the *oikos* which generated that produce. Valuations would therefore also have been notional, perhaps on the basis of citizens’ own declaration of their income which, if not subject to challenge, formed the basis of valuations for the purpose of assigning citizens to census classes. The development of quantitative relations between the value of goods was driven by the requirement that one make such valuations. What subsequently comes to appear to be a property of goods, namely, that a quantum of value inheres in them and makes them commensurable with other goods, is actually a reflection of the social relations between citizens and the Athenian state which demanded that citizens’ annual income be estimated according to a common unit.

Values and Market Prices

In contrast to the analysis of the previous section, de Ste. Croix claims that valuing in *medimnoi* would have been “a very natural phenomenon in early sixth-century Attica”. He supports his claim by observing that:

- 1) being a staple crop, barley was an obvious choice for use in valuation;
- 2) reckoning in barley weights had been common for centuries in the Near East.³⁶

The former point is plausible if, by “natural”, “conspicuous” is meant; for a crop with which Athenian farmers were most familiar would make a more obvious

³⁵ de Ste. Croix, *Athenian Democratic Origins*, 340.

³⁶ de Ste. Croix, *Athenian Democratic Origins*, 37-38.

choice that a unit derived from a good which was less commonly produced.³⁷ We should not, however, assume that barley reckoning was “natural” in the sense of “straightforward” or “habitual” for reasons I laid out in the previous section. As to de Ste. Croix’ reference to the Near East, the Mesopotamian *gur* of barley was indeed a firm accounting feature of the Ur III period at the close of the third millennium BCE, and the unit was used alongside the silver *shekel* (approximately 8 grammes) which was equivalent to the *gur* (306 litres).³⁸ The use of these units was highly administered in a dynasty which has been described as “obsessive” in its degree of centralisation.³⁹ Reckoning in the barley *gur* was administratively imposed as part of the palatial accounting system; the units of accounting were bound up with a developed state apparatus which not only determined the value of the *gur* vis-à-vis the *shekel* but which also decreed the numerical value of numerous payments. The value of fines for various offences, for instance, were stipulated in the laws of Ur-Namma in the Ur III period; the Babylonian laws of Eshnunna (1770 BCE) decree the price of numerous goods, inter alia: barley, oil, lard, wool, bitumen, salt, copper and potash.⁴⁰ These were the ways through which commensurability developed in ancient Mesopotamia, and the necessity that subjects negotiate the royal accounting system made them proficient in the art of valuation. Again, we may say that social relations between the administrative organs of the state and its subjects drove subjects’ proficiency in treating the value of different goods as commensurable. Are there measures of Solonian pedigree which are comparable to those of the Near East?

Although scholars have speculated about Near Eastern influences on ancient Greece,⁴¹ there is little evidence which causally links the use of a barley standard in the former with a similar standard at Athens. The discussion which follows, then, is not intended to suggest causal influences of the Near East on archaic Greece but instead to offer parallels amongst the measures through which valuational practices according to a single unit of account evolved.

The degree of centralisation of the Athenian state under Solon was lower than that of its earlier Near Eastern counterparts. Nevertheless, there are some parallels between the two. First, and as noted above (footnote 27), there are, in

³⁷ This is a further argument in favour of a barley rather than a silver unit, for the use of silver in late archaic Greece was limited; see Davis, “Dating the drachmas in Solon’s laws,” 129-136.

³⁸ Widell, “Some reflections on Babylonian exchange,” 391.

³⁹ Postgate, *Early Mesopotamia*, 150.

⁴⁰ Roth, *Law Collections from Mesopotamia and Asia Minor*, 59.

⁴¹ For a recent contribution, see Blok and Krul, “Debt and its aftermath” and the literature which they cite.

Solon's laws, precise, numerically-denominated fines for offences such as theft, rape, procuring a free woman and slander. To these fines may be added those administered by the Areopagus which had powers of oversight over political affairs.⁴² Second, there are stipulations of the value of prizes and sacrificial animals in Solon's laws. These are described by Plutarch as follows:⁴³

εἰς μὲν γε τὰ τιμήματα τῶν θυσιῶν λογίζεται πρόβατον καὶ δραχμὴν ἀντὶ μεδίμνου.

For the valuations of sacrificial offerings, he reckoned a sheep and a drachma as much as a medimnos.⁴⁴

Ulrich Wilcken proposed a "paleographically minimal change" to the received text which, if correct, would create a relationship between the values mentioned by Plutarch and Solon's *τέλη*. By substituting "οὔσιων" for "θυσιῶν" in the above passage, Plutarch would hold produce in general (*οὔσιων*) rather than sacrificial offerings (*θυσιῶν*) only to be the subject to which the value equivalents applied.⁴⁵ On this interpretation, Plutarch's value equivalents used for measuring produce would be the same as those used in assessing citizens' income to determine their rightful place in Solon's *τέλη*. However propitious Wilken's hypothesis would be in uniting the metrological elements of Solon's reforms, I resist the temptation to follow his proposal because his textual revision is too controversial a support to be reliable.⁴⁶ Nevertheless, I do, in what follows, argue in favour of a relationship between the values of produce used in the assessment of citizens' income and the value equivalents mentioned by Plutarch. To make this relationship clear, we must return to Horsmann's work.

Horsmann, to recall (footnote 21), holds that Athens under Solon measured the value of goods in uncoined silver *drachmae*. In a foregoing part of this essay, I expressed disagreement with him on this point and argued instead that the unit of value was the *medimnos*. This difference notwithstanding, we can trace Horsmann's argument whilst keeping my disagreement with him over the

⁴² *Ath. Pol.* VIII.4. The author of *Ath. Pol.* does not reveal the magnitude of these fines.

⁴³ Plutarch, *Life of Solon*, § 23.3.

⁴⁴ Plut. *Sol.*, § 23.3. See Waters, "Solon's 'price equalisation'", 185-186, for an analysis of the syntax of the sentence.

⁴⁵ Wilcken, "Zu Solons Schatzungsklassen", 237. For discussions, see de Ste. Croix, *Athenian Democratic Origins*, 45-46; Thiel, "On Solon's system of property classes"; van den Oudenrijn, "Solon's system of property-classes once more".

⁴⁶ See the latter three references of the previous footnote.

nature of the unit in mind. The *drachma*, Horsmann argues (following Plutarch), was equal in value to a medimnos, and this equivalency was used for the purpose of expressing the value of income derived from produce not amenable to physical measure in *medimnoi* (recalling that Horsmann holds that assessments were made on income from sources beyond agricultural produce, a point on which I agree with him). This leads to the following question: whence came the actual values of products which Plutarch mentions? Horsmann argues that they represented market prices. This hypothesis scores well on simplicity, for if there were market prices for goods (expressed, as Horsmann contends, in silver *drachmae*), these market values could simply have been used as a basis for assessing the value of annual income necessary for the determination of citizens' census class.⁴⁷ Horsmann's argument, of course, presupposes that market prices expressed in *drachmae* did indeed exist in the late archaic period.⁴⁸ Whether expressed in *drachmae* or another unit, however, one must ask: were prices sufficiently developed to form the basis of the value equivalents which Plutarch ascribes to Solon, let alone to underlie the measurement of income from diverse products? Two things should make us hesitate to answer this question affirmatively. First, as de Ste. Croix argues, much of early sixth-century Attic trade was conducted as barter.⁴⁹ Barter lacks market prices understood as abstract rates of exchange between goods which transcended the temporal and spatial specificity of a given exchange. But it is stable and context-transcending rates of exchange one seeks if the income from citizens' produce is to be meaningfully valued for the purpose of ascertaining a citizen's census class. Second, Plutarch himself suggests a different aetiology of the values which became current in Solon's Athens, for he writes, immediately after the passage quoted above, that Solon ordained (*ὀρίσσει*) the values mentioned. This suggests that his value equivalents were stipulated rather than garnered from existing market prices. The ordaining or stipulation of such values coheres with the numerically-denominated fines and prizes of Solon's laws, which, being attached to items which were decidedly not commodities exchanged on the market, could not have derived from pre-existing market prices.⁵⁰ In sum, I agree with Horsmann that the value equivalences cited by Plutarch for sacrificial offerings are related to the income assessments of Solon's *τέλη*, for the values of the one were transferable to the other: that the value equivalencies included livestock

⁴⁷ Horsmann, "Athens Weg zur eigenen Wahrung", 275-276.

⁴⁸ Horsmann draws support from Thiel ("On Solon's system of property classes", 4-5) and Plutarch (*Sol.* 23.3).

⁴⁹ de Ste. Croix, *Athenian Democratic Origins*, 42.

⁵⁰ See Plutarch, *Sol.* 21.1-2, 23.1,3.

bespeaks a scope which extended beyond agricultural produce which was measured in the wet and dry units mentioned in *Ath. Pol.* I disagree with Horsmann, however, insofar as he locates the origin of values equivalences in market prices; instead, I hold that, in lieu of stable and abstract market prices for many items, Solon stipulated, in addition to the unit of measurement, the values of goods which comprised the assessments which determined a citizen's census class.

Conclusion

This essay started with a review of Aristotle's remarks on justice in exchange in which he states that currency, qua unit of value, exists by stipulation (*ἐξ ὑποθέσεως*). Aristotle holds that the stipulation of a unit makes goods commensurable. The foregoing essay has scrutinised the relationship between the stipulation of a measure of value and the ensuing commensurability of goods historically. In dividing the Athenian citizenry into census groups, Solon stipulated the *medimnos* as a unit of measuring diverse goods produced by citizens. The process through which different goods thereby became commensurable required an analysis of the way in which Athenians became habituated to thinking of goods as commensurable values. This process of habituation represents a significant development in practices of valuation compared to the earlier archaic period with its more rudimentary oxen unit which was restricted in the scope of valuation made therein. The essay has argued that the commensurability of goods is not due to the existence of quotients of value inhering in goods but rather to the social relations between state and citizenry which necessitated practices of valuation according to which goods had to be conceptualised as mutually commensurable in value.

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