

NOTES AND DOCUMENTS

COPERNICUS ON THE EVILS OF INFLATION AND THE ESTABLISHMENT OF A SOUND CURRENCY

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Nicholas Copernicus (1473–1543) is known to the modern world primarily as the founder of modern astronomy. His *De Revolutionibus Orbium Coelestium Libri VI* [*Six Books Concerning the Revolutions of the Heavenly Spheres*], finally published in 1543 although the first draft had been made some thirty years earlier, is one of the great seminal books in intellectual history, comparable to Newton's *Principia* and Darwin's *Origin of Species*. Like many leading figures of the Renaissance, however, Copernicus was a man of many parts. In addition to his observations and deductions which revolutionized the science of astronomy, Copernicus busied himself as a practising physician, for which profession he had studied at Padua, and he also achieved great repute among his contemporaries as a close adviser in government and diplomacy to the Bishop of Ermland and as an adviser on economic matters to the Prussian Diet and to the King of Poland.

In the early years of the sixteenth century, partly because of the destruction and disorder which resulted from the long wars between the Teutonic Knights and the Kingdom of Poland, partly because of the human weakness and cupidity of petty princelings and avaricious burghers, there was disastrous inflation in the area which is now East Germany and Poland. The currency had become seriously debased as the many rulers sought temporary financial gain by reducing the gold and silver content of the coins which they issued. Under Albert of Brandenburg, for example, the proportion of fine silver in the coins issued by his authority was reduced from 9 : 12 to 1 : 12. Each ruler—Prussian, Polish, the Teutonic Knights, and the authorities of such cities as Torun and Danzig—coined his own money according to his own principles or lack of them.

Ermland, located south-east of Danzig and south-west of Königsberg, was a tiny ecclesiastical principality almost entirely surrounded by the territories of the Teutonic Knights. It was in constant danger of being absorbed by either Prussia or Poland. In 1516 Copernicus became administrator of the Allenstein and Mehlsack estates of the principality. His responsibilities soon became very onerous as the Poles and the Teutonic Knights fought across the neutral territory from 1519 to 1521. Copernicus was charged with restoring prosperity to the war stricken estates and with presenting the bill for reparation payments at the peace conference between the Knights and the King

of Poland. In the course of these duties, Copernicus became aware of the economic and social distress caused by wartime inflation. In 1522, he presented a preliminary report on the subject to the Prussian Diet at Graudenz. During the next few years he revised this report into a short but compendious treatise on the economic evils of a debased currency and made specific proposals for monetary reform. This final report, written in Latin, was prepared for presentation in 1526 to King Sigismund I of Poland. Sigismund used it as a basis in the negotiations for the monetary union of Prussia and Poland which came about in 1528.

The little treatise is of more than merely academic or antiquarian interest. Copernicus had one of the most powerful intellects of all time in its capacity for seeing through surface appearances to basic principles. He would scarcely have revolutionized man's thought about the universe if it had been otherwise. He was experienced in practical business affairs and had proven himself to be a successful administrator. He was also something of a politician and diplomatist. He lived in a time of troubles, reminiscent in many ways of the present, a period of almost continuous war arising from the collision of the eastward drive of the West, represented by the spearhead of the Teutonic Knights, and the westward drive of the Slavs, represented by the Kingdom of Poland. Ermland maintained a precarious neutrality but always faced the threat of absorption by one or other of the adjacent great powers. The rulers of such states, if they are to survive, not only must keep their wits about them but they have also unparalleled opportunities for observation and analysis. If, in addition, they are men of genius and write down their findings, posterity can learn much from them. Copernicus was such a man.

There had, of course, been writings on the subject of money before Copernicus. They were for the most part, however, glosses upon certain passages in Aristotle's *Politics* as interpreted and applied by mediaeval churchmen. They were heavily colored by theological and moral points of view and were concerned more with what ought to happen than with what actually did happen. Even Nicole Oresme, who in his *Treatise on Money* (about 1373) goes further than any other mediaeval ecclesiastic in freeing himself from theological bonds when discussing economic matters, could not in his approach to monetary problems free himself from dependence on Aristotle, of whose views he was a distinguished expositor. The novelty of the little treatise by Copernicus is that it is purely empirical and pragmatic. In place of appealing to a priori principles or leaning on philosophic authority, Copernicus appeals to the observed facts and reaches the

principles governing a sound currency from an empirical study of debased currencies in operation and from observation of their economic consequences. The result of the play of this powerful mind, uninhibited by preconceived theories, on the facts of early sixteenth-century economic life was a vivid, pungent, and practical essay on the dangers of inflation, the destructive effect on commerce of an unsound currency, and a clear statement of basic rules for the issuance and maintenance of a sound currency .

To be specific, Copernicus stated briefly but clearly:

- (1) The disastrous effects on commerce and national welfare of a debased currency.
- (2) Gresham's Law that bad money drives out good. (Some eighty years before Gresham.)
- (3) A simple quantity theory of the value of money. (Some 220 years before David Hume's classic exposition.)
- (4) Basic principles to be followed in issuing a sound currency based on gold. (Some 275 years before the great classic debate on the subject between Ricardo and Bosanquet.)
- (5) Principles and a plan for the establishment of a sound international currency based on gold.
- (6) The practical difficulties to be expected in replacing a debased currency by a sound one.

On all these matters, Copernicus is eminently practical. He supports each step in his reasoning by appeal to specific factual evidence. His statements of fundamental monetary principles are such that few modern economists would dissent from them. His little treatise is one of the great milestones in the progress of economic thought, but by pure mischance—perhaps not unconnected with the fact that most economists do not read Latin with ease—it is today virtually unknown. Yet it is so up to date that the opening paragraph might just as effectively begin a book on the social and economic troubles of the mid-twentieth century as on those of the early sixteenth century. The essential truths in this little treatise have still not been mastered by many governments even after the passage of some four and a quarter centuries.

NOTE ON THE TRANSLATION

The main passages of Copernicus' Latin treatise *Monetae Cudendae Ratio* are translated in the following pages. Certain detailed references to the contemporary scene, which do not add to the general argument, have been omitted. Slight omissions are indicated by

“ . . . ”. Lengthier passages omitted have been summarized in brackets. Paragraph headings, except for the last two, have been added by the translator. The text used is that printed by L. Wolowski, Librairie de Guillaumin et Cie., Paris, 1864. This text is apparently the same as that published for the first time by Professor Felix Bentkowski in *Pamiętnik Warszawski*, August 1816. The text of 1816 was transcribed from a manuscript discovered in 1815 in the archives of Königsberg and certified by the archivist as being in Copernicus' handwriting with manuscript corrections by Copernicus.

Copernicus was writing precisely and technically on an economic subject before there existed a science of economics with a generally accepted technical vocabulary of its own. Hence, he had trouble in finding neat phrases in which to express his ideas. The very succinct sentence structure and the awkward vocabulary of the original, if translated into English, make for clumsy reading. The following translation, therefore, has attempted to keep faithfully to the Latin original in sense, but in places is stylistically free in order to make for smooth reading and to avoid explanatory footnotes.

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NICHOLAS COPERNICUS:

THE PRINCIPLES OF A SOUND CURRENCY

The Causes of National Disaster

Numerous as are the disasters which normally lead to the decay of kingdoms, principalities, and republics, the four following are in my opinion the most to be feared:—war, disease, famine, and inflation. No person can ignore the evidence for the first three, but very few people except rare individuals of very great insight bother themselves about the fourth cause which is bound up with the soundness of the currency. Why is this? It is because this fourth cause of disaster operates not by a sudden blow, but with a stealthy and hidden power it gradually works the overthrow of states.

Money as a Standard of Economic Value

Gold or silver, minted into coin according to the laws laid down by the state, make up that supply of money which serves to determine the price of things which are bought and sold. Money is then a generally accepted measure or standard of value. But this measure is fixed in conformity with the established law. Otherwise, there would of necessity be disorder in the state and buyers and sellers would be constantly misled just as would happen if the yard or the bushel or the pound did not always represent the same measure of length or quantity or weight. Now this standard of value in economic transactions is in my opinion to be found in the value of money. Although this value may have as its basis the value of the money as a

precious metal, it is necessary to distinguish the value of money as money from the value of money as metal. Money in fact may be valued at a higher value than that of its metallic content and the opposite may also be true.

The invention of money was caused by necessity. Although by simply weighing gold and silver one could have carried out market exchanges, since these metals in the unanimous opinion of men were considered above all else as being precious things, nevertheless there would have been numerous inconveniences in having always to carry such a weight around. Moreover, not everyone is skilled in knowing at first glance the purity of the gold or silver. Men, therefore, established the practice of marking on each piece of money by the exercise of lawful authority, the gold or silver content of the piece and this value was guaranteed on the faith of the public authorities.

It became the custom to add copper to the coinage particularly to silver coins. There were two reasons for this; in the first place so that the coins would be less exposed to re-minting and melting down than if they have been made of pure silver; in the second place so that the monetary unit of silver, divided into smaller units and even into small change, should have in consequence of the alloy—that is of the copper mixed with it—a convenient size. A third reason can be added to these first two: as coins constantly suffer from wear and tear in their use as money, a copper alloy makes them last longer.

The Value of Money

Money is valued at its just and true worth when it contains an amount of gold or silver which is only a very tiny fraction less than the quantity of those metals for which it can be exchanged—the difference should be just enough to pay for the actual cost of coinage. The minting itself by the guarantee which it carries adds value to the coin above the value of the metal itself.

Money loses its value when it is issued in too great a quantity, for example as when men prefer silver bullion to silver coin. Money loses all its worth when it can no longer buy as much as the silver which it contains and when there is profit to be made by melting it down. The only remedy for this state of affairs is to cease coining any more money until it has recovered its par value and has gained again a monetary value greater than that of the silver itself.

The value of money depreciates for a number of reasons:—it may be because of a defect in the metallic content as when the amount of copper in the alloy is greater than is proper; it may be that the coin itself is light in weight even though the amount of alloy is correct. It may be—and this is the worst—because the two defects occur at the same time.

Money loses its value when it has been long in use because the process of circulation wears out the metal and diminishes the size of the coin; then a new coinage restored to its proper value must be issued. This situation

may be recognized by an infallible sign, namely, when the silver in a coin weighs decidedly less than the amount of silver which could be bought at the price represented by the face value of the coin. When this occurs, there is a depreciation in the value of the money.

Depreciated Currency in Practice

After having made these general observations on money, let us turn to a detailed study of Prussian money and show how it has become so debased in value. [Then follows an account of the origins, etc. of the money issued by the Teutonic Knights in Prussia and of its debasement—an anticipation of “Gresham’s Law” that bad money drives out good with reference to actual experience. He describes how the number of units of money (coins) increased as each town issued its own money. He then continues:]

O, Wretched land of Prussia which is paying by your ruin, alas, for the mistakes of a bad government. Although the nominal value and the real value of the coinage were both depreciating at the same time, more and more money continued to be minted. But since the costs of coinage were not even covered, the money became more and more debased and the money of account continually fell in value . . . Such were inevitably the results of the debasement of the currency when the authorities did not consider it necessary to maintain the intrinsic value of the coins at their face value. The set habit of melting down money and reissuing it at a debased value has in no way ceased in our time. It makes me ashamed and unhappy to tell what this money must inevitably become and indeed what it has already become. . . .

What will happen if nothing is done? Prussia, stripped of gold and silver, will have merely a copper coinage and this will stop foreign trade and ruin all commerce. Where, in fact, will you find any foreign merchant who will be willing to exchange his merchandise for copper money? Which one of our merchants will be able to buy commodities in foreign countries with this debased currency? Yet it is with indifference that the authorities watch this terrible disaster happen to Prussia. By their inaction they are permitting the ruin and the utter destruction of this beloved country. . . . While the Prussian currency and consequently the country itself are suffering from these vices, the jewellers and bullion dealers alone profit from our misery. They take out the old (and good) coins and melt them down in order to sell the silver and they thus obtain from the uninformed man in the street a greater value in silver than the value of the coins they give him in exchange. When the best of the old coins have completely disappeared, they then pick out the least bad of the coins still in circulation, leaving only the worst coins to circulate as money. From this cause comes the continued complaint which echoes and re-echoes on every side that the price of gold and silver, the price of corn, foodprices, and the wages of labor, indeed, the prices of everything that makes up the daily cost of living are always rising. Our negligence prevents us from seeing that the increasing dearness

of everything comes from the depreciation of the currency. As a matter of fact, prices of commodities increase and decrease proportionately to the quantity of money and in particular to the quantity of the precious metals . . . for gold and silver constitute the foundations of the currency and determine its value.

The Economic Effects of Sound and Unsound Currency

. . . it cannot be denied that sound money is advantageous not only to the government but to men of every rank and condition while unsound money is extremely harmful. There is a great volume of evidence for this contention, and experience—the most reliable guide—plainly demonstrates its truth. In point of fact we see those countries flourishing which possess a sound currency while those which have only an unsound currency fall into decadence and perish. . . . The increasing debasement of our currency is leading our country, stricken by this and other calamities, to the very brink of disaster.

It is indisputable that countries which have a sound currency shine in manufactures, possess the best workmen, and have everything in abundance. Contrariwise, in states which have a debased currency, you find a lack of accomplishment, idleness and sloth. Business and culture alike are there neglected, and the most wretched poverty is endured. We can still remember when the prices of corn and other foodstuffs were cheap in Prussia—but that was when we had a sound currency. Now that the money in circulation has become debased we note with every day that passes how the price of food and of the other necessities of life increases. . . .

Monetary Reform

[Next paragraphs outline a practical plan for centralizing the minting of money, so as to maintain full control over its physical quality, and for the issue of a new and uniform coinage.]

At the same time, in order to avoid falling again into the monetary confusion which characterizes our times—a confusion arising from the simultaneous circulation of new [sound] currency and old [debased] currency, it would be necessary, at the time of issuing the new money, to de-monetize the old currency and to withdraw it from circulation. Men would be permitted to exchange it at the mint for the new currency in proportion to its intrinsic value. Unless this were done, it would be a waste of time to re-establish sound money. . . . [He then discusses for several paragraphs the practical difficulties and confusion which would arise if the old (debased) and the new (sound) money were to circulate at the same time.]

Comparison of gold and silver: We have already stated that gold and silver are the foundation upon which rests the value of money. What we have already said about silver money applies almost equally well to gold money. It now remains to discuss the principles which govern the relative values

of gold and silver. . . . It is recognized that provided that the coins and the ingots are of the same metallic fineness and of the same weight . . . the same ratio of exchange will exist, between pure gold and pure silver as between minted gold and minted silver of the same denomination and that similarly the same ratio of exchange will prevail between gold minted into coin and gold in ingot form and silver minted into coin and silver in ingot form. [He then gives a practical example of the working of this rule by reference to Hungarian ducats (a sound currency), compares this sound coinage with the debased state of the Polish currency, and outlines a practical policy for a re-coinage of the Polish currency.]

. . . The preceding example will enable us to form clear ideas on this matter [of establishing a sound currency]. There are many [technical] ways of establishing a sound currency and I cannot describe every one of them, but common agreement after ripe deliberation will enable us to choose the method which will be most advantageous to the country. When once the standard money of account has been established correctly in relation to the Hungarian ducat, it will be easy to establish the value of other coins by reference to the amount of gold and silver which they contain. . . .

Epilogue on Re-establishing a Sound Currency

To succeed in restoring and then maintaining a sound currency, several things must be considered. They are as follows:

1. It must not be changed in value except after ripe deliberation by the government authorities [i.e., the Diet] and only then if there is unanimous agreement.
2. One single place must be chosen for the minting of the money which must be minted in the name of the entire country and not in the name of a single city. . . . In this way, the Polish currency will preserve its value over the whole area of this vast kingdom.
3. When the new currency is issued, the old currency must be de-monetized and withdrawn from circulation.
4. It is essential to have an inviolable and unchangeable rule to mint only 20 marks and no more from a pound of silver, deducting only the quantity of silver necessary to cover the expenses of coinage. In this way, the Prussian currency will have a fixed relation to the Polish currency. . . .
5. Too great a quantity of money must not be issued.
6. All the different kinds of coins should be issued at the same time. . . . The proportions and quantities of the smaller coins to the larger coins must be left to the discretion of the issuing authorities, but once the relative values of the various coins have been established, they must be maintained.

. . .

One last difficulty arises from existing contracts, that is the reconciliation of contractual obligations before and after the issue of the new coinage. A way must be found for a transition which will prevent parties to existing contracts from being harmed too much. . . .