The Coinage of El Perú

EDITED BY

William L. Bischoff

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Coinage of the Americas Conference

Proceedings No. 5

The Coinage of El Perú

EDITED BY *William L. Bischoff*

THE AMERICAN NUMISMATIC SOCIETY
NEW YORK
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Preface

The Coinage of El Perú provided the subject for the fifth annual Coinage of the Americas Conference sponsored by the American Numismatic Society. Since its inception, this program has enjoyed the enthusiastic support of the Society's governing Council as a forum for the dissemination of emerging research in western hemisphere numismatics.

The purpose of these conferences is to facilitate the exchange of information. Toward this end, experts in the field are invited to present papers, collectors are invited to exhibit, and notice of the conference is circulated widely to encourage attendance by all interested in the topic. The Society also mounts an exhibition from its holdings and invites registrants to come to know the Society's collections and library better during the days of the conference.

Contributors

The Society is grateful to the following contributors who helped make the 1988 Coinage of the Americas Conference possible:

- Dorothy Budd Bartle
- William B. Christensen
- Leslie A. Elam
- Harry W. Fowler
- Dr. Jay M. Galst
- Adon Gordus
- John P. Huffman
- Paul Karon
- Joseph R. Lasser
- Emmett McDonald
- Sewall H. Menzel
- Eric P. Newman
- Robert W. Norton
- R. Henry Norweb, Jr.
- Emilio M. Ortiz
- Edward J. Rudnicki
- Raphael E. Solomon
- Barry W. Stallard
- Dr. Juan XII Suros
- Siegfried Von Schuckmann

Introduction

The essays between these covers represent the best thinking of 15 numismatic scholars from Europe and the Americas on topics ranging in time from the sixteenth century to the present and bounded geographically only by the ample confines of the Viceroyalty of El Perú at its greatest extent. The initial versions of these articles were presented to some 70 registrants at the fifth Conference on Coinage of the Americas (COAC) sponsored by the American Numismatic Society in its West Hall on October 29 and 30, 1988. Well before the conference took place I was besieged by writers and callers eager to know when the published version of these talks would be available. And with good reason. When Freeman Craig, our first speaker, asserted that the meeting was an unprecedented gathering of experts on early South American numismatics I was highly gratified; now that I have read and reread the papers as an editor I am convinced he spoke no more than the truth.

A collection like this is by nature multifaceted, yet the attentive reader will have no difficulty in discerning the main lines of development for Spain's colonial South American issues at the least. We can be especially thankful to Freeman Craig for accepting the thankless but necessary task of providing an overview of the entire colonial series and explaining the economic and political background of the kaleidoscopic variation in the metallic finenesses, weight, design, and technology utilized by the several mints over these two and a half centuries.

Historically, of course, the silver "cob" coinage of Spain's New World colonies vastly outweighed the gold issues in quantity, value, and economic importance. Yet the gold coins have an undeniably romantic lure for collectors and the general public alike—in part perhaps because coins in the nobler metal were struck with greater care and artistry and because they hold up to immersion in seawater as sunken treasure so much better. Thus I was pleased indeed when Frank Sedwick agreed to discuss the gold cobs of Lima for COAC. After a distinguished career as a university professor of Spanish language and literature, he is now a leading dealer in cobs and author of the engagingly written guide titled *The Practical Book of Cobs*. In these Proceedings he shares his expertise on the beautiful Lima mint gold cobs, communicates the excitement involved in collecting them, and offers many a seasoned veteran's tip on attribution, value, and sources.

Gold was the main precious metal coined by Spanish mints in Nuevo Reino de Granada (Colombia), but Joseph Lasser devotes his attention here to the scarce and sporadic silver coins issued there. This colonial series has often been a numismatist's nightmare because of sparce documentation and design variation that, as Lasser says, could easily be taken as merely whimsical in origin. When nonexistent quality control in the striking process is added to the picture, one often has riddles hidden in enigmas wrapped in mystery. There can be no doubt that Lasser has substantially dispelled the confusion that formerly prevailed about colonial Colombia's early silver issues, from the beginning (1622) to 1748, just before the mint's "deprivatization" by the Crown in 1751. Any future study of the subject will have to take the lists of assayers and illustrations of coin types—for the Cartagena as well as the Bogotá mint—provided here as its point of departure.

In establishing the distinction between coins minted at these two mints, Lasser makes convincing use of the Neutron Activation Analysis (NAA) method for "fingerprinting" silver objects. Adon Gordus (a chemist) and Jeanne Gordus (a historian) are a husband-and-wife team at the University of Michigan, Ann Arbor, that has pioneered in the development of NAA over the last 20 years. Their contribution to COAC 1988 and its Proceedings reexamines an age-old paradigm using the latest techniques of science. Contemporary observers compared Spain's gold and silver wealth from the New World to rain falling on a rooftop—not

remaining there but running off to both sides and thus enriching Spain's neighbors, not Spain itself. Earl Hamilton's scholarly elaboration of this metaphor in 1934 attempted to show that Spain's economy had actually declined due to this massive influx of bullion, and that the same cause was largely responsible for Europe's catastrophic hyperinflation in the seventeenth century. What the Drs. Gordus ask is, if the Hamilton thesis is correct, why isn't more of the enormous Potosí output—identifiable through NAA—found in the contemporary coinage of nations that should logically have been inundated by it through transfer payments? In a word, Where has all the silver gone?

Some have argued that the Gordus method, for various reasons, is an unsound technique of metallurgical analysis. Yet the authors take account of many objections that might be raised; what is more, the articles by Lasser, Stallard, and Lill seem to demonstrate the trustworthiness of NAA as applied to coinage. It is the special virtue of scientific research that apparent setbacks often lead to more fruitful ways of posing questions or attempting to answer them. So whether the Hamilton thesis (in its monetarist formulation, at least) is further discredited, or Potosí silver in something like the expected quantities is discovered in alternative form in Europe or even as coinage farther afield than has been considered up to now, important new economic and historical insights will be the result. Even should NAA prove an inadequate technique for this kind of problem solving, the outcome should be new impetus for investigation of the past with the most modern of tools.

Nearly a third of the COAC contributors undertook investigations into the earliest years of coinage in the Viceroyalty, and it is in this field that I believe the Proceedings will continue to be must reading—often even the definitive authority—for years to come. Whatever their linguistic capacities, students of sixteenth- and seventeenth-century Spanish American numismatics have often found themselves handicapped by the tendency of classic authors like J. T. Medina and Francisco de Garcia Peláez to cite their primary sources incompletely or not at all. Sometimes documents that were cited in the classics could not to be found by later archival researchers. One result of such shortcomings was the habitual but unsatisfactory practice of citing secondary sources as though they were primary ("Medina reports," e.g.). It is a refreshing change to have in Eduardo Dargent-Chamot's article an almost day-by-day account, in English and clearly referenced to contemporary documents in the Archivo General de Indias, of South America's earliest mint operation. The author has found documents indicating that Lima's casa de moneda began operations some six months later than generally believed, and he is able to show conclusively that the first Lima 8 reales, produced in 1568 and 1569, were neither patterns nor counterfeits, as many have thought. Dargent revises another accepted truth by showing that the last coins minted under the assayer Diego de la Torre were struck as late as 1592. Finally, like K.A. Dym and A. Cunietti-Ferrando elsewhere in this book, Dargent identifies assayer X with Xines Martinez (1570-72), whose tenure coincided with the transition to the crowned shield pattern.

K.A. Dym's publications in Spanish, like those of Dargent and Cunietti, have been instrumental in bringing about a new consensus among numismatists as to the sequence and chronology of the first mint assayers at Lima, La Plata, and Potosí. Here that pathbreaking work is made available for the first time in English, together with an illustrated catalog of the type coins produced at the several mints and vouched for by the various assayers. There seems no reason to doubt that Ernesto Sellschopp's attribution of coins with assayer initial C to La Plata has now been definitively refuted, with the R of Alonso Rincón (the first assayer at Lima, it will be remembered) accepted as the only La Plata assayer as well as the first for Potosí. The ignis fatuus of discriminating between the coins of La Plata's ephemeral mint and that of Potosí need no longer crease numismatic brows. Moreover, Dym's article dispels the confusion that formerly prevailed (even in

the early colonial period itself) between town and mint assayers, thereby casting new light on what actually took place as Spaniards set about exploiting the mineral riches of El Perú.

Arnaldo Cunietti-Ferrando's contribution makes extensive use of vital colonial documents available so far only in the several archives he has explored. It provides—for the first time in English—a synthesis of his research and that of Dym, Dargent, and earlier, "classic," authors like Sellschopp, Dasí, Burzio, Medina, and Vigñale. For example, this extensive account allows us to follow in detail the human interactions evoked by Viceroy Toledo's decision to close the La Plata mint and move its equipment to Potosí in spite of vigorous opposition by the audiencias of Lima and Charcas and the cabildo of Santa Fe. To cite only one more of many services rendered by Cunietti in this article, he has located the testimony given in the investigation ("provansa") of 1575 carried out in Potosí at Toledo's behest. This document, as Cunietti remarks, represents one of the most important sources available anywhere for Potosí's early mint history; parts of it were cited by J.T. Medina early in this century, but it was believed lost until our author found it in the Archive of the Indies at Seville. (This provansa, like dozens of other transcripts of legal cases, appeals, and the like, would be invaluable if published in an anthology of otherwise inaccessable documents important for numismatists and others researching this era.) In sum, Cunietti's treatment, including his catalog and chronology of Potosí assayers at its conclusion, is destined to remain the starting point for any future numismatic study of this mint's early history.

Barry Stallard's in-depth analysis of the mysterious "AP" coins is an admirable assault on a tough problem that, when COAC 1988 met, had not been addressed since Sellschopp's 1974 article in the *Gaceta Numismatica*. Stallard brings together the best corpus of these coins to date, complete with schematic renderings of design devices that are sometimes extremely difficult to make out with coin in hand, let alone in a photograph. His attribution of these specimens to a period before 1585, possibly at the La Plata mint, is ingenious in its analysis of the data available to him, including neutron activation analysis carried out by Professor Gordus. Certainly his rebuttal of Sellshopp's argument that the coins are spurious is a telling one: no "unofficial mint" then or now could have an interest in striking coins of the correct weight and fineness *and* calling attention to itself by utilizing a mint mark so unlike the official issues. The greatest weakness of Stallard's hypothesis, as he acknowledges, is the lack of any written evidence—in Spain or the New World—to indicate that the colloquial Alto ("Highland") Peru was used as an official place-name ("C" for Charcas would have been a more likely way to identify a site in the area). Meanwhile, Sewell Menzel's article in the June 1989 issue of *Gaceta Numismatica* ("La misteriosa casa de moneda colonial en Panamá") has reproduced Philip II's royal ordinance establishing a (short-lived) mint in the capital of El Perú's third audiencia. Nevertheless Stallard's work will always be valuable (as it was to Menzel) for its keen analysis and description of the AP coins themselves.

Another numismatic enigma—the source of "Large Crown" countermarks on sixteenth- and seventeenth-century 2-real coins of the Peruvian mints—has been definitively resolved in the contribution by Robert Leonard presented in this volume. Leonard's work represents a diligent piece of numismatic sleuthing that began with the hypothesis that the coins were overstruck at Potosí. Helpful tips from contemporary numismatists led the author to Burzio, who led him to Medina, who led him to Garcia Peláez's mid-nineteenth-century history of Guatemala. That book in turn sent Leonard ad fontes: the seventeenth-century Guatemalan chronicles in the original, archaic Spanish of Ximénez, Molina, and Caño. Along the way the author assembled a formidable, exhaustively documented corpus of these elusive pieces, published here for the first time together. The story of how the 2 reales—and not other Peruvian denominations of this era

—came to be marked as they did, and the explanation Leonard gives for their scarcity, make fascinating reading.

The last of our articles devoted to the colonial period is Glenn Murray's "Mechanization of the Peruvian Mints." Murray's research in the Archive of the Indies has unearthed a wealth of written sources, technical sketches, and architectural plans, supplemented by his own photographs of surviving seventeenth-century mint machinery from Potosí, Lima, and Segovia. He tells how Potosí came to have a new mint to accommodate the equipment needed if modern "milled" silver coinage was at last to replace the traditional cob issues. Nearly half a century elapsed between the first royal initiative and the final shutdown of cob production—a period punctuated by inefficiency, obstructionism, conspiracy, and even by earthquake. A period that lends new poignancy to the famous response "Obedesco pero no cumplo" ("I obey but do not carry out") characteristic of colonial officials unable or unwilling to comply with royal orders.

Bolivia—republican Bolivia—is the focus of Richard Doty's lucid discussion of "proclamation coinage," defined here with admirable succinctness and examined in its historical evolution. Doty shows how such "procs" served to bolster regimes with shaky claims to legitimacy and to familiarize the population with claims upon its loyalty. As means of communication were improved, Doty shows, the need for such highly material tokens of political legitimacy diminished—ultimately even in Bolivia, the classic land of nineteenth-century proclamation coinage. These issues represented a possibly essential but inevitably evanescent stage in the evolution of nationhood.

Focusing more narrowly on a subset of Bolivia's proclamation coinage (or "special coinage" as he terms it, based on nineteenth century precedent), George Lill III asks whether the production of at least certain mules, pieforts, and uniface strikes has been as evanescent as one might expect from Doty's article. Are these pieces, in other words, actually counterfeits made sometime during the past 35 years? Lill has utilized the research of Horace Flatt and the NAA methodolgy of Adon Gordus in conjunction with his own years of study in this area to make a convincing case that the specimens he writes about were in fact produced outside the Potosí mint and at a much later date than is apparent. In conclusion he grapples successfully with the ethical dilemma familiar to those who try to make life difficult for counterfeiters and find that they have inadvertently helped them to make more deceptive fakes.

One of the many legacies of El Perú was the persistence after Independence of patterns of trade and commerce that transcended the artificial boundaries of the new nation-states. This was especially true of the link between southern Peru and Bolivia: as Horace Flatt demonstrates, it took the two states almost 40 years to free themselves from the debased coinage called moneda feble struck in particularly large amounts by Bolivia. The feble, originally intended as a kind of provincial coinage for internal commerce in Bolivia, flowed effortlessly over the borders into Peru, where a chronic shortage of coins encouraged the bad money to drive out the good. A saga of war, diplomatic demarches, and complications in international trade ensued in spite of repeated attempts at reform in both countries. Using a large assortment of primary sources, Flatt has unravelled this complex chain of events, showing how the repeated changes in Peruvian coin standards and designs of this period arose.

Concluding this volume, William Christensen picks up the historical thread where Freeman Craig earlier left off, surveying the coin patterns of Peru down to the recent past. He writes with genuine affection about these "numismatic orphans," an affection the reader comes to share. Drawing on decades of familiarity with the series, he puts them in historical, technological, and artistic perspective. Everyone at all familiar with

the evolution of Peru's coinage will find something to edify or delight him in this elegaic exploration of the paths not taken.

During the preparations for COAC 1988 and the production of these Proceedings, many scholars helped me with information and advice, notably Kurt Dym, Frank Sedwick, and Bill Christensen. Frank Deak, the ANS photographer, made hundreds of beautiful color slides for the lectures and most of the black-and-white photographs for this book. My gratitude is immense to all the authors represented here—indeed to all who spoke, exhibited, or simply constituted the sympathetic audience at the conference. From the very beginning the Organizing Committee ensured success by identifying potential speakers, convincing them to participate, and generally spreading their enthusiasm far and wide. I am particularly grateful to Howard Herz for arranging the translation of Arnaldo Cunietti-Ferrando's paper, to Freeman Craig for his infinite patience with my plodding initiation into the mysteries of colonial Spanish numismatics, to Leslie Elam for his cheerful help at every stage of the project. I took advantage of Richard Doty's knowledgeable and freely given advice more times than was fair. Finally, Joseph Lasser acted as speaker, exhibitor, sponsor, and writer with that generosity and commitment many of us know and prize so highly.

William L. Bischoff
Conference Chair

Coinage of the Viceroyalty of El Perú—an Overview

Freeman Craig, Jr.

Coinage of the Americas Conference at the American Numismatic Society, New York

The Viceroyalty of El Perú struck its first coins in Lima's recently built mint in September 1568, three-quarters of a century after Columbus "discovered" the Americas, and a bit more than three decades after Pizarro overthrew the Inca Empire and founded the city of Lima (1535). The capital of the future Viceroyalty of Peru was officially established on January 6, the day of the Star of the Magi that guided the three kings of Catholic tradition to Bethlehem. Hence Lima's title, "City of the Kings," and the use of one or more stars to symbolize the city.

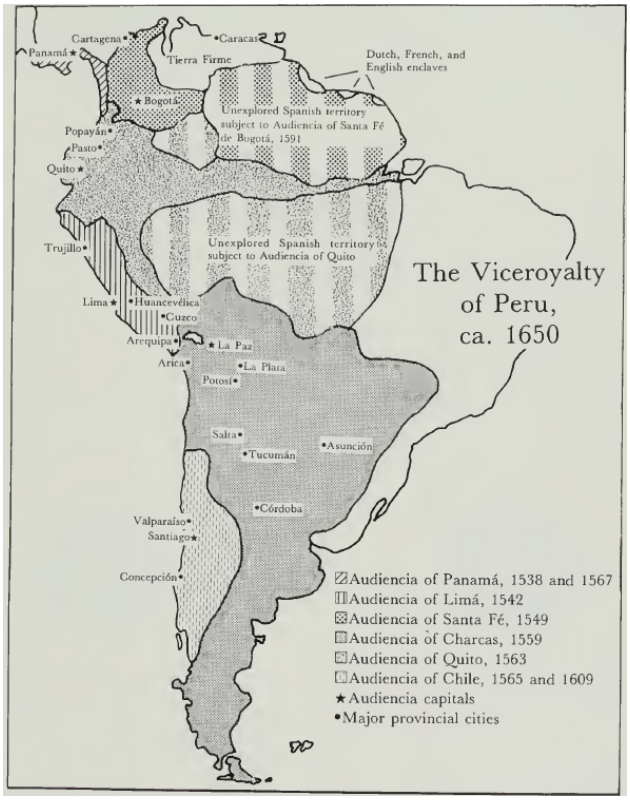
A review of the royal decrees relating to money is essential to understand the coinage of El Perú. A fundamental monetary decree by the Catholic Kings Ferdinand and Isabella in 1479, established weights and finenesses as well as fractional components of the real and escudo systems. El Perú's coinage for nearly two centuries was produced under that decree as amended by Charles I (Charles V of the Holy Roman Empire) in 1537. The value of gold to silver was fixed at 11.5 to 1. Silver was to be of .93 purity, with a weight per 8 reales of 27.47 g.[1] The gold coinage was to be of 22 carats (22/24 pure) or .92 fineness; the 8-escudo piece would weigh 27.06 g.

Mexico and Santo Domingo began striking their own silver coinage soon after Charles's reform. Both these mints issued coins of high quality, particularly compared to the irregular shape of most "cob" coins produced a century or two later. The Mexican pieces had become popular in world trading centers by 1550. Both mints initially used designs incorporating the legendary Pillars of Hercules; the Straits of Gibraltar were, for the ancients, the end of the world. Prominent in the field is the Latin phrase chosen by Charles V as his watchword, PLUS ULTRA (more beyond), to signify Spain's claim to the New World beyond Gibraltar.

Meanwhile, far to the south of Mexico, towns which would rapidly gain in importance were being founded: after Lima (1535) came Santa Fe de Bogotá (1537), Popayán (1538), Santiago (1541), and Potosí (1546). To help "civilize" South America and exploit its human and mineral resources, the Spanish throne established the new Viceroyalty of El Perú in 1544. It included Panama and all of Spanish South America except a small northern area, known as Tierra Firme, in today's Venezuela (fig. 1).

Just one year later, in 1545, an Indian made a discovery that changed the monetary and economic history of the world: an incredible mountain of silver situated at Potosí. This Cerro Rico de Potosí rose about 2,400 feet above the surrounding land and proved to contain ore with an unusually high silver content. Word spread quickly to other colonial towns and to Spain itself. Potosí's remoteness and its elevation of about 2.5 miles above sea level could not deter the soldiers of fortune who flocked to the site of this bonanza.

[1]The weights and finenesses cited herein are rounded to two decimal places.



1. Adapted from C.L. and J.V. Lombardi, *Latin American History, A Teaching Atlas* (Madison, WI, 1983)

By 1548 the city, founded two years earlier by Juan de Villarroel and other Spaniards, had an estimated 2,500 houses and 14,000 residents. The discovery of a second nearby mountain of silver—smaller but nonetheless also readily exploited—accelerated the city's growth to a bustling and affluent population of more than 160,000 in 25 years. The torrent of precious metal pouring forth from Potosí catapulted El Perú into prominence and fostered its rapid development.

The export of silver bullion in the form of ingots soon proved unsatisfactory to the Spanish throne, intent as it was on securing its full quinto, or royal fifth, demanded of all mining and refining concessions. Despite various laws intended to deter tax evasion—including the death penalty for smugglers—a great deal of silver escaped the government's claim. By 1551, the highest local authorities, headquartered in the capital city of Lima, requested permission to establish a mint. Spain's monarchs were too busy with other problems to act until 1565. The decree of that year specified the exact style of coins to be struck, a style very similar to Mexico's second issue of pillars-and-waves, then still in production. The king's name (by now Philip II) was to be boldly indicated (not, as in Mexico, those of the deceased Charles I and his mother Johanna), along with a prominent "P" for Peru (fig. 2).

2. Lima. 1 real, 1568–70

Upon receiving Philip II's ordinance, the authorities in Lima immediately set about constructing a mint. When the proper working materials and letter punches arrived from Spain, the mint began to produce coins, even though royal permission to strike them had not yet been received. Within months an entire series of silver coinage was issued. These coins—in the denominations of 8, 4, 2, 1, 1/2, and 1/4 reales—were produced in relatively large quantities. However, a royal decree of March 8, 1570, soon mandated a completely different style of coinage. The "early series" pieces were probably not actually called in and recoined, for too many of them survive (about 250 examples of the combined six denominations) for that to seem likely.

In any event, these pieces were the first coins struck in South America and are therefore of special significance. Virtually every one known is of high quality. This can be attributed to the considerable skills of Alonso de Rincón, who also had been the first assayer at the Mexico City mint. These very first issues are at least equal in workmanship to any other standard-issue cobs produced elsewhere in colonial South America.

This first series of coinage for El Perú includes one item of particular significance for numismatists, historians, and coin collectors. The largest denomination in the set represents the first silver "crown" (or silver dollar) of the Americas. If one remembers that the earliest 8-real pieces struck in Mexico could not have been made before 1573, it is clear that this pillar-style cob is the prototype for the milled pillar 8 reales issued in the eighteenth century. Since Spanish milled dollars are usually acknowledged as the ultimate trade dollars in modern world history, this earliest cob 8-real piece stands out as the ancestor of them all. Its extreme rarity makes this one of the most, if not the most, desirable silver coin minted in Spanish America.

Assayers were the individuals who guaranteed that the struck coins and cast bars were of both legal weight and fineness. Assayers were compensated for their work by retaining a small portion of the precious metal whose processing took place under their supervision. Following a tradition of more than a thousand years in parts of Europe, these highly desirable positions were purchased from the throne for significant sums. Due to the enormous quantity of silver located near the Potosí mint, the lucrative post of assayer there sold for 50,000 ducats in an auction near the end of the sixteenth century. This practice continued until the throne reclaimed assaying rights for itself in its decree of July 14, 1732.

Assayers were required to display their initial(s) on each coin in order that the authorities could determine who was responsible if debased or underweight pieces came to light. Therefore the time period of any given assayer, and the relationships of various assayers' symbols to one another, can be determined with considerable accuracy as long as official mint records are available and the assayer's initial(s) are clear on each coin. Unfortunately, neither tool is available for analyzing many cobs. However, with an adequate sample of sufficiently high-quality coins available for study, a careful researcher can deduce their order and relationship. When correlated with the mint and royal records which do survive, the coinage will assume a degree of order.

Alonso de Rincón was cited earlier as the first assayer in both Mexico and Lima. Ironically, despite some explicit documentation from the eras when each mint opened, and despite the bold letter "R" on most of these early coins, numismatists have disagreed for a century as to which of two cousins was the first assayer at these mints. Alonso de Rincón is named in classic texts, but Robert Nesmith attempted to prove that Francisco de Rincón actually signed the coins. Ray Byrne claimed that one of the Rincóns was the

first assayer in Potosí, but Ernesto Sellschopp rejected that contention. However the question is ultimately resolved,[2] the Rincón legacy will remain integral to the mint history of El Perú (fig. 3).

3. Potosí. 4 reales, 1574–77.

In keeping with the decree of March 8, 1570, cited earlier, all early cobs of El Perú subsequent to the Rincón pillar series bore the Hapsburg arms on the obverse and a cross with castles and lions quartered on the reverse. New dies of this style arrived in Lima in 1572, but the city was too distant from the mines in Potosí to serve as the only mint of the Viceroyalty. Consequently a second mint was opened about December 1573, in the administrative center of La Plata, still a difficult 110-mile trek on primitive roads from Potosí. By the edict of March 3, 1574, La Plata's mint was closed and its tools transferred to Potosí. This third mint in El Perú began operations by 1575 at the latest. Meanwhile, government documents establish that in Lima, Diego de la Torre was responsible for stylistically excellent silver cobs in all denominations between September of 1577 and sometime in 1588 (fig. 4). Nearly all his designs include a star mint mark representing the earlier-mentioned star of the Magi and thus identifying Lima as their city of origin within the Viceroyalty. The problem for numismatists is that very little reliable additional information from the 1570s has been published.

Lima's early coinage was inconsequential compared to that of Potosí, except for the early-style Rincón and later-style Diego de la Torre issues. La Plata was open for a few months at the most; moreover, it was beset by difficulties from the start; it could not have produced many coins. However, the Potosí mint was important from its inception and continued to be so long after the end of Spanish colonial rule.

4. Lima. 8 reales, 1577–88.
(ANS, on loan from The Hispanic Society of America)

Potosí was the world's most important source of silver coinage for more than a century. Its enormous production was largely responsible for the change in the ratio of gold to silver from 11.5:1 to 16:1 as established by a royal decree in 1620. The problems involved in ascertaining the "correct" ratio were formidable, and will be mentioned again in connection with the decrees of 1728 and 1750.

Potosí's assayer B coinage was interrupted by that of assayer A for a few years near 1591 and ended about 1610, when a new assayer R took office. He was soon displaced by assayer Q, who held the office for only a short period. It was at the time of these last two assayers that a royal inquiry into the proliferation of debased coinage from Potosí was launched. In April 1617, the viceroy acknowledged that debasement had occurred. Probably for this reason the then-active assayer M was required to include the current date

[2]See the articles by K.A. Dym and Arnaldo Cunietti-Ferrando in this volume for what may prove to be the last word in this controversy.

in the legends of his coins, beginning sometime that same year. M's earliest issues were of the "pre-dated" cob style; and although his dated pieces were as crude as those that preceded them, doubtful pieces can be dated by comparing them with the substantial corpus of similar, dated coins surviving. It is worth noting that M's early production was the last important issue of Spanish colonial coinage to be struck without a date (Mexico dated its coins from 1607 on).

Early in the period of dated Potosí cobs another mint was authorized in El Perú. In 1620, Captain Alonso Turrillo de Yebra obtained permission to open a mint and a subsidiary "oficina" in the towns of Santa Fe de Bogotá and Cartagena in the Captaincy-General of Nuevo Reino de Granada, later to become the Viceroyalty of New Granada. The Bogotá mint operated at least until 1789, producing primarily gold coins and a few silver pieces, with an extremely small output of silver after its first fifty years. Royal edicts, pertinent correspondence, mint records reported by Dr. A.M. Barriga Villalba, and comparative analysis of available specimens all demonstrate that coins were also minted in Cartagena.[3]

5. Nuevo Reino. 2 escudos, 1630.
(ANS, on loan from The Hispanic Society of America)

Determining the logical production sequence of Nuevo Reino coinage is more difficult than for the undated Potosí era. Even though the dies for the Nuevo Reino pieces were dated, the typical Bogotá coin planchets are so irregular that low-denomination specimens with full dates and legends are very scarce. In addition, the standard identification data required by royal decree display apparently whimsical variations.

Equal in significance to Lima's issue of the first New World silver dollar in 1568 was Colombia's production of the Americas' first gold coin in 1622. Salvage of the shipwrecked *Atocha* galleon has made several new specimens available. It is worth noting that the shield on the obverse of the 1630 2-escudo coin (fig. 5) has four fleurs-delis instead of the standard castles-and-lions quartered on silver coinage and the ordinal is that of Philip III, who died years before the coin was issued. This general style of gold cob coinage was minted for another 30 years.

By the ascension of Philip IV, the dated Potosí coins were beginning to decay in quality of workmanship and would soon be debased on a scale even greater than in the 1610-17 period. By 1620, many were apparently produced with neither date nor assayer symbol visible.

It was during this era that Potosí produced the first of a remarkable series of well-executed cobs struck on broader flans and with more complete legends and design details than had the standard pieces (fig. 6). The first of these is dated 1630. Numismatists generally regard these as genuine coins of the various eras and assume that they were struck for reasons similar to those that inspired the presentation cinquentines (coins of 50 reales) produced in Spain earlier in the seventeenth century. Called "royals" or "round presentation coins," they are of correct weight and were produced by at least three mints (Potosí, Mexico beginning just before 1607, and Lima beginning in 1684). Whatever their official status and function, these often magnificent items are the apex of craftsmanship for each mint in a given era. The survival of several with

[3]See the detailed treatment of this question in Joseph Lasser's article in this volume.

Guatemalan republican counterstamps on coins still circulating around 1850 demonstrates their acceptance as coin of the realm even that late.

6. Potosí. 8 reales, 1650.
(ANS, on loan from The Hispanic Society of America)

Given the massive quantities of silver coin produced at Potosí (Burzio estimates that by 1629 a million 8-real pieces had been struck there, and that another 2,600,000 pesos in the smaller denominations were struck by 1650), the potential profit from debasement of the coins was high indeed. Quality deteriorated noticeably between 1631 and 1648, to the point where pieces with clear dates or assayer initials are uncommon. This was probably not accidental, for the assayers were later proven to have defrauded the crown of millions of reales in silver. In 1648, an assay in Spain determined that some Potosí issues were more than half copper, and a royal letter to the relevant official, the president of the Audiencia de Charcas, demanded an explanation. His inquiry exposed the fraud, which had been underway in one degree or another for at least four decades. One assayer, Filipe Ramirez de Arellano, was executed as an example. The numismatic echo of this inquiry was the subsequent counterstamping of Potosí cobs issued in the late 1640s, authorizing them to circulate at less than their face value. This October 1650 decree was augmented by one of February 17, 1651, which mandated the retirement of all Potosí cobs of the Hapsburg shield type and the initiation of a new type incorporating the columns of Hercules, much in the tradition of the original 1568 issues of Lima (fig. 7). The transition to this "tic-tac-toe" reverse design occurred in six or seven stages during 1652. Collectors have found it possible to assemble royal presentation pieces representing the several steps in this rapid development, and even the regular-issue examples are generally of much finer quality than cobs produced earlier in the century.

7. Potosí. 8 reales, 1652.

The designs of Nuevo Reino's coins also changed during these same few months. The new coinage of Potosí was inadequate to satisfy the demand for smaller denominations throughout El Perú, and the Colombian mints were unable to supplement Potosí's output significantly. In fact, Cartagena struck its final coins around 1655 and Bogotá silver after 1669 is known in quantities of no more than three or four specimens per year.

As a result of the small-change shortfall, Lima had requested permission to reopen its mint, closed since 1589. Convinced of the real need to do so, the local authorities produced a unique style of coinage that featured the star of the Magi. The very small production of these pieces evolved through at least three stages in the period 1659-60 before authorities in Potosí convinced the king to deny Lima's petition. These

unofficial issues did circulate (one is known with the Guatemala counterstamp of around 1850; another with a Dutch countermark), and they occupy a unique place in the history of El Perú's coinage.

Potosí continued to produce huge quantities of new cobs, for the old Hapsburg-shield types were creating havoc in trade; as many as fourteen reales in face value were needed to obtain goods worth eight reales in the new pillars-and-waves style coins. For more than two decades after the coronation of Charles II in 1665, the Potosí pieces maintained a level of quality not to be regained in the subsequent production of cobs.

The Lima mint, authorized to reopen in 1684, proceeded to strike a fine run of all silver denominations, including some royals. Both Lima and Potosí produced high-quality pieces until around 1696. At that time, Lima was authorized to issue gold cobs of a specific, unique design. The 1-escudo coin varied from established patterns even more than the larger denominations (fig. 8). One searches in vain for the familiar lions and castles quartered, pillars, or a Hapsburg shield. However, for unknown reasons the silver coinage of both mints again began to deteriorate in quality. Within a short period it had decayed to levels reminiscent of the 1640-50 debacle.

8. Lima. 1 escudo, 1733.

In 1698, a mint was opened briefly in Cuzco; it produced a few small gold coins during that year only. Why it was opened and the reasons for its closing so soon have yet to be adequately explained.

In this era, near the demise of the last Hapsburg king, Charles II, and the coronation of the first Bourbon monarch, Philip V, Potosí issued a few presentation pieces cut in the mint to a shape representing a pomegranate, or perhaps a heart, as is more popularly assumed. The earliest known of these is a 2-real Potosí coin of 1691; the earliest known 8-real coin of the same configuration is dated 1704. This "heart-shaped crown" is rumored to have been struck to honor the new Bourbon king once news of his coronation reached Potosí. Two similarly cut examples are known to have been in the Vidal Quadras and Enrique Peña collections.

Except for Lima's gold pieces, the eighteenth century witnessed production of inferior coinage in all three mints of El Perú. Even Nuevo Reino gold was crude; some 2-escudo coins of the period were issued with neither mint mark nor assayer letters and the royal presentation pieces of Potosí were of significantly lower quality than those of a quarter-century earlier. The occasional "heart-shaped" pieces of Potosí and the very scarce royal strikes of Lima were of phenomenally better quality than the rest of the silver issues. In a reprise of the situations of half a century and a century earlier, debased cobs with little legible detail became commonplace.

In 1724 Philip abdicated in favor of his young son Luis I, who died just months later. However, word of the new king's ascension had already been sent to the colonial mints; at least three of them (Potosí, Lima, and Mexico) issued coinage in Luis's name (fig. 9). The known Lima issues of 8 escudos and 1/2 real dated 1725 in- clude his name or monogram. The same is true of all Potosí coinage of 1725, 1726, and 1727 on which the king's name is even partially readable. Superior-quality pieces featuring the young king's name

are in great demand. Potosí issued both royal presentation pieces and even heart-shaped 8- and 4-real coins during this brief period.

9. Lima. 8 escudos, 1724.

Before and after Luis's brief reign, the Spanish crown again took note of a decline in quality and bullion fineness of the various colonial cobs. After 160 years of corruption in the colonial mints and the concommitant decay in the quality of their production, it seemed essential to bring modern technology to the minting facilities. Decrees of 1709 and thereafter culminated in important laws of 1728 and 1730 that mandated fundamental modifications in the way coins were produced in Hispanic America. The value of gold was fixed at sixteen times that of silver. For the first time the colonial 8 escudos and 8 reales were to be of equal weight. Cobs already in circulation were recognized as frequently underweight and/or of deficient fineness; in Spain their circulating value would be based on their weight rather than on their nominal denomination.

Important for numismatists—and for the worldwide economic viability of the colonial monies—is that the latter two decrees initiated production of a machine-made, round coinage with a corded edge. The resulting superb design was that of the now-famous "milled pillar dollar" and its fractions, all noticeably indebted to the first coinage of El Perú in 1568. The Madrid mint produced a pattern 8-real piece dated 1729 that was sent to Mexico City. By 1732 the mint there issued some silver coins of this design as well as the first portrait, or bust, milled gold of the Americas.

The coinage of El Perú no longer included that of Nuevo Reino after 1739, when the Viceroyalty of Nueva Granada was definitely separated from that of El Perú (fig. 10). A mint was authorized for Popayán in 1729, but its first coinage was not struck until 1758.

Three years before the accession of Ferdinand VI in 1746, a mint was authorized for Santiago de Chile under the jurisdiction of the Viceroyalty of El Perú (fig. 11). The new mint machinery was sent there, and the first bust gold was struck in Ferdinand's name in December 1749, bearing the date 1750.

10. Adapted from C.L. and J. V. Lombardi, *Latin American History, A Teaching Atlas* (Madison, WI, 1983)

Santiago's silver coinage of the corded-edge pillar design began in 1751, but the quantities produced were tiny: the mint was important only for its gold coins. From a current numismatic viewpoint, those earlier Santiago pillar 8 reales are among the most desirable of all coinage ever produced in El Perú. Curiously, the very rare 8 reales of Ferdinand VI was the only colonial silver coin that fully spelled out Ferdinand's name. Lima produced its first corded-edge gold coins in the same year that Santiago struck its first silver of that type (fig. 12). Apparently Ferdinand was satisfied with the new style of Mexican coinage, which had already gained international favor for its careful adherence to high standards of weight and fineness. Lima's coinage during the two decades when only Mexico City was striking the milled pillar design sank to an abysmal level. Potosí's issues were not of good quality, but they were far better than those of Lima. Therefore Lima's new pillar coinage was soon acclaimed and was in great demand throughout El Perú (fig. 13). Although many of the 8-real pieces were exported to Spain, Europe, North America, and the Orient, most of the smaller-denomination coins remained in local circulation. It is for this reason that most pieces between 1/2 real and 4 reales are found in worn or holed condition.

11. Santiago. 8 escudos, 1751.

12. Lima. 4 escudos, 1751.

Spain had inadvertently guaranteed the desirability of these new pillar coins by its decrees of 1728 and 1750 that set the gold to silver ratio at 16:1. Worldwide, the then-prevailing ration was between 15.03 and

15.20:1. Thus merchants were happy to send gold coins to Spain in exchange for the undervalued silver. This error by Spanish authorities plagued them for the next half century and contributed significantly to Spain's economic decline. This made the pillar 8 reales, and later the bust 8 reales, circulate internationally, contributing to the pieces being saved by collectors at the time of issue. As a result, high-quality examples of many milled pillar 8 reales are fairly common even today, and the quality of these crowns is much higher than that of surviving minor denominations.

13. Lima. 8 reales, 1756.

The successes in Mexico and Lima prompted the throne to authorize the issue of the new-style pillar coins in Guatemala and to order construction of a new mint in Potosí. It was obvious that the old Potosí mint, with its antiquated equipment, had outlived its usefulness. Still, cobs poured forth from that mint for 24 years after the other mints ceased striking them. The reign of Charles III, whose coins were issued over nearly three decades beginning in 1760, had a baleful influence on monetary policy: decrees during these years further contributed to the decline of Spain's economy and that of Potosí, both of which had been on the wane since around the turn of the century. Most of the Cerro Rico's easily accessible silver had been depleted and the city's population had declined by 85% from its peak two centuries earlier. In 1766, four new minting machines arrived, but local problems and fraud delayed operations for several years. Milled pillar coins were produced from 1767 through 1770, but cob production was at least as great despite its wretched quality.

Mounting economic problems made the Spanish authorities search for easy solutions. By a decree of 1771, and by secret letters to the viceroys in 1772, the fineness of colonial gold was lowered to .90103; that of silver was reduced to .90278. In 1771, dies and pat- tern strikes using a standardized bust portrait of the monarch for both gold and silver emissions were sent to all the colonial mints. In 1772, production of these bust types (in the new fineness) became law (fig. 14). By this law all cobs were to be withdrawn and remelted. Their monetary standing had suffered greatly thanks to the worldwide awareness of their debased composition. In November 1772, the crown forbade South American mints to ship coins of the 1/2-, 1-, and 2-real denominations to Spain: these smaller coins were vital to New World commerce. In 1773, a corollary to that edict ordered the mints to increase production of the small denominations. This explains why pieces of the first decade of the bust type are so much more common than those of the final decade of the pillars-and-shield type silver. These decrees brought cob production and pillars-and-shield coinage to an end. The final cobs were struck in Potosí shortly before the old mint was closed on July 31, 1773. Ironically, the final pillar-and-shield coinage of any mint had ended in Lima more than a year earlier. Thus the cob issues outlasted the superb corded-edge, pillar-and-shield pieces, whose creation had been authorized in order to displace cobs entirely. Numismatists and historians can enjoy the anomaly of a three-piece silver coin set that might include a 1772 bust coin struck in Mexico, which was produced slightly before a 1772 pillar-and-shield coin of Lima, with both of them preceding a Potosí 1773 cob by quite a few months. Not exactly the typical cob-pillar-bust order familiar to most collectors!

14. Lima. 8 reales, 1772.

In 1776, Potosí and its mint were transferred to the jurisdiction of the newly created Viceroyalty of Rio de la Plata. This political restructuring greatly diminished the prominence of El Perú as a producer of silver coinage, but not of gold (Potosí was not authorized to strike gold prior to 1777). However, El Perú was in need of silver coinage for local use, and its shortage now became critical: cob coinage was awkward for commercial transactions because its weight and fineness often varied. The new milled pillar silver was of such high quality that the workings of Gresham's law drove it out of local circulation due to the 1772 debasement and the inappropriate 16:1 silver-to-gold ratio.

Counterfeiting intensified as the need for coinage increased. The royal solution, in early 1786, was to debase the colonial fineness further to .8958, and to reduce the weight of both the 8-escudo and 8-real pieces to 26.928 g. Again Gresham's law operated to decrease the supply of available coins as the 1772-85 silver and gold disappeared via export and the melting pot. By 1793, early in the reign of Charles IV, many low-denomination silver coins were actually only .85 fine. Merchants of the period complained that coins of the smallest denominations were particularly deficient, some of them being as little as .25 fine, a similar story to that of 1610, 1649, 1705, and 1728.

15. Huancavelica 4-real "proc", 1790.
(ANS, on loan from The Hispanic Society of America)

Use of the king's bust on colonial coinage presented a problem for the mints when they learned Charles III had died and had been followed to the throne by Charles IV. Without knowing what the official royal portrait looked like, all the New World mints, including Lima and Santiago of El Perú, continued to use the bust of the old king, but with a legend acknowledging the new one. Proclamation coins of proper weight and fineness were issued in recognition of the new monarch's succession. Collecting such pieces is an interesting numismatic specialty and often serves as a source of historical information not otherwise available (fig. 15).

On April 30, 1789, Spanish authorities gave permission for the colonial mints to strike cuartillos (1/4-real pieces) to help alleviate the need for small change. Other than a recently discovered coin purported to be a Lima cob cuartillo of 1750 or 1751, these were the first cuartillos to be issued in Spanish America in almost a cen- tury. The mint in Santiago was still under the jurisdiction of the viceroy of El Perú despite the establishment of the new captaincy-general of Chile in 1778. Santiago was the first to issue these small pieces. Its 1790 coins of this denomination bore a tiny bust of Charles III, but the legend indicated the new king's name as Charles IIII. Lima produced its first bust cuartillo in 1792. In February 1793, a new design for this denomination was authorized and the resultant lion-and-castle pieces became standard at all the

mints from 1796 forward. Unfortunately the coins' small size and limited production rendered them less useful than they should have been.

16. Lima. 4 escudos, 1811.

The mints of El Perú—Lima and Santiago—produced a reasonably large quantity of both gold and silver coinage from this period until the end of Spanish control. Curiously, despite intensifying political problems, the quality of production remained rather high even during the final year of output.

When Charles IV renounced the throne in 1808, his son Ferdinand VII succeeded him. Despite Napoleon's control of most of Spain, the colonial mints continued to acknowledge Ferdinand as king. As a result, both Lima and Santiago issued coins during 1808-11 that featured an imaginary bust of the new ruler (fig. 16).

The Spanish courts ruled in 1811 that the coins should bear the "natural bust" of the king rather than a military or adorned bust, and the mints modified their designs accordingly once the pewter patterns of 1811 arrived. As the wars for independence spread throughout South America, the Santiago and Lima mints produced increased quantities of coinage to underwrite the war effort. However, in 1817, Santiago was abandoned by the Spanish and the colonial dies fell into the hands of the new republican authorities. Minor-denomination coins of the colonial bust style were produced for several years (with the date of 1817, except for some cuartillos dated 1818 made from an amended 1816 die). The final colonial coin of Chile was cast around 1821 on the island of Chiloe (off the coast of southern Chile) using an 1822 Potosí 8 reales as its mold master. That island was abandoned by Antonio Quintanilla in January 1826, thus ending the coinage of El Perú in the southern part of the continent.

17. Lima. 8 reales, 1822, with royalist 1824 counterstamp.

Farther north, the Lima mint maintained relatively full production through 1821. Republicans captured it in 1822 but the royalists retook the city in 1823, at which time the colonial bust-style pieces were again coined. In 1823, some of the republican 8 reales of 1822-23 were overstruck with the colonial bust dies, and in 1824, a royal crown was countermarked on some of these same rebel coins (fig. 17). In 1824, the final colonial issue of Lima was struck; the only denomination is an 8 reales with a slightly different bust than had been used before. Viceroy Laserna, aided by General Canterac, moved some of the mint machinery from Lima to Cuzco once it became obvious that the Lima mint again would fall to the insurgents. A series of silver coins denominated 1, 2, and 8 reales was produced with the Cuzco monogram and with assayer letter T. Other pieces of this colonial design were coined in the 8-real and 8-escudo denominations, dated 1824, except with assayer letter G (fig. 18). The available documentation seems to indicate that they were probably not struck until after the republicans took control of the Cuzco mint.

18. Cuzco. 8 reales, 1824.

There is a single known example of a 2 reales dated 1826; Medina claimed it was struck in El Perú by a fleeing royalist general, but its rarity and lack of a clear provenance precludes its designation as the final royal coinage in the north of El Perú. For now, that distinction must be accorded some of the Cuzco coins even though we cannot yet be certain which ones. Thus ended more than two and a half centuries of continuous coinage by Spanish colonial mints in El Perú. A year later the final coins struck anywhere in Spanish South America were minted in Potosí.

The gold and silver of El Perú had overwhelmed traditional assumptions about the wealth and power of nations and decisively changed world monetary and political history as a result. It has been estimated that enough silver was mined in Potosí to build a bridge from there to Madrid. Indeed a symbolic bridge did exist, but its wealth spread north as well as east. The legacy of El Perú lives on in the affluent nations of the modern world, none of which could have prospered as they have had not that mountain of silver and those rivers of gold poured forth to foreign lands.

The mineral wealth of El Perú made possible its lengthy and fascinating coinage series. These coins are our historical link—another kind of bridge—to that bygone time and society that fostered so much wealth and rapid economic growth for nearly three centuries. Without El Perú, the evolution of silver coinage would have been less dynamic throughout the world. This too is part of our debt to the coinage of the Viceroyalty of El Perú.

Identification of Potosí Silver Usage in Sixteenth–Seventeenth Century European Coinage through Gold-Impurity Content of Coins

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Coinage of the Americas Conference at the American Numismatic Society, New York

Introduction

Knowing the fineness of a silver or gold coin can provide information that is very useful in various historical and numismatic studies. If the proclaimed legal standard is known, knowledge of the actual fineness of the coins can indicate the degree to which the standard was being followed by the various mints. If the legal standard is unknown, as is the case in many historical studies where adequate written records are unavailable, knowledge of the actual fineness of the coins can provide an indication of economic stresses on the society; wars and famines, for example, could be accompanied by coinage debasement. Variations in fineness among mints could indicate the degree of control exercised by the central government on the outlying mints.

Besides the weight of a coin, the fineness is also an important property associated with the coin's intrinsic value. The fineness as well as the weight of silver or gold coins are properties that could be determined by assayers, even in ancient/medieval times. There are however, other properties of coins that were not controlled by the minters and, based on modern methods of analysis, can reveal additional information about the coins and metal sources. These properties are the impurities in the major metal used in the coins: the small amount of gold impurity in all silver or the small amounts of platinum and other metal impurities present in almost all gold. These impurity levels were unknown to the minters and this information provides what historians refer to as unbiased data. The iconography and legends on coins are biased in that their purpose was usually to glorify the reigning monarch. The metal impurity levels, on the other hand, were unknown and uncontrolled and, therefore, provide totally new, unbiased information.

Coins can be analyzed by a variety of means. The fineness of gold coins can be approximated fairly accurately by density measurements since the metal usually alloyed with the gold (silver, or sometimes copper) differs markedly from the density of gold. Even silver coin fineness can be determined by density measurements, although less precisely, since the densities of silver and copper are similar in value. One problem with density measurements for the determination of fineness is that they can be applied with relative precision only to binary alloy mixtures. If a coin is made of a mixture of three metals, each with a different

density, it is not possible to calculate the fineness of the coin from the density measurement. Other (usually minor) problems can also exist, such as the possible inclusion of air bubbles in the metal matrix.

Destructive chemical analysis can provide reliable, precise, and complete analysis data for a coin. Published results indicate that about 2,000 ancient/medieval coins have been analyzed by this method during the past 150 years. The obvious problem with destructive chemical analysis is that you no longer have the coin; it is dissolved in acid as part of the analysis.

About 20 years ago, various historians and art historians inquired if it would be possible to modify methods already in use for the analysis of archaeological artifacts and apply them to the analysis of coins and metallic works of art. The method, neutron activation analysis, is based on the procedure of bombarding samples with neutrons (usually in a nuclear reactor) to make a tiny fraction of the atoms radioactive. Based on the types of radioactive atoms produced, it is possible to say what chemical elements are present in a sample. Based on the intensities of the radiation emitted by these radioactive elements, it is possible to say how much of a chemical element is present.

Neutron activation analysis is often described as a non-destructive method of analysis since the sample still remains intact; typically much less than one-in-one-billion of the atoms is made radioactive. (A coin will have about 10^{22} atoms.) After the induced radioactivity has decayed, the sample will appear unchanged. One problem with the method, of course, is how long you must wait for the radioactivity to dissipate; for some elements this could be years, for others only minutes. We have devised two methods of neutron activation analysis applicable to coins. Both can provide useful information. They are described below.

Neutron Activation Analysis Methods

Of the two methods based on neutron activation analysis that were devised for the analysis of coins, the first is strictly non-destructive, results in the production of only short-lived radioactive silver, and shows undetectable radioactivity after about 10-15 minutes. It allows determining the silver fineness of a coin. The second method, while not strictly non-destructive, requires removal of only a tiny sample of metal from the edge of the coin in the form of a metal rubbing (streak) on high-purity, quartz tubing. This metal rubbing is made radioactive in a nuclear reactor and allows determination of the *relative* amounts of silver, gold, copper, zinc, arsenic, and antimony in the rubbing. Each method has it advantages and disadvantages. Both methods have been described in various articles.[1]

Method 1: Whole Coin Irradiation

The coin, silver or gold, is irradiated with neutrons emitted from a neutron source. We use a plutonium-beryllium source that is housed in our chemistry laboratory. It has a very low neutron intensity compared to that available in a nuclear reactor, about one billionth the intensity of neutrons in a reactor. The only

[1] A.A. Gordus, "Quantitative Non-Destructive Neutron Activation Analysis of Silver in Coins," *Archaeometry* 10 (1967), pp.78-86; A.A. and J.P. Gordus, "Neutron Activation Analysis of Gold-Impurity Levels in Silver Coins and Art Objects, *Archaeological Chemistry*, Am. Chemical Society Advances in Chemistry Series 138 (Washington, 1975), pp. 124-47; A.A. Gordus, "Neutron Activation Analysis of Coins and Coin Streaks," E.T. Hall and D.M. Metcalf, eds., *Methods of Chemical and Metallurgical Investigation of Ancient Coinage*, RNS Special Publ. 8 (London, 1972), pp. 127-48.

chemical element in a coin that is made radioactive is silver and this short half-life silver radioactivity is dissipated in 10-15 minutes. Usually, the coin is irradiated for one minute; 20 seconds later the amount of induced radioactive silver is determined by taking a one minute radioactive count of the sample.

The accuracy of this method is dependent on the amount of radioactive "counts" determined; the greater the weight of silver in the coin, the larger the number of counts, and the greater the accuracy. The analysis can be repeated on the same coin after waiting the requisite 10-15 minutes. Usually about 10 repeat analyses are made on a single coin and the data averaged. By irradiating coins of known silver content (modern coins are used as these standards) it is possible to determine the counts per gram of silver that are detected. However, for a variety of reasons that relate to the manner in which neutrons interact with various densities and thicknesses of metal, this value is also dependent on the thickness and diameter of the coin. Thus, the ideal standard to be used is always a coin of approximately the same weight, silver fineness, thickness, and diameter as the coin being analyzed. We have been able to derive empirical correction factors to correct partially for some of these effects and, in general, are able to use this method to analyze for the percent silver in almost any coin. The final data can be valid to about ± 1 to ± 2% silver.

If a coin is highly corroded and thus heavier than the original coin because of the oxide, sulfide, and/or carbonate that form the corrosion products, then the measured % Ag will be less than the actual % Ag that was present in the original uncorroded coin. This effect will generally be of importance only for highly corroded silver coins having a high copper content where the corrosion extends deep into the coin,[2] and no method of analysis, including destructive chemical analysis, will provide an accurate assessment of the silver fineness of the original coin.

Over 5,000 coins have been analyzed by this method. Although the silver fineness of a coin can be determined with reasonable accuracy without destroying the coin, an obvious disadvantage is the need to have the coin at our laboratory, as well as the time it takes to perform the many repeat analyses.

None of the coins discussed in this paper were analyzed using this method. However, it was used for the analysis of 20 silver coins and buttons discussed in the paper by G. Lill published in this volume. Since time did not permit performing more than four or five repeat analyses, this resulted in ± values that are larger than is possible if ten or more repeat analyses had been made.

Method 2: Analysis of Metal Rubbings

This method does not require having the coin in Ann Arbor. The metal rubbings can be taken from the edges of coins in a museum coin room or from metallic works of art while they are still on display in a museum case. We have analyzed over 10,000 coins by this method and, in a working day, are generally able to irradiate and analyze about 100 samples plus rubbings from metal alloy standards of known composition.

There are numerous advantages to this method of analysis. They are: (a) the ability to take samples in a museum; (b) the (almost) non-destructive nature of the sampling; (c) the ability to detect certain impurities in the metal; and (d) the ease of analyzing hundreds of coin samples of the same type and from the composite data drawing statistical conclusions, which would often not be possible if only a few samples of the same type were analyzed.

[2] E.R. Caley, *Analysis of Ancient Metals* (New York, 1964).

There are two possible disadvantages of this method of analysis. The first disadvantage is that the sample is so very tiny (<0.1 mg) that we are unable to weigh it with any accuracy. Therefore, we can only determine the relative amounts, not the absolute amounts, of the metals we detect. However, if we assume that the metals that we detect account for 100% of the metal in the coin, then we can convert these relative values into absolute values. For most coins this assumption is reasonably valid. Published destructive chemical analyses of whole coins[3] generally show less than 1-2% of metals we cannot detect by this method: those metals include lead, nickel, and tin, none of which are made sufficiently radioactive to allow detection.

Although almost all ancient/medieval silver coins contain at most only 1-2% of these undetected metals, some of the coins being considered at this symposium could have appreciable tin, since tin was one of the metals also available in Bolivia and Peru. Because we are unable to detect it, if it is present to any appreciable extent in any coin, our method of calculating the silver fineness would result in erroneously high values. Consider, for example, the case where a coin contains 60% Ag and 40% Cu but nothing else, which is characteristic of some of the coins considered by G. Lill. We could determine a %Ag/%Cu ratio = 60/40 = 1.50 and calculate the % Ag correctly as = 1.50/(1.50 + 1.00) = 60.0% Ag. If, however, the coin actually contained 60% Ag, 10% Cu, and 30% Sn, but nothing else, we could experimentally determine a correct %Ag/%Cu ratio = 60/10 = 6.00, but not knowing that appreciable tin was also present, we would calculate an erroneous % Ag = 6.00/(6.00 + 1.00) = 85.7% Ag. If the undetected metals comprise only a few percent, as is the case for most coins, the error in the calculated % Ag is only a few percent. Thus, the ratio of detected metals can be correct, but the calculated silver fineness can be on the high side.

The second and sometimes more important disadvantage of Method 2 is that the metal at the surface of the coin where the metal rubbing is taken is not necessarily representative of the interior of the coin; the more reactive metals such as copper are depleted.[4] This is certainly the case for any corroded surface of the coin. Some surface "depletion" may also occur during the cooling of the planchet prior to striking[5] due to selective metal phase separation at the surface. We get around this problem of surface depletion (at least partially) by first stroking a tiny area (about 3 x 3 mm) on the edge of the coin with fine-grain emery paper to expose the shiny metal and then taking the metal rubbing from this shiny area. Working with an originally shiny coin does not assure that corrosion is absent since some method of coin cleaning could have been used and the coin cleaning could easily have depleted some of the surface copper. Rubbing gently with emery paper does not always eliminate completely the problem of surface corrosion since for some coins, especially those that have been cleaned extensively or show extensive corrosion, such "corrosion effects" apparently go slightly deeper into the coin,[6] deeper than we would want to rub. What we invariably find in some of the data is that the copper (which is much more easily oxidized than is silver or gold) percentage we detect in these rubbings is less than that present in the whole coin; because of the method required to calculate the silver fineness in Method 2, this is seen in the data as a higher calculated % Ag.

The combination of these two effects—the undetectibility of some metals and the surface corrosion loss of copper—can result in % Ag values for Method 2 that are about 2-10% higher for the typical coin than the

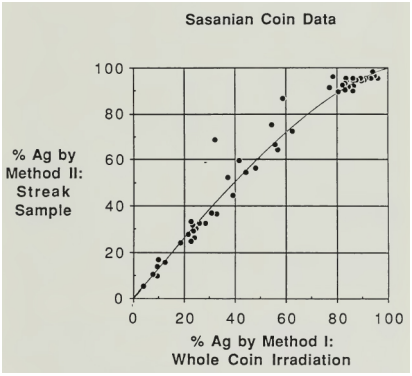
[3] Caley (above, n. 2).

[4] Caley (above, n. 2); E.T. Hall, "Surface Enrichment of Buried Metals," *Archaeometry* 4 (1961), pp. 62-66; J. Condamin and M. Picon, "The Influence of Corrosion and Diffusion on the Percentage of Silver in Roman Denarii," *Archaeometry* 7 (1964), pp. 98-105.

[5] Hall (above, n. 4).

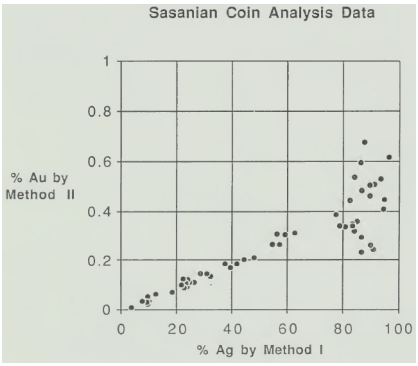
[6] Caley (above, n. 2).

true % Ag found by Method 1. This is shown in fig. 1 where % Ag data are given for about 50 Sasanian coins of the Persian monarch Shapur I (A.D. 241-72) that were analyzed by both methods. As is seen, Method 2 usually shows % Ag values that are greater than the true % Ag found by Method 1.



1. Silver content of Sasanian coins of the Persian monarch Shapur I (A.D. 241-72), as determined by Methods 1 and 2

Even in those cases where we are able to determine accurately the % Ag based on uncorroded samples, the *measured* silver content is not necessarily the *intended* silver content of the mint. The reason is that, except for modern coins for which very pure silver and copper were used in preparing the coin alloy, most older coins were made of silver and copper that were impure. Thus, the intended silver percentage is more correctly given by the measured silver content *plus* the percentages of those impurities that were associated with the original silver used in making the coin alloy. Gold (as is discussed below), and probably also lead, is associated primarily with the silver. Based on published destructive chemical analysis data for high silver content coins, it appears that our Method 2 values of % Ag + % Au could serve as a good indicator of the *intended* silver content for these coins.[7]



2. Percent gold in Sasanian coins of Shapur I

The Gold:Silver Ratio

Copper and bronze coins generally have very low and sometimes undetectable amounts of gold; the gold in silver-copper alloy coins, therefore, is associated almost exclusively with the silver. Conversely, arsenic,

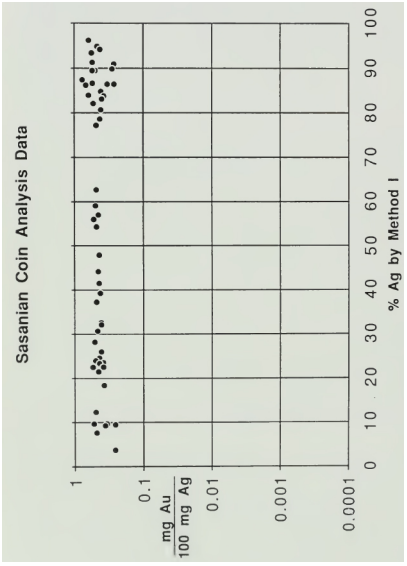
[7] A.A. Gordus, *Methods* (above, n. 1).

antimony, and zinc impurities appear to be associated almost entirely with the copper. We can illustrate this gold:silver relationship using data for the same Sasanian coins of fig. 1. Shown in fig. 2 is the weight % Au versus the weight % Ag for this series of coins. The % Ag ranges from a low of 3.7% to a high of 96.2%, a factor of 26.0; the % Au ranges from a low of 0.00984% to a high of 0.679%, a factor of 69.0. More important, there is a general correlation of the gold content with the silver content. From these and many other data we can conclude that what is important is not the % Au but the amount of gold *relative* to that of silver. We report this ratio as "mg Au/100 mg Ag," in effect, the weight % gold per 100 weight % silver. And this is one of the ratio values that we obtain directly from Method 2. It is independent of the amount of other metals such as lead, tin, or nickel, that we do not detect. Shown in fig. 3 are these gold:silver ratios for the Sasanian coins. The values range from a low of 0.266 to a high of 0.776, a factor of only 2.9.

The gold:silver ratio data are plotted in fig. 3 and other graphs in this paper using a logarithmic scale ranging from 0.0001 to 1.0. The lower value is approximately our limit of detection of gold relative to silver. The upper value is approximately the maximum gold impurity level we find in silver coins. The reason for using a logarithmic scale is that the trace-element contents of geological samples tend to display a logarithmic distribution of values. For this reason, we also calculate averages and standard deviations of the impurity ratios based on their logarithms. It is this gold:silver ratio that we use in drawing conclusions in this article. It is also used by B. Stallard, G. Lill, and J. Lasser in their presentations published herein.

The uncertainty in the gold:silver values depends to some degree on the magnitude of the value. For gold-impurity levels in the range of 0.0100-1.0000, the ± is about 10% of the value. Below 0.0100 mg Au/100 mg Ag, which is characteristic of the Potosí silver, the ± is about 0.0010-0.0030 and, therefore, can represent a ± of much more than 10%. This is because of a very small, but variable, amount of gold impurity (about one part per billion) even in the high-purity quartz we use. These two effects place a lower limit of about 0.0001 Au/100 Ag on the reliable detection of gold in the metal rubbing.

Usually three repeat samples were taken from the same cleaned spot on the edge of a coin. If the gold-impurity values were consistent, as was usually the case, then the values were averaged.



If the first sample especially was high or if the repeat samples showed a marked decrease in gold level as we progressed from samples 1 to 2 to 3, then we would select the lowest value or the average of the two lowest. The reasoning is that since gold is the least corroded of the metals being analyzed, any corrosion losses at the surface of the more reactive silver would result in aberrant high gold:silver ratios, unlike the true levels a little further into the coin.

Identification of Coins with Potosí Silver

Apparently each silver source has its own characteristic, but slightly variable, gold:silver impurity ratio. We have been able to show that, in some cases, it is possible to correlate the gold:silver ratios with the mint marks on the coins, to differentiate between coins minted in different locations where each relies on different silver sources,[8] and, in other cases, to identify modern fake silver coins or metallic works of art by the fact that they have too little gold impurity.[9] The distinction between silver sources is, of course, easier if there are wide differences in the gold-impurity levels of the silver sources. If different silver sources were used but the sources had similar levels of gold-impurity, then differentiation is not possible.

Although we ascribe differences in gold:silver ratios directly to differences in these ratios in the silver ores, an alternate explanation is possible. If the type of silver ore being extracted at two sites was chemically different (Ag metal at one, AgCl at another, for example), then different ore purification and, if necessary, smelting procedures would have been used to extract the metal. If the procedures being used altered the gold:silver ratios to different extents, then the final gold-impurity levels in the refined silver would be different at the two sites. The end result of course will be the same; silver from two different ore sites will have different gold levels. Therefore, we will continue to refer to differences in gold:silver ratios as though they were due entirely to differences existing in the original ores.

It is rare for ancient/medieval and even sixteenth-seventeenth century silver coins to have gold-impurity levels less than about 0.0200 mg Au/100 mg Ag. Some early Athenian coins are one exception. Apparently one silver source used by the ancient Greeks had a very low level of gold impurity. What makes this study possible is that Potosí silver coins also have a very low gold-impurity content and this level of gold impurity is markedly different from that in Mexican and European silver coins.

Table 1 GOLD IMPURITY LEVELS IN SILVER COINS OF POTOSÍ

Table I: Gold Impurity Levels in Silver Coins of Potosi

[8] A.A. and J.P. Gordus (above, n. 1); A.A. Gordus, *Methods* (above, n. 1).

[9] A.A. and J.P. Gordus (above, n. 1).

Owner*	Streak No.	Ruler	Year, Assayer	Mint	Denomination	mg Au / 100 mg Ag
BWS	S-45, 131/2	Philip II, 1556-98	B	Potosi	0.5 Real	0.0026
BWS	S-187/8	Philip II, 1556-98	R	Potosi	1 Real	0.0011
BWS	S-44, 129/30	Philip II, 1556-98	B	Potosi	1 Real	0.0021
JMcP	S-47, 87, 8	Philip II, 1556-98	A	Potosi	1 Real	0.0003
ANS	G-137, L-560-2	Philip II, 1556-98		Potosi	1 Real	0.0013
ANS	G-136, L-557-9	Philip II, 1556-98		Potosi	2 Real	0.0021
AAG	C-4212	Philip II, 1556-98		Potosi	2 Real	0.0010
BWS	S-171/2	Philip II, 1556-98	B	Potosi	2 Real	0.0014
JMcP	S-46, 85/6	Philip II, 1556-98	A	Potosi	2 Real	0.0014
ANS	L-555/6	Philip II, 1556-98	B	Potosi	4 Real	0.0016
BWS	S-185/6, 271-3	Philip II, 1556-98	A	Potosi	4 Real	0.0010
BWS	S-173/4	Philip II, 1556-98	B	Potosi	4 Real	0.0027
BWS	S-175/6	Philip II, 1556-98	B	Potosi	4 Real	0.0011
BWS	S-177/8	Philip II, 1556-98	B	Potosi	4 Real	0.0012
ANS	L-553/4	Philip II, 1556-98	B	Potosi	8 Real	0.0018
BWS	S-193/4	Philip II, 1556-98	R	Potosi	8 Real	0.0003
ANS	L-1091, S-3, 4	Philip II, 1556-98	B	Potosi	8 Real	12.1
ANS	L-1093, W-7-9, S-5, 9	Philip II, 1556-98	A	Potosi	8 Real	0.0018
ANS	L-1095, W-10-12	Philip II, 1556-98	A	Potosi	8 Real	0.0070
BWS	S-179/80, 262-4	Philip II, 1556-98	B	Potosi	8 Real	0.0004
BWS	S-181/2, 265-7	Philip II, 1556-98	B	Potosi	8 Real	0.0011
BWS	S-183/4, 268-70	Philip II, 1556-98	B	Potosi	8 Real	0.0001
BWS	S-191/2	Philip III, 1598-1621	R	Potosi	2 Real	0.0043
ANS	L-1085, W-13-15	Philip III, 1598-1621		Potosi	8 Real	0.0018
ANS	L-1087, 8, S-1, 2	Philip III, 1598-1621	R	Potosi	8 Real	0.0008
ANS	L-1089	Philip III, 1598-1621	B	Potosi	8 Real	0.0027
JMcP	S-95/6	Philip IV, 1621-69	1630-40	Potosi	0.5 Real	0.0068
JMcP	S-97/8	Philip IV, 1621-69	1630-40	Potosi	0.5 Real	0.0017
JMcP	S-99/100	Philip IV, 1621-69	1630-40	Potosi	0.5 Real	0.0021
AAG	C3077	Philip IV, 1621-69	1664	Potosi	1 Real	0.0035
AAG	C4259	Philip IV, 1621-69	1621-32, P	Potosi	2 Real	0.0015
ANS	G-138	Philip IV, 1621-69		Potosi	8 Real	0.0068
AAG	C-4256	Philip IV, 1621-69	1630	Potosi	8 Real	0.0018
ANS	J-85/6	Philip IV, 1621-69	1664	Potosi	8 Real	0.0044
ANS	J-83/4	Philip IV, 1621-69	1666	Potosi	8 Real	0.0045
AAG	C4213	Charles II, 1665-1700	1673, E	Potosi	2 Real	0.0032
AAG	C4214	Charles II, 1665-1700	1681, V	Potosi	2 Real	0.0020

*AAG = A. A. Gordus, ANS = Am. Numismatic Society, BWS = B. W. Stallard, JMcP = J. McPherson

AAG C4215 Charles II, 1665-1700 1687, VR Potosi2 Real 0.0019

Analysis of 38 Potosí coins spanning a time period of ca. 120 years shows an average gold level of 0.0017 mg Au/100 mg Ag. These data are given in Table 1. Omitted from the average is the one coin of Philip II from the ANS collection with a gold level of 12.1. The gold content of this 8-real coin is so high, about 11%, that it roughly doubles the intrinsic precious-metal net value of the coin. The coin has a slightly yellow color and its gold content could be easily determined by even the simple touchstone technique. This coin is either a mint error that escaped detection, was made directly from gold/silver artifacts stolen from the Incas, or was deliberately fabricated to have this high gold content. If the last, it may have been intended to be passed as a coin of about 90% gold. This would be relatively simple to achieve by acid washing the coin to remove most silver and copper near the surface leaving a surface layer of very high gold content.

As part of this ongoing study we have analyzed 143 Mexican, European, and Islamic coins that predate the discovery of the Potosí hill of silver. The number of pre-Potosí coins of each country that were examined is summarized in Table 2. Of these 143 coins, only three, two talers of 1548 from Bohemia and one 1544 coin from Hungary, contained very low gold-impurity levels. Apparently a silver source in central Europe, probably in the region of Bohemia, possessed low gold levels. All other pre-Potosí-dated coins had gold levels clearly exceeding those of Potosí coins. Thus, if a post-Potosí-discovery European or Islamic coin showed the very low Potosí levels of gold impurity, it can be inferred with relatively high certainty that it was made of Potosí silver, especially if it was a coin issued by a country that would have been expected to have had access to Potosí silver at the time the coin was issued.

Table 2 NUMBER OF COINS ANALYZED

Region/Country	Number with Date* < ca. 1550	Number with Date* ca. 1550-1700	< 0.0100 mg Au/100 mg Ag Number	< 0.0100 mg Au/100 mg Ag % of 1550-1700
Mexico	20	10	0	0%
Potosi	-	38	37	100%
Spain (incl. Barcelona)	35	51	11	22%
Portugal	-	5	1	20%
England	12	93	0	0%
France	24	99	0	0%
Low Countries	3	99	1	1%
Central Europe	11	42	1	2%
Italy	28	98	14	14%
Ottoman (Turkey)	4	22	0	0%
Sefavid (Iran, Afghanistan)	3	40	0	0%
Moghul (India)	3	151	0	0%

*Dates range from late 1400s to very early 1700s.

*Dates range from late 1400s to very early 1700s.

Total:	143	748	28	4%

A total of 700 post-1550 European and Islamic coins were analyzed to determine which have the low gold levels characteristic of Potosí silver, which we define as less than 0.0100 mg Au/100 mg Ag. The number from each country is listed in Table 2. Of these coins, only 28 (identified in Table 3) have the low levels of gold associated with Potosí silver. The surprising outcome of this study was that the fraction of post-1550 coins having Potosí silver was so small. It is possible that a few additional coins were made of mixtures of new and old silver (Potosí and European silver, for example), since old coins were sometime melted down together with new silver, or mixtures of silver from more than one silver source (e.g. Mexico and Potosí). It does not take much added silver having a high gold-impurity level to increase a low gold level markedly.[10] However, the composite data do not suggest that this is an important factor in the coins we have analyzed.

The gold-impurity data obtained for the 891 coins we analyzed are summarized in this paper in graphical form as figs. 4 and 5. Expanded versions of the data for Spain and Italy are given in figs. 6 and 7 with the identification of the mint cities noted on the graph. In almost all cases, these gold-impurity data are the average of two or three successive streak samples. The actual numerical data and coin identifications, including coin owners, are listed separately in a series of tables, copies of which have been put on file at the American Numismatic Society, the coin rooms of the British and Ashmolean Museums, and the Cabinet des Médailles of the Bibliothèque nationale, whose curators allowed us to obtain rubbings from their coins.

The Scope of the Problem

The purpose of the research on which this paper is based is to elucidate the connections between a precious metal and the economy of early modern Europe. Contemporary observers, such as Azpilceuta of the School of Salamanca,[11] and distinguished historians, such as Earl Hamilton,[12] have concurred that the silver from the New World mine at Potosí had an enormous impact on the European economy. Indeed, Hamilton carefully estimated price changes in commodities of all kinds and demonstrated in detail the inflationary process at work in Spain. Other historians, such as Spooner,[13] saw the same processes at work in France. Until recently, this economic process was connected conceptually to an increased supply of silver, an increase which could also be estimated from mine records and shipping manifests. The connection seemed so clear to observers and historians that the mechanisms through which the increased supply of silver entered the economic system of early modern Europe remained unexplored. An obvious intermediate process between the production and refining of silver ore and economic change was coinage. While it is true that silver shaped into sumptuary articles such as drinking vessels or sacred objects such as monstrances could be used as means of exchange, the coins of the period could be expected to be the major conduit through which silver made its way from the mine in the Viceroyalty of Peru into the marketplaces of Europe.

[10] A.A. and J.P. Gordus (above, n. 1).

[11] M. Grice-Hutchinson, *The School of Salamanca* (London, 1952).

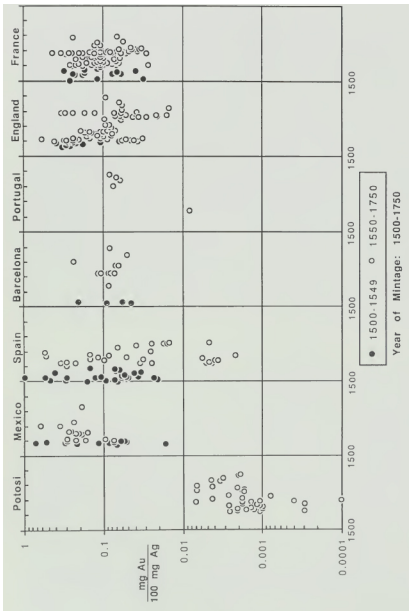
[12] E.J. Hamilton, *American Treasure and the Price Revolution in Spain* (Cambridge, MA, 1934).

[13] F.C. Spooner, *The International Economy and Monetary Movements in France, 1493-1725* (Cambridge, MA, 1972).

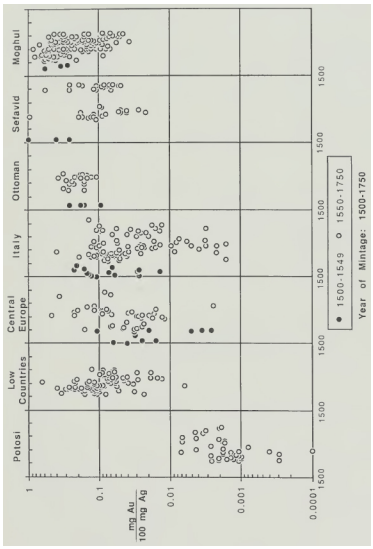
Table 3 28 POST-1550 COINS WITH POTOSÍ LEVEL OF GOLD IMPURITY

Country	Ruler	Mint	Date	Value	Weight, grams	mg Au / 100 mg Ag	Owner*	Streak I. D.
Spain	Late Charles V or Philip II	Toledo	1550-1598	1/2 Real	1.55	0.0058	BN	K88/9
Spain	Philip II	?	1556-1598	4 Real	13.49	0.0047	BN	K133-5
Spain	Philip II	Granada	1556-1598	2 Real	6.83	0.0052	BN	K136-8
Spain	Philip II	Lorcuna	1556-1598	2 Real	6.79	0.0058	BN	K139/40
Spain	Philip II	Valladolid	1556-1598	4 Real	13.60	0.0037	BN	K128/9
Spain	Philip II	Valladolid	1556-1598	1 Real	3.43	0.0044	ANS	G147
Spain	Philip II	Toledo	1556-1598	1/2 Real	1.63	0.0022	ANS	G148
Spain	Philip II	Granada	1556-1598	2 Real	6.83	0.0046	BN	J1063/4
Spain	Philip II	Granada	1556-1598	4 Real	13.56	0.0040	BN	K120/2
Spain	Philip III	Aragon	1621	1 Real	2.96	0.0053	BN	K189/90
Spain	Philip IV	Segovia	1628	4 Real	13.38	0.0048	BN	K187/8
Portugal	Philip II	Portugal	1556-1598		1.19	0.0084	BN	K1182/3
Netherlands	Philip II	Tournai	1592	1 Daldre	33.07	0.0062	BN	K912/3
Germany		Brunswick	1639		1.42	0.0025	AAGC	-4269
Italy	Biennial Doges	Genoa	1594	Solidino	9.56	0.0086	BN	K1010/1
Italy	Biennial Doges	Genoa	1616	Solidino	9.63	0.0097	BN	K1014/5
Italy	Biennial Doges	Genoa	1617	Solidino	9.13	0.0022	BN	K1016/7
Italy	Conrad II	Genoa	1617	Solidino	9.51	0.0031	BM	K391-3
Italy	Giovanni Luca Chiavari	Genoa	1628	Solidino	8.36	0.0080	BM	K395/6
Italy	Leonardo Torro	Genoa	1631	1/2 Scudo	18.43	0.0058	BM	K457-9
Italy	Giovanni Francesco Brignole	Genoa	1636		9.43	0.0032	BM	K397-9
Italy	Giovanni Battista Larcano	Genoa	1643		5.73	0.0074	BM	K437/8
Italy		Genoa	1682		37.84	0.0031	BM	K478-80
Italy	Philip II	Milan	1556-1598	1/2 Ducatone	15.86	0.0016	BM	K655-7
Italy	Philip IV	Milan	1622	Ducatone	32.10	0.0016	BM	K633-5
Italy	Pasquale Cicogna	Venice	1585-1595	Scudo	30.51	0.0022	BN	K1098/9
Italy	Marino Grimani	Venice	1595-1605	Scudo	31.08	0.0039	BN	K1108/9
Italy	Giovanni Bembo	Venice	1615-1618	Scudo	29.76	0.0050	BN	K1116/7

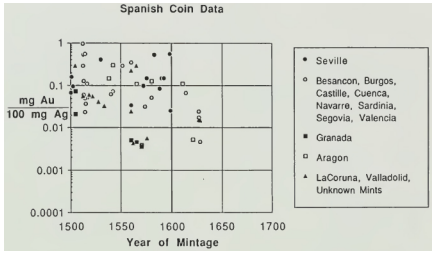
*ANS = Am. Numismatic Society, BM = British Museum, BN = Bibliotheque Nationale (Paris).



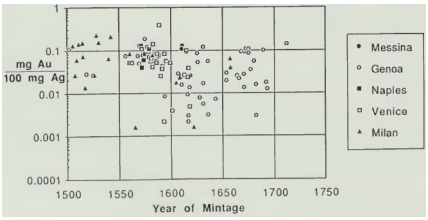
4. Gold:silver impurity levels in Potosí, Mexican, and European coins



5. Gold:silver impurity levels in Potosí, European, and Islamic coins



6. Gold:silver impurity levels in Spanish coins, identified by mint



7. Gold:silver impurity levels in Italian coins, identified by mint

When this research first began more than a decade ago, the research question focused on the amount of the Potosí silver expected to appear in coinage and the dates of these appearances.[14] In addition, the presumed absence of Potosí silver in some coinage, primarily English coinage, was to be confirmed. As the research progressed, a major paradigm in economic history began to shift. An approach which sought to confirm the presence of the American silver and to estimate its influence also shifted. The focus moved to an investigation of where the metal actually did appear. The analyses reported here were developed to ascertain where silver from Potosí could be identified in the coinages of the Iberian peninsula, England, the Spanish Netherlands, the cities of Italy, France, trading cities in Central Europe, and the Islamic world.

A review of the findings presented in the graphs, shown as figs. 4 and 5, reveals that very little Potosí silver could be found in the European coinage. Predictably, Spanish coinage of the period had the highest percentage at 22%. If the coinage of Barcelona, which contains no Potosí silver, is omitted, then 31% of the remaining Spanish coins were made of Potosí silver. Analysis of five coins from the rest of the Iberian peninsula showed one made of Potosí silver, and Italy, the center of the arms industry of the period, has the next highest percentage of Potosí silver at 14%. This is a predictable finding since the Spanish Crown was known to be among the best clients of Italy's many armorers. The Low Countries' coinage has very little Potosí silver; only one such coin was found. And, contrary to the expectations of many distinguished economic historians of France, extensive analysis of the coinage of the period reveals no trace of Potosí silver. England, as expected, has shown no American silver in the coins analyzed. New analyses were conducted recently on Central European coins and the gold level associated with Potosí silver was found in only one 1639-dated coin from Brunswick. Other new, extensive analyses of Ottoman (Turkey), Sefavid (Iran, Afghanistan), and Moghul (India) coinage, considered a possible entrepot for American silver, revealed that no Potosí silver could be detected in those coinages.

A major difference between historical research and other types of scientific research is that those who work with coins or other historical materials can use only surviving evidence. There is no way to know whether surviving materials resemble all materials of the period or are different from them. Therefore, we do not know whether the coins which have been studied are representative of the coins produced in the period. Further, the great collections from which our samples came may contain certain types of surviving coins but not others. While this difficulty cannot be overcome, steps were taken to select coins for analysis which could be considered as more likely to contain Potosí silver than other coins. The underlying logic was that coins of higher denomination as well as coins early in a series of fixed-type coins were more likely to have been made from the new silver. Finally, whenever historical documents indicated that American silver was present in an area, coins from that area were chosen for study.

[14] A.A. and J.P. Gordus, E. Le Roy LaDurie, and D. Richet, "Le Potosi et la Physique Nucleaire," *Annales: Economies, Societes, Civilisations* 1972, pp. 1235-56; A.A. and J.P. Gordus, "Potosí Silver and Coinage of Early Modern Europe," H. Kellenbenz, ed., *Precious Metals in the Age of Expansion* (Stuttgart, 1981), pp. 225-41.

If the data presented in the graphs do adequately represent the metallic profile of early modern European and Asian coinage, the silver from Potosí, which in the words of the Dominicans at Salamanca "made all things so expensive," had little impact on the coinage except for Spain and Italy. Even there, the impact, and presumably the real economic effect, was small.

A number of related questions arise for consideration. First, it is clear that the simplistic monetary explanation of the inflation of the sixteenth century is seriously flawed. While the evidence adduced here is not the first to raise serious concerns about the Hamilton thesis, it provides compelling evidence that other factors, such as pressure of population upon a relatively rigid agricultural sector, explain increases in food prices much better than any monetary explanation. Indeed, British and Scandinavian food prices were rising as rapidly as continental prices. Further, some price rises have now been shown to predate the mining of the silver.

A second question concerns the other ways in which American silver could have been somewhat influential in European market economies. Clearly, it is possible that coins minted in the New World could have circulated in that way and could have been used in bulk for some transactions.

A third question is related to the ultimate destination of the American silver. Some was used for non-monetary purposes, such as the decorative arts and jewelry and, in that form, could have remained outside the economic system for centuries, or could have been used for collateral for loans. Still, such utilization could not have accounted for most of the silver. There is also a possibility that some of the silver could have found its way even farther east in Asia, and that possibility requires further study.[15]

[15]This study would not have been possible without the gracious cooperation of curators at the American Numismatic Society, the British Museum and Ashmolean Museum Coin Rooms, and the Cabinet des Médailles of the Bibliothèque National, all of whom allowed us to take metal rubbings from their coins. Numerous undergraduates also assisted in this study and their help in irradiating coins and performing the data reduction has been invaluable.

The Early Lima Mint (1568–1572)

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Trial and Error

The study of the origin of the Lima mint has been difficult due to misleading information which has been carried forward from one author to another and to the lack of published documents on the subject. Ismael Portal notes that "one of the first actions of Pizarro after founding the city (Lima) was to establish here a mint."[1] Later he indicates that Charles V approved the creation of a mint in Lima by a royal decree dated May 11, 1535:[2] It is our wish, and we order, that in the cities of Mexico, Santa Fe de el Nuevo Reino de Granada and in the Imperial Villa de Potosí there should be mints with suitable staff and personnel for their operation. In the margin: "The Emperor D. Carlos and the Queen G (Juana) in Madrid May 11, 1535."

It is obvious that the law could refer only to Mexico, as Santa Fe (Bogotá) was founded only in 1538. The mines of Potosí were discovered in 1545 and the city became the Imperial Villa in 1547. Moreover, Lima, although founded January 18, 1535, is not even mentioned in the law.

If not Pizarro, then other officials in charge of Lima and the Viceroyalty, had for some time implored the Council of the Indies to establish a mint. In the late 1540s, the king answered that, following the return to Spain of Pedro de la Gasca, who had settled the insurrection of the Pizarros in Peru, he would have a better knowledge of the needs of that realm and would then decide on the mint issue. La Gasca arrived back in Seville in September 1550 but no decision was forthcoming. In 1551 the council wrote to Charles V reminding him of his offer.[3]

The demands for a mint continued into the next decade. Viceroy Andres Hurtado de Mendoza wrote in 1556 and viceroy Conde de Nieva in 1561 repeated the need for a mint.[4] Finally, by a letter from Nieva to Philip II on December 26, 1562, we know that the king had asked him to indicate the most convenient place to build the "Casa de Moneda."[5]

[1] Ismael Portal, *Cosas Limeñas* (Lima, 1919).

[2] *Recopilación de las Leyes de Indias* (Madrid, 1682), Book 4, Section 23, *Ley Primera*, vol. 2, p. 30.

[3] J.T. Medina, *Monedas Coloniales Hispano-Americanas* (Santiago de Chile, 1919), p. 148.

[4] Medina (above, n. 3), p. 149, cites the Mendoza letter, dated September 15, 1556, from "Colecciõn Torres de Mendoza," vol. 4, p. 99. The Conde de Nieva wrote on the issue on April 28, 1556.

[5] Archivo General de Indias (AGI), Lima: 92A.

Lope García de Castro succeeded Nieva after the latter's death. Castro wrote once more to express the need for a mint in the Viceroyalty and mentioned that by the time he left Spain in 1563 the "ordenanzas" and all the documents required to establish the mint had been prepared and needed only the royal signature.[6]

The Ordenanzas of Segovia

Finally the law creating the mint was signed by Philip II at El Bosque de Segovia on August 21, 1565. In the introduction to the ordenanzas the king clearly states that he knew of the problems afflicting the land due to the lack of coinage, a hardship for all and especially the poor, and therefore he had decided that it was necessary to establish a mint in Lima.[7]

When the governor, Lope García de Castro, received the ordenanzas he hastened to write to the sovereign on June 3, 1566,[8] that the mint would be of great benefit for the country; but three months later, on September 22, 1566, Licenciado Juan Bautista Monzón wrote the king to complain that Castro had done nothing about the mint.[9]

The 1560s were an especially conflict-laden decade for the Viceroyalty of Peru. The conquest and the civil wars were over and the old men "who had won the land for themselves and their children" were continually displaced by groups of bureaucrats arriving from the Peninsula who took the best positions, both social and political, for themselves. García de Castro meanwhile was informed, it seems, of Monzón's accusation and on October 1, 1566, wrote to the king that he had begun to work on the mint, but as there was no one there qualified to superintend production of the coins, he suggested that somebody be sent from Spain.[10] Castro repeated his request by letter of April 2, 1567. In that letter he also suggested that in addition to the Lima mint, another should be established in La Plata since it was close to Potosí and there was an ample supply of firewood there.[11] Again on December 20, 1567, García de Castro insisted on the need for mint officials, and revealed a very interesting detail concerning the location of the mint. "In the Government House I believe would be a place to establish the mint in such a manner that we will have together the Presidency, the foundry, the mint, and also the jail."[12] This letter and other references make it clear that the original Lima mint was established where the Presidential Palace today stands, at the Plaza de Armas and not at the later location "Campo del Fraile" or where the present mint stands on Moneda Street.

Finally, on February 7, 1568, Castro informed the king that he had found the persons he required for the mint and hoped to start the coinage within one month.[13] We should not be misled by this letter, as some historians

[6]AGI, Lima: 92, Nov. 20, 1564.

[7]AGI, *Contaduría*, 1683, Sec. 5. An original copy of the "ordenanzas" is in Seville. It is photographed and published in H.F. Burzio, *La Ceca de Lima* (Madrid, 1958), pls. 21a-g.

[8]AGI, Lima: 92.

[9]AGI, Lima: 92

[10]AGI, Lima: 92.

[11]AGI, Lima: 92.

[12]AGI, Lima: 92.

[13]AGI, Lima: 92.

have, to think that the mint started operations in March 1568. New documentation in Seville has pointed to September 2 of that same year as the occasion of the first official ceremony at the mint. Alonso Rincón, an assayer, who had been in Peru since at least 1558, made available to the engraver Antonio de Bobadilla his identifying "R" so that the coins made with the silver he assayed could be marked. The document detailing this event was signed by the official scribe, Joan de Iturrieta.[14] On that same date Baltazar Tercero was named supervisor and the witnesses were Juan de Evia, master of the scales, and the guardian Nuño Carvajo; both of whom were related to the house of Castro, as was a nephew, Lope de Mendaña, who was named treasurer of the mint, all of whom were by then already appointed to their mint positions.[15]

The first silver received in the mint was registered on September 6 and the next day four minters were appointed to start production immediately. The list of all the employees of the first mint during Mendaña's administration is as follows:

Treasurer	Lope de Mendaña Osorio
Assayer	Alonso Rincón
Die Sinker	Antonio de Bobadilla
Master of the Scales	Juan de Evia
Scribe	Joan de Iturrieta
Guardian	Nuño Carvajo
Supervisors	Baltazar Tercero
	Pedro Naxerá
	Pedro Bautista
	Miguel García (appointed 1569)
Minters	Diego Amaro
	Diego Hernandez Ayllon
	Cristobal de Villafana
	Alonso Gonzales

Before November 27, 1568, all the silver delivered to the mint came from the royal treasury (real hacienda) but on that date we find a note about the reception of 118 marks, 7 ounces 4 ochavas brought to the mint by the silver merchant and later Potosí assayer Juan Ballesteros Narvaes.[16]

The End of the Plata Corriente

On November 2, 1568, the audiencia declared January 1, 1569, as the terminal date for the circulation of plata corriente. The councillors and their president made it clear by public notice that the transition period was being allowed so that the earlier silver issues could be spent, marked, or coined, and that as of New

[14]AGI, *Contaduría*, 1683, Sec. 5.

[15]AGI, *Contaduría*, 1683, Sec. 5.

[16]The silversmith Narvaes arrived in Honduras from Spain January 31, 1564. After working as a silver broker in Lima, he is known to have been employed at the Potosí mint in 1575; see Maria Rostworowski, *Etnia y Sociedad* (Lima, 1977), p. 238.

Year's Day, plata corriente could no longer circulate, not even that on which the 20% royal tax had been paid.[17] The audiencia also explained that contracts established before November 2, stipulating payment in plata corriente, had to be paid at 1 1/4 real each tomin and 10 reales per peso: that is, at 2 reales more than the minted peso.[18]

Two days later Juan Sanchez de los Ríos, as delegate of the Lima merchants, claimed they would lose much by that exchange rate and that the problem could be solved by "providing that those who owed in plata corriente could pay with assayed money reduced 25%, the difference of many years standing between the 'ensayado' and the 'corriente'."[19] The audiencia adopted the arrangement advanced by the merchants.

At the end of 1568, and in the first days of 1569, some 8-real coins, not authorized by the ordenanzas of 1565, were produced. Some numismatists have claimed that the extremely rare 8-real pieces minted in the early Lima mint were patterns or even fakes, but it is now known that they were officially coined with the approval of the audiencia, a fact that helped Mendaña against the accusation that he had those struck against the orders of the king. Not only the entries made by the mint specifying the 8-real pieces, but also documents that will be mentioned later, remove all doubts about the nature of these coins.[20]

From late 1568 until October 11, 1569, the mint produced its coins regularly; according to a letter signed by Gregorio Gonzales de Cuenca to the king dated February 6, 1571, 29,597 marks were made into coins.[21] The date October 11 is of special importance because it seems that Mendaña's administration ended then or soon after. Dr. Gabriel de Loarte prosecuted Mendaña and the other mint officers on several charges, one of which was the minting of the 8 reales mentioned above. This trial was long and tedious but after influencing the right people and after the loss of important documents, all were absolved of the charges.[22] Since one of the accusations was that the mint had produced coins of less silver content than officially decreed, all persons in possession of these coins were called to weigh them, and from July 29 through August 2, 32 individuals presented a total of 105,080 reales of which 10% were found to be underweight.[23]

At the end of September 1570, the Viceroy Francisco de Toledo named two new officers to the mint: Xines Martinez, its second assayer, and Cristóbal de Segovia, its first blanqueador.[24] But the corruption that had been hinted at since the end of 1569 became fully apparent in February 1571. On the sixth, Cuenca revealed how the Mendaña administration had cheated the royal treasury and how some pages of the trials had been

[17]AGI, *Contaduría*, 1683, Sec. 5.

[18]AGI, *Condaturía*, 1683, Sec. 5.

[19]AGI, Nov. 4, 1568.

[20]Discussed in detail in Eduardo Dargent Chamot, "Los Reales de a ocho acuñados en Lima en 1568 y 1569," *Cuadernos de Numismatica* Oct. 1985, pp. 21-26.

[21]AGI, Lima: 270.

[22]The charges and outcome of the trial against Medaña and other officers of the mint are detailed in AGI, *Justicia* 463.

[23]AGI, *Justicia* 463.

[24] B.T. Lee, ed., *Libros de Cabildos de Lima* (in 22 vols.), 7 (Lima, 1935), p. 54. The blanqueador was charged with restoring the "natural" hue to newly minted silver and gold.

purposefully lost;[25] on the twelfth, Licenciado Ramires de Cartagena also addressed the king to say that the ordenanzas he had issued in 1565 had not been adhered to. Nevertheless, Cartagena argued that despite the existing problems, the Lima mint should not be closed since to do so would impose great hardship on the poor.[26]

A month and a half later, on March 28, the spokesman for the audiencia Licenciado Vizcarra informed Philip II that "the work of the mint in this city is coming to an end" and that "there are very few reales and almost nothing is being coined and although in the mint and tools—much money of the royal treasury has been spent, there would be no problem if the work stops."[27]

On March 8, 1570, Philip II caused the dies of the American coins to be changed to make them similar in type to those used by the peninsular mints. On July 28, the die sinker Roxini received an initial payment to prepare the punches and other instruments to be sent to Mexico and Lima;[28] on April 24, 1571, Ramirez de Cartagena informed the king that he had received the order to change the dies and that it would be done as soon as they arrived. He added, "although today not even a peso is minted,...when the dies arrive, whatever is coined will be done with them," confirming that by this date the Lima mint had ceased operating.[29] Nevertheless, viceroy Toledo informed the king on March 1, 1572, that the new punches sent by him to stamp gold and silver and to make coins had arrived and would be used accordingly.[30] Some coins of the new dies were made in Lima, since examples are known with the initial "X" of Martinez.

Due to the paucity of silver arriving at the mint and the previous complications with the officers, viceroy Toledo urged a change in location of the mint to the vicinity of Potosí which, he argued, was the "fountain" from which all the silver of the kingdom flowed.[31] The audiencia of Lima opposed Toledo's decision, arguing that the city had a heavy financial investment in the mint. In the end an agreement was reached, as reported by Medina, by which half of the equipment and tools were sent to the mountains and the other half stayed in Lima.

Soon after the transfer of the tools and machinery, the Lima mint quarters were transformed into the jail of the audiencia.[32] Toledo at about the same time wrote from Cuzco to the king informing him that Lima "had kept half of the tools and with them they are doing some work" but also pointed out that the Lima mint was of no use and that no coins issued there were to be seen at ten leagues from the city.[33]

[25]AGI, Lima: 270.

[26]AGI, Lima: 270.

[27]AGI, Lima: 270.

[28] A.F. Pradeau, "Grabadores en la Ceca de Mexico," *Gaceta Numismatica* 33 (June 1974), p. 31.

[29]AGI, Lima: 270.

[30] Medina (above, n. 3), p. 155.

[31] Lee (above, n. 24), 7, p. 473.

[32] Medina (above, n. 3), p. 156.

[33]AGI, Lima: 28.8, Sept. 24, 1572.

Years later, Toledo recognized the mistake of leaving Lima without a mint, and on August 31, 1577, he named Luis Rodriguez de la Serna as treasurer of the new Lima mint; soon after the mint was working again. In this second period of the mint, which ended in 1592 according to the last payment of the royal minting tax,[34] the silver was assayed by Diego de la Torre, who used a "D" and a star as his mark, taken from the arms of the city.

This second period of the Lima mint, which is beyond the scope of this paper, has been well studied and much information on it has already been published. Those interested may refer to Medina, Burzio, and Sellschopp.

[34] J.J. TePaske and H.S. Klein, *The Royal Treasuries of the Spanish Empire in America* (Durham, NC, 1982), 1, *Peru*, pp. 284-91, summarize the relevant documents from the AGI. The minting tax is included in the Lima mint accounts through 1587 and again in 1592.

Documentary Evidence Regarding the La Plata Mint and the First Issues of Potosí

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Before the founding of the mints in Lima, La Plata, and Potosí, financial transactions often depended on "plata corriente"—unstamped, privately issued coins made of silver alloyed with various quantities of copper, tin, or lead. This situation was accepted out of custom and pure necessity although it was a source of problems for private individuals and especially for the Indians. At the same time the Spanish royal treasury was deprived of its income from the quinto—applicable to precious metals at the minehead—which was impossible to collect on this silver.

This illegal traffic, however much tolerated, justified the founding of the Lima Mint in 1565, which began to strike coins two years later. Its output, however, was not sufficient to meet the needs of Peruvian commerce or to replace the plata corriente. The mint alternated its coining with prolonged periods of inactivity. The viceroy, Francisco de Toledo, reluctantly had to authorize the continued circulation of the plata corriente, an authorization renewed on two later occasions.

Determined to undertake severe measures to end this abuse, the viceroy in a decree of May 20, 1571, ordered the sealing of the Luis de Berrío mine on the hill of Potosí as well as all other copper mines in order to prevent the use of this metal in alloys with silver to produce the low-grade coinage. On November 22, he decreed a period of four months for those who possessed plata corriente to have it melted down, assayed, and marked under penalty of forfeiture.

Much earlier, it had been recognized that the only way to eliminate totally the bad silver money was to increase the production of coins to replace it, which implied the founding of new mints. After meeting in Lima with several officials to study the matter, the viceroy undertook in mid-1572 a trip through the main cities under his jurisdiction. The officials had agreed that the founding of a new mint was necessary: some advocated founding it in Arequipa, while others preferred the town of Potosí because of its abundant silver supply.

During this trip, viceroy Toledo visited La Plata, at that time comprising ca. 700 buildings, of which 60 were of some importance and another 250 were one-storied and of good construction. Among the latter there were a large number of shops employing craftsmen of all kinds. La Plata had been founded by Pedro Arzures under orders of Francisco Pizarro at an unknown date in 1539, following cruel warfare against the area's natives, the Chuquisaca and Charca Indians. Until 1555, La Plata was legally a "villa", or town, and afetr that date had the status of a city. Viceroy Toledo met there with the most important residents, judges of the royal audiencia, and members of the city council. After explaining to them the reason for his visit, he

was persuaded to install the new mint in that city. The La Plata dignitaries set forth three reasons to persuade him: 1) that the employees of the mint would be dissuaded from thefts through fear of the presence of the audiencia in the same city; 2) that the cost of living was lower than in Potosí; and 3) that the abundance of firewood and coal would facilitate the melting of the metal, whereas in Potosí there was barely enough fuel for their present ovens and extraction industries.[1] According to Vigñale, the viceroy considered the rest of the arguments, such as climate, superfluous or "trivial and exaggerated," and he decided to dismiss them.[2]

Viceroy Toledo must have reached his decision toward the end of August 1572, for Dr. Barros communicated it to the monarch from that city on September 8. He called it "advantageous" and said that he had been commissioned to acquire the building in which to install the press, using money from a suit won against the heirs of a certain Tomás Vázquez.

Viceroy Toledo issued a directive which was to provoke serious conflicts and confrontations: he required that Lima send to him all the tools and machinery of the which had been inactive since 1570. The Limeños saw it as the dismantlement of a mint founded by royal decree of Phillip II on August 21, 1565, and constructed at a cost of more than 30,000 ducats. They maintained that the move to La Plata could not be made without authorization of the monarch. The order was defied, especially by the judges of the audiencia, whose spokesman was Ramírez de Cartagena.

In a document authored years later in Potosí, Alonso Rincón noted that the order was transmitted to an official, Altamirano, "ordering him to take apart said mint and convert it into a jail or residence for judges and royal officials, and send all machinery and tools of said mint to this province. Said Altamirano carried out the order. Some persons and officials of said city and said mint sued against the transfer in the audiencia of said city."[3]

As a result they sent only half the dies and machinery and on January 27, 1573, having officially protested the new authorization as unlawful, they composed and sent a fully documented protest and complaint to the king. They were certainly right when they affirmed that in La Plata, "with the salaries of the employees they cannot live, nor will anyone manufacture coins there given the expensiveness of land and the fact that things cost twice what they do here...."[4]

Viceroy Toledo also wrote to the king justifying his conduct and noting, among other things, that the complaint lodged against him in Lima was motivated by his having hurt the private business ac- tivities of the judges. In an official document of September 24, 1573, he announced that the dies and machinery were already in La Plata.

Meanwhile he organized a small staff of employees by ordering to that city, among others, Alonso Rincón, in order to work there in his double capacity of assayer and engraver, just as he had at the Lima Mint.

[1] Pedro Juan Vigñale, *La casa real de moneda de Potosí* (Buenos Aires, 1944).

[2] Vigñale (above, n. 1).

[3] Archivo General de Indias (AGI), Patronato: 190, "Provansa ffecha en la Villa Ynperial de Potosí a pedimento del procurador de las Haziendas y patrimonyo real de Su Magestad."

[4] J.T. Medina, *Monedas coloniales hispanoamericanas* (Santiago de Chile, 1919).

Thereby he was able to send to the king, enclosed in his letter of December 20, 1573, "as a sample, the first coin struck—and the new stamp—after the founding of the mint in this province."[5] Years later Rincón was to state in Potosí that before the founding of this mint "some coinage was struck in La Plata while His Excellency was there. The coins were struck with a part of the machinery that should have been there: it being necessary to round up the rest by borrowing and by making some indispensable items themselves. They were borrowed from silversmiths and other craftsmen-engravers who owned them: without such equipment it would have been impossible to strike coins."[6]

To carry out the ephemeral production of the mint, the viceroy counted on the personal labor of Miguel García, who was put in charge as minter. In the testimony given years later in Potosí (1575) García recalled: "about twenty months or two years ago more or less, while this witness was at the Huancavélica Mines, he was ordered by His Excellency to strike two thousand marks of silver, which order he carried out. As soon as they were finished, he ordered me to come to Potosí in order to strike the rest of the coins which were to be made in the mint which he had ordered founded in Potosí...."[7]

Another important witness was Juan de Iturrieta, treasurer of the Potosí mint in 1575, who had been present at the coining. The viceroy's order was that "in the residences where the president of the audiencia lived the striking of the coins was to commence...." Nevertheless the witness pointed out that by then there were doubts "whether in said city it was wise to set up said mint because the businessmen and private persons would have greater costs than the profits they could realize, having to transport their silver from Potosí to be struck in said city. Since from said city it would not be possible to supply said money to this site and the rest of this kingdom, His Excellency later ordered that said mint be founded and made in Potosí...."[8]

At this juncture the viceroy himself must have already become aware that the Limeños' criticisms had a basis and that his decision to install the mint in La Plata had been unfortunate. He therefore decided to establish the mint permanently in Potosí. Before doing so he ordered coins to be struck there in order to justify his policy in this matter and took care to send a sample to the king. The coinage in itself was inconsequential and was so completely unnoticed that even in Lima they did not know of it. Since the Lima officials believed that nothing had been struck there, in January 1574, the audiencia addressed the king regarding the failure of the mint in Alto Peru:[9] As to the mint we already wrote to Your Majesty about what had been done and how inconvenient the location would be besides the high cost. Also what had been invested in the Lima mint, which was founded by order of Your Majesty who had sent employees and dies for it. Also how unwise it would be to dismantle this mint or set up any other without express orders from Your Majesty. In spite of all that [Viceroy Toledo] undertook to dismantle this one—which is so necessary—and to set up the other one—which cannot be supported. The result is that neither here nor there is any money coined at all. In the Mint out there, there will be no coining unless it is after a great lapse of time and at great cost.

The viceroy had his share of the blame for acting in this manner evidently influenced by the pressure of the La Plata officials. On later recognizing that he had erred in his choice, he ordered the striking of the

[5] Medina (above, n. 4); Vigñale (above, n. 1).

[6] AGI (above, n. 3), fasc. 10v, 11.

[7] AGI (above, n. 3), fasc. 16v.

[8] AGI (above, n. 3), fasc. 10v, 11.

[9] Medina (above, n. 4).

2,000 marks and enjoined the city council to ensure delivery by the citizens of their silver to be converted into coins. As was to be expected, the response was negative and nobody turned in his silver for coining. This was exactly the justification which Viceroy Toledo was looking for to communicate his irerevocable decision to found the mint in Potosí and move to Potosí all the tools, dies, and machinery to be found in La Plata. Here is his description in his official communication, section 37, to the king on March 20, 1574:[10] In reference to the mint about which I wrote to Your Majesty at length in my earlier dispatches, it was of great importance to this dominion to bring it up here for the following reasons: the silver—except that which contained mercury—could not be revalued and raised to its legitimate value because it was undervalued; the fifths tax of Your Majesty could not be collected on all the plata corriente, thus producing so many losses to Your royal treasury; it was not possible to prevent many swindles and much cheating which occurred every day in calculating the percentage in which the corriente should be adjusted in order to find their equivalent in assayed money; the commonwealth was deprived of the many functions for which money serves. Since it was understood that there was not enough silver here for coining, I had two thousand marks coined by the means I described in a previous letter. I requested the city council to procure silver for coining and they did not bring any at all. Neither was it possible for Your Majesty to have here the royal taxes, which were paid in neither Lima nor here, So the mint established in Potosí in buildings belonging to the crown, as I wrote that it would. There it is being minted and the minting is with the advantages and utility for the reasons that Your Majesty will see and as is contained in the royal ordinances that have been printed.

But the La Plata officials were not in agreement and on December 24, 1573 (that is, a few days after receiving the news officially), wrote to the king urging, "that [Toledo's action] not be consented to because, above all, there sits here an audiencia that can oversee the employees in charge of the minting. Also the weather in Potosí is bad and its inhabitants do not live there themselves [*sic*]."[11]

The situation must have been disagreeable for the viceroy, but he did not back down. On the contrary, Viñale points out that in answer to the arguments from La Plata, viceroy Toledo put forth his own views.[12] In the first place, he pointed out, there was a corregidor at Potosí, and the regulations governing mints assigned to the mayors and corregidors the responsibility to inspect them and exercise jurisdiction over their staffs. Toledo recommended that improved supervision and a less cumbersome legal process be achieved by sending two judges and a president with a prosecutor and two officers to reside in Potosí. These officials, he wrote "'would hold court to supplement the audiencia here [in La Plata]; I am convinced that this would serve the general welfare of this realm and Your Majesty's other kingdoms as well. The only opposition to this course of action arises from private interest.'" As for the cost of living, it was actually lower in Potosí, since mint officials—the ones most directly concerned—demanded only two reales in seigniorage, due to the large amount of money to be coined there, whereas the cost for coining in La Plata would be three reales. Moreover, the high cost of fuel in Potosí was a result of the recent disorders; without them the low cost of Indian labor for hauling goods would lower prices, and If one were to use the low-grade silver that circulated up to the present for coining, a great deal of firewood would be necessary to smelt it to the prescribed fineness; but since in fact a mercury-silver amalgam is to be smelted, only a very small amount of charcoal is required and there is no reason to deforest the mountains near Potosí.

[10] Roberto Levillier, ed., *Gobernantes del Perú. Cartas y papeles, siglo XVI. Documentos del Archivo de Indias*. 14 vol. (Madrid, 1921-26), 5, pp. 375-76.

[11] Medina (above, n. 4).

[12] Vigñale (above, n. 1).

He added other reasons that had made the transfer of the mint advisable and, Medina says, the transfer took place "on a date which is not given explicitly in the records, but ought to have been at the end of 1574 or the beginning of the following year."[13]

The Founding of the Mint in Potosí

Two early writers, Bartolomé Arzáns in his *History* of Potosí, composed in the first half of the eighteenth century, and Pedro Vicente Cañete in his *Guide to Potosí* concluded in 1791, give 1572 as the year of the founding of the Potosí mint.[14] Arzáns says that in mid-December of that year work started on the foundations of St. Lawrence Church "and on the same day work started on the great mint and royal bank because in that same year by order of his excellency the mint that had been established earlier in Lima was transferred to this Imperial Town. The reason for the move was that commerce had to be carried out using unstamped silver which they called plata corriente. Nine reales of corriente were given for eight of the official issue, hence the term peso [weight] and piece-of-eight reales for the highest denomination."[15]

The Bolivian traditionalist, Modesto Omiste, transcribes in his *Potosí Chronicles* the same information given by Arzáns but without mentioning that this author, unpublished at the time, was his principal source. On citing Omiste, Medina states that he considers the date to be in error because the viceroy, while in La Plata, "began there the manufacture of coins toward the end of 1573; however after a few months—in December of the following year or slightly later—decided to transfer it to Potosí, as he in fact did on an unspecified date, which nevertheless ought to have been at the beginning of 1575."[16]

H.F. Burzio, writing in 1958, states, "the Potosí Mint was installed between the end of 1573 and the beginning of 1575. The proof is that a letter of the viceroy himself states in 1574 that they were already coining money." Further on he continues, "from the fragment of the letter transcribed—dated March 3, 1574—one sees that when Viceroy Toledo wrote it the mint was already operating. That means that its installation must have bewen carried out toward the end of 1573 or beginning of the following year."[17]

We have seen how, at the end of August 1572, the viceroy established the mint in La Plata, which the citizens of Lima complained against in their letter to the king of January 27, 1573. On September 24 of that year, the dies and machinery were already in La Plata, and on December 20 it was possible to send the sample of the first coin minted to Phillip II. In that letter Viceroy Toledo says nothing about the founding of the mint in Potosí. Four days later, however, the outraged La Plata people wrote to His Majesty asking him to order the viceroy not to make the change: that is, not to close the La Plata mint and found another in Potosí.

[13] Medina (above, n.3).

[14] P.V. Cañete, *Guía histórica, geográfica, física, política, civil y legal del Govierno e Intendencia de la Provincia de Potosí* (1791), Armando Alba edition (Potosí, 1952).

[15] Bartolomé Arzáns de Orsuá y Vela, *Historia de la villa imperial de Potosí* . 3 vol. (Providence, RI, 1965), Bk. 5, Ch. 1.

[16] Medina (above, n. 3).

[17] H.F. Burzio, *Diccionario* 2, s.v. "Potosí."

Evidently in that period between December 20 and December 24, the viceroy must have communicated to the judges of the audiencia of La Plata and made public his decision to found the mint in Potosí. Burzio is correct in affirming that the mint was founded in December 1573.

Attorney Ravanal, prosecutor of the Charcas audiencia, in a letter to the king, opposed the transfer of the mint to Potosí: '"having founded the mint in Potosí is, in my opinion, a great disservice to Your Majesty because the site of Potosí has expensive food, firewood, and coal and this city [La Plata] is much cheaper and thus we can coin at less cost. Besides Potosí is very cold and its climate is bad for minting: during four months out of the year they cannot strike coins without their cracking....' "[18]

Nevertheless Viceroy Toledo's decision was irrevocable and immediately after making it he went to Potosí. There he met with the city councillors and other important persons, whom he consulted regarding the appropriate neighborhood and building in which to set the mint up. It was decided to install it in the center of the Crown's buildings where the royal fifths were to be collected, on the south side of the Rogocijo Plaza in front of the main church and on a site called "El Pedregal." Toledo ordered that adobe bricks and other elements for the construction of the building be supplied at the expense of the royal treasury. He put the architect Gerónimo Leto in charge with Alonso Rincón as advisor, who gave "orders as to how said buiding was to be constructed and how to coin the said money."[19]

Rincón was a versatile person who, although his specific crafts were assaying and engraving, knew in depth how to construct and operate a mint. He acted as an indispensable advisor to the viceroy. In his previously cited deposition of 1575 he affirms that he had "much experience" because he had engaged in these crafts for "more than forty-five years in these dominions and in New Spain and in the Kingdom of Spain," further stating that he was then more than 55 years old.[20]

Almost certainly he was the son of Alonso del Rincón, who also pursued the crafts of assayer and engraver and started work in the Mexico Mint at its beginning in 1535. After starting as assayer, in 1542 he was named engraver of the mint. Later transferred to Spain, he died in Madrid in 1555. Another son, Francisco del Rincón, held the post of engraver of the Mexican Mint from 1542.[21]

Alonso Rincón must have learned his crafts at his father's side and worked at them in Mexico, later moving to Lima to work in that city's mint as assayer and engraver. He occupied this post from 1568 until 1570, when it is recorded that he was replaced by Xines Martínez. Rincón's work is recognizable by the tiny initial "R" that appears on all the column-type coins minted during that period. As noted, on the viceroy's order he went as assayer and engraver to La Plata and when this mint was closed he went on to Potosí in the same posts.

Juan de Iturrieta also came to Potosí from La Plata and was named treasurer of the mint. Miguel García was to be minter and Gerónimo Leto was named pressman. Leto was in charge of the construction of the building, for which he was paid 8,231 pesos of plata corriente according to a payment order issued in Arequipa on September 27, 1575.

[18] Roberto Levillier, *La audiencia de Charcas. Correspondencia de presidentes y oidores*, 1 *1561-1579*, p. 423.

[19] AGI (above, n. 3), fasc. 11.

[20] AGI (above, n. 3), fasc. 11v, 16.

[21] A.F. Pradeau, *Numismatic History of Mexico from the pre-Columbian Epoch to 1823* (Los Angeles, 1939).

Juan de Iturrieta was treasurer until early 1576, when he died. Some years earlier he had worked as a scribe in the Lima mint and was trusted by the viceroy, with whom he became an efficient collaborator during the visit to Potosí in 1574. His assistant was Alonso López Barriales, who took his place upon his death but who was ousted shortly thereafter because of multiple irregularities.

Once the Potosí mint building was finished, the first furnace was built "with all speed and diligence," in just one month; three more were soon added. There they melted the silver-producing bars or ingots from which the planchets were cut that went to the minter for conversion into coins. Foremen were in charge with their craftsmen and black slaves. Although each oven was fit to deliver 1,000 marks of silver per week, the mint stopped work altogether after having coined only a negligible quantity during all of 1574. Nobody had brought in silver to be coined, despite the best efforts of the Potosí officials.

The situation changed in 1575; in August of that year three furnaces were working; the fourth was inactive "because they did not have slaves or machinery necessary for said operation." For this reason the assistant treasurer, López Barriales, requested permission to buy four slaves at the expense of the royal treasury. Viceroy Toledo authorized the purchase but later decided that it was not logical for the crown to assume the risks and upkeep of slaves. He therefore ordered them delivered to the foremen in order "that they pay for them in installments deducted from their profits" until the slaves were fully the property of the foremen.

In order to outfit the mint, the viceroy had the dies and machinery brought from La Plata and again demanded that the Lima officials send him the rest of the equipment in that building which was shut down. After several months he got them to send him another shipment, but his efforts to obtain what he needed were in vain and in 1574, he ordered the machinery to be manufactured in Potosí. It cost the Crown, besides the delay, an expensive 20,000 pesos extra since the iron and steel had to be bought at twice what it cost in Lima; the labor costs were similarly high since there were no specialists in Potosí. About this, Alonso Rincón notes that to prepare a die in Lima cost him a ducat (somewhat less than a peso) whereas he could not do it in Potosí for less than three pesos.[22]

Machinery was lacking in the assayer's office (assay weights, hammers, springs, tongs, molds, and assaying vessels); likewise in the foundry (bellows, shovels, and bars of iron); and the engraver complained about the lack of files, sinks, and dies. Despite legal requirements, neither was there in Potosí any standard peso or mark which was to be kept according to the royal ordinances in the safest of strongboxes.[23]

All these inconveniences combined to produce a slowdown in the work of the mint such that during the entire year of 1574 only some 60,000 pesos worth of coins were produced. It is likely that, if all the instruments and machinery had been sent from Lima, the mint could have struck between 300,000 and 600,000 silver pesos from the date of its founding.

One of the principal steps taken by the viceroy as soon as the mint was installed was to start its coining immediately. Aside from the income this deposited in the royal coffers, it was the only way to remove from circulation the plata corriente. Ironically, the center of production and shipment of corriente coins for the whole of Peru continued to be Potosí.

[22]AGI (above, n. 20).

[23]AGI (above, n. 20).

Therefore, on February 28, 1574, in an order directed to the officials of the royal treasury of that city, the viceroy set forth, "In fulfillment of what his majesty has commanded, ordered, and directed me to do: I have had established in that town the mint in order that in it be manufactured the quantity of coins necessary for the commerce of these dominions. Since traders and private persons are not at present bringing in silver to be coined in said mint, it is fitting that from the treasury of his majesty silver be taken to coin some silver marks so that everyone may become accustomed to said process."[24] He ordered the treasurer to convert into reales up to 2,000 marks "in order that with them coin production may begin in said mint and so that its employees not be idled."[25]

Four months later the situation had not changed. The treasurer, Juan de Iturrieta, expressed the view that because the mint was new and because the local inhabitants still did not understand the advantages in having legal coins, they had not brought in silver to be minted. Viceroy Toledo, by order of June 26, raised to 6,000 marks the quantity of coins to be minted at the expense of the king, a figure later raised to 10,000 in order that "the kingdom move forward in supplying itself with money." This situation worked against the viceroy's own policies, especially against this requirement that the Indians be paid in reales. Toledo decided to prolong the circulation of plata corriente four months longer. In sum, 1574 passed without the mint having coined anything except what was taken from the royal treasury.

Faced with this situation, Viceroy Toledo ordered Attorney Recalde, of the audiencia of La Plata, to initiate an investigation of possible illegalities and commissioned Luis de Hoyos, prosecutor of the treasury and estates of His Majesty, to carry it out. Consequently, in February 1575, the latter undertook a formal investigation in Potosí, in the course of which testimony was taken from the most important officials of the mint as well as other persons. They had to reply to an 11-part questionnaire, which today constitutes one of the most important sources of information about the early stages of the mint.[26]

From then on Viceroy Toledo decided to resort to more drastic means. Taking into account that his previous orders had been published but not obeyed, he ordered on February 9, 1575, that the bars of mercury-silver be confiscated when they were brought in for the fifths tax, and a fourth of them turned over to the treasurer of the mint to make reales. Later he authorized the royal officials to retain the fourth part of the silver which had paid the royal fifths tax in order to make coins out of it. But these measures were not considered sufficient to give the mint the momentum the viceroy sought; he decided to obtain a more stable supply of silver by auctioning off the monopoly for refining the ore. The auction took place on April 27, 1575; the highest bidder, Juan del Castillo, "contracted to deliver to the mint, in each of the three years of the contract, sixty thousand marks of silver—assayed and marked—with a fineness of 11 dineros and four grains, to be converted into reales at the rate of 20,000 marks every four months. He was assigned two of the furnaces and the third was reserved for government use. Calculating 67 reales for each mark, each year should have had an output of 502,500 pesos. Adding the production of the "common" third furnace—which at best would

[24]Archivo National de Bolivia (ANB), Charcas. Minas. 133, fasc. 63v, 64.

[25]AGI, Casa de Moneda de Potosí, Libro Real de Provisiones, 1571-76, Cajas Reales 30. This file is particularly valuable for the early history of the mint. Some paragraphs have been published by Medina (above, n. 3) without citation.

[26]AGI (above, n. 25).

turn out a quarter or a fifth as much as Juan del Castillo's monopoly—the total would come up to 600,000 pesos, more or less."[27]

By the end of 1575, the Potosí Mint was operating with all four of its furnaces. This permitted the emission and circulation of enough royal coins to drive out the plata corriente, the use of which had been prohibited by the viceroy in his edict of March 15, 1575. That edict put a drastic end to the problem: "not having paid attention to the warnings to cease using the bad silver circulating in this town, within three days all plata corriente—be it good or bad—shall be melted down and all transactions shall take place using assayed, marked silver applying exactly the marked value of each coin."[28]

This edict was rigorously enforced in Potosí and in the rest of Peru. In refining the great quantities of plata corriente, the loss of face value ranged from one-third to one-half. At the same time the viceroy ordered Alonso Rincón to cut several "royal markings" to apply to the fine silver to show that the royal fifth had been paid. One of these was escorted by Attorney Herrera to "tierra firme" (Central America) where the circulation of the bad Upper Peruvian coins had caused serious trouble. In 1575, the viceroy also composed his famous ordinances for the operation of the mint, basing them on the ones used for the installation of the Lima Mint and adapting them to the conditions and peculiarities of the Potosí region. They were delivered to the treasurer and scribe of the mint and governed the various crafts, rights, and duties of the employees.

The Coins of La Plata and Potosí

A royal decree of March 8, 1570, had standardized New World coinage with that of European Spain as it had been emitted there since 1566. Variations in its design were introduced; thus there appears on the obverse an imperial shield of Spain with all its dominions surmounted by a royal crown. On the reverse there is a cross with quadrants of castles and lions, closed by semicircles in their respective fields. This type coin is called the crowned shield to differentiate it from the previous column type. It began to be used in Lima in February or March of 1572, when it is estimated that the punches and burins arrived from Spain to cut the new dies.

La Plata and Potosí began operating well after this change of dies and, therefore, only manufactured coins with the crowned shield. Since they both used the initial P of the Lima mint, which identifies their common Peruvian origin, it is difficult to classify unambiguously what was struck in one or the other mint during the period when they operated simultaneously. Burzio did not differentiate between mints for the crowned shield pieces, classifying all those of the reign of Phillip II as coined at Potosí, leaving for Lima only the series of column type.[29]

The first scientific differentiation was made by Ernesto Sellschopp. He classified the coins with assayer's initial D as emissions of the Lima mint, based on the presence on almost all the pieces of a tiny star—the symbol of the city of Los Reyes or the Magi. The attribution of the initial D to the assayer Diego de la Torre was made on the basis of the latter's taking of the oath of office, registered in the *Libro de Acuerdos del Cabildo de Lima* on September 23, 1577.

[27] Cañete (above, n. 14), p. 160.

[28] Biblioteca de la Universidad Mayor de San Andrés (La Paz, Bolivia): Manuscritos. Provisiones del virrey Toledo. fol. 45.

[29] H.F. Burzio, *La ceca de Lima, 1565-1824* (Madrid, 1958), pp. 70-72; *Diccionario* (above, n. 17) 1, "Lima".

Later Sellschopp started a systematic, methodical study of all the crowned-shield coins and allocated to Lima more of those pieces that Burzio had previously attributed to Pososí. Besides the written documents, he used direct observation of the pieces, especially the artistic development of the castles and lions on the reverse and variations in the inscriptions.

His most novel theory pertains to the first strikings at La Plata and Potosí, denying that Ricón was assayer at either mint and proposing in his place an assayer B from Lima. On founding La Plata, among other machinery they sent dies with the initial of this assayer. At La Plata this assayer mark was erased and replaced with the initial C of the unknown La Plata assayer. On the failure of the La Plata mint, the same dies were sent to Potosí where they were once more adapted by superimposing another letter B on the C. "Until the arrival or preparation of new dies, this reworking was the simplest and quickest way to get the new Potosí Mint underway as was so desired by Viceroy Toledo," as Sellschopp puts it.

On the basis of the discovery in the General Archives of the Indies in Seville of the questionaire answered by order of viceroy Toledo in 1575, it can now be confirmed that Alonso Rincón was the assayer and engraver of Lima who later went to La Plata and Potosí in the same capacities. Medina's original attribution is therefore correct.

The theory about obliterating the dies and repunching them with a C for use in La Plata and then again retouching them for Potosí is very original, but it is inconsistent with the known contemporary documentation. By means of that documentation we now know that the coins struck in La Plata in December 1573 were samples of the crowned shield variety with the initial of the assayer Rincón, as were the first coins manufactured at Potosí.

Moreover, there exists a key document that not only discredits this attribution of Sellschopp's, but requires that we review everything that has been classified up to now regarding the crowned-shield coins of Lima, La Plata, and Potosí.

As noted, following the foundation of the Potosí mint in December 1573, it was totally inactive for a large part of the next year. During March 1574, 2,000 silver marks were coined, and 6,000 more in June, all of which were struck from silver supplied from the royal treasury. These 8,000 marks amount to coins worth 68,000 pesos, which agrees fairly well with the testimony of a witness in the judicial inquiry cited who gives for that year an emission of approximately 60,000 pesos.

Beginning in 1575, the situation changed as the mint gradually achieved a steady output. Remember that in that year Juan del Castillo started his activity, having committed himself to delivering 60,000 silver marks annually at a rate of 20,000 every three months. Considering that his contract took effect in April, in the remaining months of 1575 what he delivered must have amounted to about 40,000 marks, making an estimated value of more than 300,000 pesos in silver delivered by the contractor alone without counting what private citizens put in.

A short time before, the viceroy had made a decision which had a major impact on the Peruvian coinage. It was the order to strike, for the first time during his governorship, coins of 8 reales. This edict, which took effect in the first days of April, states in its central part:[30] In order that the contracting parties have more incentive to bring in silver for coining, many people have urged me to order said mint to mint 8-real coins. Despite the fact that in the ordinances governing the mint there is no provision for making 8-real

[30]ANB (above, n. 24), fasc. 61-63.

coins, they urge that the sinks and dies necessary be cut. I note that throughout the realms of Spain they do so whenever the need arises. In Los Reyes City [Lima], where in the first place said mint was founded, Governor Castro and the audiencia of that city permitted and ordered that said 8-real coins be made and minted, and in fact they did so. That being the case and because said coin is so necessary for commerce, it is my will and I so order Juan de Yturrieta, present treasurer of said mint and who shall continue as treasurer, to make and mint 8-real coins there from now on until such time as His Majesty, and I in his royal name, deigns to order otherwise. For this purpose the engraver of said mint may and shall make the necessary sinks and dies subject to the condition that said treasurer and officers of said mint maintain their supervision over the work. Those employees shall be fined a thousand pesos who have failed or who fail to coin small coins such as quarter- and half-reales and 1-real pieces and those of 2, 4 and 8, as is commanded by the ordinances of His Majesty...."

This document helps to clarify several points regarding production of the crowned-shield coins, not only for La Plata and Potosí but also for the Lima mint. One observes that Viceroy Toledo mentions only two precedents for his decision to coin 8-real pieces: that in Spain it was done whenever the necessity arose; and that it was done in Lima when his predecessor, Lope García de Castro, was governor. In the latter case the reference is to the small production of eight-real pesos of the column type coined in that mint.

We can deduce, therefore, that from November 26, 1569, when Francisco de Toledo took charge of the viceroyalty, until the date of the edict, March 31, 1575, no 8-real pieces of the crowned-shield type were minted in any of the three Peruvian mints. This means we must discard Sellschopp's attractive theory about the pesos of the assayer C coined at La Plata and those of the same assayer corrected by superimposing an initial B for the first Potosí coins. Similarly, we can conclude that the 2,000 marks struck at La Plata were in small denominations, most probably in only one denomination, of either 1 or 2 reales. Such a small quantity would not have justified, given the precarious circumstances in which the mint started up, putting to work a whole legion of workers who would have not only had to manufacture the bars for each diameter, but also check their weights; correct, engrave, and adapt dies; and all other operations attendant to the minting process. It is inconceivable that they would have gone through all this to produce only 2,000 marks.

The coins of La Plata and the first pieces from Potosí all bore the initial of the assayer Rincón and until April 1575, were struck in denominations less than one peso. The La Plata Mint had a merely anecdotal existence and since its few coins were of the same type as those struck immediately afterward in Potosí, any serious attempt to identify them is to be disregarded.

Potosí's First Years

On founding the Potosí Mint in December 1573, viceroy Toledo named as assayer and smelter Alonso Rincón, who had had lots of experience in the field. Nevertheless his performance at the mint was strongly criticized when he clashed with Alonso López Barriales, assayer of the town. For each silver mark of .930 fineness (i.e. 11 dineros 4 grains), Rincón delivered 2,233 maravedis as against Barriales's 2,380, provoking frequent complaints from the customers.

Because of this standard the Potosí coins were of such fineness that four reales coined in America had an exchange rate in Spain of four reales and three blancas. It was also claimed that this excess of fineness was not really to be found in the coins; rather it wound up in the pockets of some employees of the mint who by these fraudulent means could profit from the strikings. The allegations regarding the bad assaying of

Rincón is substantiated mainly in the 50,000 pesos which were struck each year during the early days of the mint at the expense of the king, wherein the crown, in the words of Ravanal, lost "everything which is made here of greater fineness than in Spain."

We do not know the exact reason Rincón ceased to be assayer in Potosí—whether it was because of death or because he simply moved away. Given the scarcity of pieces of 8 reales with his initial R in contrast with the abundance of coinage with the letters B or A, it is doubtful that his term extended much beyond late 1576, for in November of that year Ravanal mentions him as an assayer "who was" of the mint. His successor was almost certainly Juan de Ballesteros Narvaez, even though we do not have documentary proof of his activity before 1581. We do know that ten years later, on petitioning for the formal assumption of the posts of assayer and smelter of the mint, positions which he had acquired in public auction, Ballesteros testified that he deserved them:[31] ...for more than sixteen or seventeen years serving Your Majesty in said posts and in many other things which came up and because of my great ability and competence and the great fidelity with which I served in said posts and the assaying and melting down of the bars, the long time I have served Your Majesty and the public benefit from the royal fifths tax and other exactions and for all other things for which an assayer is needed....

His claim that he served in the post for 16 years provides the date for the beginning of his tenure as 1575. We do not know whether he served in this capacity only in Potosí or also in Lima; nor do we know whether he was assayer only at the mint or also at the royal foundry; it appears that he occupied this latter post occasionally.

Ballesteros worked as assayer and smelter in Potosí on two occasions. He served first under the patronage of the viceroy until 1586, the year in which he was replaced by Juan Alvarez Reinaltes when he moved away from the town. Alvarez obtained the title Count of Villar from the viceroy in Lima on February 13, on which occasion he was described as "a person of ability and competence." He assumed the post formally on an unknown date in 1586; unfortunately it does not appear on the oath of office which he took before the officials of the mint. On the other hand we know that he promptly presented this document at city hall on November 27.

In January 1589, the mint was visited by Juan Gutiérrez de Monte Alegre where he conferred with Ballesteros, later describing him as a person of "much experience and rectitude, and "talented in the affairs of said mint." In that same year Alvarez, who identified his coins with an initial A, moved to Spain. The need to replace Alvarez being urgent, the treasurer of the mint once more named Ballesteros Narvaez to the posts.

By royal decree of October 4, 1589, Phillip II ordered that various posts be sold, among them those of assayer and smelter. At Potosí two distinct posts were put up for auction: one was that of assayer and smelter of bars of the town and the other involved the same duties at the mint, positions which until then had been held by persons appointed by the viceroys. Judging that they might be worth "a good deal," said the monarch, to them could be attached "some distinctions which would not amount to much and would not cost my treasury anything." The viceroy García Hurtado de Mendoza had the announcements of the auction broadcast in Potosí and Lima.

The posts of assayer and smelter of the town were won by Gaspar Ruiz for 50,000 Castilian ducats. He also received a seat on the city council, the right to fulfill his duties through assistants, 12 Indians to make

[31]AGI, Charcas 43.

coal, and the right to sell them to third parties. The posts of assayer and smelter of the mint were won by Ballesteros for 20,200 pesos to be paid one-third down, another third after two years, and the last third after four years. The formal document was issued by the viceroy in Lima on November 21, 1591, and obtained royal confirmation by decree of December 4, 1595.[32]

In addition to being a talented silversmith, Ballesteros was an affluent resident of Potosí who owned several veins of silver in the mountain. Earlier he had been an active supplier of silver ore to the Lima mint. It is not impossible that he served there as assayer since there are coins with an initial B attributed to Lima. His important business affairs often took him outside the town; since he had bought the posts with the right to exercise them by means of lieutenants, several such individuals occupied the office. Thus, on October 23, 1596, his brother Hernando Ballesteros advised the city council that, because of the absence of the owner, he would exercise said office as lieutenant. This activity by the brother, which continued into the reign of Phillip III (1598-1621), cannot be distinguished on the coins since he used the same initial B of his family name.

On the other hand, the work of Baltasar Ramos Leceta can be recognized. A former assayer of the royal foundries, he began his work toward the end of Phillip II's reign. He marked his coins with a monogram RL and later with a big, rustic R. His tenure continued through a good part of Phillip III's reign, judging by the abundance of coins with his mark. Because he was a lieutenant of Ballesteros, it is impossible to say exactly when he began and whether his tenure was sporadic or continuous.

During Phillip III's reign, an unknown lieutenant of Ballesteros marked the coins with an initial C. He must have worked a very short time only, given the great rarity of the pieces of 8, 4, and 2 reales known with his

[32]The different posts of assayer and of smelter of the royal foundries and of the mint have caused some confusion among coin collectors who assumed they were the same posts, based on incomplete information given by Medina (above, n. 3): "and to conclude with the little that we know regarding the beginnings of that mint, I shall state that during the term of Viceroy García Hurtado de Mendoza...Gaspar Ruiz bought the post of assayer for 50,000 ducats...." From this it was inferred that the coins of the end of Phillip II's reign which bear an initial R should be attributed to Ruiz. Ernesto Sellschopp, citing the "Record of the suit of 1500 of Gaspar Ruyz, principal assayer of the mint of the town of Potosí in Peru...," set forth his theory, which caused a protracted debate with this author in *Cuadernos de Numismatica* (vol. 1-2 [Mar. 1972-June 1973]). In reality, both Sellschopp and Medina depend on a letter from Viceroy Velazco to the king dated in El Callao (Peru) on April 16, 1598 (AGI, Lima 33), the text of which is: In Potosí, where all coins that circulate in this dominion are struck, during the governship of my predecessor, Marquis of Cañete, the post of assayer was sold to a Gaspar Ruiz, who still mans it. He paid 50,000 ducats for it and received a seat on the City Council; 1,200 assayed pesos per year in salary paid by the Royal Treasury; and other privileges that, although they were well conceded to fetch a better price for the post, cause a certain amount of trouble. The income he has, aside from the salary, are the bits which he takes from the bars to assay them, which, according to Viceroy Toledo's ordinances, shall weigh two reales.
The affected parties filed suit with Inspector Ullóa because Gaspar Ruiz took out three ounces in each assay, claiming this was justified by the costs of smelting. Thus arose a protracted litigation, the record of which was, in its printed version, used by Sellschopp. This document, except on the title page which mentions Ruiz as "assayer of the mint," nowhere deals with the specific task of a mint, that is, the minting of coins: in it there appear only problems related to the melting down of the bars. Furthermore, in that period the royal foundaries were also called "casas de moneda": for example in Quito or Loxa where no mints existed. In the list of positions in the Potosí mint, attributed to the treasurer, Cristóbal de Espinosa, this topic is covered as follows: "the assaying and smelting, which are two jobs, were sold to Juan de Ballesteros Narváez for 2,250 assayed pesos, including 2,000 pesos paid to Luis Guisado as bonder: he has six Indians and only those distinctions which the law grants as assayer of the mint. These two posts were sold by order of Viceroy García de Mendoza, Marquis of Cañete." (AGI, Lima 33).

mark.[33] More lengthy was the tenure of his successor, Agustín de la Quadra, who worked later than Ramos Leceta and assayer C. His abundant coinage continued until his death in 1616. We should also assume that there exist coins of Phillip III with the initial B of the proprietary assayer, although these early seventeenth-century issues are very rare.

Ballesteros died in 1615, prompting a lengthy process to select his successor. Since the office was vacant, the viceroy of Peru, the Marquis of Montesclaros, named as assayer Gaspar de Heredia in a title issued at Lima on August 20:[34] Joan [*sic*] de Ballesteros Narvaez, assayer of the Mint of the Imperial Town of Potosí, has died and it is necessary for the royal service of His Majesty to name another person of merit and trust in his place who will attend to said office. Since the requisites for said office are present in you, Gaspar de Heredia, I give this document by means of which in the name of His Majesty I appoint you as assayer and smelter of the mint of said town of Potosí.

Nevertheless, until now no coins have appeared which can be identified as those of Heredia. He probably did take office and exercised it, as was customary, through a lieutenant. We know the assayer with initial Q was succeeded by M, an unknown official who started minting coins without date in 1616 and continued with the first dated pieces in Potosí the next year.

Heredia died in July 1617. On July 2, 1617, the presiding judge of the Charcas audiencia named García de Paredes y Ullóa in his place "for the interim until his Excellency Prince Desquilache, viceroy of these dominions, deigns to appoint whom he pleases or whoever is most suitable." We know the performance of this assayer from the extremely rare coins dated 1618 that bear the monogram PA of his family name. In July 1618, his interim appointment ended when the viceroy named as his replacement Antonio Salgado. Salgado only collected the income from the office, naming as his lieutenant Juan Ximénez de Tapia. All these changes are reflected on the coins, as follows:

Assayer Initial	*Date*
Q	1615-16
M/Q	1616
M	1616-17
PA	1618
T/PA	1618
T	1618 onward

The Successors to Ballesteros

Among other favorable conditions, Ballesteros had acquired the posts of assayer and smelter in 1591 with the privilege of selling them to a third party; this was confirmed by a new royal decree of 1606. But according to a letter of the Marquis of Montesclaros of April 3, 1612, addressed to Phillip III, the monarch intended

[33]On some pesos the die was later retouched: on top of the C there appears a chiseled Q in a larger size for the new lieutenant Agustín de la Quadra. Karel A. Biegman writes about this assayer, whom I discovered, in his article, "The Lieutenant Assayer C at the Potosí Mint during the reign of Phillip III," *Cuadernos de Numismatica* 64 (Oct. 1988).

[34]ANB, Cabildo de Potosí 14 (1614-16).

to take the post away from Ballesteros, for he had an offer of 30,000 ducats for it. The viceroy opposed this action, arguing that it would be more profitable to leave him there "because he is fairly old and can be expected to vacate soon and Your Majesty will collect the part that you have coming for the sale and the offer of the new buyer may well be negotiated and accepted by Ballesteros to get out of the post free with a simulated renunciation.[35]

Thus it was that at the beginning of 1615, the year of his death, Ballesteros executed a formal renunciation of his posts in favor of Juan Baustista Fusilaserra "in whom are united the qualities and competence required to use and exercise it." The latter had to pay into the royal treasury one-third of the value of the posts and on that basis the viceroy granted him the title at La Plata on June 15, 1615. But two days later he appeared before the audiencia, petitioning to be excused from paying.

The dossier was assigned to the prosecutor, who doubted the power of viceroy Marquis de Cañete to sell the posts for two lifetimes since Ballesteros had entered "the auction of said post with the characteristic of exercising it for his lifetime and that of another person to whom he might renounce it sometime...." As the case was being studied, Fusilaserra himself renounced the post in favor of Juan de Ballesteros, Jr., in a document signed in Potosí January 5, 1616.

This chain of renunciations engendered drawn-out appeals and lawsuits. To further complicate the matter, María Ravaneda, widow of the original assayer Ballesteros, intervened alleging that the post had been bought during her married life and that therefore half of its value belonged to her "as the deceased had not left any other estate with which to satisfy her dowry."

Finally, the viceroy granted to Ballesteros, Jr. the title of assayer and smelter of the mint on January 19, 1619. He took office on June 26.[36] Finding Juan Ximénez de Tapia exercising the duties, Ballesteros confirmed him in it on July 2, 1619. Thus it is that we encounter the initial T of Tapia on coins of 1621, the year in which his successor, master silversmith Luis de Peralta, begins as assayer P.[37]

Peralta continued during the following years, although we have been able to document his activity only for 1621-23. Many coins of this period of the reign of Phillip IV are difficult to identify because they lack either a visible assayer initial or date.

On the death of Juan Ballesteros, Jr. in 1626, the posts were again put up for auction. They were acquired by Juan Martel de León for 80,000 pesos according to one document, 51,200 according to another. The new owner again delegated Juan Ximénez de Tapia as working assayer and his initial T appears again beginning in 1626.[38] Nevertheless, in 1628 and 1629, we again find the assayer Peralta active.

Juan Martel de León died November 7, 1632; the authorities declared the posts vacant and ordered them sold November 15 of that year. Juan de Figueroa finally won them for 85,000 pesos with the "condition and

[35] Kurt Dym, "Los ensayadores Baltasar Ramos y Agustín de la Quadra de la casa de moneda de Potosí," *Cuadernos de Numismatica* 12 (June 1985).

[36] ANB, Cabildo de Potosí 1.

[37] The P was for a long time erroneously attributed by others to Pedro Perez de Carrión based on a vague reference in Tomas Dasí, *Estudio de los Reales de a Ocho*, 2, pp. cxiv-cxv.

[38] ANB, Cabildo de Potosí, Acuerdos, 19, fasc. 178v.

qualification that I be able to attend and exercise said office of assayer and smelter by means of a person whom I shall appoint." Figueroa was a Spaniard from Granada and an influential citizen of Lima, where he was corregidor on the city council. The Viceroy Count of Chinchón delivered formal title to him on September 28, 1634. Since he had friends at court he obtained confirmation without problems, by order of Phillip IV on March 26, 1637; and by a royal decree dated December 2, 1648, received perpetual possession of the titles for himself and his successors.

The first act of the new owner on taking office as assayer and smelter was to appoint a lieutenant. Having received good reports about Juan Ximénez de Tapia "who at present uses and exercises said post," he confirmed him in it on October 1, 1635.[39] Because Figueroa lived in Lima, he designated Pedro Fernández de Oporto as his representative in Potosí. Fernández appointed and removed lieutenants according to his whims, thereby giving rise to protests and lawsuits which today provide us with an invaluable source of details about the officials who worked in the assay and foundry shops of the mint during the period.

Meanwhile, in October 1635, Pedro Treviño petitioned in Lima to have Miguel de Rojas, principal assayer of the city, examine him as assayer. Once he passed the exam he managed to have Tapia's appointment revoked in Potosí and have himself appointed in his place, taking office April 30, 1636. Since his predecessor had used the mark T of his family name, Trevino chose the monogram TR which, in various forms (including what appears to be FR), appears on the ongoing issues from Potosí.

The removal of Tapia gave rise to a long lawsuit during which the outgoing assayer defended himself as having "the qualities necessary to be not removed from said post because he is an intelligent person for the job due to more than twenty years of experience in said mint with the approval of his superiors and satisfaction of the said merchants and public welfare and the other employees of said mint." With regard to his successor he affirmed: "Pedro Treviño is not a knowledgable person for the needs of said post—as he has not worked at it ever in this town nor anyplace else—something which can be proven by examining him. One of the important things about said mint is that the exercise of said post should be permitted to no one who is not very expert."[40]

Nevertheless Treviño was confirmed and continued assaying coins with his initial at least until 1647. During some years he alternated the post with Ximénez de Tapia. Sometimes it was to spend time away from the town, sometimes to exercise other responsibilities, or to take leave to devote himself to exploiting the mines, something many other mint employees also did.

As for Tapia, he worked as assayer until 1646 when, having "decayed in his eyesight a lot because of his great age of more than seventy or eighty years [*sic*]," could no longer be punctual in attendance at smelting, provoking complaints from the merchants. He was replaced by Gerónimo Velázquez, who was assayer of the royal vaults of the town. Later Tapia again worked at his trade at the behest of the viceroy, the Marquis of Mancera, but soon the treasurer Ximénez de Cervantes was authorized to replace him permanently.[41] For this reason the initials T and V both appear on coins of 1646.

[39]ANB, Cabildo de Potosí, Acuerdos, 20 (1634-36), fasc. 324.

[40]Archivo Casa de Moneda de Potosí, Año 1636, 3, 17.

[41]Above, n. 40, 5: 31.

The Potosí assayer was again changed the following year. By a royal decree of August 1, 1646, Gerónimo Velázquez and Francisco de Uriona, assayer of Oruro, were sent to Spain accused of malfeasance.[42]

In August 1647, Luis de Peralta appeared before the treasurer petitioning for his replacement as assayer because of his age and poor health.[43] In his petition he affirmed that it was "indispensable and necessary that there be a person who can be present at the assaying and in the administration of this mint because it is an important function and cannot be carried out in a dilatory manner." He was succeeded by Pedro Zambrano "who will evidently exercise said office lawfully and in complete trust.[44] His appointment is dated September 4, 1647; the initial Z of Zambrano begins, then, in 1647, and continues for all coins of 1648 and on into 1649. In 1649, he was replaced by the new assayer Juan Rodríguez de Roas, whose assay mark is a letter O with a dot in its center.[45]

In reality, with the exception of Rodríguez, all these officials were lieutenants of Figueroa and later of Ramírez de Arellano. In fact Ramírez, who worked as chief engraver starting in 1640, rented the posts of assayer and smelter to Figueroa for 20,000 pesos a year. With the complicity of other employees and of town merchants, this permitted him to participate actively in frauds involving both the fineness and weight of the coins, a situation which worsened after 1648. Having under his control the offices of engraving, assaying, and smelting, Ramírez dominated all the operations of the mint. But of course his initial(s) do not appear on the coins of this era.

The king, on the basis of these irregularities and taking into account "the rampant greed and untrustworthiness of the assayers" ordered by royal decree of April 16, 1651, that "these posts not be bought....Let those of this kind be extinguished and in case of vacancies follow the new rule....Let them be carried out by the same person we appoint and in case they cannot be performed and it has to be a third person temporarily appointed by the post's owner, I warn you to take care that no substitute be admitted unless the owner be held fully responsible for the misdeeds and damages caused by the substitute and for their repayment."

It was pointed out by the viceroy, the Count of Salvatierra, that, although Figueroa was familiar with the value of these posts and the income that could be derived from them, he rented them for 20,000 pesos per year to Felipe Ramírez de Arellano, a sum very much higher than what they could generate legally. For that reason he suspected Ramírez of complicity in the frauds and ordered that he be arrested and treated "in accord with the seriousness of his guilt."[46]

The next year Salvatierra wrote a lengthy report to the king in which he acknowledged the problems created by the lieutenants and agreed with the monarch's opinion about prohibiting the sale of these posts. He reported having ordered Nestares Marín to buy them back "paying what the owner had paid" with the money

[42]Years later both of them returned to America and Nestares Marín ordered the arrest of Velázquez for the frauds committed in the fineness of the coins during the period he held the post of assayer of the mint.

[43]Archivo Casa de Moneda de Potosí, Año 1647, 5, 42.

[44]Like his predecessor, Zambrano was a famous silversmith, active since 1621; see Mario Chacón Torres, *Arte virreinal en Potosí* (Seville, 1973), p. 310.

[45]Bartolomé Arzans, in his *Historia de la Villa Imperial de Potosí* , invents the assayer Antonio Ovando, a name not confirmed by comtemporary documents.

[46]AGI, Lima 54 (official report of Viceroy Salvatierra to the king).

from the fines imposed. Regarding the participation of Juan de Figueroa, the viceroy confirmed that in the latter's rental to Felipe Ramírez, he forced him to collaborate in order to pay the rents, participating by this means in the fraud, and therefore had had Ramírez imprisoned in Lima. He reported that when Nestares Marín fined Figueroa 100,000 ducats, Figueroa "asked that it be paid off by the purchase price of said posts, which was done by mutual agreement and was resolved....Afterward another court order was sent by Nestares Marín in order that he be notified if within 60 days he [Figueroa] appear personally or send a person with power of attorney to settle the account and pay or receive whatever balance might remain." For this reason the viceroy advised the king "that this post is now free to be disposed of as best serves your interests," but that he was of the opinion that both this post and that of treasurer, which was also vacant, be sold.[47]

Despite the interest of Nestares Marín in bringing the coins up to the proper fineness, the assayer Rodríguez de Roas could not overcome all obstacles, including the fact that his coins were 6 grains under fineness, a situation soon solved by the change of design in 1652. Rodríguez de Roas was replaced in 1651 by Antonio de Ergueta; his initial E appears on the last coins with the crowned shield and on the first "column" coins of 1652.

APPENDIX
Potosí's Assayers (1573-1652)

Date	*Name*	*Initial*
1. Working Assayers		
1573-76	Alonso Rincón	R
1576-86	Juan de Ballesteros Narváez	B
1586-89	Juan Alvarez Reinaltes	A
1589-1615	Juan de Ballesteros Narvaez	B
	Baltasar Ramos Leceta	RL; R
	Hernando Ballesteros Narváez	B
	Agustín de la Quadra	Q
	Unknown lieutenant	C
1616-17	Juan Muñoz (?)	M
1617-18	García de Paredes y Ullóa	PA
1618-23	Juan Ximénez de Tapia	T
1621-24	Luis de Peralta	P
1626-37	Juan Ximénez de Tapia	T
1628	Luis de Peralta	P
1636-45	Pedro Treviño	TR
1644-47	Juan Ximénez de Tapia	T
1646-47	Luis de Peralta	P
1646	Gerónimo Velázquez	V

[47]AGI, Lima 56, viceroy's report of August 14, 1652.

1647	Pedro Treviño	TR
1648-49	Pedro Zambrano	Z
1649-51	Juan Rodríguez de Roas	#
1651-52	Antonio de Ergueta	E
2. Proprietary Assayers		
1615-17	Gaspar de Heredia	
1618	Antonio Salgado	
1619-26	Juan de Ballesteros, Jr.	
1626-33	Juan Martel de León	
1634-	Juan de Figueroa and his successors	
3. Leasing Assayer		
1646-49	Felipe Ramírez de Arellano	

Potosí's Treasurers (1573-1648)

Date	*Name*
1573-76	Juan de Iturrieta
	Alonso López Barriales
1576-77	Alonso López Barriales
1577-78	Juan Lozano Machuca
1578-80	Cristóbal de Espinosa Villasante
	Diego Cabeza de Vaca
1581-93	Pedro de Alvarado
1594-95	Luis de Isunza (executor of Alvarado's will)
1596	Felipe Godoy
1596-97	Cristóbal de Espinosa Villasante
	Gaspar Fernández de Espinosa
1598-1604	Nicolás de Garnica
	Juan de Miota
1604-38	Alonso de Reluz y Huerta
	Fernando Ortiz de Vargas
	Juan Rosel
	Alonso Sánchez Salvador
	Felipe Godoy
	Diego Hurtado Melgarejo
	Martín Salgado de Ribera
	Pedro de Elorriaga
	Juan Pérez Tamariz
	Símon de Heredia Quevedo
1638-39	Rodrigo de Espinosa Manrique

1640-48	Bartolomé Hernández
	Francisco Ximénez de Cervantes
	Alonso Sánchez Salvador
1648	Confiscation by Nestares Marin

The First Assayers at Potosí

K.A. Dym

Coinage of the Americas Conference at The American Numismatic Society, New York

When discussing the early assayers at Potosí, one has to distinguish between the assayers of the town and those of the mint. With regard to their different areas of activity, two dates should be kept in mind: the rapidly expanding mining operations were initiated soon after the rich silver ore had been discovered in 1544 on the slope of the Potosí mountain—the assayer of the town fulfilled certain duties in connection therewith; the activities of the mint in Potosí started only in March of 1574.

Throughout the lands of the Peruvian Viceroyalty, the Spaniards stationed assayers in mining centers like Oruro and Potosí and in places where the original inhabitants had accumulated precious metals as in Cuzco and Quito. These assayers were in office before the mints of Lima and Potosí existed, their official title being "Smelter and Assayer of the town of ...." Their responsibilities were to smelt the precious metals into bars, to assay the entire production of the area and to collect, in fact to separate, the tax of the quinto (one fifth).

In Potosí, with its huge production from the mines, the office was of great importance and included special amenities like a seat in the Cabildo, a yearly fee, and the service of up to 30 slaves.[1] The principal income of the office was obtained by retention of the samples or "bocados" taken from the bars for assaying. The size of those samples was a frequent source of complaint.

The special attention given the assayers of the town in this paper is to distinguish them unequivocally from the assayers at the mint. More about the town's assayers and their sequence during those early times can be found in the Appendix. Their responsibility was to verify the fine silver content of all the registered production of precious metal and to separate the fifth. The metal, cast in bars, was then returned to the owners, who were generally free to use them in transactions, have them transformed into coins or artifacts, or ship them to Spain. The only connection of the assayer of the town with the mint was that each bar taken to the mint had to bear the marks corresponding to its assay and separation of the fifth.

The assayers whose initials appear on the coins, and who were responsible for the fine silver content of the coinage, handled only the metal that was delivered by its owners to the mint. When not enough bars were submitted, silver would be transferred from the royal treasury where the separated pieces of the fifth were stored. Obviously not all metal brought for minting was of equal grade. By 1574 nearly all the silver was being extracted from the ore in Potosí by the amalgamation process and the silver obtained by this method was generally quite pure. However there were still some outlying districts that smelted ores directly and the grade of the final pro- duct would vary. The legal standard for the coinage was a proportion corresponding to 93.055% silver and 6.945% copper; the assayer of the mint was responsible for adjusting the metal

[1] "Memorial del Pleito de Mil y Quinientas de Gaspar Ruiz," in Biblioteca de Real Academia de la Historia, Madrid. Contains testimonies of many witnesses concerning activities and also prerogatives of the office of assayer of the town. On the first page Gaspar Ruiz is referred to erroneously as assayer of the mint, an error made clear on page 4 where offices of assayers of the "mint" are cited in towns which never had a mint, but where also assayers of the town were active.

accordingly, adding copper when the grade was too high or refining the alloy when the silver content was too low. In either case smelting was involved, the end product being poured in rods from which the blanks could be cut. The office carried the official title "Smelter and Assayer of the Mint of Potosí," and provided for six slaves but there were no other special amenities. The expenses, including charcoal, were covered out of the assayer's proportional share of the minting charge and by retention of samples of a certain limited volume taken from the crucibles of smelted metal.

Beginning in 1617, the Potosí coins bear dates; from then they are relatively easily classified. For the period before 1617, the historical sequence of the assayers and thus of coinage with their corresponding initials, has gradually come to light, partly by revision of earlier studies and partly as a result of investigations by Cunietti-Ferrando, Dargent and the present writer. The information is summarized in Table 1 below, including the early Lima series; illustrations follow the text.

The coins of series L1 and L2 are of the original colonial pattern issued under Charles V (Carlos I in Spain) with the PLVS VLTRA motto across the pillars of Hercules on reverse, as in Mexico, but with the correct name of Philip II, including "II" which was eliminated in the next die pattern. Series L3 and L4 and all the listed P series were struck with the new dies per the royal order of March 8, 1570, with the crowned shield bearing the arms of various lands and provinces under Spanish rule on the obverse.

The present tabulation does not resolve all details—such as the exact dates of transfer of office in some cases or the identities of the alternative assayers of series P3. Also yet to be discovered are the exact times when Ramos acted in the place of Ballesteros during periods P5 and P7 and the date when de la Quadra succeeded Ramos, but in general terms the summary places each assayer in his period. It is hoped that further investigations will succeed in answering the remaining questions.

Table 1 CHRONOLOGICAL SEQUENCE OF THE ASSAYERS AT PERUVIAN MINTS (1568-1617)

Cat.	*Period*	*Mark*	*Assayer*	*Note*
PHILIP II				
Lima				
L1	Sept. 1568-mid 1570	R	Alonso Rincón	a
L2	Oct. 1570-early 1571	X	Xines Martinez	b

For the data presented in Table 2, see Enrique de Gandia, "Ensayadores y fundidores de la Villa Imperial de Potosí, *Boletín del Instituto Bonaerense de Numismatica y Antigüedades* (Buenos Aires), 1 (1943), pp. 9-26; "Memorial del Pleito de Mil y Quinientas de Gaspar Ruiz," ms in Biblioteca de la Real Academia de la Historia, Madrid; AGI, Lima: 37; Charcas: 418, 419; *Diario de Lima de Juan Antonio Suardo, 1629-1639*, Universidad Católica del Peru (Lima, 1936).

[b] K.A. Dym, "La actuación del ensayador Xines Martinez en la Casa de Moneda de Lima," *GacNum* 62 (Sept. 1981), pp. 33-40.

L3	After Mar. 1572, briefly	X	Xines Martinez	c
L4	Sept. 1577-ca. 1589	D	Diego de la Torre	d
La Plata				
P1	Dec. 1573-Feb. 1574	R	Alonso Rincón	e
Potosí				
P1	Mar. 1574-76 or 1577	R	Alonso Rincón	f
P2	1576 or 1577-86	B	Juan Ballesteros	g
P3	Bet. 1577 and ca. 1581	M L C	Names not known. These 3 acted occasionally instead of B.	h
P4	1586-91	A	Juan Álvarez	i

[c]See above, n. b.

Libros de cabildos de Lima (1570-83), Minutes, Sept. 1577; H.F. Burzio, *Diccionario de la moneda hispano-americana* (Santiago de Chile, 1958), s.v. "Lima," p. 285.

Dargent (see above, n. a)

Medina (above, n. a), p. 153, n. 18, mentions an inquiry held in Potosí in 1575 in which Alonso Rincón testified. A.J. Cunietti-Ferrando rediscovered this document in the Archivo General de Indias (AGI) recently. It confirms Alonso Rincón's earlier activity in the mints of Lima and La Plata. The inquiry was held to establish the damage caused by the delay in dispatch of the mint's tools from Lima to Potosí. The new mint in Potosí could not operate at capacity for lack of tools, although the basic equipment and personnel were in place; see also Dargent (above, n. a), p. 54: Rincón was still active in November 1576.

A.J. Cunietti-Ferrando, "Los primeros ensayadores de la ceca de Potosí," *Cuadernos de Numismatica* (Buenos Aires) 3 (June 1972), p. 7; "Fuentes para la historia de los primeros ensayadores de la ceca de Potosí," *CuadNum*5 (1972), p. 8.

The dies of series P3L and P3C are frequently adapted by overengraving of the assayer initials; those of P3M to a lesser extent. The following are known: M, M/B (or R?), L, L/B, B/L, C, C/B, B/C. The identities of the three assayers and the dates of their activity are as yet unknown, except for what the coins reveal.

The order of issue is apparently M, then L, with C a little later. The coins of series M have much in common with those of R and the very earliest of B: hardly any 8 reales; few of 4; obverse legend of the 1/2 real begins with DEI GRATIA; there are small cuartillos, pieces of 1/4 real. The L series coins have similar characteristics, but the finishing of the coins seems to be a little more hurried, less thorough, and pieces of 4 and 8, although still scarce, are found more frequently. The word HISPANIARVM occasionally lacks the initial H in these four early series marked R, B, M, and L.

In contrast, the series with mark C is well represented by 8 reales, while the smaller denominations are rare. The 1/4 real of mark C is not yet known in the literature, nor is the early spelling ISPANIARVM. The original instructions for the Peruvian mints were to strike coins from 1/4 up to 4 reales. By 1575 the viceroy permitted production of 8 reales and the corresponding dies had to be procured. This explains the scarcity of the very early 8 reales and puts the C series a little after those with M and L.

The 1/4 real pieces were discontinued about this time. The production of the mines increased rapidly; there was price inflation in Potosí; the cost of those tiny coins was relatively high and there was obviously more demand for the larger coins. Pieces with letter C often show traces of repeated adaptations; in particular, assayer C apparently substituted on several occasions for Juan Ballesteros.

"Memorial" (see above, n. 1) folio 388; Cunietti-Ferrando (above, n. g), 3 (1972), p. 15; AGI, Lima: 273. Potosí to viceroy advising that sale of assayer office at mint is being announced by crier, Oct. 15, 1590.

P5	1591-98	B	Juan Ballesteros, 2nd per.	j
P6	1591-98	R	Baltasar Ramos when substituting for B.	k
PHILIP III				
Potosí				
P7	1598 ca. 1610	B	Continuation of P5	l
P8	Ca. 1610-ca. 1613	R	Baltasar Ramos	m
P9	Ca. 1613-ca. 1616	Q	Agustín de la Quadra	n
P10	Ca. 1616-17	M	Name not confirmed.	

APPENDIX
Table 2 ASSAYERS OF THE TOWN OF POTOSÍ (?1548-1633)[a]

AGI, Lima: 273. Listing of offices sold by the Marquis of Canete, viceroy of Peru, of the persons who bought them and at what prices. One of the entries: The office of assayer of the mint in Potosí was sold to Juan Ballesteros for 20,200 pesos; AGI, Charcas: 43. "Memorial" concerning position of Ballesteros, dated Potosí, 1594: the auction sale was concluded May 27, 1591, and Ballesteros was installed at the mint on the following June 28. In the course of the auction Ballesteros remarked that he had served the king in the same office 16 or 17 years earlier. That would place his first term in 1575, but Rincón was still in office at the end of 1576. Ballesteros had probably meant 14 or 15 years and increased the figure during a heated argument in which he pleaded that the office should be sold to him and not to one of the competing bidders.

AGI, Charcas: 44. Annotation dated La Plata, April 8, 1595: Juan Ballesteros, assayer of the mint of Potosí is presently absent, in Tucuman. (During his absence he was replaced by Ramos and sometimes by his brother Hernando Ballesteros. At the auction in 1591, Juan Ballesteros had stipulated that he should be free to appoint assistants to replace him when absent. He was a famous silversmith and occasionally contracted for major works of art in churches. He also held a mining claim.)

AGI, Lima: 36. Viceroy to king dated April 3, 1612: Juan Ballesteros was still holder of the title to the office. In practice Ramos had already taken over; AGI, Charcas: 19. Inspection at Mint by Maldonado de Torres, 1603. Hernando Ballesteros was fined because the samples removed were too large.

Cunietti-Ferrando (above, n. g) 3 (1972), pp. 8-9.

AGI, Charcas: 19. D. de Portugal to king; K.A. Dym, "Los ensayadores Baltasar Ramos y Agustín de la Quadra de la Casa de Moneda de Potosí," *GacNum* 78 (Sept. 1985), pp. 63-66. Diego de Portugal was commissioned to verify complaints about deficiences in the weight and silver content of Potosí coinage. He visited the mint, ordered over 1,000 assays, and reported to the king: "Some coins from the times when Baltasar and Agustín de la Quadra, both deceased, were assayers, were of considerably substandard grade; they have the letter R when assayed by Ramos and Q when assayed by Quadra...." This report is dated June 13, 1616.

For the data presented in Table 2, see Enrique de Gandia, "Ensayadores y fundidores de la Villa Imperial de Potosí, *Boletín del Instituto Bonaerense de Numismatica y Antigüedades* (Buenos Aires), 1 (1943), pp. 9-26; "Memorial del Pleito de Mil y Quinientas de Gaspar Ruiz," ms in Biblioteca de la Real Academia de la Historia, Madrid; AGI, Lima: 37; Charcas: 418, 419; *Diario de Lima de Juan Antonio Suardo, 1629-1639,* Universidad Católica del Peru (Lima, 1936).

Cristobal Ruiz Viscaino	Date not known
Francisco de Baeza	Dismissed after 2nd term, Feb. 1564
Juan de Bruselas	Feb. 3, 1564-Aug. 31, 1572
Alonso Lopez de Barriales	Feb. 3, 1564-May 27, 1591
Gaspar Ruiz	May 27, 1591-Nov. 18, 1617
Juan de Losa Baraona	Nov. 18, 1617-1629
Rodrigo de Castro	(Viceroy's nephew), Nov. 26, 1629, ad interim until candidate Bartolomé Astete was confirmed
Bartolomé Astete	Position confirmed by royal order dated June 22, 1633, in Madrid

During the term of Gaspar Ruiz the actual work was done by the following assayers:

Diego Diaz
Juan Davila
Juan de Alva
Alonso Lopez de Oviedo
Diego Lopez Reloxero
Gabriel de Robles
Juan Álvarez Reinaltes

These names are mentioned in the "Memorial" of Gasper Ruiz's lawsuit, mostly as witnesses, on occasion also as accused. They acted as lessees, individually, on 12- or 16-month contracts, paying Ruiz 4,500 pesos for a 12-month term. Of these seven only Juan Álvarez Reinaltes is identified as a former assayer of the Mint.

L1. 1 real, R

L2. 1 real, X

L3. 1 real, X

L4. 8 reales, D

L4/3. 2 reales, D/X (adapted die)

P1. 4 reales, R

P2. 8 reales, B (1.25x)

P3. 4 reales, M

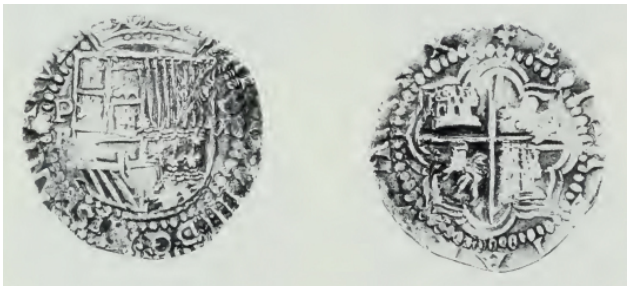
P3/2. 1 real, L/B (1.5x)

P3. 8 reales, C

P4. 8 reales, A

P5. 8 reales, B (rev. HI)

P6. 8 reales, R



P7. 8 reales, B

P8. 4 reales, R

P9. 8 reales, Q

P10. 8 reales, M (no date)

P10. 8 reales, M (rev. 1617)

The Gold Cobs of Peru, 1696-1750

Frank Sedwick

Coinage of the Americas Conference at The American Numismatic Society, New York

One of the boldest undertakings in military history was the subjugation of a huge, united, aggressive Inca empire in Peru by a few hundred Spaniards led by an illiterate adventurer, Francisco Pizarro. From the lowest infantryman to the King of Spain himself, who merely authorized the expedition rather than paying for it, lust for gold was the single powerful incentive, with glory and gospel being only delusions, palliatives to the conscience.

Gold, in the figurative language of the sun-worshipping Incas, was "the tears wept by the sun." Those children of the sun possessed gold in abundance, but used it only for ornamentation, such as in and on the temples of their capital city of Cuzco. Having considered that Cuzco was too withdrawn among the mountains and too far from the coast for easy commerce, Pizarro himself fixed the site and laid out the lines of his new capital that with time came to be called Lima, a corruption of Rimac, the Inca name for the valley and river of its location.

From Peru and the rest of their distant empire in the New World and across the immense Atlantic in what today would have to be called tubs rather than ships, the Spaniards dumped gold on Europe in quantities more vast than had ever been seen, only a fraction of it left behind for local commerce in the regions of its origin.

The three primary regions of precious-metal production were the Nuevo Reino de Granada, encompassing principally the Colombia of today, with more gold than silver; Nueva España, mainly Mexico, with more silver than gold; and Peru, with both metals, but of later fame for its mountain of silver in Potosí, now part of Bolivia. Mexico was developed first, so its mint came first, yet turned out silver coins for 144 years before it was permitted to produce gold coins. Minting in Colombia commenced in 1622, 86 years after Mexico, but from the beginning included gold cobs, the first gold coins of the Americas. Although the Lima mint opened in 1568, it was closed through most of the seventeenth century, and no business-strike gold coin was minted in Peru until 1696, which is where our story begins.

In English these hand-hammered coins are known as cobs. Since they are of various shapes, it is their weight that is the key to denomination. The prescribed weight of the large pieces of 8 escudos (or 8 reales in silver) was 27.4680 g before 1728, and 27.0642 g thereafter. The prescribed fineness was slightly over 90%. The denominations in gold are 8, 4, 2, and 1 escudos, each lower denomination weighing exactly one-half of the next larger denomination. Pared to the right weight by metal shears or chisels, the warm planchets were then placed between dies before a strong arm delivered a hammer blow, sometimes a bounce or two blows, which accounts for the occasional blurry impression of a double strike. In Spanish the finished cob is called a macuquina or, by regional linguistic variation, macaco, macaca, or moclón.

It is reasonable to ask why these asymmetrical coins were ever produced, and for several hundred years, when the tradition of round coins had existed for a long time previously in Europe and even back into ancient times. One part of the answer is that colonial Spanish America was crude, like the coins it minted

without proper equipment, workmanship, or supervision. The remaining reason was probably expedience, as most cobs were not struck primarily for normal circulation, but for large business transactions in Europe (including remelting), with a resultant shortage of coins for daily commerce in the Spanish colonies. Circulating silver cobs got much use and suffered much wear. Gold cobs, on the other hand, were seldom seen or used except by the wealthy. Gold or silver, every coin is unique. If you are a collector, nobody else in the world owns a cob or a collection of cobs exactly like yours.

Still, each mint had its own characteristics and prevailing styles by period. Lima gold cobs approach roundness more consistently than those of any other mint. The least round and most angular were those of most periods of Colombia, while Mexican gold cobs assumed many shapes and cuts. Paradoxically, the workmanship of Lima gold cobs reached its high point about 1712 and then gradually diminished, so that most of the specimens of the final decade ending in 1750 are abominable.

Of course there are years of rarity by denomination and by assayer, and it is not certain that each Lima year between the first, 1696, and the last, 1750, exists in each of the four denominations, but in general the later years are the rarer. Cuzco produced gold cobs in only one year, 1698, and only in the denominations of 1 and 2 escudos, the Cuzco 1 escudo being very rare and specimens of the 2 escudos varying greatly in quality and shape.[1]

All Lima and Cuzco 1-escudo cobs have a simple design. On one side is a single castle, whose style varies with the period, the Lima L mint mark (or C for Cuzco) to the left of the castle, the assayer's initial to the right, and the final three digits of the date below. On the other side is a cross with tressure. A circle of dots forms the circumference of each side, with no legend on either side.[2]

All Cuzco 2 escudos and all Lima 2, 4, and 8 escudos share a design quite different from the 1 escudo. The concept of the reverse[3] is built around a basic tic-tac-toe design of nine spaces or blocks. Pictorially the two vertical lines represent the Pillars of Hercules with an ornament atop, a mythological reference to the Straits of Gibraltar, with one pillar in Spain and the other in North Africa, beyond which the ancients considered to be the end of the world, or exit to the unknown. Waves under the pillars denote distance by sea. In the middle three horizontal blocks appear P-V-A (the A sometimes without the crossbar), a three-letter abbreviation of the Latin phrase PLVS VLTRA, "more beyond." The conveyed message was: over the waves (the Atlantic Ocean), beyond the Pillars of Hercules, a New World (America) exists, with the implication that this New

[1]It may be of interest that of the two Cuzco 2 escudos in the ANS, one was purchased in 1934 for $8, the other in 1967 for $450, their retail value today being ca. $3,500.

[2]It is seldom mentioned in history books, but Spanish documents beginning in 1529—the year of Pizarro's royal authorization for discovery and conquest south of Panama—refer to the region of Peru (or P*i*ru) as Castilla del Sol (Golden Castile) or Nueva Castilla (New Castile), just as the term New Spain was coined for Mexico. It is well known from all cobs of all colonial mints that all the successive kings' escutcheons included lions and castles. But was there some deeply seated identification of Castile, *castle*, with Peru, more so than with the other provinces? If there was, it might explain why the Peru 1-escudo cob, unlike that of Mexico and Nueva Granada, is the only colonial 1 escudo—in fact the only colonial cob of any mint—to show a single castle, and no lions, as its entire pictorial matter.

[3]The papers in this volume take the pillars side as the reverse of the coin, although Dr. Sedwick offers cogent reasons to consider the pillars side as the obverse. In the interest of consistency I have adjusted the author's usage in this respect. - Ed.

World belongs to Spain, personified by its ruler's crown that rests highest above the top blocks of the design at 12 o'clock—all of this an admonition to other European powers not to trespass.

The bottom three blocks of the design date the coin, in its final three digits only. Every Cuzco or Lima gold cob bears a date, whereas the peripherally placed dates on Mexican and Colombian gold cobs are off the planchet on about nine of every ten coins. In the top three blocks, reading from left to right, are the letter L as Lima mint mark (or C for Cuzco), the denomination of 2, 4, or 8 expressed by an Arabic numeral, and the assayer's initial. The single Cuzco assayer of 1698 was M. A summary of assayers' initials for all Lima gold cobs, classified chronologically by the four kings and their five reigns spanned by these coins, is given in Table 1.

Table 1 ASSAYER MARKS ON LIMA GOLD COBS, 1696-1750

CHARLES II (1665-1700)

8, 4, 2 escudos	*1 escudo*
1696 H	1696 H
1697 H	1697 H
1698 H	1698 H
1699 H, 2 escudos only	1698 R
1700 H	1699 R
1701 H	1700 R
1699 R	1701 R

(Although Charles II died in 1700, his name appears on most 1701 coins due to the time it took for word to reach the mint officials.)

PHILIP V (1st period, 1700-1724)

8 escudos	*2 escudos*
1701-10 H	1700-1710
1706 R	1709, 1711-24 M
1709-24 M	

4 escudos	*1 escudo*
1702-10 H	1702-10 H
1709 M (unlisted but exists)	1709-24 M
1711-12 M	
(1713-24 may exist but unreported)	

LUIS I (1724), *8 escudos only:* 1725 M

PHILIP V (2nd period, 1724-46)

8 escudos
1724-27 M
1728-39 N
1739-47 V

2 escudos
1724-28 M
1733-37 N
1740-44 V

4 escudos
1736, 1738 N
1739, 1740 V
(1724-35, 1737, 1741-46 may exist but unreported)

1 escudo
1724-28 M
1728-38 N
1730, 1740-45 V

FERDINAND VI (1746-59)

8 escudos
1747-49 V
1748-50 R

2 escudos
1747-48 V
1748-49 R

4 escudos
1749 R

1 escudo
1747-49 V
1748-50 R

This chart has been compiled from various sources, including personal experience, but it is surely not intended to be definitive, especially for the later period, in which new dates and new date/assayer combinations remain to be discovered. We are on safest ground in summarizing the date/assayer combinations of 8 escudos, for those pieces are the most available and hence the most studied. The lower denominations are all rare, especially the 4 escudos of any year, and do not necessarily show the same assayer for the same year as the corresponding 8 escudos. Further, there must be some years in which not all four denominations were minted.

On the obverse, the central feature is the same as that on Spanish colonial cobs of all mints, all denominations, gold or silver: a cross, symbol of the union of church and state. The basic cross can take various forms but on Peru gold cobs (including the 1 escudo) it bears a perpendicular bar on each of the four extremities, known as the cross of Jerusalem. (An exception is the first year of issue, 1696, whose cross has no bars.) Within the four quadrants of this cross appear the usual two lions and two castles in their accustomed positions of castle in the bottom right and top left, and lion in the bottom left and top right, emblematic of the merger of the two medieval kingdoms of León (lion) and Castile (castle) that formed the nucleus of the various unified provinces which later came to be known as Spain. On Lima and Cuzco 1 escudos, the lions and castles are replaced by four fleurs-de-lis, which can degenerate into what looks like the letter X, or can often be reduced to no more than dots, owing to the small size of the coins. On the three larger denominations there is no tressure, instead a circle of dots that separates the cross from the legend. The evolution of artistic styles of the lions and their poses, and of the castles and their entrances and windows and parapets, can be a field of study in itself. Only one gold cob of one year, the 8 escudos of 1750, bears a date below the cross in addition to the primary date above the waves on the reverse.

Beginning in 1710 (for I have seen none earlier), the pillars side of Lima cobs of 2, 4, and 8 escudos may exhibit a repetition of the date at 10-11 o'clock in the legend, again in three digits. Double-dated coins are considered desirable and trade at a higher price than comparable specimens with one date, even though in nearly every case, because the complete dies were inevitably of greater diameter than the planchets, a visual presence of the second date pushes the central tic-tac-toe design off center, and as well tends to reduce or eliminate the opposite part of the legend at 4-5 o'clock.

If the legend were complete around both sides of the Peru 2, 4 or 8 escudos, typically one reads in Latin in capital letters and beginning at 1 o'clock on the cross side: the name of the King, e.g. PHILIPPVS V (Charles II is abbreviated as C.II), followed by D.G. (Dei Gratia, "by the grace of God"), HISPANIARVM ("of Spain," and often abbreviated in various ways); and then continuing at 1 o'clock on the pillars side, ET YNDIARVM ("and of the Indies," seldom abbreviated), REX ("king"), followed by (on coins that have two dates) ANNO ("year," spelled with either one N or two), and then the second date.

Some of the features of the legend require commentary. The words often seem to run together, with no logical space between them, or there may be a dot, or above the top of the central cross, some ornamental device such as a small cross or rosette, or in later years a star, separating the end of HISPANIARVM from the beginning of the king's name. YNDIARVM, spelled with an initial Y (instead of an initial I), is a peculiarity of the Lima mint. The New World collectively was known to Spaniards as "the Indies." On a typical specimen, the least important word of the legend is usually the most prominent—ET. Before 1710 the legend ended with REX; when the second date was added beginning in 1710, it was deemed necessary to insert ANNO before the date. The addition of a date squeezes the legend, the constriction compounded by inclusion of the unnecessary ANNO. The result is that the second date is usually off-flan, as it is the final element of the legend; all we see is ANNO, or part of ANNO, or more often what looks like REXA.

Although the word "Spain" is singular, HISPANIARVM, like YNDIARVM, is Latin genitive plural, hence literally "of the Spains." There is a historical reason for this plural usage, rooted in feudal times before the various small kingdoms of the Iberian peninsula came to be united into one nation by Ferdinand and Isabel. One may think of HISPANIARVM as meaning "of the lands of Spain." The component regions of "Spain" have always had separatist tendencies and throughout the peninsula the typical Spaniard's loyalty has tended to be regional first and national second. "Las Españas," plural, in place of "España," singular, is a term in Spanish usage even today.

To complete the analysis, it remains only to mention what seems an indiscriminate use of dots or periods and stars on denominations higher than 1 escudo. The numbers and letters within the nine blocks of the tic-tac-toe design are usually unadorned in the earliest years of issue; but beginning in the early 1700s, and especially evident in the several final decades of issue, they may be accompanied by a dot or period, before or after the number or letter, or only before, or only after—there seems no pattern to it. On one notable year of 8 escudos, 1716, these dots may become vertically doubled as if colons, or there may be some colons along with some single dots; and on one odd variety of the 8 escudos of 1717, even the final digit of the date is replaced by a colon, the exact year of issue identifiable only by the second date at 10 or 11 o'clock if it shows. Also on coins of several years, at random but especially 1716, ornamental dots not only crowd around the lions and castles of the cross, but by their linear repetition substitute for the horizontal lines that create the tic-tac-toe with the pillars. Then in 1746, there are numerous varieties of dies that seem to experiment with varying numbers of stars: throughout the tic-tac-toe; in the legend; and in the field around the lions and castles of the cross; so that the whole coin appears decorated with stars.

Every collector knows that in the sixteenth century an early mint mark of Lima silver cobs was the star, as Lima was founded on January 6, 1535, the Biblical Epiphany or Twelfth Day, thus connected with the star of the Magi. Originally Lima was named Ciudad de los Reyes (City of the Kings) by Pizarro himself, but on the coins of the year 1746 why are the stars in such profusion, and why this particular year? Some interpret the phenomenon as a memorial to Philip V who died in 1746, while others connect it with the great earthquake of October 28, 1746, when the Lima mint was destroyed, to be rebuilt and enlarged later. Both these theories can be dismissed, however, because a few star-filled coins are dated 1745, much rarer than the 1746 pieces.

1. Lima, 1 escudo, 1710 H

2. Lima, 2 escudos, 1711 M

3. Lima, 4 escudos, 1711 M

4. Lima, 8 escudos, 1712 M (2 dates)

5. Lima, 8 escudos, 1716 M (dots instead of horizontal lines; extra dots around the lions and castles)

6. Lima, 8 escudos, 1746 V (profusion of stars)

7. Lima, 8 escudos, 1696 H (earliest Lima 8 escudos)

8. Lima, 1 escudo, 1750 R (latest Lima 1 escudo)

The Evidence from Salvage Operations

Where are all the Lima gold cobs today? They are surely not in Peru or anywhere else in Latin America, as can be attested to by numismatic travelers. Since the 1960s the most available pieces, in all denominations, have been those that sank with the Spanish treasure fleet of 1715, probably ten ships, destroyed in a hurricane off the east coast of Florida between Stuart on the south and Melbourne on the north.

The wealth transported by this particular convoy was far greater than usual because it represented an accumulation of many years. With the sea lanes vulnerable and ships in short supply, many fewer Spanish ships made the voyage after 1700, for Spain was otherwise engaged in a long civil war and general European conflict known as the War of Spanish Succession, finally terminated by the Treaty of Utrecht in 1713.

Commercial salvage operations to recover the coins carried by this 1715 fleet began in the 1960s and, with diminishing results, continue even today. The finds, all cobs, include hundreds of thousands of silver coins

and many thousand gold coins, including many dates and varieties of the 1700-1715 period that had been either rare or unknown.[4] The state of Florida, which asserts a claim to 25% of all salvaged treasure, has acquired the largest accumulation of material from these wrecks.

Some of the state's material is on display in Tallahassee, the rest still in state vaults, at least 60,000 silver cobs, which remain mostly uncatalogued even today. As of 1986, the gold cobs numbered: 1,153 from Mexico (all denominations); 143 from Colombia (all 1 and 2 escudos, as 4 and 8 escudos were not minted at the time); 4 from Cuzco (all 2 escudos); and 111 from Lima. Although more have been added since, and will continue to be added by divisions with divers, the distribution of the 111 Lima gold cobs of record owned by the state of Florida is as follows:

8 escudos: 56	8 escudos: 56	4 escudos: 7	4 escudos: 7	2 escudos: 42	2 escudos: 42	1 escudo: 6	1 escudo: 6
1704	2	1697	1	1700	7	1697	1
1705	1	1699	1	1702	1	1698	1
1707	1	1707	1	1703	1	1701	1
1708	1	1710	2	1704	1	1709	1
1709	1	1711	2	1707	1	1710	1
1710	6			1708	4	1711	1
1711	4			1709	10		
1712	39			1710	4		
1713	1			1711	11		
					1712	2	

This sample provides the basis for several observations. First one notes that the Mexican gold cobs (1,153) far outnumber the Lima (111), and that there are relatively few Lima 4 and 1 escudos. One notes the preponderance of coins 1709-13, about which I shall comment later. Finally one notes the absence of coins dated 1714 or 1715, which has always been one of the mysteries of the 1715 fleet.

As a dealer, and occasional confidant of divers, I have handled and have had the opportunity to analyze, at least briefly, more than 1,000 gold cobs from the 1715 fleet. While I have seen every Mexican and Colombian date from the mid-1690s up to and including 1715, until recently I had never seen a 1715-fleet Lima gold cob dated later than 1713. On July 1, 1988, four Lima 8 escudos of 1714 were retrieved from a 1715-fleet site. We had always asked ourselves: if the Colombian 1714s and 1715s could make it up from Cartagena to the assembly points in Panama and Havana, along with the many thousands of 1714s and 1715s from Mexico, why could not the Lima pieces of the same two dates reach the assembled fleet?

One possible answer has to do with the composition of the fleet, whose main elements had gone to Veracruz to deliver mercury (an essential substance in the refining of silver cobs), sell merchandise, and pick up

[4]Although coins of this description are more common now, they still command high prices because of the demand created by years of publicity and because—as most will agree—Mexican and Lima gold cobs are beautiful. Some of this material is recent, much of it found and sold surrepticiously to avoid a division of the treasure with the state of Florida; but a significant amount of it is still in the hands of the old-timers throughout Florida—divers, beachcombers, and established collectors who love their cobs and sell only when they must. The one collector that never sells is also the one with the largest accumulation—the state of Florida. Spain lost it all to America, whence it came.

quantities of Mexican-minted bars and cobs. There was no actual southern fleet this trip, just a number of individually contracted vessels to and from Cartagena and Panama. Perhaps the Colombians sent their coins to the assembly points by dispatch boats, while the route from Lima was more complicated (it involved the delays of overland transport from the Pacific to the Atlantic coast of Panama), or perhaps the ships called in Panama earlier and most of the latest Peruvian mintage missed the boat. It is known that the material from the south waited a long time in Havana for the much-delayed section from Veracruz.

It is important to recognize that the abundant representation of, for example, Lima 1711s and 1712s among the fleet coinage does not necessarily mean that Lima produced more gold cobs in those two years. It is possible that the fleet carried the entire or nearly entire Lima mint production of those years (the 1711 and 1712 coins are rare except as sea salvage), whereas a comparable Lima production in 1714 and 1715 somehow made it back to Spain by other means, and was melted, with the the few surviving 1714s and 1715s being mostly the pieces left behind in Peru for local commerce.

Another possibility is that among the several ships of the 1715 wrecks still not located is the one that was carrying the bulk of the 1714 and 1715 Lima production. In the summer of 1988, a salvage crew brought up ca. 800 gold cobs, including 121 Lima 8 escudos dated 1708, a hitherto scarce date from the 1715 fleet. In the early years of the 1715-fleet salvage in the 1960s, the most common dates of salvaged Mexican gold cobs were 1713 and 1714, while the most common Mexican dates of the second largest finds of about six years ago were 1711 and 1715, evidently a matter of different chests in different locations.

The science of sea salvage has developed rapidly in recent decades. New diving techniques and sophisticated equipment for exploration in very deep water now entice investors around the world to form companies for the attempted salvage of known wrecks. Records of shipwreck locations are being searched as never before. Governments are devising new laws to define jurisdictions over marine territory and the subsequent rights to salvaged property. In short, sea salvage has become a growth industry; even jewelers cannot seem to get enough cobs, which has contributed to the remarkable surge in their prices over the last two years.

Numismatists once preferred the dated Mexican 8 escudos to the Lima 8 escudos of the 1715 fleet, probably because of the elusiveness of the date on Mexican cobs, with the result that Lima 8 escudos were always in greater supply and at a lower price than the Mexican. Now the situation is reversed, because of jewelry and not numismatics, with many more consumers than serious collectors of cobs. The Lima gold cobs are more reliably round, with devices more uniformly centered and, most importantly, each coin bears a date. The only source for this material, however, is the 1715 fleet, nearly all of whose gold cobs emerge from the ocean beautiful, protected by white coral (easily burned off with muriatic acid and water), or practically unimpaired by their centuries of immersion in the warm and usually peaceful waters off Florida.

Many other shipwrecks of the 1700s have been salvaged around the world, yet only one other known to me has produced even a small quantity of Lima gold cobs. Though probably a Dutch East India Co. ship recirculating cobs through Holland, the identification of the ship is not certain, but its location is the turbulent English Channel. The wreck has yielded Lima gold cobs with dates through 1718, including the familiar dates of the 1715-fleet treasures, and even the unfamiliar dates of 1714 and 1715; but with no coral in cold water to protect the coins, or whatever the reason may be, the Peru gold cobs from this ship are so pitted and sand-washed as never to be confused with the typical Florida material.

What we all await is the salvage of the large Spanish galleon *San José* , sunk by the English off Cartagena, Colombia, on June 8, 1708. The wreck was located by commercial salvors in December 1981 at a depth

of over 750 feet. Although this depth makes salvage difficult and expensive, the main problem has been indecision on the part of the Colombian government in the award of a contract. The bidding has been intense since a range of divers of many nations have been eager to participate in the salvage of this potentially richest wreck of them all, as revealed by the ship's manifest. This vessel was part of the only large fleet to sail for the New World during the War of the Spanish Succession, a convoy of 12 Spanish and French ships that left Cádiz, Spain, on March 9, 1706. The *San José* had already visited Panama, where it loaded much Peruvian gold and was to sail from Cartagena to Havana, thence home to Spain. Now, if we review again the distribution of Peru gold cob holdings of the state of Florida and the relative rarity of pre-1709 Lima pieces in the 1715-fleet inventory, we might speculate that most of them went down on the *San José* .

At least for the present, the 1715-fleet pieces continue to provide the primary material for study. Beyond 1715, and for the minor denominations especially, we need a more comprehensive date/assayer study than now exists. Nor has anyone ever made a study of overdates. Because of the vast extant quantities of Mexican and Colombian 2 escudos, we assume this to have been the most useful denomination, yet we do not know why Lima 2 escudos are not abundant and have always commanded two or three times the price of their shorter date-run Mexican equivalent. There is so much yet to be learned that a paper like this is only the needle of a compass. Now someone needs to produce a map.

The Enigmatic Sixteenth-Century AP Coins: Issues of a Peruvian Mint in Alto Peru?

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Coinage of the Americas Conference at the American Numismatic Society, New York

Introduction

A new series of Spanish colonial coinage, minted in Peru during the reign of Phillip II, has been recently uncovered. These coins are distinguished by the letter combination A over P. On all coins so far examined the A never appears separated from the P, as might be the case if A were an assayer's initial, and it seems likely that the AP combination specified a mint name. Examples of this coinage first became known to the author in 1979, when they were offered in several United States auction sales.1 A subsequent search of numismatic journals showed that E.A. Sellschopp had published a short article on these coins in 1974.2

A typical example is the 4-real denomination with the assayer's initial X shown in fig. 1. The coin matches the new design specified by the royal decree of March 8, 1570. The previous design, which had been minted at Lima since 1568, and at Mexico City from about 1542 (the late series of Carolus and Johanna), displays on the obverse a crowned shield, with lions and castles in four quadrants over a pomegranate, and on the reverse crowned pillars over waves with the motto PLVS VLTRA. The new design, mandated by the decree, shows on the obverse the crowned great shield of the House of Hapsburg and on the reverse a cross with lions and castles in the quarters. On the example shown most of the legend is visible: one can read PHILIPVS.D.G.(ISP)ANIA(RV)M.R. on the obverse, continuing with ETINDIARV(M)REX.D.G. on the reverse. The presence of INDIARVM (of the Indies) is important because it means that these coins can be attributed to the New World rather than the Spanish peninsula. The series has a number of unusual characteristics, including most notably a retrograde or inverted D in the legend, parenthesis brackets (}) at the ends of the cross on the reverse instead of the usual loops or half-circles ( )), and the placement of the assayer's initial on the reverse of the 2-real coin for assayer X.

What is the orgin of these coins, when were they struck, and where was the mint? Research presented in this paper indicates that the coins originated in the Viceroyalty of Peru, and that the AP mint produced coins during the early years of minting in Peru before 1585. It has not been possible to determine the exact location of the AP mint, and only conjectures can be offered. A hypothesis is that the mint was located in the highland

area of Peru and that the initials AP refer to Alto Peru (Upper Peru), the initials being used to distinguish a highland mint from the coastal mint at Lima. The coins are very rare: a total of only 24 examples in all denominations has so far been catalogued. The rarity of these coins, some peculiarities of the die work that distinguish them from other Peruvian issues, and the apparent lack of documentation in official records of the period examined to date probably explain why so little has been published concerning them.

Attribution of AP Coins to Peru

Attribution of the AP coins to Peru is based on: 1) find spots of the coins; 2) the assayers' initials, which are the same as those already known for Peru; and 3) analysis of the gold-to-silver ratio, which is similar to that in known Peruvian issues.

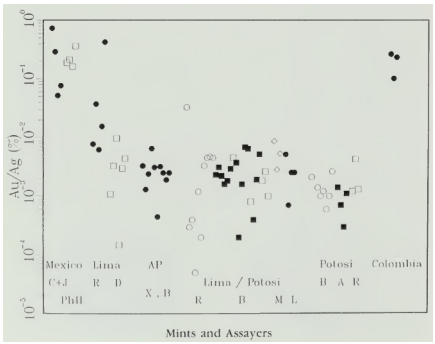
The find spots of 11 AP coins have been determined. One coin was acquired from a coin dealer in the Lima, Peru area. Eight coins were discovered in "Old Panama." Panama, as a transshipment point for goods, was a vital link in the trade between Peru and Seville in Spain.3 No mint is known for Panama, but discoveries in Panama might be expected for coins that originated in Peru and were used in commerce. Finally, two specimens were recovered from the wreck of the Portuguese ship *Santiago* , which sank off the eastern coast of Africa on August 19, 1585.4 Also recovered from the wreck were coins of Mexico, Peruvian coins with assayers' initials R, M, L, B, and D, and coins struck at Spanish mainland mints. The *Santiago* , after leaving Lisbon on April 1, 1585, did not make port in the New World but followed the coast of Africa, bound for India and the spice trade. The New World coins carried by the ship were acquired in Europe after having been previously shipped there from the Spanish colonies. Considering the time required to transport goods from the colonies to Spain, the latest possible date for minting of the AP coins would be one or more years prior to 1585.

Four different assayers' initials—X, M, C combined with X, and B—have been seen for this series. Assayers with these initials are known for Peru. Sellschopp attributed X (Xines Martinez) and M (possibly also Martinez) to Lima, C to La Plata, and B to both Lima and Potosí.5 More recently K. Dym, after searching original documents of the period in the Archives of the Indies in Seville, places B, M, and C at Potosí.6

Using the neutron activation technique, A. Gordus at the University of Michigan has determined the gold-to-silver ratio of the AP coins, contemporaneous mintings of Mexico and Peru, and mid-seventeenth century Colombia issues.7 The technique involves measurement of the gamma decay spectra of a sample from the coin after irradiation by neutrons in a nuclear reactor. Each element in the sample produces a distinct decay spectrum whose intensity is proportional to the quantity of the element present. Only minute streak samples from a coin, obtained by rubbing a small quartz rod against the coin edge, are needed to make the measurement.

Table 1

GOLD TO SILVER RATIO OF SELECT COINS



Gordus had previously determined that coins from the Potosi mint have a very low gold-to-silver ratio (<0.01 %) compared to contemporaneous coinage of Mexico and many European mints.8 For the present work Gordus and I compared the AP coins with Peruvian issues of Lima (assayer R [Alonso Rincón], pillars-over-waves type, and assayer D [Diego de la Torre], new design) and, following Dym, La Plata/Potosí (assayer R [Rincón, new design], and Potosí (assayers M, L, B [Juan Ballesteros], A [Juan Álvarez], and B [Baltasar Ramos])

The results are plotted in Table 1, where the average gold-to-silver ratio for each assayer is indicated by a dashed horizontal line. The data labeled Lima/Potosi for assayers R, B, M, and L are for coins Sellschopp had attributed to Lima.9 Those of this group for assayer B are of the earliest style and include coins (five examples) lacking the initial H in HISPANIARVM, which Sellschopp attributed to Lima rather than Potosí. In order to check Sellschopp's attribution of these coins to Lima, the Lima/Potosí group was analyzed separately from known Lima coins of assayer D and the Potosí group, which included later-style coins of assayer B. From the data we can draw several important conclusions:

1. With the exception of the first Lima issues of Rincón (pillars-and-waves type), and possibly also of assayer M, both the AP coins and all the remaining Peruvian coins have similar low gold-to-silver ratios. Statistical analysis by A. Gordus shows that the gold-to-silver ratios for these coins are statistically indistinguishable. This result shows that all the coins were struck from silver similar to, or the same as, that mined at Potosí. By contrast, there is generally a 10- to 100-times greater gold content for mintings in Mexico (late series Carolus and Johanna and the new design for Phillip II) and Colombia (mid-seventeenth century for Phillip IV). Since only Mexico and Peru are known to have minted coins during the period of interest (ca. 1575), the low gold content of the AP coins is nearly conclusive evidence of a Peruvian origin.

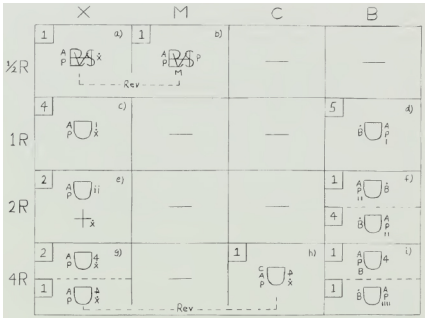
2. The coins of assayer B lacking the H in HISPANIARVM (data with open squares for B in Table 1) statistically cannot be distinguished from other assayer B coins. From these data there is no reason to separate these coins or coins of assayers R and L of the Lima/Potosí group from Potosí-struck coins. Furthermore, since the metal content of the coins of Lima (assayer D), Potosí, and the Lima/Potosí group is statistically similar, the data neither confirm nor deny Sellschopp's attribution.

3. The first Peruvian coins for Rincón have a higher gold content, seven times greater on average (the data point 0.43 for Rincón was omitted for computing the average), than all later coinage of Peru (assayer M possibly excepted), indicating that the source of silver for the coins was probably not the Potosí mines.

4. The coins of assayer M appear to have a somewhat higher gold content than other Peruvian issues (excepting the first coins of Rincón).

Table 2

AP COINS BY DENOMINATION AND ASSAYER



The number of recorded examples is indicated in the small box in the upper left corner for each type.

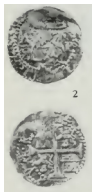
- a *GacNum* 32 (1974), p. 30; Swiss Bank Corp. 14 Sept. 1988, 453.
- b Freeman Craig 17 Nov. 1981, 442; coin found in Panama.
- c 1 obv./2 rev. dies; Henry Christensen 8 Dec. 1979, 1130; Freeman Craig 17 Nov. 1981, 443; Louis Hudson example; two coins found in Panama.
- d 2 obv./2 rev. dies; *GacNum* 32 (1974), p. 30. The two 1 reales were offered by Swiss Bank Corp. 14 Sept. 1988, 454-55 (3.28, 3.29 g); Henry Christensen 8 Dec. 1979, 1132, (3.38 g); Freeman Craig 17 Nov. 1981, 444; two coins found in Panama and one purchased in Lima, Peru.
- e 2 obv./2 rev. dies; Freeman Craig 13 May 1987 (6.65 g).
- f AP left: Henry Christensen 8 Dec. 1979, 1131 (6.20 g); AP right: 1 obv./1 rev. die; Freeman Craig 17 Nov. 1981, 445; one coin found in Panama.
- g Normal 4: 2 obv./2 rev. dies;Ponterio 25 Mar. 1986, 704, recovered from *Santiago* ; Louis Hudson example; rotated 4: *GacNum* 32 (1974), p. 30 (13.62 g); Galerie des Monnaies 11 Feb. 1980, 1162.
- h 13.36 g; coin found in Panama.
- i AP left: Freeman Craig 14 Nov. 1984, 863, ex Peña coll., 1895 (13.47 g); AP right: Ponterio 25 Mar. 1986, 774, recovered from *Santiago* .

Since only three coins were sampled for this assayer, this result is preliminary and more data are needed before conclusions can be drawn.

Catalogue of AP Coins

Table 2 shows all AP examples, by denomination and assayer, known to the author, and the number of recorded examples for each type is shown in the small boxes. I have also indicated in the footnotes to the table where coins were found. No examples of the 1/4 real (cuartillo) or 8 reales have been found, and for assayers M and C, only single examples have been seen. For each example Table 2 shows the placement of the mint initials AP, the assayer's initial(s), and the mark of value with respect to the monogram (for the 1/2-real denomination), to the Hapsburg shield, or to the cross on the reverse (for larger denominations).

As already indicated, the designs for the 1, 2, and 4 reales are the same as those which were specified by the royal decree of March 8, 1570. The 1/2-real design shows the crowned monogram for Phillip on the obverse and the quartered cross with lions and castles on the reverse.

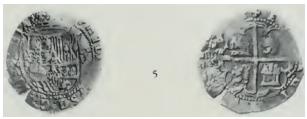


The 1/2 real exists with assayers' initials X and M. Fig. 2 shows the 1/2-real coin for assayer M, together with an enlargement (4x) of the obverse. This coin has a feature unique to the series—it shows both the initials AP to the left of the monogram and the initial P to the right. The P below the A is blurred by multiple striking, but it is clearly a letter P, rather than a B, with the "foot" of the P clearly visible in the enlargement. Why do both AP and P appear on the coin? A possible interpretation is that P refers to the Peruvian viceroyalty and AP is specific to the mint to distinguish it from an already operating mint. Such an interpretation would be plausible if more than one mint were operating simultaneously. A similar occurrence can be seen in the issues of Diego at Lima during this period (ca. 1577 to 1588); the coins show both the initial P for Peru and a star, symbol of Lima, the City of Kings. Only single examples of the 1/2-real value have been seen for each assayer. As indicated in the table by a connecting dashed line, the reverses share the same die, which suggests that the striking of assayers X and M coins were separated by only a short interval.

For the 1-real denomination, assayers X and B are known. For assayer X (fig. 3) four examples, all struck from the same obverse die, are known. The 1-real coins of assayer X have the initial AP to the left of the shield.

Five examples are known for the 1 real of assayer B, from two obverse and two reverse dies; all examples show the initials AP to the right of the shield. Fig. 4 illustrates this type; on this coin the vertical lines for Aragon in the shield were omitted.

Two 2 reales of assayer X, each from different obverse and reverse dies, are known (fig. 5), and this type is unique in the entire AP series in that the assayer's initial was placed on the reverse at about the four o'clock position, below and at the end of the arm of the cross. The placement of the assayer's initial on the reverse is previously unknown for Phillip II issues in the New World, although at the Spanish mint at Seville this location was used for 2, 4, and 8 reales for assayers C and F.10



For the 2 reales of assayer B, two varieties occur with the AP either to the left or to the right of the shield (figs. 6-7). The five examples were struck from two obverse and two reverse dies. As occurred on the 1 real of assayer B, the vertical lines for Aragon were left off the dies for the coin with AP to the right.

6. AP left

7. AP right

Each of the three 4-real coins with the single assayer's initial X was struck from different dies; two of these coins were salvaged and one has been definitely identified from the wreck of the *Santiago* .11 The arabic numeral 4 was stamped on the dies in either the usual upright position or rotated 90 degrees clockwise. Fig. 1 above shows the variety with the 90-degree rotation.

A particularly noteworthy 4 reales shows both the initials X and C. The remnants of the lower loop of the C are visible above the AP in fig. 8. This coin shares the same reverse die with the coin in fig. 1, which has only the single X initial. Both coins also have the arabic 4 rotated by 90 degrees.

Two 4 reales for assayer B are known, again with the AP initials both left and right of the shield. For AP to the left of the shield (fig. 9), the value is given by an arabic numeral 4, whereas on the coin with AP to the right (fig. 10), the value is given by the roman numerals IIII. The specimen with AP to the right was recovered from the *Santiago* .12

9

10

The dies for the AP coins have a number of characteristics which set them apart from Lima and Potosí coins. A summary of these characteristics includes the following:

1. On the reverse the arrangement of parenthesis brackets alternating with semicircular loops, which encloses the cross, is rotated 45 degrees from the normal orientation, so that the brackets are at the ends of the cross. This pattern occurs on all but one example (4 reales, assayer X). This die design also occurred at the Spanish mints of Granada (assayers D, A, and F) and Toledo (assayer C) under Phillip II.13

2. A retrograde letter D appears in the legend (D of D.G. and D of INDIARVM), although there are exceptions. This also occurred at the Granada mint.14

3. As noted, the assayer's initial X appears on the reverse of a 2 reales.

4. The arabic mark of value for the 4-real coin appears both in the normal upright position and rotated 90 degrees clockwise.

5. On one obverse die for both the 1 and 2 reales of assayer B, with AP to the right, the vertical lines for Aragon in the shield are omitted.

6. Periods are used in the legend rather than commas and the lettering is more spread out around the rim than on Lima and Potosí issues.

7. The assayers' initials X and B are surmounted by a small circle or point, whereas there is no point over the X (ca. 1572) at Lima or the B at Potosí. On the other hand, a few years later (ca. 1577) a small circle was placed over D (for Diego) at Lima.

These unusual die details, common to the whole series, suggest the work of a single die sinker who had worked in Spain and had little familiarity with the conventions of Peruvian die sinkers. Generally the

punches used to produce the dies for the AP coins are different from those used for the early dies of assayers X, R, and M at Lima and Potosí. However, there are some close similiarities:

1. The castles used on the reverses of the 1, 2, and 4 reales are nearly identical to those of Lima and Potosí.

2. The reverse lion for the 2 reales of AP-B (fig. 6 above), may in fact be identical to the reverse lion used on 1 and 2 reales of assayer M.15 These lions are rampant and have long tails curved in the shape of an S.

3. Whereas the base of the crown for Lima and Potosí issues usually either lacks the rear loop of the crown or is a nearly closed ellipse, this was not always the case for the earlier issues. Examples are a 1 real of P-X (Xines Martinez at Lima, fig. 11) and a 1 real of P-R (Rincón, fig. 12), both of which have the more open ellipse found on the AP coins.

The AP coins were made from good quality silver and the coins were of legal weight. For most of the coins examined, the weights of the AP coins fall within the ranges of coins produced at Lima and Potosí.

The relative silver purity for the different assayers is indicated by the neutron activation measurements. The principal constituents measured were silver and copper, although not all elements are detected by the technique (tin, which can be present in Peruvian ores, is not measured). The copper content measured by streak samples from the edge is a lower limit on the actual value because copper is more readily affected by surface corrosion than silver. Nevertheless, we can compare the silver and copper for the AP coins with the same metals for Potosí coins to arrive at a relative silver purity. For the AP coins the 10-sample average and standard deviation were 96.00% ± 1.12% for silver and 3.93% ± 1.12% for copper. This compares with 96.20% ± 1.60% for silver and 3.74% ± 1.60% for copper for 10 coins of Rincón of the new design. These results show that the AP coins have the same purity as other Potosí issues.

Location of the AP Mint

The location of the mint that produced the AP coins cannot yet be determined with certainty because no documentation concerning it has been found. From the evidence presented, it seems clear that the mint was located in Peru in an area with access to Potosí silver. It also seems likely that the mint operated for only a short period since: 1) most, if not all, of the dies were apparently made by the same individual; 2) assayers X, M, and C are directly linked by the reverse dies; and 3) assayers X and B share similar punches for the lions and castles. This small number of dies and the short period of production would explain the rarity of the AP series.

I have advanced the hypothesis that AP was an abbreviation for Alto Peru. At least in more recent times, the highland area of present day Bolivia has been referred to by this name. In the early Spanish period the

region was known as Charcas, and a royal audiencia was established in La Plata by a decree of 1559. At what date the name Alto Peru came into common use for the area I do not know. There is a possible clue in the transitional coinage struck at Potosí in 1652. An example of the 4-real denomination is shown in fig. 13. This coin shows on the obverse the initials A P, arranged vertically to the left of the shield, and O E, arranged vertically to the right. Now E is clearly an assayer's initial: assayer Ergueta produced coins at Potosí during the years 1651 to 1679. The initial O could also be an assayer's initial, since assayer O is known for the years 1649 to 1651 and perhaps continued in office into the year 1652. Sellschopp asserted that only E was an assayer's initial and that the letters A O abbreviate the Latin ANNO.16 This is unlikely if O remained in office into 1652. It is tempting to attribute the AP to Alto Peru. If correct, the use of AP for Upper Peru dates from at least the mid-seventeenth century, only 70 to 80 years following the period of our study.

What was the status of the AP mint? Was it official or unofficial? Sellschopp speculated that the coins were produced at an illegal or unofficial mint.17 He based his conclusion upon the peculiar characteristics of the die work. Such a conclusion cannot be disproven, but different characteristics do not necessarily indicate a fraudulent origin. Even though the AP dies show many differences from early Lima and Potosí dies, there are (as noted) a number of similarities. In addition, it is evident from even a cursory study of the dies of Lima and Potosí that over the short period of a few years there occurred a steady evolution of the style of the coins, the design of the punches, the placement of initials, the punctuation in the legend, etc. A particularly good example of this evolution can be seen in the substantial differences between the dies of the new design at Lima for Xines Martinez (ca. 1572) and the dies of Diego de la Torre, starting in about 1577.

I have also noted that the coins were struck at the correct weight and fineness and that they were accepted in trade, as evidenced by their find spots and by their presence in the specie cargo of the *Santiago* . Thus, there is no indication that the AP coins were struck to defraud merchants and the general population. (There was, of course, an advantage to be gained by striking coins at a private workshop to avoid payment of the king's tax, the royal fifth.)

In the early years of the Lima mint, before the Potosí mint was in full production, there was a serious shortage of good quality silver coins.18 From ca. 1570 to 1577, there was a very sporadic output of coinage at the Lima mint, and for some years during this period the mint apparently ceased production altogether.19 For these reasons the striking of coins of good weight and quality by a private mint would have benefitted to the general population. However, if the AP mint was unofficial, there was no attempt to hide the fact because the mint letters AP are not the same as the single initial P of Lima (and later of Potosí). If deception of the public or avoidance of the king's tax collectors was intended, it is more likely that only the letter P would appear on the coins in order to imitate officially minted specie.

If the AP coins were officially struck, where was the mint located? I have argued that AP indicates a highland mint, which would exclude the coastal mint of Lima. There remain the two documented highland mints of La Plata and Potosí in Charcas. From the published records of the period, the La Plata mint apparently operated for only a few months sometime near the end of 1573 and early 1574, after one-half of the tools

and equipment from the Lima mint were transferred to La Plata by Viceroy Toledo.20 This followed receipt of new tools from Spain as acknowledged by the viceroy in a letter to the king in March 1572.21

The identity of the coins struck at La Plata during this period has not been confirmed. Is it possible that the AP coins were produced by the mint in La Plata? The brief period of AP mintage is consistent with the few months of operation of the La Plata mint. The conclusion that a die sinker trained in Spain used new punches to manufacture the AP dies could also fit the known fact that new tools, recently received from Spain, were sent to La Plata. But E. Dargent and other experts hold that Alonso Rincón, in addition to being the first assayer at both Lima and Potosí, was also the assayer at La Plata.22 (Although not explicitly stated in any known document, this can be inferred from contemporary documents.) So far, no AP coins with the initial R are known, and one might ask whether the number of assayers found for the AP series could have worked at the La Plata mint. No firm conclusions can yet be drawn.

Could the AP mint be identified with Potosí? I have already noted the presence of AP on the issues of 1652. There is also the attribution to this mint by Dym of the assayers B, M, and C for the period ca. early 1580s, even though assayer X, whose initial appears on the same coin with assayer C (fig. 8 above) for AP, has been attributed only to Lima. Here again we are left with unanswered questions.23

The Silver Cobs of Colombia, 1622–1748

Joseph R. Lasser

Coinage of the Americas Conference at The American Numismatic Society, New York

Colombian cobs, the coins of Nuevo Reino de Granada, are only a minor segment in the spectrum of Latin American coins, dwarfed by the production of Potosí, Mexico, and Peru. Colombian gold is rare, but the silver pieces are even rarer and appear primarily as peripheral specimens in large collections or as scattered additions from wrecks of seventeenth- and early eighteenth-century vessels all over the world. Salvage of the *Atocha, Concepción, Feversham, Johanna, Maravilla, Vergulde Draeck* and *Vliegenthart* has added to the census of Colombian silver cobs but, in every instance, the number of pieces recovered has been quite limited, reaffirming the generally accepted view that Nuevo Reino silver occupied a minor position in Hispano-American coinage.

However, the coins themelves are provocative because of their rarity and extraordinary variety. Virtually every Nuevo Reino silver cob is unique. It is extremely unusual to find two coins from identical dies—and a cache of half a dozen coins from the same obverse and reverse dies would be unprecedented.

As early as 1865, Aloiss Heiss correctly identified Nuevo Reino coinage and in 1892, Manuel Vidal Quadras attributed a number of Santa Fe (Bogotá) silver pieces properly in the published catalogue of his collection.1 J.T. Medina briefly discusses Nuevo Reino cobs in his 1919 study2 and a number of scattered articles have appeared in numismatic journals, but it is a succession of three volumes in the 1950s and 1960s by F. Xavier Calicó, Juan Friede, and A.M. Barriga Villalba, plus Robert Nesmith's article published by the ANS, that have established an adequate base from which to gain an overall perspective on the silver coins of Nuevo Reino de Granada.3

Historical Overview

The first Spanish settlement on the Caribbean coast of Colombia, Santa Marta, was founded in 1525; in 1533, Cartagena was established as a port further west. Because the mountain range immediately south of Santa Marta restricted inland exploration, in 1536 Pedro Fernández de Lugo, governor of Santa Marta, sent an expedition up the Magdalena River exploring for the golden treasures of fantasy sought by all conquistadores.

Upon conquering the Chibcha Indian chief Bogotá early in 1538, the Spanish commander, Gonzalo Jiménez de Quesada, renamed Muequeta, the largest Chibcha town, Bogotá; and when the Viceroyalty of Peru was created in 1544, Colombia, known as Nuevo Reino de Granada, was incorporated into it.

Nuevo Reino, of course, was not El Dorado, and although the Spanish raiders looted a sizeable number of Indian towns, they found only a small number of gold hoards and no bonanzas. The subsequent slender

but steady stream of newly mined yellow metal and a minute silver output yielded modest contributions to the Spanish empire, but were insignificant compared with the flood of wealth extracted from other New World colonies.

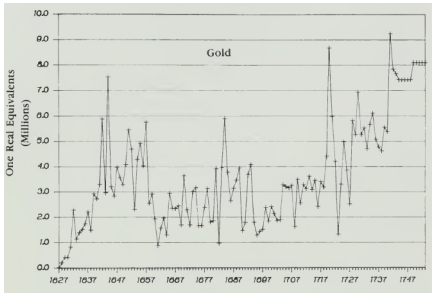
The interests of the throne and local commerce caused Philip II to authorize a mint in Nuevo Reino as early as July 20, 1559. However, it was not until April 1, 1620, that Alonso Turrillo de Yebra purchased the office of treasurer and proprietor of the Casa de Moneda of Nuevo Reino from Philip III. Turrillo was granted the right to construct a mint in Santa Fe de Bogotá and an "oficina" (a subsidiary mint) in Cartagena. Production was initiated in 1622 and the mint remained in private hands until December 13, 1751, when Ferdinand VI acquired it by royal edict. Gold cobs were produced from 1622 to 1756 and silver cobs were made almost without interruption from 1622 through 1675, and thereafter irregularly through 1748.

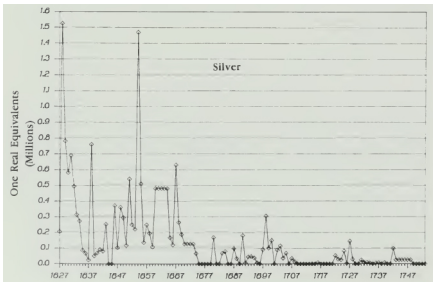
Silver Cob Output

Although the gold and silver of Nuevo Reino was meaningful to the royal treasury and local commerce, its output was tiny compared with the major Latin American mints. The primary source of Colombian gold was alluvial streams, not conventional mines, and its silver was a by-product of gold refining and a few minor short-lived ore deposits.

Gold coinage reported in marcos (1 marco = 230.1232 g) by Barriga averaged 3,644,091 reales (227,756 escudos) per year between 1627 and 1753.4 By contrast, silver mintage averaged only 148,713 reales annually for the 122 years, 1627-1748; and if the two major aberrant peak periods of 1627-34 and 1654-55 are excluded, production was only 100,822 reales per year.5 During the final half century, silver cob output was a negligible 26,280 reales annually (see Table 1) Furthermore, analysis of Barriga's data indicates that a sizeable portion of the 1627-34 and 1654-55 cobs was not newly mined silver, but was remelted and restruck from earlier, substandard production. Barriga states that the equivalent of 2,364,840 reales of silver was recoined between June 1, 1627, and the end of 1633 to conform to a royal ordinance of 1627 which, in essence, ordered the recall of all billon coins and those silver pieces 5% or more below prevailing fineness standards.6 As a consequence, more than half the 4,596,034 reales of cobs produced from 1627 to 1634 were not of newly refined silver—an amount representing 13% of the mint's entire 122-year output.

Table 1
COB COINAGE OF NUEVO REINO





Similarly, it is obvious that the abnormally large production of 1654-55 represents Nuevo Reino's conformance to the cédula of December 22, 1650, requiring the restriking of all debased Potosí silver of the 1640s circulating in Latin America, even though the quantity of coins restruck in Nuevo Reino is not known.

Two less prominent but unusually active periods also are evident in 1638 and 1667. No specific reasons for the surges appear in the histories of the mint, but 1638 was Antonio de Vergara Azcárate y Dávila's first year in office, following the death of the original proprietor, Alonso Turrillo de Yebra. Had production lagged in the year preceding Turrillo's death? Did Azcárate accelerate minting at the start of his term in office in order to build a nest egg? Admittedly, both explanations are pure speculation.

The rationale for the upward spike in 1667 can be conjectured more easily, although without precise historical documentation. On June 1, 1667, Queen Maria Anna ordered that the workers at the Santa Fe mint be paid the same wages as those in Spain even though the cost of living in Santa Fe was enormously higher. Not surprisingly, the workers went on strike when the mint managers attempted to enforce the edict. Production was not resumed until mid-1668 following an appeal to the Governor General of Nuevo Reino by the city officials of Santa Fe to set aside the ordinance because of its severe disruption of commerce. It is logical to assume that, anticipating the workers' reaction to the proposed wage cut, production was pushed to abnormally high levels prior to the temporary halt of operations.

A few years later, at the beginning of the 1670s, supplies of new silver apparently fell sharply, never to recover during the remaining 79 years of the minting of silver cobs. In only four years between 1670 and 1748 were more than 150,000 reales produced and no silver coins were struck in 31 of the 79 years. It is surprising, therefore, that even the small number known of Nuevo Reino silver pieces of the late seventeenth to mid-eighteenth century have survived.

Assayers

When Alonso Turrillo de Yebra purchased the post of treasurer and proprietor of the Casa de Moneda of Nuevo Reino from Philip III in 1620, he acquired a position of substantial importance and an office that could bring its occupant considerable wealth. The king, of course, received his "quinto"—a fifth of all metal brought to the mint—and the treasurer/proprietor was paid a toll on all metal processed.

To manage the mint, Turrillo, like other mint owners, entrusted its day-to-day operations to lieutenants. Responsibility for weight and fineness of the coins and bars rested with a chief assayer whose initial or initials customarily were imprinted on all coins and bars. However, assayers' terms of office were not concurrent with those of the treasurer, a pattern observable in the history of Nuevo Reino's mint.

Turrillo experienced numerous difficulties in organizing and maintaining operations at the mint in Santa Fe de Bogotá and the oficina at Cartagena. He not only made several trips between the two cities, but in 1622 he went to Madrid to present his political problems to the Spanish court and did not return to Nuevo Reino for an extended period of time.

During his absence Turrillo apparently authorized Iñigo de Alvis, a senior member of his staff, to manage the Sante Fe mint and, based on the historical evidence available to date, Alvis also probably was the first assayer of the mint at Santa Fe de Bogotá (1622-27). Significantly, a contemporary document relating to the royal cédula of 1627 identifies Iñigo de Alvis as treasurer.

In 1627, Alvis appointed Miguel Pinto Camargo to the position of assayer. Thereafter, the succession of assayers at Santa Fe can be ascertained for the remaining era of silver cob production with two exceptions. Still to be identified and precisely placed in the chronology are assayers "H" and "T". Several 1-real "H" coins are known. All carry the escutcheons of both Portugal and Flanders/Tyrol on the Hapsburg shield. Therefore, they appear to have been struck very early in Nuevo Reino mint history; however, no documents have been found that identify assayer "H". Assayer "T", who is known both on gold and silver coins, is equally elusive. Barriga comments that in testimony taken in a 1627 lawsuit concerning the theft of a gold bar it is stated that among the mint dies of 1627 are some bearing the letter "P" for Miguel Pinto Camargo and others with the letter "T" which "does not correspond to Turrillo and for which there is no explanation."7 Unfortunately no information, other than Barriga's citation, has surfaced from the colonial archives.

In addition to the impediments caused by the limited supply of specimens and the crudeness and inconsistencies of coin designs, there has been considerable further confusion in assayer listings because assayers sometimes not only varied the initials they placed on their coins (a practice in Latin America unique to Nuevo Reino) but also, in a substantial number of instances, the assayer initials are lacking altogether on gold or silver low-denomination pieces. Nonetheless, logically acceptable patterns within style groupings are evident, making possible a convincing chronology of assayers.

Table 2 SILVER ASSAYERS OF SANTA FE DE BOGOTÁ

Assayers	*Term of Office*	*Identifying Initials*
Iñigo de Alvis (probable)	1622-27	A
Unknown	early 1620s	H
Unknown	1627-?	T
Miguel Pinto Camargo	1627-32	P
Alonso de Anuncibay	1632-42	A
Pedro Ramos		
Hapsburg shield	1642-51	R
Pillars and Waves	1651-76	R RMS
		$P^{O}R$ PRS
		$P^{O}RM$ $P^{O}RS$
		$P^{O}RAS$ $P^{O}RMS$

		P^{O}RNS P^{O}RAM
		P^{O}RAMS P^{O}RMOS
José de Olmos	1676	OLM
Gaspar de los Reyes	1676	?
		S
José Silvestre de Soto Maldonado	1677-78	M (on gold only)
Pedro García de Villanueva	1678-91	PG; P and G (on gold only)
Buena Ventura de Arce		
	1691-1702	VA; A (on gold only)
	1702-21	A ARC
José Sánchez de la Torre	1722-32	SAN; S (on gold only)
Miguel Molano	1732-43	M
Sebastián de Rivera	1743-48	S; SR (on gold only)
Manuel de Porras	1748-53	MP

Style

During the first 29 years of output, 1622-51, the basic design of Colombian silver coins consisted of a Hapsburg shield on the obverse and castles and lions in quadrants of a cross on the reverse. There are four types of these shield specimens (fig. 1):

1 (1) Carries the escutcheon of Portugal, a small shield of Flanders and Tyrol and a Granada centered below.
2 (2) Has no Portugese escutcheon, no Flanders and Tyrol, but a Granada at the bottom.
3 (3) Has no Portugese escutcheon, has a shield of Flanders and Tyrol and has an empty triangle where the Granada should be.
4 (4) Is without a Portugese escutcheon, but has a Flanders and Tyrol shield and an appropriately struck Granada at the bottom.

1. Shield types at Santa Fe
(1) 4 reales, 1622 (2) 4 reales, early 1630s (3) 2 reales, 1628 (4) 2 reales, 1640s

Unquestionably, the most unconventional feature of the early coins of this type is the almost unfailing reversal of the normal placement of the castles and lions of Castile and Leon on both obverse and reverse shields of the coins of Santa Fe, until assayer Pedro Ramos consistently began to position them properly about 1646. Summary production statistics of Nuevo Reino silver cobs reported by Barriga provide a tentative clue as to why this persistent error might have occurred. According to the data, the money value of silver coined by Cartagena during Alonso Turrillo de Yebra's tenure was virtually twice as great as at Santa Fe, which minted only 336,648 reales per year.8 Is it possible that once the mistake in positioning

the castles and lions was made, it simply continued because the smaller, less important, mint facility was sketchily supervised?

The second major design was introduced in 1651 to conform to Philip IV's mandate to adopt the "pillars and waves" motif on all South American silver coins because of the debasement and recall of all Potosí silver struck in the late 1640s. Pedro Ramos not only introduced pillars-and-waves coins to Nuevo Reino; in 1654 and 1655, he produced a transitional style similar to that of the transitional coins in Potosí (fig. 2). He then resumed the traditional pillars-and-waves design until his death in 1676. During Ramos's later years, his coins became simpler with thinner pillars and elementary, almost cartoon-like wave effects.

2.2 reales. 1653-55

Although, according to the archives, no silver coins were struck between 1676 and 1680,9 a 4 reales of assayer José de Olmos dated 1676 is known. The coin exhibits unusually good workmanship for Nuevo Reino, with satisfactorily engraved pillars and waves within three concentric rings of two solid lines with a beaded line between. An outer border legend, HISPANIARUM ET INDIARUM, completes the reverse design; the obverse has a large, simple shield of Castile and Leon surmounted by a crown. This central device is bordered by a crown at 12 o'clock and the inscription, CAROLUS REX DEI GRA (fig. 3).

Olmos's presentation is almost duplicated by Pedro García de Villanueva until as late as 1690, and the early coinage of Buena Ventura de Arce in 1702 continues to show similar characteristics.

In 1709, silver cob production halted, and with the exception of 9,000 reales in 1716, no additional silver was minted until 1721. In the interim, on May 27, 1717, a separate Viceroyalty of New Granada was created and all ensuing coinage carries the mint marks SF, FS, S, or F, even though the new viceroyalty was dissolved between 1723 and 1739.

3. 4 reales, 1676

In 1721, the final year of Buena Ventura's stewardship, output was resumed and new designs were introduced. These cobs have a Hapsburg shield on the obverse, with an arabic denomination on the left and a roman denomination on the right, all within a rope border. A crown surmounts the Hapsburg shield with the inscription PHILIPUS IIII DG ranging around the outer perimeter. The reverse design has simpler, rounder pillars with pedestals encompassing the legend PLUS ULTRA N^{O}R with lines of waves below. All are within a rope border inside the inscription, HISPANIARUM REX 1721 (fig. 4). Provocatively, at least some of the lower denominations have neither mint mark nor assayer.

From 1722 to 1732, José Sánchez de la Torre carried on the style of his predecessor. In 1732 a new assayer, Miguel Molano, came into office. Molano produced the most crudely designed coins of all Nuevo Reino's assayers. The pillars and waves are flat and unmodeled. Similarly, the castles and lions on the obverse have virtually no detail. Overall, the coins are readily distinguishable by their poor medallic quality (fig. 5).

Although documents indicate that Sebastián de Rivera produced silver coins between 1743 and 1748, no specimens attributable to him have as yet been identified. As a consequence neither the visual appearance of his coins nor the assayer's initial he might have employed on silver cobs is known. However, on gold cobs, Rivera employed both the initials "S" and "SR".

Available documentation indicates that Manuel de Porras, who became interim treasurer of Nuevo Reino in 1748, produced the final silver cobs of Santa Fe de Bogotá during his first year in office.10 Thereafter, no silver coins are known for Nuevo Reino between 1749 and 1760.

4. 2 reales, SF, 1720s

5. 8 reales, 1742

6. 1/2 real, 1673

7. 1/2 real

Fractional Silver

Apparently, half reales (medios) and quarter reales (cuartillos) were made throughout Nuevo Reino's history. The earliest-known dated Nuevo Reino half real is 1628, but it is virtually certain that earlier coins exist without dates, as is the case with most Colombian cobs. There are only a few half reales with assayers' marks; either because assayers often omitted their initials on lower-denomination coins, or because most silver sheets from which Nuevo Reino coins were struck were too thick to carry complete die impressions, causing the planchets to receive only the central portion of the design.

The format of the half reales is simple. The obverse has the monogram typically employed by die designers during the reigns of Philip II and his successors throughout Latin America. The reverse shows an elementary and often inaccurate emblem of a basic cross or a cross of Jerusalem with the castles and lions in each quadrant surrounded by a legend including the coin's date of issue. All currently known half reales carry the Philip monogram, including a half real of 1673 minted eight years after Charles II (1665-1700) came to the throne (fig. 6). Furthermore, there are coins which appear to bear the monogram of Philip but the border inscription of Charles (fig. 7).

While Colombian half reales have elementary designs and inscriptions, the cuartillos have no legends at all. Of proper weight and fineness, they carry only the die-punch impressions of the castles and lions (one each) employed for the shield obverses of the 8 reales in the year that the specific cuartillo was made. Ownership of a cuartillo initiates a tantalizing but frequently unsuccessful search for the 8 reales that will validate the cuartillo's date (fig. 8).

8. Cuartillo, 1651; 8 reales, 1651 (0bv)

Despite their subsidiary status, half and quarter reales played a significant role in the monetary system. Small change was essential to everyday life. Fractional silver was so important that in 1690, Diego de Villalba y Toledo, governor of Nuevo Reino, ordered José de Ricaurte, the treasurer of the mint, to make cuartillos and other small denominations from the inventory of silver bars at the mint in order to alleviate the prevailing shortage of minor coins. Ricaurte immediately complied and, to justify his action, wrote to Charles II that it was "extremely necessary" because the shortage of small coins was restricting the amount of alms being given to the poor and hampering the purchase of food at small grocery stores.11 Clearly, while cuartillos and medios might not have been needed by the gentry, they were vital to the populace as a whole.

Idiosyncrasies

Coin manufacture is generally viewed as an exact process involving precision in weight, fineness, and uniformity of appearance. Spanish American cobs are an exception and Nuevo Reino silver is the most extreme example of variability and inconsistency among them. Seemingly the sole objective of Nuevo Reino assayers was to produce coins of proper weight and fineness, with other standards violated or ignored.

More than half of all surviving Nuevo Reino coins have incomplete border legends or none at all. As previously mentioned, often no assayer appears on low-denomination coins. (Ironically, in a few cases an assayer's initials have been placed on both sides of the coin.)

There are occasions when no mint mark appears. Sometimes denominations are omitted, but there are instances when a denomination is given in both arabic and roman numerals. The pomegranate of Sante Fe is placed in many different locations. The motto PLUS ULTRA is seen in a wide variety of abbreviated forms.

9. 4 reales, 1653

10. 1 real, 1721

Double-striking is relatively common and there are several examples of double-struck coins which show both obverse and reverse designs on the same side (fig. 9). Also known are instances when major parts of the design are missing, including a 1 real of Buena Ventura de Arce which omits half of the shield of castles and lions on the obverse (fig. 10). A well-struck 2 reales mule of Pedro Ramos combines a crowned Hapsburg shield and a pillars-and-waves design.

Virtually any error that might be imagined can be found, constantly reminding the student that Nuevo Reino silver was a residual coinage, apparently minted only as a local convenience with almost no attention given to uniformity of design and appearance.

Production at Cartagena

Numerous royal ordinances, production statistics from contemporary records, physical analysis, and Colombian cobs themselves support the conclusion that silver coins were minted at Cartagena, 1622-34 and 1653-55, even though detailed output data have not surfaced to date.

The royal edict issued in Madrid, April 1, 1620, which authorized a mint in Santa Fe de Bogotá, also sanctioned a branch mint in Cartagena. On April 9, 1621, when Alonso Turrillo de Yebra arrived in Cartagena and presented his credentials, the governing authorities vigorously objected to his request to construct a mint, so after a brief stay Turrillo proceeded up the Magdalena River to Santa Fe where he opened the mint in 1622. However, it appears that Turrillo was also successful in erecting a subsidiary mint in Cartagena, despite the strong protestations of the local dignitaries, and initiated its operations shortly after starting at Santa Fe. A royal edict of May 18, 1623, directs the city officials of Santa Fe to authorize production of new, lower-grade, billon coins and exchange them for the higher-grade billon coins already made in Cartagena. An edict of August 24, 1626, countermands the directive of May 18, 1623, and instructs the governor of Cartagena to recall all billon coins and permit production only of refined silver in Cartagena, but no gold coins.

Additional evidence for activity in Cartagena is contained in a letter of October 27, 1629, from Colombian colonial officials to Philip IV, citing problems relating to the silver coins minted at Cartagena. Finally, an April 21, 1635, letter from the king's counsel in Madrid to Philip IV reviews the history of the Cartagena mint and, because of its unsatisfactory performance, recommends that it be allowed additional production only of small silver coins totaling 100,000 ducats, for the convenience of the city. The permitted coins would range from cuartillos to 2 reales, but no higher-denomination silver, and no gold.

These documents and others reported by Barriga and Juan Friede 12 make it clear that minting took place at Cartagena. Barriga not only lists annual gold-coin output for the years 1627 through 1753, and silver from 1627 through 1748, he also summarizes production of each treasurer, including "Don Alonso Turrillo de Yebra...en Cartagena...1,219,559 [pesos]...en Santa Fe...631,215 [pesos]."13 The patterns visible in the yearly production data reported by Barriga not only support the conclusion that a mint existed at Cartagena,

but also strongly suggest that it was an auxiliary mint, utilized only when exceptionally large production was required for a limited period of time.

Again, the royal edicts confirm this. In 1627, Philip IV directed that the billon coins then circulating in Nuevo Reino be exchanged for silver of full weight and fineness. As a consequence, Turrillo began restriking all coins then in use and, according to Barriga's data drawn from the colonial documents, some 2,364,840 reales of silver were recoined in the years 1627-33.14 When the 2,231,194 reales of new cobs struck during the same period are added to the recoinage, these years account for 25.3% of the total Nuevo Reino output of silver coins. Reflecting the abnormal minting requirements caused by the recoinage, not only is it reasonable to assume that any facilities available at Cartagena would be pressed into service, it also would seem to have been both prudent and efficient to produce some cobs at Cartagena to avoid the transport of large amounts of billon more than 500 miles up the Magdalena River to Santa Fe and then return the metal as new coins to the Caribbean shore.

Similar circumstances demanded recoinage about 20 years later. Condemning the debasement of Bolivian coinage in the late 1640s, on December 21, 1650, Philip IV recalled all recently minted Bolivian silver cobs circulating in the Spanish-American colonies and mandated the adoption of a new design for all colonial silver consisting of a simplified "castles and lions" shield and "pillars and waves" on the reverse. This meant that Bolivian silver circulating in Nuevo Reino had to be restruck. Just as in the 1622-34 period, cob output rose sharply, most probably making it necessary to reactivate the Cartagena mint. No specific recoining data are available, but the production figures for 1653-55 aggregate 12.1% of the 1627-1748 period.15 As in earlier years, it would seem inefficient and unnecessary to have sent faulty coins to Santa Fe and return new coins to Cartagena.

Physical analysis of Nuevo Reino silver coins corroborates the historical record. In an experiment, Adon Gordus of the University of Michigan, Ann Arbor, irradiated metal samples from a group of Nuevo Reino silver cobs including randomly selected specimens potentially attributable to Cartagena. The results were dramatic. Coins definitively from Santa Fe contained at least 3.7 times as much gold-trace element as the coin with the highest gold content among the possible Cartagena pieces, and the average of the Santa Fe samples exhibited over 50 times the gold content of the postulated Cartagena specimens. If Cartagena silver cobs consist of Potosí silver, which seems most likely, or were from a source different from Santa Fe, the irradiation results are exactly what might have been expected.

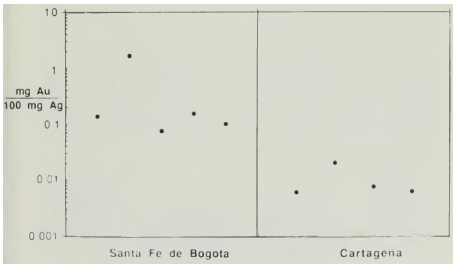
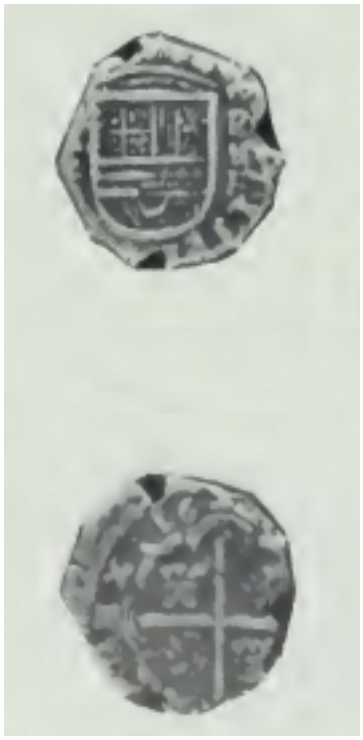


Table 3 NAA STREAK ANALYSIS, AUGUST 19, 198816

Visually, Nuevo Reino coins themselves provide further support for the contention that there was a mint at Cartagena. A distinctive identification mark for the city of Santa Fe is set forth in item six of the royal cédula of April 1, 1620, describing the design for the first Nuevo Reino billon coin: "...the insignias that this

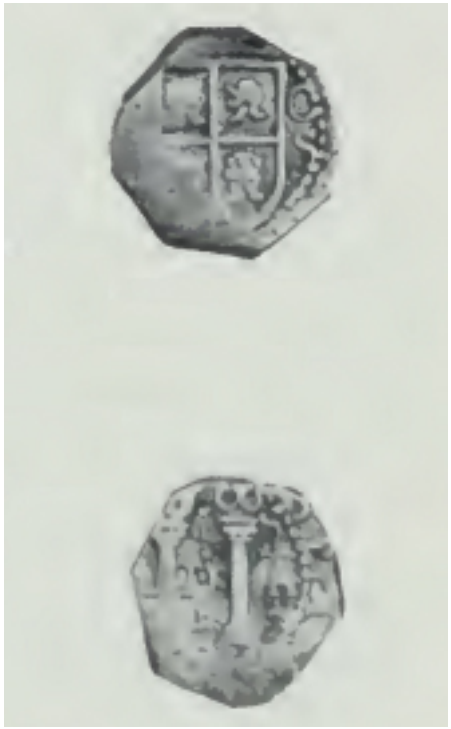
money is to have for one side is the Arms of Castile and Leon and the other, two columns with a Granada (pomegranate) in the center, insignia of the city of Santa Fe proper..."17 (fig. 11). Although inconsistencies abound in the coinage of Nuevo Reino, specimens attributable to Cartagena never carry a pomegranate. They may have an "NR" mint mark; they may bear an "A" assayer initial and occasionally they may have the reversed lions and castles typical of Santa Fe until the mid-1640s; but the pomegranate assigned to Santa Fe does not appear, even on the earliest Cartagena coin, which carries the escutcheon of Portugal in addition to the small shield of Flanders and Tyrol.

11. 1/2 real, 1620



12. 1 real, 1628?

13. 4 reales, 1630-34



14. 1 real, 1653-55

Differences in coin styles and differences in mint mark and assayer initials also indicate the presence of two mints. Observably, Cartagena coins have smaller, squarer, and simpler shields than their Santa Fe counterparts during the 1620s and 1630s. The 1655 Cartagena pieces, by contrast, are more elaborate and appreciably more sophisticated than their southern cousins. Cartagena cobs of the early 1620s carry mint mark/assayer combinations of NR/A on the Hapsburg shield side. On those of the late 1620s, NR/E and NRE/denomination (fig. 12) appear in several arrangements while the 1630-34 pieces have the C/E mint mark/assayer combination (fig. 13); and C/S appears on the 1655 coins (fig. 14). The first Santa Fe coins,

on the other hand, have an S/A mint mark/assayer combination on the Hapsburg shield side, followed by NRP/denomination and then NRA/denomination in the 1630s during Alonso Anuncibay's term as assayer. Finally, Pedro Ramos's "pillars and waves" silver of the 1650s is easily distinguished from that of the "S" assayer in Cartagena.

Table 4 SILVER ASSAYERS OF CARTAGENA

Assayers	*Term of Office*	*Identifying Initials*
Iñigo de Alvis(?) or Martín de Arbustante(?)	1622-27(?)	A
Unknown	1627(?)-34	E
Unknown	1653(?)-55(?)	S

It should be noted that while a chronological list of the silver-cob assayers can be reconstructed for Santa Fe,18 the roster excludes both the "E" and "S" assayers logically attributable to Cartagena. Also, the assayer initial "A" of the early 1620s, appearing on both Santa Fe and Cartagena coins, possibly represents two different assayers: Iñigo de Alvis and Martín de Arbustante, lieutenants of Alonso Turrillo de Yebra. Each served as interim treasurer of Santa Fe, Alvis from 1627 to 1631, and Arbustante for a short period prior to Alvis in 1627 and as his successor, 1631-37.

The accumulation of evidence is too substantial to deny the presence of a mint in Cartagena despite the absence of detailed records in the logical repository, the Archivo General de Indias. Numismatists can hope that some future scholar will discover the documentation providing a complete history of the mint. Until then, the many references relating to its activities and the coins of Nuevo Reino themselves (figs. 15-16) must suffice to confirm its existence.19

15. Type coins of Santa Fe
(1) First style, 1622-27: 4 reales, A
(2) Second style, 1627-32: 8 reales, P
(3) 1627-32: 4 reales, p
(4) 1651-76: 8 reales, R

16. Type coins of Cartagena
(1) 1622-27: 4 reales, A
(2) 1627-30: 4 reales, E
(3) 1630-34: 4 reales, E
(4) 1653-55: 8 reales, S

Mechanization of the Peruvian Mints: Problems of Implementation

Glenn S. Murray

Coinage of the Americas Conference at The American Numismatic Society, New York

This study examines the mechanization of the Lima and Potosí mints during the period 1728-77. Philip V promulgated two acts ordering the changeover from cob to round coin production. That of June 9, 1728, ordered all coins to be machine struck, with milled edges. The act of July 16, 1730, caused mint ownership and labor to be transferred from private contractors to crown authority, to facilitate implementation of mechanization.

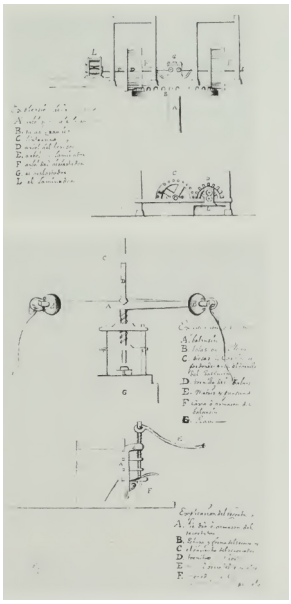
Before round coins could be struck, however, the New World mints had to be completely rebuilt in order to accommodate the new machinery, especially the huge mule-driven laminating mills. Mexico was the first mint to be converted, taking roughly four years from start to finish. But it took 12 years to do the same job at the Lima mint, and 24 years at Potosí. Cob production at Potosí continued 44 years after the 1728 law. It is this delay, the problems involved, and ensuing scandals that will be examined here.

The Lima Mint 1

Shortly after the king's order for mechanization arrived in Lima, the viceroy of Peru, Marques de Castelfuerte, was ready to comply. In a letter dated August 1729, which included drawings of proposed equipment (fig. 1),2 the viceroy stated, "I am anxiously awaiting the punches for the new round coins. Meanwhile, I have instructed special care be taken that the coins be struck clearer, on flatter bars, and more centered—especially to see the date, assayer, and mint marks. Until the new punches arrive that is all I can do." He went on to say he had found a resident of Lima, Juan de San Vicente, who by experience of having seen this machinery in Europe, was willing to construct the mills and presses needed for Lima. A copy of this letter and the plans, according to the viceroy, was "sent two days later on a different ship in hopes it would arrive faster."

No further reference is made to this letter, yet it leads one to imagine Lima striking milled coins 20 years before it actually did. Nothing more is noted until 1736, when the Madrid mint reported to the king on its tests of Lima coins dated 1733-35. Finding fault with the coins, the mint officials recommended penalties for the workers involved, but placed most blame on the fact that Lima had not yet been supplied with the new machines.

In May 1737, the viceroy informed the king that the extensive remodeling and repairs being done at the mint were potentially a waste of the treasury's money, since the building was still privately owned and any improvements would remain with the building when the mint was moved to a new location. Shortly after receiving this



1. Machinery for the mint; drawings by Juan de San Vicente, 1729. AGI, MyP, IyM.: 171.

letter, the king requested information on the cost of a new mint building.

In August 1742, the Board of Coin and Commerce informed the king of the urgent need to implement the 1728 law in Lima. They reported the dissatisfaction of the workers, paid less than those at the new plant in Mexico, as an explanation for the poor quality coinage. Its members go on to note that, "the new viceroy in Lima, Marqués de Villa Garcia, does not answer letters about the cost of a new mint. He insists his predecessor supplied that report—but the Board cannot find it." The Board then emphasized that it had received no help or answers from Lima, and it was completely uninformed on the situation there. Eighteen years had passed and nothing had been done. Finally, in October 1746, a secret courier informed the viceroys of Lima and Mexico simultaneously of the king's plan.

Andres de Moralés y de los Ríos, of Córdoba, Spain, was appointed the new superintendent of the Lima mint. Morales was first being sent to Mexico to study and learn the mechanized process at that mint, and would then travel to Lima. He was to make copies of all the instruments and machinery in Mexico and personally take them to Lima. The viceroy in Mexico was instructed to assist Morales in any request he made. Morales was allowed to select any assistants from the Mexico mint, and assign them to positions in Lima. Morales's true mission was to be kept an absolute secret both in Mexico and Lima, but especially in Lima where he was authorized to discharge the entire supervisory and labor staff upon his arrival.

While in Mexico, Morales learned that an earthquake had struck Lima, leveling the mint building. He notified the king that he was taking Salvador de la Villa, an architect of the Mexico mint, to Lima to rebuild the mint. He decided also take with him plans of the Mexico mint, since in his words, "it is so well designed and built." He also informed the king that he had not been able to keep his mission a secret, since various technicians were needed to assist in duplicating the Mexican equipment. Morales was in Mexico seven months, leaving in some haste due to the earthquake crisis in Lima. The Mexican viceroy literally

commandeered a ship in Acapulco to have Morales, his team, and the equipment taken to Lima as quickly as possible.

In March 1748, the Board sent a stern warning to Lima stating that the coins of 1739-44 were totally unacceptable, and again recommended stiff penalties. This letter appears to have been timed to Morales's arrival in Lima on May 25. Morales took charge of the mint upon arrival. He purposely delayed one week before firing the workers and officials, "to have time to discover their tricks." The metal owners as well as the king were being cheated. Morales's inventories began on June 1, 1748.

The 1746 earthquake destruction was so severe that the private owner of the mint building was unable to rebuild. He subsequently sold the ruins to the crown—which then purchased the remainder of the lots on the block, and erected the new building on the original location. In May 1749, Morales informed the king that production was being delayed because the wood for the laminating mills had not arrived from Guayaquil, where it was being cut. Mill construction was stalled until April 1750, when the wood finally arrived.

By September 1750, most of the production area was completed. Work continued on the laminating mills. Three screw presses had been cast from the wooden patterns brought from Mexico. Morales predicted round coins would be struck during all of 1751, but the dies did not arrive from Spain until October 31, 1751. They came in two small boxes, holding ten dies each for gold and silver.

On November 20, 1751, Morales wrote that working dies were still in the process of being cut from the originals, and that cob coins continued to be struck due to a lack of qualified workers for the new presses. Finally, in July 1752, Morales sent samples of Lima's first round coins to the king. He reported nearly 14,000 marcos in round gold coins and "some" marcos in round silver, struck in 1751. Apparently all the round coins were struck in December, or some 1751-dated dies were used in early 1752. Morales proposed to end cob production in 1753, but noted that the workers were still "timid" of the new machines. The old dies were finally destroyed on February 13, 1753.

Completion of the building itself dragged on. Morales first estimated completion by 1754, then 1755. Finally in May 1758, the viceroy reported that the building was complete and all equipment installed. He wrote that Morales had done such a commendable job, he should be sent to Potosí to straighten out the disaster caused there by Superintendent Santelices, who had been attempting to reconstruct that mint for nearly 10 years. The current mint building was built in the 1870s at the same location as the colonial mint. No plans are known to exist of the previous structures.

The Potosí Mint 3

In August 1749, one year after Morales arrived in Lima, the king appointed Ventura de Santelices as superintendent of the Potosí mint. Santelices had served other positions in Potosí prior to taking charge of implementing round coin production. At the same time, equipment was ordered to be made in Spain—a pattern laminating-mill and two screw presses at the Seville mint, other instruments at the Madrid mint. An inventory list for Potosí dated October 3, 1750, in Madrid, includes a box of 18 dies for all types of round gold and silver coins. A team of six specialists was also selected from the Seville and Madrid mints for duty in Potosí.

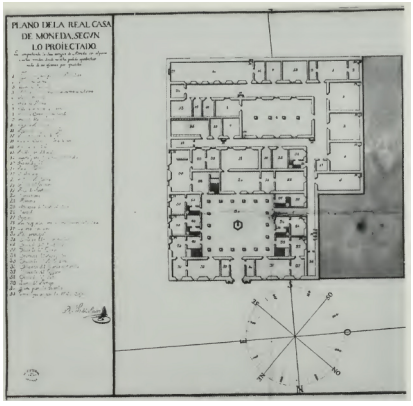
The equipment and officials were cleared for loading in Cádiz in November 1750, but they did not arrive in Montevideo until September 1752, nearly two years later. No archival documents explain the delay. Documented is the fact that the team was then stranded in Buenos Aires for four months after exhausting the funds advanced for their trip. The Captain General of Río de la Plata eventually helped and they began the arduous trek to the highlands. Another year went by before they arrived in Potosí in mid-1753. The equipment was stored at an undisclosed location, since there was no room at the mint, and planning for reconstruction commenced.

Two potential sites were selected for the new mint: the location of the old mint, on the Plaza del Regozijo, and another site two blocks away, on the much larger, and vacant, Plaza del Gato. In August 1753, an official commission inspected both sites; the decision was nearly unanimous to build on the larger Gato site.

Four months later Santelices informed the king that he had decided to go against the commission and simply remodel the existing mint. He explained that it would cost less than 4,000 pesos, and included a rough sketch of the new Santiago mint as an example. Then, in a conspiracy with several others, he ordered director Joseph del Rivero, who was partial to the Gato site, to draw new plans for the old building (fig. 2). There is some evidence suggesting that Santelices's motive for preferring the Regozijo site was to benefit a friend who owned a neighboring lot toward the rear of the building that could later be purchased for expansion, presumably at a handsome price.

Reconstruction of the old mint started while coins continued to be struck. Problems began to develop because the site quickly proved inadequate. Toward the end of 1756, the conspiracy began to surface amid utter chaos at the mint.

In November the treasurer informed the king that mint director Rivero, ill and near death, had left Potosí for the lowlands. On his deathbed, Rivero admitted that there had been a conspiracy and destruction of documents by Santelices. Rivero conceded he was orginally partial to the Gato site, but was forced to go along with Santelices. In January 1757, the viceroy suspended construction pending an inquiry into the conspiracy. He accused Santelices of wasting money for eight years without obtaining results. A special commission was formed to assess the problem. Many involved, wary of the reported conspiracy, wrote their own individual letters, supplementing the lengthy testimonies taken by the commission. As before, nearly all preferred the larger Gato site, even though 134,000 pesos had already been spent on the old building.



2. Original undated plan by Joseph del Rivero showing the new mint as projected for the old (Regozijo) site. AGI, MyP: 300.

The commission's lengthy report sent to Spain included five explanatory architectural renderings. The first showed both sites on a map, with a profile of the existing building. Next were an exact copy of Rivero's plan, which was found to be unworkable; and the same plan with changes made by Salvador de la Villa, builder of the

3. Salvador de la Villa's revision of Rivero plan. AGI, MyP, Buenos Aires: 264.

Lima mint (fig. 3). Also included were first- and second-floor plans for a new building for the Gato site, drawn by Villa in Lima without ever having visited Potosí (fig. 4).

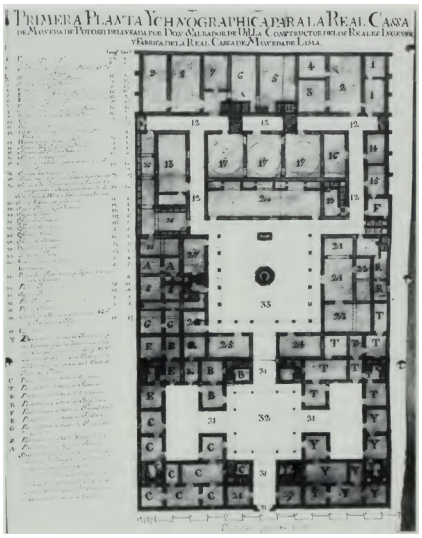
In February 1757, Santelices informed the king that the new director, Thomas de Camberos, questioned the mint plans drawn by Villa. He requested that Villa be brought to Potosí to supervise construction personally. Santelices blamed all problems on Rivero, now dead, and on the viceroy, for not ordering Villa to Potosí. He also wrote directly to Villa in hopes of persuading him to come.

Two months later the viceroy informed Santelices that Villa, old and feeble, was under doctor's orders not to travel. He furthermore harshly accused Santelices of having created the problem himself. In August 1757, after an eight-month freeze on all work, the viceroy ordered construction to begin at the Gato site according to the plans Villa had drawn in Lima. Santelices reluctantly complied, transferring all equipment and materials to the new site.

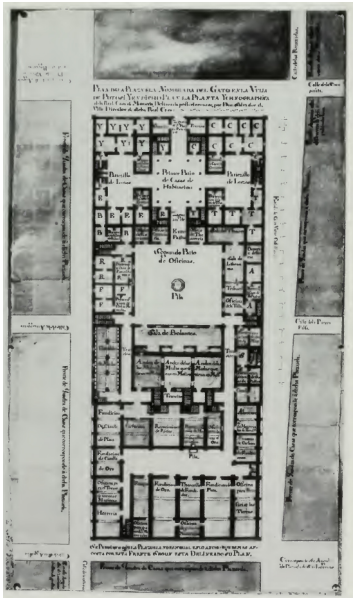
In October Santelices wrote the king of his reservations about having begun work at the Gato site. He reported that the foundation lines were laid with noticed hesitation, and work begun slowly—with an uneasy feeling. He insisted that the crisis was due only to Rivero's death, and that the Regozijo site should be reevaluated before being abandoned. He also noted that no wood had yet arrived from the lowlands, since the inadequate roads were still being widened. He concluded with another desperate plea to have Villa brought to Potosí.

In February 1758, Santelices wrote again, complaining to the king that the viceroy had sent the ex-treasurer as construction inspector (the same person Santelices had previously fired for publicizing Rivero's deathbed accusations). The ex-treasurer reported directly to the king. He accused Santelices of being incompetent, and only concerned with continuing cob production for his own interests. He claimed that Santelices had no intention of implementing round coin production.

Things seemed to take a turn for the better when Salvador de la Villa arrived in Potosí in November 1758; but the mood quickly changed as the next disaster came to light. In a letter written directly to the king, Villa explained the latest crisis. The dimensions supplied to him in Lima for the Gato site were seriously flawed. The site was actually narrower than first reported, and the building would have to be lengthened to compensate for the loss in width. Another year and a half of time, as well as quantities of materials, had been wasted. Villa immediately suspended all work until he completed new plans.



4. First-floor plan drawn by de la Villa in Lima for the Gato site, using faulty measurements sent to him from Potosí. AGI, MyP, Buenos Aires: 265.



5. De la Villa's design for the Gato site, drawn in Potosí, 1759. AGI, MyP, Buenos Aires: 268.

Villa's plans for the revised, longer and narrower, three-patio mint, were approved in Lima by Andrés de Morales in October 1759 (fig. 5). In November, the 10-month work stoppage was ended, new foundation lines were laid, and construction began anew. It was now a full 10 years since Santelices had been appointed to implement production of round coins, and the construction of what would be the finished mint had just begun.

In March 1760, Santelices complained to the king that the viceroy was continuing to obstruct progress; he further claimed that it was his own vigilance that caught the measurement error—created by the viceroy when he had plans drawn in Lima. He also stated that still no wood had arrived because the 482 mules

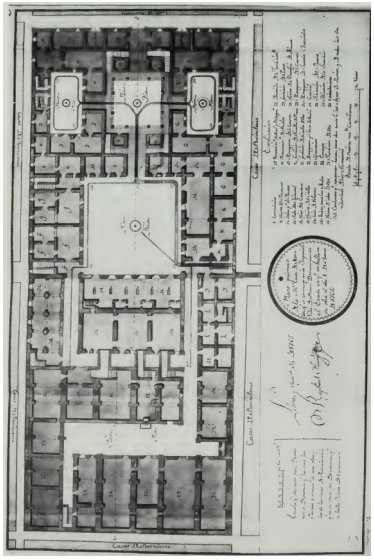
on reserve had been sent to other jobs due to the viceroy's work-stoppage orders. He added there were not enough laborers without pulling workers from the silver mines.

At some point during this period Santelices also asked the king for permission to strike gold coins. In December 1761, the king answered. "In reply to your letter stating your discovery of it being feasible to strike gold from the local area in Potosí...for now that gold must be struck only in Lima. You should inform the Board when the new mint is completed so a final decision can be made."

The request to strike gold sealed Santelices's fate; he was dismissed early in 1762. Shortly thereafter, the incoming superintendent, Jaime Sanjust, reported a disastrous state of chaos which he termed "purposeful disorder" at both mint sites. He noted the mint workers' ineptness at processing metal into coin, and he generated numerous letters in an attempt to document the disarray left by Santelices, which he claimed would be "impossible to organize."

In October 1763, Salvador de la Villa died from age and altituderelated problems. This greatly complicated matters and created yet another setback. Camberos, now the deputy director, had been in the lowlands personally supervising the cutting of lumber for the mint. This left Luis Cavello, the second deputy director, in charge, and work proceeded slowly. In January 1764, the viceroy informed the king that expenses for the two construction sites were poorly documented and hopelessly mixed. Funds could not be recouped by the sale of the Regozijo site since the building was torn apart, worthless, and, above all, still needed for production.

In December 1765, the new viceroy, Samuel Amat, sent the king plans of the mint showing its current status (fig. 6), and promised his constant vigilance toward its completion. In October 1766, the king instructed the viceroy to speed the completion of the building, keeping the Regozijo site open while the new mint started up.



6. Plan of mint under construction, 1765. AGI, MyP, Buenos Aires: 270.

On May 15, 1767, the first lot of round coins was struck in all five silver denominations. Samples were immediately sent to Spain for inspection. The accompanying letter states that hammered coins continued

to be struck because most workers were still unfamiliar with the new machines. In November 1768, 24 samples of each denomination of the silver round coins were sent to Spain for inspection. Production was reported to be proceeding well. Then, in another management change, Santiago de Arze replaced Sanjust as superintendent.

Finally, on May 17, 1770, three years after the first round coins were struck, Arze discontinued cob-coin production. The new mint was apparently finished and operating; the old mint closed. On September 15, viceroy Amat sent Pedro de Tagle, "oidor" of Charcas, to inspect the finished mint. Tagle, of his own volition, suspended round-coin production and resumed the striking of cob coins, claiming that the mint was not yet ready.

The cob coins were struck in the old mint while Tagle, acting as interim superintendent, proceeded to make a few finishing touches on the new building. He painstakingly recorded the improvements; later he drew the finished mint, with cross-section views of the facade as it remains today. He also recorded the finished details of the new water supply pipe and the foundry. Two more screw presses were cast in July 1771; Tagle had them drawn also.

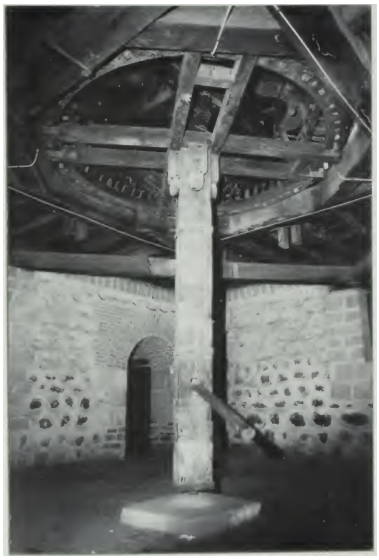
Even with two more presses, Tagle caused only cob coins to be struck in 1771 and 1772, under the pretext of a still-unfinished mint. Arze complained bitterly that Tagle resumed cob production only to claim the glory for himself when he would finally declare the mint finished. "Tagle's improvements are superficial," he said, "the presses and mills had been operational for over three years and the cob mint closed for five months."

Tagle's motives had more to do with money than fame and glory. He purposefully prolonged cob coinage in a scheme of fraud and corruption based on sloppy coins and deceitful bookkeeping. Even though new gold-coin dies arrived early in 1773, Tagle said he preferred to work only on silver coin production. The deceit was exposed when Tagle and viceroy Amat became embroiled in an argument over the new, secretly debased coinage. In July 1773, Tagle was removed from office and his artificially extended cob production ended. The striking of the new bust coins began immediately.[4] in La Plata, wrote a continuous stream of letters in his own defense, blaming the delay of bust coins on Amat. He insisted his mission was only to finish the mint. Tagle was later proven guilty in an investigation which dragged on for 10 years.

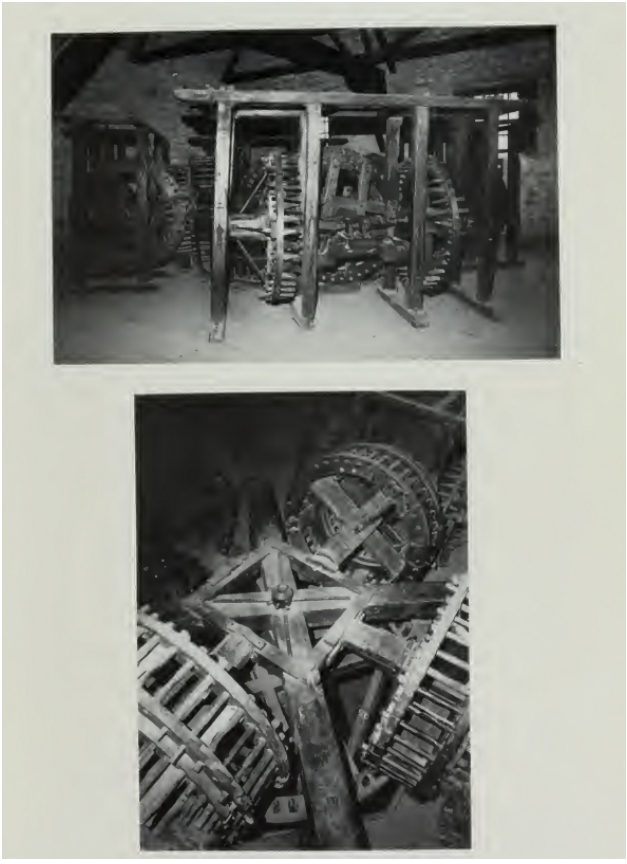
After the purging of Tagle, the mint settled down to normal. Superintendent Sanjust, fired in 1768, was restored to his position in May 1776. He then requested permission to strike gold coins, since the mint was finally completed. In January 1777, gold coin production was approved for the first time at Potosí.

Appendix: Views of the Potosí Mint Laminating Mills Installed 1760-67

[4]On the final plan of the Potosí mint, Tagle notes in the legend that he "initiated the round-bust coinage in March 1773." Documentary evidence indicates, however, that this did not take place until July 1773, after Tagle was removed from office.



A. The mills were driven by mules that ploded around a capstan on the ground floor.



B. There are three complete mill assemblies, each having four separate laminators on the upper level. One assembly was shipped from Spain in 1750 as a pattern; the other two were made in Potosí.

C. Compression cylinders were set at successive thicknesses on each laminator.

D. The wooden tooth-and-spoke gears required constant maintenance during their more than 100-year 1767-1869) service at the mint.

The "Large Crown" Counterstamp on Peruvian 2 Reales: A Guatemalan Issue of 1663

Robert D. Leonard Jr.

Coinage of the Americas Conference at The American Numismatic Society, New York

The "Large Crown" counterstamp found on Peruvian (Lima and Potosí) 2-real coins of the sixteenth and seventeenth centuries has been attributed to Bolivia (Potosí), the West Indies, and even to Swedish Pomerania. Over 10 years ago I began compiling a corpus of specimens of this counterstamp in an attempt to determine its correct attribution and purpose. This corpus has now grown to 52 entries, which represents at least 49 different coins.[1] While I have cast a fairly wide net, the corpus is certainly not yet complete; I have been unable to examine three Almanzar catalogues and a number of Freeman Craig lists and auction catalogues which probably contain additional specimens, and have likely missed some pieces in Europe and Latin America. In addition, Frank Sedwick has handled several specimens over the years, disposing of them quickly at low prices, which may not appear in the corpus.[2] However, duplication is minimal, and the corpus has certainly grown large enough to be useful.

There are two types of this counterstamp, a neat version, which must be an official issue of some kind (figs. 1-2), and a crude version (fig. 3), which is nine times rarer and may be a contemporary counterfeit. It is of course possible that the crude version is an official issue also, but if so it was certainly not engraved by the same person as the neat version.

Several similar die varieties exist for the neat version, which can be differentiated in some cases by die breaks; the neat counterstamp shown in fig. 2 has a large, vertical bisecting die break[3] and other specimens are known with both a horizontal bisecting die break and a piece missing on the right side.

1. Leonard 37

[1]I am indebted to William L. Bischoff, Gregory G. Brunk, William B. Christensen, Richard Doty, K.A. Dym, Georg H. Förster, Joseph R. Lasser, Danny Lee, Porter A. Montgomery, Jr., Edward H. Roehrs, Paul Rynearson, and Juan XII Suros, M.D., and to the late Joseph Lepczyk and Richard A. Lukas for their assistance with the corpus.

[2]Thanks to Douglas O. Rosenberg for advising me of his conversation with Frank Sedwick on this subject.

[3] Danny Lee is the discoverer of this variety, which was first called to my attention by Douglas O. Rosenberg.

2. Leonard 9 (vertical die break)

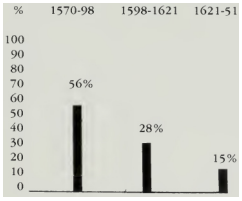
3. Leonard 51

Specimens with these die varieties are identified in the corpus. Each counterstamp is listed separately with the neat version first. Within each category, the listing is chronological by date, beginning with the earliest coin, according to the attributions of Grunthal and Sellschopp,[4] as modified by the findings of Arnaldo J. Cunietti-Ferrando and K.A. Dym presented elsewhere in this volume. All coins are numbered consecutively.

Since an empirical study is to be made of the corpus to draw some conclusions about this counterstamp, some statistical tests should first be performed on it to determine whether it represents a large enough sample for us to have confidence in the results. It is likely that no effort was made to position the counterstamp at any particular place on the coin, as was sometimes done. Therefore we would expect to see 50% of the counterstamps on the obverse and 50% on the reverse. In fact the corpus does not deviate far from this statistical norm, with 40% of the counterstamps on the obverse and 60% on the reverse, and if the five coins whose counterstamp location is unknown are all stamped on the obverse, the location would be equal within four coins.

A second test to make is the date of the coin itself. I have divided the range of dates of those coins which can be closely dated into three roughly equal periods of about 25 years each, as shown in Table 1.

Table 1 DISTRIBUTION OF "LARGE CROWN" COUNTERSTAMP BY COIN DATE



We might expect to see similar quantities in each category, with perhaps more of the more recent coins. Instead we find a skewing, with an apparent over-representation of the older coins, though it was pointed out by one of the participants in the Conference that this distribution is almost exactly equal to that seen in collections. The apparent over-representation of older coins in both cases is unlikely to be real and probably reflects the greater difficulty of attributing the later coins of this type, which tend to be struck on small flans with the date and the assayer's initial frequently missing. Also, the early coins may have had a higher survival rate because they are better looking and might have been preferred for piercing. Making allowance for this, the distribution of dates is very close to what would be expected. Therefore, while not perfect, the corpus appears to contain a large enough sample for conclusions to be drawn with some confidence.

[4] Henry Grunthal and Ernesto Sellschopp, *The Coinage of Peru* (Frankfort a.M., 1978).

The primary conclusion to be reached is that this counterstamp was applied in the mid-seventeenth century in one of the Spanish dominions, since it is known only on Peruvian coins of the sixteenth and seventeenth centuries, and apparently on 2-real coins exclusively.

For many of the coins in the corpus the provenance is known. Only two specimens are thought to have come to light in South America, and even this tiny number is doubtful because this coin is missing in several large collections of Peruvian coins formed in Bolivia and Peru. This counterstamp was also unknown to Medina in Chile. However, nearly half (48%) of the known specimens were collected in Central America.

One other salient fact is that 80% of the coins whose condition is known are holed. I began tracking this parameter because eight of the first nine coins I encountered were holed and I thought that the counterstamp might have been used to validate such coins for continued circulation in the manner of the fleur-de-lis counterstamp of Puerto Rico. This cannot be the case, but the percentage of holed coins is remarkably high—more than twice what would be expected. This high level of holed coins is probably indicative of a recalled coinage, that survived primarily as jewelry, and is reminiscent of the later countermarks of Guatemala, usually found on holed coins.

Several different attributions have been proposed for this counterstamp: Bolivia (William B. Christensen) Pomerania (Ray Byrne) St. Bartholomew (J. Schulman, Meili auction) West Indies, unattributed (Ray Byrne, later) Guatemala (K.A. Dym; G.H. Förster)

Each of these possibilities will be considered in turn.

Originally I agreed with the suggestion of William B. Christensen that this counterstamp was probably of Potosí, ca. 1649-52,[5] but the process of doing the investigation for this paper led me to a different conclusion. In any case, the "Large Crown" counterstamp is of a style different from those of Potosí.

4-6. Pomerania under Sweden, Carl XI, schillings, 1691.

In three letters to me in the early 1970s, the late Ray Byrne attributed this counterstamp to Pomerania: "they are Pomeranian crowns stamped on various early European & Spanish coins (as they were purchased on open market by weight to alleviate coin shortage)."[6] While crowns are known counterstamped on various Pomeranian coins of the late seventeenth century, lending some credence to this theory, they are of a completely different style and size, as can be seen by comparison to three specimens in the ANS collection, which show different varieties of the counterstamp (figs. 4-6).

The "Large Crown" counterstamp is most often attributed to St. Bartholomew, a Swedish colony in the West Indies, an identification that goes back to the J. Schulman auction of the Meili collection in 1910 and has

[5] William B. Christensen, "The 1649-1652 Revalidation Countermarks of Potosí," *Numismatics—Witness to History* ([London], 1986), pp. 169-72.

[6] Ray Byrne, letter to the author, 2 February 1970.

been followed by many catalogers since. Ray Byrne himself showed that this could not be correct in a 1967 article.[7] Again, the shape of the crown is different and the "Large Crown" is applied to much older coins.

By the time his collection of coins of the West Indies was sold in 1975, Ray Byrne had changed his mind about giving these coins to Pomerania and simply listed them as "Unattributed Caribees."[8] This attribution is untenable because the counterstamp is found only on South American coins; it would be expected that Mexican coins would be included for any counterstamp applied in the West Indies. Also, the mid-seventeenth century date makes this older than most other West Indian counterstamps.

This leaves what is certainly the correct attribution—Guatemala—based on both known provenance and historical data. In a letter of 19 November 1987, to William Bischoff at the ANS, K.A. Dym cited Medina's listing of a crown countermark used on 2-real pieces in Guatemala.[9] On 12 October 1988, Georg H. Förster of Ludwigshafen, Germany, wrote to Dr. Bischoff independently propos- ing the same attribution. I have investigated this attribution thoroughly, with the enthusiastic assistance of Dr. Bischoff, and have assembled the following account.

There are several sources for the monetary history of Guatemala in the seventeenth century. In 1851-52, D. Francisco de Paula Garcia Peláez published his *Memorias* in Guatemala, drawing on several old manuscript sources deposited there.[10] Medina quoted and paraphrased Garcia Peláez in his *Las monedas coloniales*,[11] and drew on his researches also for *Las monedas obsidionales*.[12] (Medina assigns no. 132 to this counterstamp in this latter work, listing it under Guatemala.) But the chief primary sources are the manuscript chronicles of the history of Guatemala by Ximénez [13] and by Molina, Caño, and Ximénez.[14] Fray Francisco Ximénez, a Dominican friar, was born 23 November 1666, and died after 1721. In late 1687 or 1688, at the age of 21, he was sent to Guatemala. A student of the Central American Indian languages Quiché, Cacchiquel, and Subtuhil, he published vocabularies and grammars of them and the well-known creation legend, Popol Vuh.

From these various sources the conditions that led to the counterstamping and continued circulation of 2-real pieces can be reconstructed (Table 2). The problem began with the discovery that the silver coinage of the mint of Potosí had been surreptitiously debased in the mid-1640s. In Guatemala these debased cob coins were called moclones. By royal decree of 1 October 1650, these coins were devalued, the pesos of 8 reales

[7] Ray Byrne, "St. Bart's Revisited," *The Numismatist* 1967, pp. 1548-49.

[8] Peters, 13-15 June 1975, 1245-48.

[9] José Toribio Medina, *Las monedas coloniales hispano-americanas* (Santiago de Chile, 1919), p. 282.

[10] D. Francisco de Paula Garcia Peláez, *Memorias para la historia del antiguo Reyno de Guatemala* , 2 (Guatemala City, 1852).

[11] Medina (above, n. 9), pp. 281-82.

[12] José Toribio Medina, *Las monedas obsidionales hispano-americanas* (Santiago de Chile, 1919), p. 85.

[13] Fray Francisco Ximénez, *Historia de la provincia de San Vicente de Chiapa y Guatemala de la Orden depredicadores, compuesta por el R. P. Pred. Gen. Fray Francisco Ximénez* , 3 vols. (Guatemala City, 1929-31).

[14] Fray Antonio Molina, Fray Augustin Caño, and Fray Francisco Ximénez, *Antigua Guatemala (Cronología guatemalteca del siglo XVII)* [Pub. in paleographic transcription with index and notes by Jorge de Valle Mattheu (Guatemala City, 1943)]. Molina began this work in 1677 (though he starts his chronicle of Guatemala in 1628); it was continued by Caño in 1678 and passed to Ximénez in 1699.

being reduced to 6 reales and the 4 reales to 3 reales. However, this decree did not apply in Guatemala and over time large numbers of these debased coins were brought there, where they could still be passed for full face value, and Mexican coins of good silver were removed.

Finally, at the Guatemalan council meeting of 16 May 1653,[15] it was decided to implement the decree of 1 October 1650 throughout Guatemala also, and the notice of devaluation was published the next day, Saturday, 17 May 1653.[16] The debased coins continued to circulate at these reduced values for some years, though they had been largely melted elsewhere. But gradually many false coins of silvered copper entered Guatemala, since it became known that the 8-real moclones were still circulating there at the value of 6 reales. By the early 1660s their continued circulation had become a scandal, and public protest meetings were held. Petitions were submitted to the prelates and government officials dated 21 June 1661 calling for the total elimination of the moclones.[17] These petitions were accepted and shortly thereafter the audiencia ordered that the moclones might no longer circulate.[18] The owners of these coins, in order to avoid loss of their silver, either cast it into bars or converted it into wrought silver.

The only exceptions to this general destruction of Peruvian cob coins were the pieces of 2 reales. Molina wrote:[19] They would only circulate the 2 reales, and these, in the year of [16]63, they declared might not pass until they might recognize the good and bad, and those which are not suspect might be counterstamped; and this is the coin that today [i.e. 1677] passes; since they do not cross to Spain, there are some [2-real coins] in the land which are not able to leave it.

In his later work, Ximénez repeated this information and described the counterstamp used:[20] ...and they only used the 2 reales until [in] the year 1663 it was ordered that they might not pass until those that were debased were recognized and the others might be counterstamped and might pass, that today [i.e. after 1687] these are found with a crown....

[15] Garcia Peláez (above, n. 10), p. 190. I would like to express my thanks to Dr. Bischoff and Kevin Rosenberg for their assistance with translations from Spanish for this and other sources, but wish to emphasize that any faults in the translations given here are not theirs but mine.

[16] Molina, Caño, and Ximénez (above, n. 14), p. 82.

[17] Garcia Peláez (above, n. 10), p. 191.

[18] Molina, Caño, and Ximénez (above, n. 14), pp. 78-79; Ximénez (above, n. 13), 2, pp. 284-85; Garcia Peláez (above, n. 10), p. 192.

[19] Molina, Caño, and Ximénez (above, n. 14), pp. 78-79: "Solo corrían los reales de á dos, y estos el año de 63 se volverieron a pregonar que no corriesen hasta que se reconociecen los buenos y malos, y se resallasen los que no tenian malicia, y fue así, y esta es la moneda que hoy corre; que como no pasa a España hay alguna en la tierra de la que no puede salir della." On p. 82, this information is repeated but the date of the counterstamping is given as 1662 [*sic*]. Dr. Bischoff suspects that this passage was supplied by Caño when he took over the *Cronología guatemalteca* in 1678 from Molina. In any case, all other contemporary references to the counterstamping state that it occurred in 1663.

[20] Ximénez (above, n. 13), 2, p. 285: "...y solo corrieron los reales de á dos hasta que el año 1663 se mandó que no corriesen hasta que se reconociesen los que estaban alterados y aquesos se resallasen y corriesen, que son los que el día de hoy se hallan con una corona...."

The removal of the last Peruvian 8- and 4-real coins presented problems in remitting taxes to Spain, for these were required to be paid in large-denomination coins. Molina noted:[21] This year of [16]77 there came a certificate of permission from the king: as for the royal revenues that they may carry to Spain, they might be in Mexican and Peruvian 2-real coins.... This has to be a great loss in the land, because there has not been coin for ordinary commerce.

Continued circulation of the Peruvian 2-real coins remained controversial. Wrote Garcia Peláez:[22] The dispute on account of the 2 reales was not completed for a period of 15 years after the counterstamping, and moreover, was extended to the 1 real coins. In the royal provision of 13 April 1678, the president and judges spoke. For so much silver as is found in the royal treasury of this court which is in counterstamped 2 reales belonging to his majesty that might not have been exchanged for duplicate coins, nor even for the 2 reales and 1 reales, that [silver] is ordered to be remitted to the lord viceroy [in Mexico] for exchange [beginning with] 5,000 pesos of those in the royal treasury...

A total of 5,000 pesos in counterstamped 2-real coins—20,000 pieces—was exchanged for Mexican 2-real coins.

Presumably there were further exchanges, because these coins have survived primarily in the form of specimens that were holed by the Indians for jewelry. However, they must have remained in circulation for a number of years afterward, since Ximénez, who did not arrive in Guatemala until 1687 at the earliest, wrote that "today these are found with a crown." This phrase can have been written no earlier than 1699, when he began his chronicle of Guatemalan history, and was probably composed well into the eighteenth century. (Molina, in his chronicle, did not describe the counterstamp, so Ximénez must have seen it for himself, indicating that the counterstamped 2-real coins had not totally disappeared from circulation as late as 1687.)

[21] Molina, Caño, and Ximénez (above, n. 14), pp. 78-79: "Este año de 77 vino cédula del Rey para que las rentas reales se lleven a España aunque sean en reales de á dos mexicanos y peruleros, porque solo se llevaban de a ocho, y de á cuatro. Esto ha de ser un gran daño de la tierra, porque no ha de haber moneda para el comercia ordinario."

[22] Garcia Peláez (above, n. 10), p. 193 (text in full): "La contienda por los reales de á dos, aún no era acabada 15 años despues de resellados, y ademas, se extendió a los reales sencillos. En real provisión de 13 de abril de 1678, el presidente y oidores dijeron. Por cuanto en la real caja de esta corte se halla alguna plata en deadoses resellados pertenecientes á S. M. que no se han podido reducir á moneda doble, ni aun á los deadoses y sencillos, que están mandados remitir al señor virey para su trueque, y habiéndosele dado noticia que el capitán don Isidro de Zepeda llegó á preguntar, si anticipando alguna moneda doble, se le remataría el cacao del tercio de Sant Juan, y habiéndosele enviado recado, para que sirviese á S. M. en reducir á moneda doble 5 mil pesos de la que se halla en la real caja resellada provinciana con cargo de que se le volverá; respondió no hallarse con moneda doble, por cuya razon no habia hecho postura, que á tenerla, sirviera á S. M. mediante lo cual, mandaban y mandaron, sin embargo de lo que respondió, se le notifique, ponga oy en todo el día en la real caja 5 mil pesos en moneda doble, para que en ella se trueque, con cargo de que dentro de dos meses se le volverá. Notificada la providencia al interesado, apeló á la misma audiencia, y en eso quedó."

Table 2 CHRONOLOGY OF "LARGE CROWN" COUNTERSTAMP

Ca. 1645-49	Potosí silver coinage is seriously debased
1 October 1650	Devaluation of debased Potosí coinage in Peru and New Spain (8 reales to 6 reales, 4 reales to 3 reales)
16 May 1653	Council meeting in Guatemala; decision is reached to implement the devaluation in Guatemala
17 May 1653	Devaluation is published
After 21 June 1661	Demonetization of Peru 8 and 4 reales
1661 or 1662	Private melting and smithing of withdrawn silver
1663 (1662?)	Examination of 2-real coins in Guatemala to separate the good pieces from the debased; counterstamping those not suspect with a crown
1677	Royal cédula received permitting export to Spain of 2-real coins for royal revenues
15 April 1678	5,000 pesos of counterstamped 2-reales pieces (20,000 coins) in Guatemala treasury remitted to the lord viceroy in Mexico in exchange for Mexican 2-real coins
1687 or 1688	Francisco Ximénez arrives in Guatemala; sees counterstamped 2-real coins in circulation
24 July 1715	Counterstamped 2-real coin carried by sailor on 1715 Plate Fleet; lost in shipwreck

An archaeological confirmation of this survival was found recently by Mel Fisher's Cob Coin Co. in salvaging the remaining wrecks of the 1715 Plate Fleet. One of the pieces recovered was a Potosí 2 reales with the neat "Large Crown" counterstamp, unholed but eroded to less than 50% of its original weight—about the diameter and thickness of a modern dime (fig. 7). This discovery shows that at least one sailor had one in his pocket when the fleet set sail from Havana 24 July 1715.

7. Leonard 33.

To sum up, the "Large Crown" counterstamped 2-real pieces formed the principal currency of Guatemala for a period of 15 years, from 1663 to 1678, and lingered in circulation for several decades thereafter—the final legacy of the great Potosí debasement of the 1640s.

Table 3 CORPUS OF "LARGE CROWN" COUNTERSTAMPS[a]

A. Neat "Large Crown" Counterstamp (Official Issue)

No.	*Denomination*	*Date*	*Mint Assay*	*Location*	*Condition*	*Source of Coin*
1	2 reales	1570-88	Lima?	Obverse	Holed	Almanzar Mail Bid Sale, Nov. 30, 1981 (Castillo 1), 1707
2	2 reales	1570-88	Lima?	Obverse	Holed	Almanzar Sale, June 30, 1983 (Castillo 9), 2517 "ex Castillo"
3	2 reales	1570-98	(Peru)?	Obverse	Holed	J. Schulman Sale, Feb. 20, 1910 (Meili), 2167
4	2 reales	1570-98	(Peru)?	Reverse	Holed	Georg H. Förster Coll. (purchased in El Salvador, 1959)
5	2 reales	1570-1621	(Peru)?	Obverse	Holed 2x, worn	Almanzar Sale, June 30, 1983, (Castillo Coll. 9), 2511 "ex Castillo"
6	2 reales	1570-1621	?	Reverse	Holed	Almanzar Sale, Oct. 28, 1983 (Castillo Coll. 11), 2135
7	2 reales	1570-1651	"Spain"	?	Holed	Peters Sale, June 13-14, 1975 (Byrne), 1246
8	2 reales	1570-1651	"Spain"	?	Holed	Peters Sale, June 13-14, 1975 (Byrne), 1248
9	2 reales	1574-98	Potosí	Obverse	Holed	Kevin Rosenberg Coll., ex DHL stock, Nov. 2, 1988
10	2 reales	1574-98	Potosí	Reverse	Holed	Hans M. F. Schulman Sale, Mar. 18-19, 1966 (Gibbs), 1738, ex Bergsøe Coll., 1903
11	2 reales	1574-1621	Potosí	?	Reverse	Holed 3x	Estate of R. A. Lukas, ex Ryan's Coins, 1978
12	2 reales	1574-1621	Potosí	?	Reverse	Intact	Georg H. Förster Coll., purchased in Guatemala, 1960

[a]Nos. 31 and 47 may be the same coin. No. 47 may be a badly clipped 2 reales; this coin has not been available for examination.Nos. 1, 2, 5, 6, 13, 15, 16, 23, 24, 25, 28, 34, 38, 39, 42, 44, 45, 49, and 52 are from "an outstanding (lifetime endeavor) collection of Hispanic American coinage,"—later identified as the Castillo Collection—"this collection came from the Central America region;" it was sold by Almanzar between November 30, 1981, and February 1, 1984. In addition, 19, 20, and 26, sold by Almanzar privately ca. 1960, were purchased by him in Guatemala as part of a large group of Spanish-American coins, cob and milled. Nos. 12 and 18 were purchased in Guatemala also and 4 was purchased in El Salvador.The punch used to counterstamp 11 and 22 is broken on the right side and has a horizontal bisecting die break. Nos. 9, 18, 42, and 46 have a vertical bisecting die break and thus are from a different die than 11 and 22. There are other minor die varieties of the neat counterstamp, A.Of the entire corpus, 25 pieces (48%) are known to be of Central American provenance, 2 (4%) are thought to be from South America, and 25 (48%) are of unknown origin.Of the 39 coins that can be closely dated, 22 (56%) are from 1570-98, 11 (28%) are from 1598-1621, and 6 (15%) are from 1621-51.Of the 47 coins whose counterstamp location is known, 19 (40%) are counterstamped on the obverse and 28 (60%) on the reverse.Of the 50 pieces whose condition is known, 40 (80%) are holed.

13.	2 reales	1574-1621	Potosí	?	?	?	Almanzar Mail Bid Sale, Mar. 8, 1982 (Castillo Coll. 3), 2021
14.	4 reales	1577-88	Lima	D	?	"Badly holed"	NASCA Sale, Dec. 5, 1977 (Wayte Raymond 1), 647
15.	8 reales	1577-88	Lima	D	Reverse	Holed	Almanzar Sale, Feb. 28, 1983 (Castillo Coll. 8), 2061, ex Almanzar Mail Bid Sale, Sept. 30, 1980, 36
16.	8 reales	1577-88	Lima	D	Reverse	Holed	Almanzar Sale, Feb. 28, 1983 (Castillo Coll. 8), 2062
17.	8 reales	1577-88	Lima	D	Reverse	Holed	Georg H. Förster Coll., ex Freeman Craig & Co. Mail Bid Sale Mar. 27, 1985, 439
18.	8 reales	1577-88	Lima	D	Reverse	Holed 2x	Georg H. Förster Coll., purchased in Guatemala, 1960
19.	8 reales	1577-88	Lima	D	Reverse	Holed	Porter A. Montgomery, Jr. Coll., ex Almanzar's Coins of the World, ca. 1960 (privately), purchased in Guatemala as part of group of cob coins
20.	8 reales	1577-88	Lima	D	Reverse	Holed	Porter A. Montgomery, Jr. Coll., ex Almanzar's Coins of the World ca. 1960 (privately), purchased in Guatemala as part of group of cob coins
21.	8 reales	1577-98	Potosí	B	Reverse	Holed	ANS, ex Juan XII Suros Coll., 1984, ex Freeman Craig ca. 1978, purchased in South America?
22.	8 reales	1577-98	Potosí	B	Obverse	Holed	ANS, ex Juan XII Suros Coll., 1984, ex Freeman Craig ca. 1978, purchased in South America?
23.	8 reales	1577-98	Potosí	B	Obverse	Holed	Almanzar Sale, Sept. 9, 1983 (Castillo Coll. 10), 2346, ex Almanzar Sale, April 29, 1983 (Castillo Coll. 8), 1991
24.	8 reales	1577-98	Potosí	B	Obverse	Holed	Almanzar Sale, June 30, 1983 (Castillo Coll. 9), 2515 "ex Castillo"
25.	8 reales	1577-98	Potosí	B	Obverse	Holed	Joseph R. Lasser Coll., ex Almanzar Mail Bid Sale, Mar. 8, 1982 (Castillo Coll. 2), 2022
26.	8 reales	1577-98	Potosí	B	Obverse	Holed	Porter A. Montgomery, Jr. Coll., ex Almanzar's Coins of the World, ca. 1960 (privately), purchased in Guatemala as part of group of cob coins
27.	8 reales	1577-81	Potosí	L	Reverse	Holed	ANS "St. Bartholomew," gift of Charles M. Wormser, 1951?
28.	8 reales	1591-98	Potosí	?	Obverse	Holed	Almanzar Sale, June 30, 1983 (Castillo Coll. 9), 2513 "ex Castillo"
29.	8 reales	1598-1610	Potosí	B	Reverse	Clipped?	ANS, "St. Bartholomew," gift of Charles M. Wormser, 1951?
30.	8 reales	1598-1621	Potosí	?	Reverse	Holed	DHL stock, Nov. 2, 1988
31.	8 reales	1598-1651	"Spanish World"	?	Reverse	Inset	Christensen, Dec. 10, 1983 ("Santa Cruz"), 1158
32.	8 reales	1598-1651	Potosí	?	Reverse	Holed	Hans M.F. Schulman, Mar. 18, 1966 (Gibbs), 1738A; Hans Schulman, May 24-25, 1968 (Van Loan Gaines), 1052?

33.	2 reales	1598-1651	Potosí	?	Reverse	Intact (eroded less than 50% of original weight)	DHL stock, Nov. 2, 1988, ex 1715 Plate Fleet wreck (with Mel Fisher's Cob Coin Co. certificate)
34.	4 reales	1613-16	Potosí	Q	Reverse	Holed 2x	Almanzar Sale, June 30, 1983 (Castillo Coll. 9), 2514 "ex Castillo"
35.	8 reales	1616-17	Potosí	M	Reverse	Holed	ANS, "St. Bartholomew," gift of Charles M. Wormser, 1951?
36.	8 reales	1616-21	Potosí	?	Reverse	Intact	El Dorado Sale, Aug. 12, 1985, 3180
37.	2 reales	1617	Potosí	M	Obverse	Holed (solder plugged)	R.D. Leonard Coll., ex Culkin Mail Sale, Nov. 29, 1969, ex Barney Bluestone Sale?
38.	2 reales	1617	Potosí	M	Obverse	Intact	Lepczyk, Nov. 26, 1983 (MSNS), 1826, ex Gregory G. Brunk, ex Almanzar Mail Bid Sale, Nov. 30, 1981 (Castillo Coll. 1), 1708
39.	2 reales	1618-21	Potosí	T	Obverse	Intact	Almanzar Sale, Oct. 28, 1983 (Castillo Coll. 11), 2136
40.	2 reales	1618-21	Potosí	T	Obverse	Holed	DHL stock, Nov. 2, 1988
41.	2 reales	162(0 or 1)	Potosí	T	Reverse	Holed	Edward H. Roehrs Coll., ex Peters, June 13-14, 1975 (Byrne), 1245
42.	2 reales	1621-35	Potosí	P	Obverse	Holed	Almanzar Sale, June 30, 1983 (Castillo Coll. 9), 2518 "ex Castillo"
43.	2 reales	1621-51	Potosí	?	Obverse	Clipped?	Christensen (above, n. 5), pl. 33, 21
44.	4 reales	1633	Potosí	P	Obverse	Holed	Almanzar Sale, Feb. 28, 1983 (Castillo Coll. 7), 2060
45.	8 reales	1640-51	Potosí	?	Obverse	Holed 2x	Almanzar Sale, June 30, 1983 (Castillo Coll. 9), 2516 "ex Castillo"
46.	8 reales	1649-51	Potosí	O	Reverse	Holed	R.D. Leonard Coll., ex DHL stock, Nov. 2, 1988
47.	1 real? ("early cob")	1570-1651	"Spanish America"	?	?	?	Peters, June 13-14, 1975 (Byrne), 1247

B. Crude "Large Crown" Counterstamp (Contemporary Counterfeit?)

No.	*Denomination*	*Date*	*Mint*	*Assayer*	*Condition*	*Source of Coin*
48.	2 reales	1570-1651	Lima	?	Reverse	Holed	ANS, "St. Bartholomew," gift of Charles M. Wormser, 1951?
49.	2 reales	1574-1651	Potosí	?	Reverse	Crude, worn, ctft?	Almanzar Sale June 30, 1983 (Castillo Coll. 9), 2512 "ex Castillo"
50.	2 reales	1574-1651	Potosí	?	Reverse	Intact	Swiss Bank Corp., Sept. 14-15, 1988 (Sellschopp), 1327, *not ex Sellschopp*

52.	1618	Potosí	Revolute	Holed reales	R.D. Leonard Coll., ex DHL stock, Nov. 2, 1988
52.	1621	Potosí	Revolute	Holed reales	Almanzar Sale Feb. 1, 1984 (Castillo Coll. 13), 2170, ex Almanzar Sale, Apr. 29, 1983 (Castillo Coll. 8), 1990, ex Almanzar Mail Bid Sale, Nov. 30, 1981 (Castillo Coll. 1), 1709

The Pattern Coinage of Independent Peru

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Coinage of the Americas Conference at The American Numismatic Society, New York

This paper discusses those coins of independent Peru which were not issued—the patterns, proofs, and die trials which never saw the light of day as adopted, issued coinages. The topic is too broad to be treated in depth here; it is rather my intention to provide an introductory gloss of the subject, together with somewhat fuller coverage of some of the more numismatically important and artistically significant patterns.

The pattern, proof, and trial coins of a country form an integral part of its numismatic history just as much as the adopted and issued coins. Proofs made for the record and for official collections (as contrasted with modern, mass-market proof sets) are equally important. Quite a number of pieces published as patterns in the past, particularly base metal strikes of precious metal coins, are nothing more than contemporary counterfeits designed to pass into circulation with a silver or gold wash and dupe the unwary. Such pieces, too, form a part of numismatic history, but they are not patterns and need not concern us here.

Some Definitions

Proofs are coins struck on specially prepared flans from specially treated dies, often struck with more than one blow on the coining press. Proofs may have various finishes—mirror, frosted, sandblasted, matte, Roman, to cite the most common. In Great Britain a coin of the adopted type which is dated a year before the standard issue is termed a proof, as is an off-metal strike. Here in the United States, we categorize as proofs only those pieces specially struck in the year of standard issue in the metal of standard issue. For Latin America, many coins were struck outside of the nation of issue, generally at mints—private or governmental—in the United States or Europe. In many instances, diplomatic and presentation proof sets were made prior to the general issue. Such pieces are often among the highest examples of the coiner's art.

Patterns are defined as coins of designs or denominations or metals which were not adopted for currency issue in the form and at the date which the pieces present to us. There can be many reasons why a pattern coin or series did not emerge as the adopted type for business strikes. Often an artistically pleasing coin will prove technically unfeasible for mass production. The most common reason for this is that the engraver has placed high relief devices opposite each other on the two faces of the coin. These designs cannot both be "stuck up" fully from a single blow in the coining press, resulting in flat spots on the coin. Examples of issued coins with this flaw include the 8-escudo and 8-real pieces of Ferdinand VII, typically with flat coats of arms; the Peruvian 8-real pieces of 1822 and 1823 that suffer from the same defect; as a modern example, Great Britain's Churchill crown, on which the queen's portrait and Churchill's bust oppose each other—as a result, both remain flat. Mint technicians, unless constrained for political reasons, understandably reject such designs as impractical, and the result is a beautiful, unadopted pattern for us to covet today.

Other patterns were not adopted for political or economic reasons. The government that authorized the coinage may have fallen from power before the coins could be delivered; inflationary pressures may have mandated an alloy change or even rendered a low denomination useless in trade before it could be struck. In Latin America's case, patterns were often produced by European mints in an effort to secure a coinage contract from the country in question. Sometimes, for the same year, we may encounter different sets of patterns from two rival European mints competing for the same contract. All of these factrors can leave us with these charming numismatic orphans, disparaged when they were made, but now much sought after jewels of a numismatic collection, combining beauty, rarity, and historical interest.

Trial strikes are pieces struck from the same dies used to strike the issued coinage, but in different metals. These may be uniface, soft-metal trials from unhardened dies, true artist's models and trials, base-metal trials of finished dies (true "proving pieces," the origin of the term "proof"), even precious-metal strikings for presentation, but always struck from the regular coinage dies.

As will readily be seen, there are frequent overlaps between these categories. We are left with the basic criterion that we will deal with those coins, of whatever type or metal, which were legitimately ordered or commissioned by a mint enterprise or government, but which never were released for commerce and trade at the date, in the form, and in the metal as we know them. These pieces may be in the purported metal of issue or in base metals as samples or in more precious metals designed to impress the powers then prevailing, but in a given form and at a given date, they were not granted legal-tender status.

Survey of the Issues

During the Spanish Colonial era, the mints of El Perú, together with the other New World mints, received sets of official patterns, struck in Madrid or Seville, whenever a design change was decreed for the imperial coinage. It is likely that when the first dies, punches, and matrices were sent from Segovia to Santo Domingo and Mexico in the 1530s, die trials were made to check the dies before shipment. None of these are presently known. The earliest known Spanish Colonial pattern is the 1729 pillar 8 reales with Madrid mint mark which was sent to the Mexico City mint in 1729 and still resides there. Pillar patterns were undoubtedly sent to the other mints as well but are unknown today. In 1770, Tomas Prieto at the Madrid mint prepared sets of bust-type patterns for the new colonial coinage of Charles III. These were sent to all New World mints together with master dies and punches. The Santiago Mint Museum has preserved intact its magnificently cased set of these patterns, complete from 8 escudos to 1/2 real. The sets sent to other mints have been broken up, but single pieces are known. Though a few are in their proper metals, most are uniface strikings in tin or pewter. On the reverses, instead of proper mint marks and assayers' initials, the pieces have various combinations of the letters SNI. At first it was believed that these random letters were chosen merely because no New World mint used them. I have concluded that these letters are intended as sample lettering, undoubtedly denoting the placement of N-Nombre, S-Sigla (mint mark); and I-Inicial.

The new coinages of Charles IV and Ferdinand VII were also preceded by official patterns from Spain, and a few of these base-metal trials, uniform for all mints, have come down to us.

Once San Martín's army captured Lima, it was quickly decided to replace the hated symbols of Spanish royalty on the coinage. What resulted was the famous 8-real PERU LIBRE coinage of 1822-23. As noted earlier, the design of these coins led to many technical problems. There was, however, great approval for the symbolism depicted on them. In late 1823, it was decided to proceed with other denominations of this design, but with the formal name, REPUBLIVCA DEL PERU, added (fig. 1). To the best of my knowledge, only the 2 reales was struck under this plan, and that only as a unique pattern. The Spanish loyalist forces reoccupied Lima in 1824, and the coinage plans of the liberating army came to nought. The pattern itself is a uniface, plain-edge striking in silver. It weighs 6.45 g, correct for the 2 reales. The design features the column of Liberty flanked by figures of Virtue and Justice, blindfolded, just as on the 8-real piece. Randolph Zander spotted this coin in a group of patterns from a classic old collection many years ago and rescued the piece from obscurity.

Once republican forces reoccupied Lima and later Callao, independent Peruvian coinage recommenced, with major design changes, important both stylistically and philosophically. The Peruvians had learned that liberty, once secured, had to be defended in order to be preserved. Instead of harmless, neoclassical figures of Virtue and Justice, the new coinage features a standing, pseudoclassic La Patria, carrying a shield (with the word LIBERTAD sometimes visible) and a spear surmounted by a Phrygian cap of liberty.

Unfortunately, the Creole engravers never managed to execute a figure of Liberty or La Patria of the dignity appropriate to an important symbol of national pride. The standing figure usually ends up being an unsuccessful cross between an Indian mountain girl and an Amazon warrior. In 1825 and again in 1826, patterns were struck which attempted to correct this artistic defect. They did not succeed and were not adopted, but two 8-real pieces remain as classic pattern coins of El Perú. Attempting to impart more dignity to the figure with a more erect posture, the patterns show a figure reduced in size and still lacking in nobility.

For the next decade or so, Peru muddled along with an unsatisfactory coinage but one which met the needs of commerce and trade both domestic and international. Everyone knew that they needed better designs and better machinery, but both financial and political priorities continually interfered. Among the Peruvian mints, Lima represented the capital, the center of power; the ancient Inca city, Cuzco, was closer to the mines. The Cuzco mint operated for a year or two under Charles II, then reopened over a century later to provide coinage for the Spanish loyalist forces during the wars of independence. At that point in 1824, machinery was sent from the Lima mint to Cuzco to meet coinage needs. The Lima mint director, like any good bureaucrat, did not send his finest machines. Yet, under the republic, the Cuzco mint continued to produce a reasonably satisfactory coinage with these obsolete machines. Pro tem repairs were an everyday occurrence, but in the end proved insufficient. The Cuzco mint needed new machinery badly. Accordingly, in 1835, the Peruvian minister to France made arrangements for new mint presses. As a result of these negotiations we have the Thonnelier press pattern 8-real pieces of 1835 for Cuzco. These coins have on the obverse a neat and precise rendition of the Peruvian arms with the Peruvian motto and an advertisement for Thonnelier on the reverse. The coins exist in two different metals, bronze and silver-plated bronze. Each of these appears with two different edges, plain or ornamented with incuse leaves. Pieces have been published which are described as being in silver; however, specific gravity tests thus far have shown them to be, in

fact, silver-plated bronze. The pattern is not particularly rare; it is likely that extra examples were struck to advertise Thonnelier's competence to other governments as well.

The next two years bore witness to great political changes in Peru. Andrés Santa Cruz attempted to reform the old Viceroyalty of Peru from the three constituent states of North Peru, South Peru, and Bolivia with, naturally, himself as the suzerain. Rivals such as Gamarra soon put an end to Santa Cruz's grandiose schemes, but this episode has left us with a number of most interesting coins. South Peru struck coinage both at Cuzco and at Arequipa, all of interesting designs with radiant sunfaces, Inca ruins, and similar types. At Cuzco gold 8, 1, and 1/2 escudos and silver 8, 2, and 1/2 reales were made. Two other Cuzco pieces have come down to us only as patterns—a gold 2 escudos and a silver 4 reales. The gold 2-escudo pattern has a coat of arms very similar to that of the 8-escudo piece. The most obvious difference is that the name ESTADO SUDPERUANO appears below the arms rather than above them as on the larger coin. The piece is uniface with a plain reverse except for an incuse inventory control number "G3". The second remarkable South Peruvian pattern of Cuzco is the 1837 4 reales. For some reason Cuzco felt no need for 4-real coins at the time, although some were struck at Arequipa the following year. We know of the existence of the die only from a later mule struck on an 8-real flan. One die is the Cuzco sunface 4 reales with date and denomination, while the other die is that of an 1845 Cuzco 8-escudo piece. Since this represents the only known example of the denomination, the coin is worthy of our attention.

There are also a few very interesting Lima patterns for 1837. Peru was still faced with the dilemma of finding a truly satisfactory standing figure to grace its coinage. In 1836 the Paris Mint was approached and Jean Jacques Barré undertook to engrave new dies for the 8-real piece. While the pattern is executed with typical Gallic fineness, in this writer's opinion the figure of the standing Patria is still deficient. The figure, with spear and shield and wearing a cowled mantle, looks more like an ancient Assyrian warrior than a Latin American maiden. The piece is struck in bronze with an incuse, ornamented edge. A plain edge version may exist as well.

By the time the dies arrived in Lima, the area's name had been changed to North Peru, and the dies were unusable. It is interesting to note that, when Peruvian unity was restored, the Barré figure of the standing Patria was adopted for the new 8-real piece in 1841.

A closely related, peso-sized piece of 1837 is a commemorative honoring the mint director, Grand Marshall Don Mariano Necochea. The obverse is identical to that of the preceding pattern with a sun-face replacing the denomination. The reverse carries the honorific inscription to Necochea within a wreath. This piece exists both in bronze and in silver-plated bronze with either a plain edge or an incuse-ornamented one. It is rumored that one piece was struck in gold for Necochea himself.

The Longacre Patterns

The next major Peruvian pattern series appeared in 1855. By this time the Peruvian government recognized the need both to modernize the mint machinery and to decimalize the coinage. The government contracted with Morgan and Orr of Philadelphia to provide the coining presses; Longacre of the Philadelphia mint engraved the patterns. These pieces are important not only for their rarity and beauty but also because they are the first official foreign coinage struck at the United States Mint. The precursor to the set is a Morgan

and Orr machinery trial piece which includes a misspelling in the Spanish legend. A rather common item, this piece occurs in a brassy alloy, in copper, and in silver-plated copper.

The full set of patterns consists of gold 20, 10, 5, and 2 pesos; silver 1 peso, 50, 20, 10, and 5 centimos; and copper 1 centimo and 1/2 centimo—11 coins in all (fig. 2). Only one complete set is known, that being in the Smithsonian Institution, which received it from the old collection of the Philadelphia mint. Another broken-up set of gold pieces is known; approximately a half-dozen sets of the silver pieces and a dozen pairs of the coppers could be reassembl- ed from worldwide holdings.

The gold pieces have a handsome rendition of the Peruvian arms with draped flags and probably the finest standing Patria figure ever executed. The silver pieces have a rather slavish copy of Barré's Patria figure. Note that the engravers once again failed in their knowledge of Spanish, the word CENTIMOS being improperly abbreviated as CENTI. The two copper pieces have a handsome radiant sunface flanked by REPUBLICA PERUANA on the obverse, and the reverse (turned 90 degrees) carries the mint name, date, and denomination within a wreath. Of this magnificant series only the 50 céntimos was issued for circulation, and that in 1858. The 5 céntimos of this design was also struck in 1858, but with the denomination rendered as medio real.

In 1863 Peru commenced a decimal coinage based upon the silver sol. Surprisingly, we know of no patterns preceding this major coinage revision although an early encyclopedia does illustrate what purports to be a pattern 1/2 sol of 1863 of the type issued in 1864. During the first years of the sol coinage, Peru concentrated on silver issues, including a great deal of recoinage of earlier real pieces in yet another effort to drive out finally the moneda feble and pesos chinos. Apart from an issue of copper-nickel 1- and 2-centavo pieces struck in 1863 and 1864, there was a dearth of base-metal small change. With an eye toward remedying this situation, in 1875 a pattern medio céntimo was struck at Lima, using the hubs from the 1855 Philadelphia pattern and changing only the penultimate digit of the date. This scarce piece was not adopted, and it was decided to continue with centavos instead of céntimos for the copper coinage.

The Lima mint continued to function, with difficulty, for a number of years and continued to produce a surprisingly high quality coinage of silver soles and their fractions. It is little short of amazing that Lima produced any coinage at all. The difficulties were both mechanical and political. By the 1870s and 1880s, the mechanical difficulties were great. Lima had troubles with the Morgan and Orr coining presses of 1855. It is the author's opinion that this was almost totally due to improper maintenance in Lima. In 1974, the author observed a Morgan and Orr press from 1851 still in daily use in the old Mexico City mint, producing 1-peso coins. If the Lima presses did not work in 1873, it was more likely the fault of the Peruvian mechanics than the Welsh engineers from Pennsylvania.

Another major problem in Lima was the constant breakdown of the smelting and annealing furnaces. These were truly ancient and badly in need of replacement. Yet another problem was the bad state of repair of the master dies, matrices, and hubs needed to produce working dies for coinage. Because of this sad state of affairs we run into the many minor varieties of silver soles during the period from the late 1870s and

early 1880s, when, after the early death of Britten, the master engraver of the Lima mint, there was no one competent to replace the master dies.

As if these problems were not enough to exasperate the most competent bureaucrats, another factor intervened—war. The Pacific Nitrate War (1879-83), between Peru and Bolivia on the one side and the Chileans on the other, was disastrous for Peru. The Chileans occupied Lima and the the mint. Coinage continued in order to meet the needs of the Chilean occupation forces, but, at the same time, there were continuous changes of officials of conflicting political loyalties, removal of some machinery by loyal Peruvian forces, removal of other machines taken as spoils of war by the Chileans, and a steadfast policy of deferred maintenance. After all, the Chileans knew that they would not be in Lima forever and were content just to run the mint into the ground, with the full knowledge that it would be somebody else's task to clean up the mess they left behind.

The Wyon Coinage

By the mid-1880s, when the political and economic climate in Peru had returned more or less to normal, the Lima mint was found to be in a state of complete decrepitude. One might suggest that the mint in 1725 was more modern and up to date than it was in 1885. Indeed, much of the equipment left in the mint in 1885 dated from the reign of Philip V.

What with the cost of the war, indemnities, reparations, and loss of territories, the state of the Peruvian economy in the 1880s was not much better than Germany's in the 1920s. Peruvian inflationary paper money of the era illustrates this point. Yet the newly restored Peruvian government, still in control of bullion mines, recognized that one major factor needed to restore public confidence in the government was to provide a stable and well-made coinage. To provide this coinage they had to go overseas.

But where to go? Germany had sided with and trained the Chilean army during the Pacific Nitrate War; France was still recovering from the Franco-Prussian War; and the United States continued in its post-Civil War, isolationist phase. The answer was England. Although a Peruvian ship, *Huascar* , had had a serious encounter with the Royal Navy, business was business. The Peruvian minister contracted in England for new mint tools and furnaces and for new master dies and hubs. What resulted are the superb proof pattern sets of 1886.

Leonard Charles Wyon, engraver at the Royal Mint, prepared hubs, dies, collars, and matrices for the Peruvian silver and copper coinage. Samples of earlier-issued coins were sent to him to aid him in his work. Obviously, no explanation was given to Wyon regarding the meaning of sundry initials on the coins; errors did occur and were corrected prior to the striking of the final proof sets by the Royal Mint.

From data uncovered by Horace Flatt we know that 13.81 ounces of fine silver were used to coin nine silver proof sets of 1886 Peruvian coin patterns at the Royal Mint. Presumably, a similar number of proofs of the copper coins were made, though that, of course, does not appear in the bullion report. The coins struck were the silver 1 sol, 1/2 sol, 1/5 sol, dinero, 1/2 dinero, 2 centavos, and 1 centavo—7 coins in all. Prior to these, Wyon made soft-metal die trials which were submitted to the Peruvian minister for approval. Obviously, certain elements did not meet with approval, as we shall see.

The first coin which Wyon produced was the crown, silver dollar, or un sol (fig. 3). It carries the assayers' initials R.D. for Remy and Davelouis, initials not embarrassingly antiquated. This superb rendition of the seated Patria design was soon adopted in Peru. The sample coins for the minor denominations were long out-of-date. For example, the 1/2 sol had not been struck for 20 years and carried assayers' initials of people who had long since left office. Hence, on the finished proofs, the initials were omitted. There is a unique, uniface die trial of the 1886 1/5 de sol, with assayers' initials Y.J., which last appeared on the coins in 1875. The silver proof has these erroneous initials erased. The silver dinero and medio dinero follow this formula.

For the copper coins, ordered to be 1- and 2-centavo pieces, Wyon was sent examples of the earlier issues from the 1870s. For the DOS CENTAVOS bronze proof pattern, a tin die trial of the reverse has come down to us from the Wyon estate. The 1 centavo is known from bronze proofs, together with the artist's die trials of the obverse and reverse. On the obverse die trial, Wyon copied the earlier Peruvian issues which had the name REPUBLICA PERUANA below the sunface. It was decided by the Peruvian minister, however, that the country name should appear above the sunface, and this was how the final proofs were struck.

These beautiful patterns, the "issued" pieces with only nine struck, and the uniface pieces, all unique, are often lumped together in catalogues as proofs within the regular series; this they clearly are not. They are excessively rare Royal Mint patterns, some of which were adopted for currency use in later years. What matters most, of course, is that they are beautiful coins.

Coinage of the Twentieth Century

During the last decade of the nineteenth century, Peru, like many other silver-producing nations in the world, was dismayed by the fluctuations in the international price of silver and decided to go on the gold standard. Peru had struck no gold coinage since 1863 (though the issuance of a gold coin was debated in 1885), the British gold sovereign or pound having been made legal tender many years before. To accord with this, the Peruvian government decided to strike a gold libra or pound which exactly matched the weight and bullion content of the British soverign. In 1897, sample patterns of this gold libra coinage were produced. A gold-plated bronze proof piece of the 1/2 libra features a handsome rendition of the bust of the Inca Manco Capac. On the other side there is only the (posthorn) mint mark, used by a European mint as symbol for its foreign work.

With free coinage of gold, libras, 1/2 libras, and 1/5 libras continued to be struck at intervals, depending upon the desires of those who submitted the bullion. Meanwhile, the silver sol went through the worldwide, post-World War I silver bullion crisis. It was decided in 1922 to reduce the fineness of the silver sol from .900 to .500. This "media leche" coinage continued until 1935. At that point, even regularization of the world's silver markets could not compensate for the widespread economic depression and the fall in the value of the sol. Peru debated whether to go to a merely token brass coinage or to keep a "white" coin of the same size and design as the old un sol, but even further debased, to retain the coin as a viable mint product. One proposed solution to the problem was a coin of the same size, type, and design as the old .500 fine sol, but

of a new alloy as detailed on the piece: 55% copper; 10% zinc; 10% nickel; 25% silver. Nevertheless, no 1-sol coin at all was struck un- til 1943, and at that point, it was decided to strike the piece in brass. The earlier piece remains as a fascinating and historic alloy trial.

In 1930, Peru decided to resume gold coinage, on the sol, rather than libra, standard. Since then the two have existed as parallel gold coinages for Peru. The Lima mint struck the famous Manco Capac gold 50-sol piece in 1930. It features a fine bust of Manco Capac facing left and Inca symbols on the other side. This coin was restruck legally but to private order in 1967-69. Less well-known is the pattern of the 1930 Manco Capoc 50 soles. The design and devices of this noble coin are the same as the issued piece, but the reverse legends are rendered in Quechua, Manco Capac's language, rather than in Spanish. Only two strikes in gold were made of this Quechua pattern in 1930, one retained by the Peruvian government and one now in the Vatican Museum. At a later date, one or more restrikes were made in silver for the Peruvian Numismatic Society. It remains one of the classic coins of the twentieth century from any nation.

In 1940, although they were confronted by somewhat more pressing matters at the time, such as nightly air raids by the Luftwaffe, the Royal Mint at Tower Hill fulfilled its coinage contract with the Peruvian government. This provided for copper-nickel 20-, 10-, and 5-centavo pieces. These coins feature the date spelled out in words, as UN MIL NOVECIENTOS CUARENTA, rather than in numerals. Adhering to Royal Mint policy of the time, six proofs of each of the coins were made for official purposes. I believe that the business strikes were actually made by ICI's Kings Norton Mint using the Royal Mint dies, but the proofs come from London.

Following World War II, the Banco Central de Reserva del Peru decided to initiate a gold coinage valued in soles to run parallel to the gold libra and its fractions. They chose the handsome design of the coat of arms and seated Patria figure, last used on .500 fine silver soles in 1935, but still remembered and admired by Peruvians. Indeed the old silver coinage hubs were resurrected and reworked, with the addition of the incuse initials "AP" for the engraver Antonio Pareja. The coinage was to consist of a gold 100 soles weighing 46.8071 g, containing 1.3544 ounces of fine gold, plus smaller 50-, 20-, 10- and 5-sol pieces of proportional size.

The first coin struck under this plan was the 100 soles of 1947 (fig. 4). Only two examples were struck, in fire-gilt bronze: one for the president of Peru and the other for the president of the Peruvian senate. The regular coinage of gold 100-, 50-, and 20-sol pieces commenced in 1950 and continued for two decades; gold 10- and 5-sol pieces were added in 1956.

From large, gaudy, gold pieces, we turn to the everyday coinage of commerce. During World War II, the Philadelphia mint produced shell-case brass coinage for Peru. A set of lead die trails, dated 1944, is known for the brass 1 sol, 1/2 sol, 20, 10, and 5 centavos.

Starting in 1943, a brass un-sol piece was struck for Peru. After the close of hostilities, the postwar recession left Peru in a situation where even a brass un-sol piece cost more to produce than it was worth in commerce.

Accordingly, in 1948, die trials were produced of the un sol using the regular dies, but struck in aluminum instead of brass. However, the aluminum pieces proved even more expensive than the brass and the brass coinage was continued.

In 1952, an attempt was made to reinvigorate the un sol design, which was decidedly pedestrian. R. Pelletier engraved a rather nice pattern coin featuring a bust of Liberty facing left and and a winged torch of freedom with legend (fig. 5). The design was fine, but it was soon discovered that, in order to strike the bust properly in high relief, more than one blow of the hammer was necessary. A charming coin, but not suited for mass production. The pattern is struck in a brass alloy with a milled edge.

5.

A few other pieces are worthy of mention at least in passing. In 1956, when the gold 10 and 5 soles were added to the coinage, all of the gold denominations in the sol series—100, 50, 20, 10, and 5 soles—were struck as die trials in yellow bronze. In 1958, the gold 50 soles was struck in silver with the raised word PRUEBA across the reverse. Similar off-metal 50-sol pieces, of both the seated Patria and Manco Capac types, were struck in silver in 1964, 1965, and 1967. All were struck at the mint to the private order of a Peruvian numismatist. The same individual was responsible for the so-called proofs of 1965 and 1966, the "double-Pareja" mules of 1966, and the proof sets of 1967 struck in silver. Under Peruvian law at the time, all of these pieces were legal but were, officially, private medals, not coins or patterns, and should be considered as such.

The pattern coinage of Peru is not one of the world's larger series, but, apart from a short phase in the 1960s, it is one of the cleaner series. Patterns were made for legitimate financial purposes rather than to satisfy a collector's whim. Like the proverbial philosopher, patterns were generally scorned in their own land in their own time. Fortunately for us, the coins themselves still exist in later years for us to appreciate.

Moneda Feble in Peru, 1830–1867

H.P. Flatt

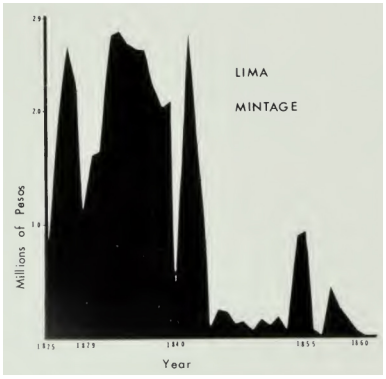
Coinage of the Americas Conference at The American Numismatic Society, New York

Introduction

The collector of Peruvian coins of the period 1825 to 1861 quickly discovers that the coins minted in the first half of this period are in general much easier to obtain than those made subsequently. It may take the collector years to realize just how difficult it is to obtain an example of each of the different coins of the period, even ignoring the coins of the small mints of Pasco and Arequipa.

With some research, the collector discovers the coinage output of the principal mint in Lima was much lower than in colonial days: in the period of equivalent length preceding independence, the average mintage was over 4.7 million pesos in gold and silver each year. In this first republican period, the peak mintage was only a little over 2.9 million pesos, but it is obvious from Table 1 that the average production from 1843 to 1861 was low indeed.

Table 1 LIMA MINTAGE, 1825-61[1]



Yet, based on political and economic considerations, this very low production in the period 1843-61 is unexpected. Peru was regaining a real measure of political stability under Ramón Castilla, one of its ablest leaders. A period of apparent prosperity began, fueled by the sales of the natural fertilizer guano in the European and American marketplaces. The English loan dating from the War of Independence was at last resolved and Peruvian public credit was excellent. While it is impossible to link directly the amount of money to the growing economy, it would be a reasonable expectation to see coinage increasing in this period, for this was a "hard money" period in Peru. There was no trust in paper money and it was believed that the intrinsic value of a coin should be equal to the nominal value—"Coins of low fineness are not truly

[1]**Based on Archivo General de la Nación (AGN), Lima, CMR, Act 121, Oct. 9, 1873.**

money."[2] How, then, was the need for coins met? It is something of a surprise to find that debased silver coins (moneda feble) were the primary circulating medium. Some debased coins came from Ecuador and Colombia. More coins were produced in Peru, principally before 1840. But most business of the country was conducted with Bolivian moneda feble. As we shall see, Table 1 reflects another instance in which "bad" money drove the "good" money from circulation. This instance is different in that the bad money from one country drove out the good money of its neighbor.

The difficulties for both Peru and Bolivia in resolving the problems created by moneda feble seemed at times insurmountable. While the story of moneda feble in Peru must of necessity be told serially, it frequently is one in which actions were taking place in parallel in both Peru and Bolivia. An already complex story thus becomes even more difficult to relate.

In summary, this article is concerned with the impact of the Peruvian and Bolivian moneda feble upon the number and design of Peruvian coins made in the period 1830-67. Many aspects of Bolivian numismatic history of the period must necessarily be covered in order to obtain a more complete understanding. The origins of the moneda feble in both countries are discussed. The growth in circulation of the debased coins in Peru is related and the ultimately successful efforts of the Peruvian government to rid the country of this evil are recounted.

Peru and Bolivia

Upper Peru, or Bolivia, had been a part of the Viceroyalty of Peru during much of the colonial history of the New World. But when Bolivia was liberated from Spanish rule, a decision was made to establish a separate republic. The economic ties uniting the two countries were more enduring; a glance at a map of the period shows the basic reason. Cobija was the only Bolivian seaport. It was almost 600 miles distant from Potosí and much further from the population center of the new country. Charles Masterson, the British viceconsul in La Paz, described the trail in 1843:[3] The distance from Potosí to Cobija is 199 leagues; a road the most dreary and comfortless in the world. It is a continued track over black cordelleros, and sandy table lands full of saltpetre beds, without water, destitute of vegetation and of inhabitants....None but those who have performed this journey can form an idea of its superlative discomfort.

1. Lima, 8 reales, 1825

[2] *El Peruano* (Lima), June 20, 1840.

[3]Public Records Office, London, Foreign Office (PRO:FO), Series 11/1, Aug. 10, 1843.

2. Potosí, 8 soles, 1827

There was also much to fear from bandits. While there was an alternate route through Buenos Aires, the fastest and safest trade routes were through Peru. The route through Arica and Tacna was preferred to that through Islay and Arequipa. Even that route of ca. 300 miles required the mule trains to cross through a pass 14,000 feet above sea level.[4] These caravans also carried the agricultural products of southern Peru to Bolivia, where there existed a ready market. For both geographic and economic reasons, southern Peru was thus linked more closely to Bolivia than to the remote northern part of the country. This linkage was a dominant factor in the political, economic, and numismatic history of the period.

Laws of 1825 in both Peru and Bolivia reaffirmed the use of the colonial bimetallic monetary system. The basic gold coin, the onza, weighed 27.064 g and had a fineness of 21 carats (0.875). The basic silver coin, the peso fuerte, weighed 542 grains (27.064 g) and had a fineness of 10 dineros 20 grains (0.903). These coins were used primarily for overseas commerce, but were the standard against which other coins were measured. Coins with a lower fineness or a lower weight (in proportion to the denomination) were considered moneda feble. The simplicity of the design of these early coins made them comparatively easy to counterfeit (figs. 1-2).

Small silver coins were intended to meet the needs of the internal market, but were relatively more expensive to make. They were always in short supply, particularly in southern Peru. The reason for this may be established by some coinage data from the period. The mark (six Spanish ounces) of silver was made into 8 1/2 pesos of coins at the time. While 1,562,446 marks of silver were coined into pesos at the Lima mint from 1825 through 1832, only a little over 41,501 marks were made into minor coins.[5] This was about one-half the proportion of small coins made in France at the time.

Origin of the Bolivian Moneda Feble

Both Peru and Bolivia initially saw the gold and silver mines of their countries as primary revenue resources. In Peru, the colonial system of levying taxes on bullion being exported or on bullion coined at the mint was continued. In Bolivia, however, a monopoly was established. The owners of the bullion were required to sell to the government at a price fixed by the government, one usually significantly lower than that prevailing on the world markets. In both countries, there was a very active clandestine trade as the owners tried to

[4]U.S. National Archives, *Despatches from United States Ministers to Bolivia, 1848-1906*, Feb. 15, 1849.

[5] M.E. de Rivero y Ustary, *Colección de Memoria Científicas Agricola é Industriales. Publicados en distinctas epocas* (Brussels, 1857), 1, p. 227.

obtain a better price for their bullion than the state would pay. For a variety of reasons, both governments obtained less money from mining than they had hoped and their financial situations were critical.

The financial state of Bolivia was particularly bad. Bolivian imports through Buenos Aires and Arica in 1825-26 amounted to 6,504,715 pesos, more than double the 2,928,287 pesos minted.[6] The situation worsened after the Peruvian invasion of 1828. When Andrés Santa Cruz became president in 1829, the country was essentially bankrupt. Just as in Peru, there was a shortage of the small coins needed for internal commerce. The balance of trade between Peru and Bolivia favored Peru. The small Bolivian coins used to pay for imports from Peru were welcomed in Peru because of the shortage of small coins there. There was no legal bar to their circulation, for the use of foreign coins in Peru had been permitted since the first days of San Martín and his liberating Army of the Andes.

Santa Cruz, formerly Bolívar's chief of staff and subsequently vice-president and chief executive of Peru, was the ablest political leader of either country during this entire period. However, he signed a decree of October 10, 1829, which, in the hands of his successors, was to prove disastrous for the monetary systems of both Peru and Bolivia. This decree lowered the fineness of the minor silver coins to 8 dineros. The tostón, or four soles, that should have contained 12.245 g of silver was in the future to contain only 9.025 g. The coins were to maintain the same design and weight as before. There was a clear initial intent to deceive the public as to the intrinsic value of the coins: this is made clear in an exchange of letters between the finance minister and the prefect of Potosí in November and December, 1829.[7] Nevertheless, the stated purpose of the decree was to resolve the shortage of small coins.[8] This purpose was reaffirmed subsequently in several letters of 1830, particularly that of September 18, 1830, which concerned the distribution of the coins.[8]

The Spanish monetary system clearly provided a precedent for the debasement. There were two distinct types of gold and silver coins which circulated side by side. The provincial coins were intended to be used only within the country; to prevent the export of such coins, the fineness was deliberately lower than that of the national coins which were used both within and without the country. In spite of the intended use of the coins, some of the provincial coins found their way to the New World, to the great profit of the Spanish merchants.[9]

Initially the new, lower-fineness, Bolivian coins were made in relatively small amounts. By the end of November 1830, the mint at Potosí had produced 200,119 pesos worth of them. While this was only about 11.5% of the total amount of silver coins made in 1830, it was 35% more than the total amount of small coins made in the entire period 1825-29.[10] Most of the new small coins were used in the external trade of the country as before and there was a continued scarcity of them. Storekeepers were giving a peso fuerte for 7 to 7 1/2 reales in the small coins. In December 1830, the mint was ordered to coin 200,000 pesos worth

[6] J.B. Pentland, *Informe sobre Bolivia* (Potosí, 1975), pp. 119-21.

[7] Archivo Nacional de Bolivia (ANB), Ministerio de Hacienda, Sucre, 1829, 16, no. 22, Nov. 25, Dec. 4, 1829.

[8] Carlos Rojas, *Historia financiera de Bolivia* (La Paz, 1977), pp. 109-11.

[8] Carlos Rojas, *Historia financiera de Bolivia* (La Paz, 1977), pp. 109-11.

[9] ANB (above, n. 7), 1830, 56, no. 4.

[10] ANB (above, n. 7), 1831: 27, no. 18, Jan. 20, 1832.

for 1831 without changing the 1830 date (fig. 3). A year later, Santa Cruz ordered the min- ting of 300,000 more pesos of the debased coins.[11]

3. Potosí, 4 soles, 1830

The Peruvian government learned of the debasement at a very early date. According to a note of July 31, 1830, reports were circulating in Lima about the new Bolivian coins. The Peruvian legation in Bolivia was requested to send data, information, and coins for assay in order to verify the reports. The personal interest of Gamarra, then president of Peru, was underlined in the note. It was also clearly understood that the circulation of the moneda feble could be injurious to commerce.[12] However, no record has yet been found of any action taken by the Peruvian government to stop the importation of the coins into Peru. There is even some evidence that the situation was accepted and that the coins were circulating freely, at least in southern Peru. In 1832, an assay at the Cuzco mint of a debased coin "from a neighboring Republic" was reported without special comment.[13] While Colombia had been producing debased coins since 1821, these coins mainly circulated in small amounts in the northern departments of Peru.[14] Thus the coin in question was most likely from Bolivia. Whatever its origin, the point is that the coin apparently was not considered unusual.

In later years there were charges that Santa Cruz had capitalized on his knowledge of the balance of payments between Peru and Bolivia in order to obtain money for his army in the continuing conflicts with Peru.[15] However, during the first five years (1830-34), 8,096,637 pesos fuertes were produced—but only 1,347,662 pesos of the debased coins.[16] In the view of Belford Hinton Wilson, the British chargé d'affaires in Peru as well as consul general, "no serious inconvenience has, it is said, hitherto resulted from its regulated issue."[17]

There is little reason to doubt that in these first years the primary purpose of debased coins was to meet the needs of internal commerce. Although a fraud was deliberately perpetrated, it could be argued that, just

[11] P.T. Parkerson, "La Política Minera de Andrés Santa Cruz (1829-1835)," *Historia y Cultura* (Pa Paz), 2 (1976), p. 162.

[12] Carlos Ortíz de Zevallos Paz Soldán, *La mision Alvarez en Bolivia (1829-1830)* Archivo Diplomatico Peruano, 6 (Lima, 1957), p. 23.

[13] AGN (above, n. 1), O.L. 216-478, July 11, 1832.

[14] J.M. Restrepo, *Memoria sobre amonedación de oro y plata en la Nueva Granada* (Bogota, 1860), p. 14.

[15] Jorge Basadre, *Historia de la Republica del Peru* (Lima, 1962), 1, p. 557.

[16] Rojas (above, n. 8), p. 111.

[17] PRO:FO (above, n. 3), Series 61/45, Wilson to Palmerston, Aug. 3, 1837.

as in Colombia in 1821, it was motivated primari- ly by a lack of resources and the desire not to forfeit the confidence of the public in the new government. In any event, the increased profits of the mint made possible the minting of the first gold coins of the Republic and contributed significantly to the treasury. In 1835, it was surely no coincidence that the minting of an additional 200,000 pesos of debased coins was ordered on the eve of the Bolivian invasion of Peru.[18]

The Chilean decree of August 20, 1835, forbidding the acceptance of the Bolivian debased coins was a concern in Lima.[19] Santa Cruz directed his ambassador in Lima, Manuel de la Cruz Méndez, not to discuss the matter further with the Peruvians.[20] Santa Cruz stated that the Chileans, by their refusal to accept the Bolivian coins, were even assisting in his purpose of providing small coins for circulation within Bolivia. Even at this late date there is no indication of a Peruvian understanding of the seriousness of the financial problem posed by the circulation of the moneda feble.

Peruvian Moneda Feble

Approximately 1.5 million pesos of Peruvian moneda feble were made during the 11-year period, 1835-45. Debased coins were made in each year (except possibly in 1842 and 1843) and were mostly authorized by legitimate governments. The story behind the coins' production is of greatest interest because it explains the changing attitudes of the Peruvian governments during this period.

The first Peruvian moneda feble was made at the Cuzco mint in 1835 without benefit of a governmental decree. Gamarra, after his term as president expired, rose in unsuccessful revolt against the elected government of Luis José Orbegoso. On his return to Peru from exile in Bolivia, he proclaimed the formation of the Estado Central del Perú on June 8, 1835.[21] The coinage of moneda feble began in Cuzco at least by July 22.[22] This was about three weeks before the entry of Santa Cruz's victorious forces into the city on August 16. Production of the debased coins continued, with both 2 and 4 reales (pesetas and cuatros) minted that year. The latter coin was the first of its denomination made in Peru since independence. Cuatros dated 1836 were made in Cuzco the following year and for many subsequent years—all bearing the same date and utilizing the same standing-Liberty design typical of Peru's first coinage (fig. 4).

Debased coins of the same design and dated 1836 were also made at the new mint in Arequipa. These were the medios (1/2-real coins, fig. 5) and the cuatros. Records suggest that these coins were also made in 1837 using the 1836 date.[23]

[18]ANB (above, n. 7), Ministerio de Hacienda, Sucre, 1838, 58, no. 1, June 12, 1835.

[19] J.T. Medina, *Monedas chilenas* (Santiago de Chile, 1902), p. cclxxxvii.

[20]ANB (above, n. 7), Ministerio de Relaciones Exteriores, Sucre, 1834, 1, no. 32, Nov. 4, 1835.

[21]Horacio Villaneuva Urteaga, "La Revolución de Lopera y el efimero Estado Central del Perú," *Revista del Archivo histórico del Cuzco* , 12 (1967), p. 127.

[22]Manuel del Rio, *Memoria que presente el Ministro de hacienda del Perú al congreso de 1847* (Lima, 1847), Appendix.

[23]AGN (above, n. 1), CMR, Act 108, Aug. 31, 1840.

4. Cuzco, 4 reales, 1836

5. Arequipa, 1/2 real, 1836

The independence of the four southern departments of Peru and the establishment of the Estado Sud-Peruano was declared on March 18, 1836. A short time later the basic decree of July 25 governing the issuance of the new "sunface" coins of South Peru was published (fig. 6).[24] The first article of that decree provided that the coins were to have the same weight and fineness as those of the Republic of Peru. This was reinforced by a circular of October 2, 1836, which required the observance of all of the existing regulations for the minting of coins as given in the decree of April 24, 1830.[25] One of those regulations required that all silver coins have a fineness of 10 dineros 20 grains.

[24] *El Republicano (Arequipa), Aug. 6, 1836.*

[25] *Reglamento para los casas de moneda de la República Peruana* (Lima, 1830).

6. Arequipa, 4 reales, 1838

In practice, however, all of the minor coins of both the Cuzco and Arequipa mints were of 8 dineros fineness. According to Mariano F. Paz Soldán, an eminent Peruvian historian, all orders for the minting of the debased coins were secretly communicated to Anselmo Centeno, the Director of the Casa de Moneda in Cuzco, and "fulfilled with servility."[26]

The debased coins circulated without difficulty in southern Peru. From the beginning, the foreign merchants began to gather up the Spanish pesos and columnarios (pillar dollars), paying initially a small premium of one or two percent. The minting proceeded on a large scale; the people in the south, seeing a great quantity of coins, attributed the abundance to the "wise policies" of Santa Cruz. If the people did not know that the coins had lost a significant part of their value, the foreign merchants did. They began to pay a premium of up to 30% for Peruvian coins of the full legal fineness.[27] The "good" coins began to leave Peru.

A separate state, the Estado Nor-Peruano, had been established in 1836 in northern Peru. Santa Cruz's order to begin the minting of debased coins in Lima was published in July 1837.[28] However, before such coins could be struck, the order was rescinded due to the strong opposition of the foreign merchants resident in Lima. Nonetheless, the "good" coins began to leave North Peru as well. Thus a decree of Orbegoso (then president of North Peru) of April 5, 1838, forbade the transportation of more than 200 pesos of gold and silver within 10 leagues of the coast unless it was under official escort.[29] All actions were fruitless; by the first part of 1839, the only coins remaining in circulation in all of Peru were the debased pesetas and cuatros of Bolivia and South Peru.

The intervention of the foreign merchants in monetary affairs had been important in South Peru as well and clearly affected the thinking of Santa Cruz on this subject. An order of Santa Cruz dated June 26, 1837, required that no more than a fourth part of the coinage should be small coins, with the remainder in pesos fuertes.[30] The order was attributed to the repeated observations of foreigners that the excess of the small coins was prejudicial to foreign commerce. A subsequent order dated November 27, 1837, of Centeno (in his new position as prefect of Cuzco) conveyed the order of Santa Cruz's secretary on October 28, lowering the allowed fraction of small coins to one-fifth of the total coinage.[31] An order to the Secretary General of the State of South Peru dated February 3, 1838, attempted to stop totally the mintage of debased coins in response to:[32] The very urgent and very repeated complaints that have been directed to the Protectoral

[26] M.F. Paz Soldán, *Historia del Perú independiente 1835-1839* (Buenos Aires, 1888), p. 294.

[27] Paz Soldán (above, n. 26), p. 294.

[28] *El Protectorado del Norte* (Lima), July 12, 1837.

[29] *El Eco del Norte*, (Lima), June 2, 1838.

[30] AGN (above, n. 1), O.L. 251-76.

[31] AGN (above, n. 1), O.L. 277-999, May 27, 1840.

[32] *El Eco del Norte* (Lima), Apr. 4, 1838.

Government concern- the excessive abundance of small coins of low fineness that circulate in the State of South Peru and that, not being of any utility for the balance of accounts for foreign commerce, are accumulating fruitlessly in the ports and foretell a great decrease in imports and in consequence a large gap in the customs revenue. His Excellency the Supreme Protector has ordered me to call the attention of that Government to a point of so vast importance in order that without loss of time a remedy be set for the mentioned abuse, attributed to the lack of observance of the decrees that have been expedited concerning the matter. His Excellency believes that it is of all necessity that there be suspended the minting of the small coins of eight dineros fineness; that in the future all that be minted ought to have the fineness of eleven [dineros] and that in each emission only have a sixth part of small coins, the other five [parts] should be in pesos fuertes.

(We may note here the common Bolivian use of "once dineros" or "eleven dineros" as a short way to describe the actual fineness of the original silver coins of the republic. This was done even in documents from the mint.)

This order was apparently followed by a supreme order of March 13, which required the production of only pesos fuertes at the Arequipa mint. Santa Cruz, undoubtedly yielding to the financial realities of the time, seems to have authorized the continued production of a fixed amount of feble at Arequipa.33 Nonetheless, all of these actions reflect a change in the understanding of Santa Cruz as to the consequences of the course that he had undertaken in 1829. By this time, however, the Confederation was in its last days. The ability of Santa Cruz to enforce his orders was at best questionable. We see no real effect on the operations of the Cuzco mint and no equivalent orders were given to the Potosí mint, suggesting that the problem was perceived as one existing only in Peru.

There was one more lasting consequence of the Confederation: a legal justification for the circulation of the Bolivian moneda feble in Peru. The formation of the Peru-Bolivian Confederation had been decreed by Santa Cruz on October 28, 1836. The "Fundamental Pact of the Peru-Bolivian Confederation" was signed in Tacna on May 1, 1837. Article 36 declared that "each one of the Republics will keep its coins that will circulate in all the territory of the Confederation."34 Santa Cruz was defeated by a combined Chilean and Peruvian army at the battle of Yungay on January 20, 1839. The Confederation was ended, but the minting of the debased coins at both the Cuzco and Arequipa mints continued. This was with the acquiescence of the new prefects appointed by Gamarra, the provisional president of Peru, and continued unchecked until the following year. Formal decrees in both Chile and Nicaragua had called attention to the debased coins of the Cuzco and Arequipa mints. On March 20, 1840, Ramón Castilla, the finance minister, conveyed the orders of Gamarra to the prefects of both the departments of Arequipa and Cuzco, that in the future all coins be made in accord with the regulations of 1830.35 It appears that these orders were obeyed at the Arequipa mint, but not at the Cuzco mint. Dispatches from the English consul at Islay, Thomas Crompton, noted as late as December 1841, that "Hard Dollars continue exceeding scarce; the coining of small base Money in the Cuzco Mint as usual."36 However, the intent of the new Peruvian government had been established by a decree of September 30, 1840.37 This decree of Gamarra reiterated the requirement that all silver coins have a fineness of 10 dineros 20 grains in accord with the regulations of 1830 and that this fineness be inscribed on the coins (fig. 7). Similarly, the gold coins should be inscribed with their fineness, required as before to be 21 carats. However, the decree did not deal with the problem of the moneda feble already in circulation. A committee from the Tribunal del Consulado was appointed in 1841 to advise the government on the problem.38 Their report was instructive as to the problems faced by the government: a devaluation of the Bolivian moneda feble would cause chaos and confusion in the marketplace. It was said that people

would be victims of a situation they didn't create. The committee recommended the government indemnify holders of the moneda feble because of the fraud thrust upon them. In any case, free export of the moneda feble should be

7. Cuzco, 8 reales, 1840

permitted. The report closed with two observations: Peru would have to continue to accept foreign coins, for there was a scarcity of resources for recoinage. The government couldn't even afford to melt foreign coins to produce Peruvian coins. Consequently, the government should periodically carry out assays of foreign coins in order to determine their true value. The government should also more effectively punish counterfeiters, a continuing problem in Peru.

Almost simultaneously, the government took two actions which had a direct bearing on the minting of coins. Proposals were requested for the management of the smelting and coining operations of the Lima mint.39 A resolution was also approved establishing a mint at the Cerro de Pasco in fulfillment of the law of December 19, 1832.40 The latter resolution caused immediate difficulties, for potential contractors saw their profits threatened by competition from the new mint for the already scarce silver bullion. Limitations on the new mint's operations were proposed in the responses and to a certain extent reflected in a new request for proposals.41 As a new basis for the operation of the Lima mint, it was suggested that the contractor would have to mint only pesos as long as the Pasco mint made small coins. Otherwise, 4,000 pesos of small coins would have to be made for each 6,000 marks of silver coined. A copy of the contract awarded (if indeed it was) is not currently available. However, this approach explains the scarcity of the small coins of 1843 and the apparent lack of any small coins from the Lima mint in 1844.

8. Pasco, 4 reales, 1844

The opening of the Pasco mint was approved in three decrees of July 13, 1843.42 It did not actually open until almost a year later under private ownership. It was soon apparent that the limitations placed on the operation of the mint forced it to operate at a loss.43 The minting of debased 4 reales began, only to be stopped by successive orders of the government on August 17 and the new prefect on August 21.44 Nonetheless, in the disorder of the times, minting of debased coins was resumed about November 22, 1844 (fig. 8). It continued until a Supreme Order of January 8, 1845, closed the mint because of the renewed infractions of the law. Only a total of about 219,300 debased coins were made in all, hardly an important quantity considering the amount of Bolivian moneda feble which had already entered the country. These coins are the last known debased coins to be made at the Peruvian mints of the period. The government's action put an end to the continued minting of debased coins within Peru. Nevertheless, it remained powerless to deal with the continued influx of Bolivian moneda feble. A circular of April 1845 prohibited for the first time

the importation of Bolivian moneda feble.45 This order apparently was ignored because of the continuing need for a means of exchange with Bolivia.

Table 2 BOLIVIAN COINAGE, 1830-59

Years	*Pesos Fuertes*	*Feble (Pesos)*	*% Feble*
1830-34	8,109,638	1,347,662	14.2
1835-39	8,337,005	2,172,760	20.7
1840-44	6,786,060	4,694,626	40.9
1845-49	4,692,387	4,193,488	47.2
1850-54	2,301,930	9,600,677	80.7
1855-59	186,057	10,767,328	98.5

The Dimensions of the Problem

At the same time that the new decree of 1840 was being promulgated in Peru, Foreign Minister Manuel Ferreyros wrote to his counterpart in the Bolivian government of José Miguel de Velasco. In this letter, he mentioned the actions of the Chilean and Central American governments and stated the desire of his government to return to the circulation of coins of full legal fineness. He expressed the hope that the Bolivian Government would do the same.46 On December 3, Ferreyros wrote to Castilla that a letter of October 14 from the Bolivian government had been received. Therein the government of Bolivia said it understood the importance of reestablishing the credit of the country's coins and would consider what measures would be conducive to that objective.47

The actions of the Bolivian government were diametrically opposed to the tenor of its letter. The production of moneda feble in 1841 and 1842 equaled that of the preceding five years. Undoubtedly the need for money at a time when war with Peru was a constant threat was the basic cause for this. The profits of the mint became increasingly important, accounting for over 14% of governmental revenue in 1842. For whatever reason, there was a clear shift in the monetary policy of the Bolivian government following the demise of the Confederation. This is made clear in Table 2.48

This change in policy caused problems in both Bolivia and Peru. Since much bullion was still leaving Bolivia as contraband, only a limited amount of silver was available for coinage. The shortage of pesos fuertes needed for overseas commerce drew bitter complaints from foreign merchants in Bolivia.49 And, commenting on Peruvian trade in 1843, Crompton wrote to Viscount Palmerston:50 No hard dollars can be procured for the Shipment at scarcely any premium, the Mints in South Peru coining nothing at present but the debased small Silver money, which also continually flows in from Bolivia, and shortly hard Silver Dollars may be expected to disappear entirely from circulation.

We may infer that even in 1843 the Cuzco mint was still making moneda feble, although there are no records to support this. However, we see that just as the production of small coins in Lima was dropping due to the projected startup of the Pasco mint, there was a sharp increase in the amount of available Bolivian moneda feble. The consequence was inevitable. In the above note, Crompton went on to warn his own government: If the [Peruvian] Government do not in time conform to the repeated warnings they have received on this

subject by calling in all the base Coin, prohibiting at the same time its Coinage and circulation in future, a dreadful and inevitable catastrophe will occur to shake Credit to its foundations, involving in the ruin many of the British Merchants. The amount of the base Money in Circulation is supposed to exceed Ten Millions of Dollars....

While Crompton probably overestimated the amount of debased money in circulation, the amount was still large enough to concern the new Peruvian government brought together under the leadership of Ramón Castilla. Manuel Mendiburu, the finance minister, described the situation in some detail at the end of 1844.51 He acknowledged that good Peruvian coins were scarce in the south of Peru and that the merchants found it convenient to accept the Bolivian coins: Through the carelessness of the Peruvian government and the diligence of the Bolivian government, the Bolivian government prospered at the expense of Peru.... At the present time, our markets are inundated with the coin that no government has been able to abate.

Mendiburu described in some detail the key problem: the trade with Bolivia. Peru had an imbalance between its imports and exports overseas, while the net balance of payments on the trade between Peru and Bolivia favored Peru by about 500,000 pesos each year. Although this had been going on for years, Mendiburu estimated that only about 3 million pesos of Bolivian moneda feble were actually in circulation in Peru. The debased coinage was found throughout the country, but Mendiburu noted that the Bolivian coins were the only coins in circulation in southern Peru.

Almost simultaneously with Peruvian actions against moneda feble, José Ballivián, president of Bolivia, demonstrated his own recognition of the growing problem. Minting of debased coins was suspended in Bolivia as of January 1, 1845. This decision was hailed by newspapers in both Sucre and La Paz. By May, however, there were reports of a shortage of small coins.52 Thus, once again the need for these coins in the trade with Peru and Argentina was shown. The shortage of coins and the combined protests of both miners and mint workers led to a resumption of the minting of moneda feble in the second half of 1845. Nevertheless, Ballivián's thinking on this problem led to acceptance of an important article in a subsequent trade treaty with Peru ("The Treaty of Arequipa"). Two years later, José Paz Soldán described the financial consequences of the current situation.53 Assuming that 3 million pesos of Bolivian moneda feble were in circulation and 1.5 million pesos of Peruvian moneda feble, the cost of a recall and recoinage of the debased coins was estimated to be 1 million pesos to the Bolivian government and half that amount to the Peruvian government. This cost was based on an even exchange of new coins for debased ones. Even assuming that Bolivia was willing, Paz Soldán felt the country did not have the resources. The Peruvian government could not indemnify the holders of even its own moneda feble. Paz Soldán recommended that no tax be placed on the export of the feble, but that steps (unspecified) be taken to impede its importation. He felt that special care should be taken to see that counterfeit coins from Europe and the United States were not admitted.

These discussions illuminate the essence of the problems faced by Peru in dealing with Bolivian moneda feble:

- 1. *Importation of moneda feble*. The Bolivian moneda feble fulfilled a very real need for a circulating medium, particularly in southern Peru. Further, the trade with Bolivia was an essential part of the economy of the south; the only money available in Bolivia was the debased coins. Not much could be done unless the Bolivian government was willing to stop making the bad coins and the Peruvian government was able to supply the needed coins. Neither was possible at that time.
- 2. *Indemnification of the holders*. There was some justification for the assertion that holders of moneda feble should be indemnified. This was not possible. Neither was the government so stable

that it could force a devaluation of the coins—revolutions occurred for much less fundamental reasons.

- 3. *Counterfeiting*. The simplicity of design on both the Bolivian and Peruvian coinage and the relatively crude minting techniques of the time made counterfeiting easy. Essentially, no two legitimate coins were really identical; the detection of counterfeit coins was not easy. Further, the debased coins wore relatively quickly, obscuring the details of the coins. Even experts could not tell the difference between circulated "legitimate" moneda feble and counterfeit moneda feble. A very lively import trade developed in these counterfeits. Thus, a number of changes had to be made in the design of the Peruvian coinage as well as in the operations of the mint itself.

The dimensions of the problem were well understood by the middle of the 1840s. There were no solutions at hand. The problem worsened as the years passed. Peru's policies were not always helpful in resolving the difficulties. Even the determination to resolve the problem was at times in question. Nevertheless, from this time forward, moneda feble became a central economic concern of the country. There were several aspects to the ultimate solution:

- 1. Through a new source of revenue, the sale of guano, sufficient money became available to pay for the needed machinery and the costs of recoinage.
- 2. A new and sufficiently complex coin design was adopted which significantly decreased the possibility of counterfeiting. New procedures and better minting machinery produced more uniform coins in sufficient volume to meet the needs of the marketplace, at least through the period of amortization of the feble.
- 3. The moneda feble slowly fell in value to its intrinsic worth. By that time, the government was strong enough to deal with the inevitable protests of holders of moneda feble.

All these elements were in place by 1863. The remainder of this article will trace the uneven course taken to resolve the problem.

Some Contradictory Actions

Despite the fact that Castilla and Ballivián were personal enemies, a treaty of peace and commerce was signed in Arequipa on November 3, 1847.54 Overall, the treaty was very favorable to Bolivia. All taxes for the transit of goods to and from Bolivia were dropped. Bolivian and Peruvian merchants were to be charged the same import duties in Peruvian ports. However, in exchange, Bolivia agreed in the fourth article to stop the emission of "moneda feble whose fineness does not reach ten dineros twenty grains." The seventeenth article provided that Peru could maintain a consulate in La Paz in order to oversee compliance with the treaty. Ballivián approved the treaty and, shortly after submitting it to the Bolivian congress for final approval, resigned the presidency.

By 1847, however, it was acknowledged by Manuel del Río in the *Memoria de Hacienda* that the Peruvian banks in the interior had nothing but moneda feble.55 Both Peru and Bolivia were seen to be suffering from "un cancer tan mortífero." The amount of feble in circulation was now estimated to be 3.5 to 4 million pesos in nominal value. In the *Memoria de Hacienda* of 1849 it was estimated to be about 8 million pesos.56 Pending approval of the treaty, the Bolivians had cut back only slightly on the production of the moneda feble.

Shortly after the Treaty of Arequipa was signed in 1847, a law was passed in Peru which lowered the export duty on silver to only four reales per mark.57 Silver bullion acccounted for about two-thirds of the country's exports in that year. This law was intended to stimulate production further and to bring a better balance between imports and exports. The owners thus could sell their bullion at a much higher price on the world markets, and they did. The resultant scarcity of silver brought the operations of the mint almost to a halt. An order of the Council of State dated November 23, 1848, increased the price to be paid at the mint for silver to 9 pesos 1 real, equivalent to 8.6783 maravedis (mvs.) per grain (34 maravedis were equal to 1 real). The cost of only the silver in the alloy used for coins thus rose to 2,256.36 mvs. per mark, leaving a gross profit of only 55.64 mvs. per mark. Since a good approximation of the cost of salaries and pensions in the mint during this period was 39,000 pesos per year, over 190,000 marks of silver would have to be minted each year in order to pay these costs alone.58 This no longer was a reasonable expectation in view of the profits to be made on the export of silver bullion. In 1849, only 6,845 marks of silver were minted in Lima compared to the 30,950 marks of silver minted in the month of September, 1841.59

The mint's machinery then deteriorated from lack of use. The ability to produce a number of coins sufficient to meet the needs of the marketplace was an essential part of any plan to replace the moneda feble. That capability was lost for a number of years through the lack of an overall plan within the government to deal with the problem of moneda feble, while the lack of good coins insured the continued growth in use of the bad coins.

The War Over Coins

Under the leadership of a new president, General Manuel Isidoro Belzú, approval of the treaty of Arequipa was given by the Bolivian congress on January 28, 1849. The treaty became governing law in that country on January 8, 1850.60 However, the Bolivians were faced with almost insurmountable financial problems. Not only were they to lose some taxes on the Peruvian imports, they were to lose a substantial part of the profits from the mint. It was financially impossible to amortize the existing moneda feble, yet Bolivia was required to mint coins of the full legal fineness. The new finance minister, Raphael Bustillo, the former assayer of the Potosí mint, floated a "trial balloon" in the third issue of *El Celage*, a new journal in Potosí.61 He argued that no one had ever been compelled to accept the moneda feble. Further, everyone had been free to set whatever price they chose for their products in terms of the true value of the feble. Prices for domestic products had not increased since 1830 (this was essentially true in Peru as well). He therefore argued that the government had no obligation to recall the moneda feble and indemnify the holders. Bustillo proposed that new coins of 10 dineros 20 grains fineness be minted and circulated alongside the existing feble. These coins would have a weight of only 400 grains (19.968 g), rather than the traditional 542 grains of the peso fuerte. Two tostones of the moneda feble would have precisely the same amount of silver as the new peso that was proposed. Therefore, the owners of the existing moneda feble would suffer no loss, while the coins would meet the requirement of the fourth article of the Treaty of Arequipa.

This proposal was incorporated in the decree of October 6, 1849, which was to take effect 180 days later. The Peruvian representative designated to monitor implementation of the treaty (Mariano José Sanz) arrived in December. He had his first substantive meetings in the following month with Tomás Baldivieso, the Bolivian foreign minister. Sanz vigorously made the point that in both technical and popular use, the words "moneda feble" united both the concepts of weight and fineness. He maintained that the decree of October 6 did not fulfill the terms of the treaty. In addition, with the treaty in full force as of January 8, there was no

legal basis for continuing the emission of moneda feble until April, as called for in the decree. As a result of his protests, implementation of the decree of October 6 was suspended on February 14.62 However, the emission of moneda feble was not halted; instead, it sharply increased. A new mint was opened in La Paz in February 1853, to produce even more feble, including coins bearing the mint mark of Potosí and the date 1830. While a great diplomatic affront of Peru by Bolivia was the immediate cause of a war in 1853 between the two states, the most basic reason was the failure of Bolivia to implement that provision of the Treaty of Arequipa which dealt with the issuance of moneda feble.63

The Administration of Echenique

Castilla was succeeded by General José Rufino Echenique in 1851. The congresses of 1851 and 1853 sought to take action on the problems caused by the moneda feble. The congress of 1851 did not adopt a proposed decimal monetary system. A commission on moneda feble found that use of debased coins had not affected the prices of domestic products, but that the price of imported products was increasing. Several proposals to deal with the situation were made, but none were adopted. There were no coins to replace the Bolivian ones, and no practical alternatives. The government could not afford to ignore claims of the holders of moneda feble, yet it did not have sufficient money to reimburse their loss.

Sales of guano had provided more money to the government by 1853. Enough money was available to begin negotiations for new mint machinery. A new proposal for a decimal coinage was made in 1853 and led to the pattern coins of 1855.64 The problems of the coinage became worse. Counterfeit coins now had an established price of 5 pesos of legitimate moneda feble per 100 pesos of counterfeit. Bolivian moneda feble was accepted in payment of taxes and used to pay public employees. Colonel John A. Lloyd, the British consul general in La Paz, described the effect on trade in 1854:65 In the absence of hard dollars, vast remittances of this base coin were received by the merchants of Tacna in return for their goods, raised probably in price to meet the returns in money of low standard.... The Tacna houses with their principals in Lima / Valparaiso only received this debased coin at its intrinsic value / have therefore been turning over large sums until the abuse has become intolerable to the Peruvian treasury.... The edict of Peru if it is issued will be the ruin of the Tacna merchants and the Peruvian distiller who introduces enormous quantities of spirits into this country in return for coins—the Tacna merchants having very heavy claims on the Bolivian native houses in the interior they must either receive base coin at par and lose thirty per cent in payment of the debts as they cannot realize in standard specie in Peru or they must receive their credits in manufactures produce or bark at the Bolivian price.

The Peruvian edict mentioned above, the first law dealing with moneda feble, was passed by the congress of 1853.66 It authorized the executive to retire from circulation the Bolivian moneda feble in the manner, form, time, and place he judged most convenient. Holders of the moneda feble were to receive the nominal value of the coins by payment of three-quarters part in national coins and the remainder in bills of public credit. The cost of the conversion had been estimated at 2 million pesos, and the executive was authorized to obtain a loan in Europe for that amount. By the time the money arrived in Lima, the rebellion of Castilla in the south of Peru was underway. The loan was diverted to fighting the rebellion and to attempts to subvert the government of Belzú in Bolivia. An opportunity to do something meaningful about the problem of moneda feble was lost; however, the mint machinery was still almost useless. While some machinery was repaired and minting resumed at a much greater rate, the needed coins could not have been provided in sufficient quantities to replace the debased coins in circulation. The positive aspect of this episode was that it showed

how the country's financial situation had improved: funds were, in principle at least, available to deal with the problem.

A sign of the continued determination of the Echenique administration was an order dated July 8, 1854, which declared that the new Bolivian coins called arbolitos, of 4 soles nominal value and dated 1854, should not be received in national offices because they were deficient in weight and fineness (fig. 9).67 An early act of Castilla's government reversed this decision the following year. There is reason to believe that this and a later decision legalizing the arbolitos of 1855 were made in response to Belzú's support of Castilla during the recent rebellion. It must also be acknowledged that coins were also needed for the marketplace: this was indeed the official justification for the action.

9. La Paz, 4 soles, 1853

The Laws of 1857

In a decree interpreted as the fruit of Junín's support of Castilla during the recent rebellion, the tax of four reales per mark on silver bullion intended for export was abolished on March 26, 1855. The price of silver in the Cerro rose one peso per mark the following month.68 While much of the silver was now going overseas, there was an even more profitable use of the metal closer to home—the counterfeiting of the Bolivian cuatros. The journals of the time contain many references to such activities, both in Peru and Bolivia. One raid on a ranch near Cocabamba led to the discovery of two large presses, a device for milling the cuatros, and a number of other pieces of machinery.69

The discovery of gold in California and Australia had led to a steadily increasing price for silver. This was recognized in a law of June 2, 1855, which reduced the weight of the peso fuerte from the traditional 542 grains to 480 grains of silver, 10 dineros 20 grains fine. Later in the year, another proposal was made to recall the moneda feble—one so complicated that it probably was just as well that it was not implemented.70 Moreover, the mint still had not received the machinery ordered from the United States and so could not have produced the required coins.

That machinery was finally received by the end of 1855, whereupon its installation began, virtually bringing the mint operations to a halt in 1856. The following year, another congress convened, and there was no lack of proposals for dealing with the monetary problems. Of special interest was that of a commission headed by Ignacio Noboa, who as finance minister in later years was to oversee the actual conversion of the moneda feble.71 There was now (July 1857) estimated to be 27,000,000 pesos of bad coinage in circulation, with about one-third of it counterfeit. There was already evidence that the legitimate Bolivian moneda feble were being melted down to provide material for coins with even less silver content. A rise in the price of food and

clothing as well as real property was also noted.72 This was the natural effect of the dominance of debased coins; indeed, it is something of a surprise that it was so long delayed.

Through action and inaction, a situation had now arisen in which the arbolitos of 1854 and 1855 were considered acceptable for transactions, but those of 1856 and 1857 were not; thus the merchants were being asked to examine all of the coins received in the course of business just in order to determine the dates.73 Since coins for large transactions were customarily weighed rather than counted, the problem was compounded. Counterfeiting continued widely. Even the legitimacy of the new coins from the Pasco mint was questioned.74 There was increased pressure on the government to take more decisive action. A new proposal was accepted to hasten the new machinery's installation, and it was completed by the end of 1857.

Other actions were taken later in the year in anticipation of renewed minting in Lima. The first of these was a law of October 2. This provided for a decimal monetary system utilizing copper, silver, and gold coins. The silver and gold coins were to be 0.9 fine.75 The silver coinage was based on a peso of 475 grains (23.711 g), thus overvaluing silver—only one of the several problems with this new law.76 An important article of the law, however, provided that the executive could make whatever alterations in the design or other properties of the coins it deemed appropriate. It was subsequently charged that the low weight of the new peso was set in order to lessen the cost of any possible indemnification of holders of moneda feble.

The second of these actions was a "secret" law of the same date—one not published until 1862.77 Noting that the national dignity and public interest demanded the immediate amortization of the moneda feble in circulation, the executive was authorized to do so. This was to be done in the briefest time possible, either reducing the feble to coins of 0.9 fine or, if it were easier and faster, to produce coins 0.667 fine and of weight 641.043 grains (32.0 g) for the peso fuerte. The executive was empowered to negotiate a loan based on the sale of guano in order to finance the conversion. This was to be confined to legitimate moneda feble only, i.e. counterfeit coins were to be returned to their owners. Further, all necessary measures to impede the further importation of moneda feble were to be taken. Finally, another article authorized those changes in the mint regulations required to facilitate and standardize the minting of coins. Based on this article, a decree dated October 29, 1857, closed the Pasco mint as of the end of the year and ordered the removal of its machinery.78

10. Lima, 50 centimos, 1858

11. Lima, 50 centavos, 1858

Coinage at the Lima mint was resumed early in 1858. The new coin presses were so fast that it was impossible to supply a sufficient number of planchets.79 The first coins produced used the same design as that of the patterns of 1855 (fig. 10). That design was changed by a decree of May 14, 1858, because it was thought that counterfeiters could too easily duplicate it. It was replaced by a design produced by the new English die sinker, Robert Britten. This featured a seated figure representing Liberty (fig. 11). Coins having denominations of 50 centavos, 25 centavos, 1/2 real, and 1 real were produced during the period 1858-61. These coins, called the "transitional coins" of Peru because they form a bridge between the old colonial monetary system and the metric decimal system adopted in 1863, reflect all the difficulties of the coinage of Peru in this period.

Many of these problems were summarized in a most-influential monograph of the period by the Polish engineer Ernesto Malinowski.80 Malinowski had worked in the Lima mint and was familiar with all its operations. The monograph, written in 1858, pointed out that the Peruvian coastline, with its many coves, together with the long land frontiers of the country, made it impossible to prevent the influx of counterfeit coins. Expensive presses of great power were required to make coins capable of foiling counterfeiters. However, while such machinery was now available, many varieties of both designs were produced because the workers in the mint had been long accustomed to making poor coins. There were great variations in the weights of the coins. Malinowski believed much practice was needed in order to mint truly acceptable coins. Most of his attention was focused, however, on problems with the governing law. He maintained that the weight of 475 grains was unsuited to a metric decimal system such as that followed in most countries of the time. A better system would be based upon a peso of 25 g. This and other recommendations of Malinowski were studied and debated. Almost all were subsequently incorporated into the law of 1863.

The first assayer of the refurbished mint, Ignacio Ortíz de Zevallos, had also recommended the use of a 25 g peso in 1858.81 Nevertheless, a decree of February 16, 1859, provided for the minting of 300,000 pesos of 1/2-real and 1-real coins of 25 and 50 grains, respectively.82 Note the continued use of the traditional names of the denominations. Apparently this was supposed to cause less confusion. These new coins were worth relatively more than those having denominations of 25 and 50 centavos, which were based on the peso weight of 475 grains.

However, the new coins suffered the same fate as other good coins of the period. As Malinowski noted, "There is no law or power in the world that is able to compel in any permanent way the receipt and circulation in commerce of two coins with equal value that in reality have distinct values."83 The British consul in Islay was to note in 1862 that:84 About three years since half a million of dollars was coined in Lima, consisting of four reals, of two, of one, and half-real pieces, but being good money, the whole of it was shipped to England, leaving in the country the so-called Bolivian money only....

Thus the third effort (1841-43, 1854-55, 1858-61) to supply good coins for circulation failed.

Foreign Trade in the 1850s

It is not surprising to find that both Peru and Bolivia began to experience difficulties because of the widespread use of moneda feble. We have seen that the Peruvian congress of 1851 was told that the prices of imported articles had risen, but not the price of domestic products, because of the debased coinage. George Hodges Nugent gave a contradictory report in 1848. Nugent, the British consul in Islay, noted that "...all Articles of Food and consumption have risen upwards of one third in value...."85

Similarly, the Bolivian congress had been told about the same time that there had been no effect on the prices of domestic articles. Bolivia, too, was dependent upon imports for many of its needs—items from Peru, Argentina, and overseas. Silver pesos of Peru and Bolivia were used to pay for the overseas goods. However, the production of Bolivian pesos fuertes fell below 100,000 coins in 1853, and decreased further in later years. The production of Peruvian 8-real coins was even lower, with the last 8 reales (except for the extremely rare coins of Pasco) being made in 1855. The growing Peruvian trade in guano provided a means of paying these debts.86

The sale of guano was a government monopoly in Peru. By 1848, sales had reached very substantial levels. It was to grow much more in the following decade. An early result was the satisfaction of the English bondholders, as noted above. Large sums of money became available in Europe as a result of the shipments. The Peruvian government used this money as the basis for the sale of commercial drafts which importers could use to pay for their merchandise. With little or no money in pesos fuertes available, and the moneda feble valued only at its intrinsic value overseas, such drafts became the common mode of payment during most of the 1850s.

The heightened business activity brought increased points of contact between the internal and external markets of both Peru and Bolivia. In particular, with the moneda feble being used almost exclusively in the internal markets and coins of the full legal fineness being required (or at least used as the measure of value) in the external markets, there was an inevitable confrontation. When the moneda feble came in increasing amounts to the coastal business centers, the difference in the nominal and intrinsic values could no longer be ignored.

Toward the end of the decade, the value of moneda feble began to decline. The peso fuerte was valued at 48 British pence; in 1840 a peso of moneda feble was valued at 46 pence. In July 1861, the actual value in exchange was usually 37 pence and sometimes fell to 36 pence, somewhat less than the intrinsic value of the coin.87

Wholesalers in the interior of Peru or Bolivia would send their moneda feble to the commercial houses in Tacna or Lima. There the moneda feble would be discounted by an amount which came to be greater than the difference between the intrinsic and nominal values. The government had a monopoly on the sale of commercial drafts generated by the overseas sale of guano. The value of the Peruvian peso set by the law of 1857 was 42 pence (based on the weight of 475 grains). There were few if any coins of the full legal fineness in circulation. Nonetheless, the government maintained this value for the purchase of drafts. Those merchants permitted to buy the drafts at this price had an immediate advantage over those forced to pay the current exchange value. While the potential for graft was apparent, the greatest problem was the multiplicity

of exchange rates in effect: the rate set by the government, the current market rate, and the rate established by the intrinsic value of the coin.88

The rise in prices for imported articles was inevitable. Prices in Bolivia increased even for items from Peru. Between 1840 and 1860, the price of olive oil increased from 4.5 pesos to 13.5 pesos, while the price of a mop increased from 1.25 reales to 3 reales.89 In Peru, Osore noted the price of animal feed had increased from 2 reales to 3 reales; the price of meat increased from 1 peso to 12 reales.90 It was claimed that while prices in Peru had increased about 50% because of the moneda feble, in Bolivia they had increased by from 50% to 100%.91

The price of silver bullion had reached 13 pesos per mark in 1861.92 At this price, the value of the debased coins was worth about 6% more than bullion. By 1860, Mitre notes, moneda feble was being exported on a large scale.93 The actual conversion of the debased money had really begun, albeit not by direct government action. But in September 1861, the Peruvian government dropped its support of the debased coinage through the commercial drafts sold at 42 pence. That month the value of the debased peso fell to 36 1/2 pence.94 While there was still to be much discussion of indemnification of holders of debased money, it no longer was a real option. Moneda feble continued to provide the circulating medium, but there was a perceived need to replace that coinage by one whose nominal and intrinsic values were essentially the same. This problem was taken up in the next Peruvian congress.

Bolivian Reforms

Almost in parallel with the Peruvian actions of 1857, the Bolivian government had begun to consider some belated actions related to the moneda feble. A proposal was made to the congress of 1857 to approve the monetary decree of October 1849 and to increase the price paid for silver bullion in order to end the trade in contraband.95 Although Finance Minister Aguirre called for a resolution of the questions surrounding the monetary system, no action was taken.96 Subsequently, Dorado proposed an end to the minting of debased coins and a resumption of the use of coins of the full original weight and fineness.97 As in Peru the amortization of the existing feble was a problem, not so much because of that circulating in the country (which was rapidly exported in any case), but because it was believed that the mintage of pesos fuertes would induce the return of feble from other countries.

By 1859, Bolivia was deep in a monetary crisis. Money was needed for merchandise from both Peru and overseas. Ultimately, money was needed that could be exchanged for commercial drafts; i.e. money was needed which was acceptable in the Peruvian treasuries. The Bolivian 8-sol coins were no longer made. Only Bolivian feble made before 1857 was accepted in the Peruvian treasuries and such coins essentially had disappeared from circulation in Bolivia.

The Bolivian government initially considered resuming minting the feble dated 1830.98 However, officials of the Potosí mint suggested to the finance minister, Tomás Frias, that a variety of alternatives be considered. They outlined alternatives ranging from a return to the coinage of the full and original weight and fineness to an especially complicated proposal from some merchants of Sucre that involved payments to the mint of premiums for coins.99 The alternative most profitable to the government, and the one selected, was implementation of the decree of 1849 calling for coins of fineness 10 dineros 20 grains, but with the peso (8 soles) having a weight of only 400 grains (fig. 12). While the intrinsic value of the silver was the same,

there was a saving in the cost of minting of the new peso as compared to that of the moneda feble. A decree of August 17, 1859, placed the earlier decree into effect.100

An early action of the Peruvian government was to declare that the new peso should be received at a value of only 6 reales.101 This clearly undervalued the coin even by current Peruvian standards. For that reason a decree subsequently declared that the coins should be received based upon their intrinsic value.102 By 1862, Bolivian Finance Minister Carvajal noted that the "pesos Frias" served only for circulation in the interior. They had lost their monetary value in foreign markets and were received only for their intrinsic value. There was a recognized need for coins to meet the needs of both internal and external commerce.103

12. Potosí 8, soles, 1861

As another indication of the necessity for sound coinage and the confusion over suitable remedies, Peruvian Finance Minister Juan Salcedo had authorized the acceptance of the arbolitos of 1856 and 1857 at their nominal value on October 7,1859.104 Thus these debased coins were given a legal status at almost the same time the new coins were denied that status. However the earlier coins had disappeared by then from Bolivia, and the monetary problems of that country were to grow as effective means of exchange were sought with Peru.

The Laws of 1863

Despite continuing political difficulties, economic forces were moving both the Peruvian and Bolivian governments toward a resolution of the moneda feble problem. Early in the Peruvian congress of 1862 (August 27), the government introduced a proposal for a metric decimal coinage based on a silver peso ("sol") of 25 g of 0.9 fineness. The problem of moneda feble was to be attacked in two ways. There was a proposal that the government set the value of the circulating medium in relation to the new coins. A coin of 40 centavos value was also proposed to facilitate the exchange of the moneda feble for the new coins. However, the problem of reimbursement of the holders of the moneda feble was still unresolved. In the congress of 1860, Paz Soldán and José Galvez had concluded that the slow depreciation of coinage and the rise in prices had made it impossible to compensate fairly anyone for losses incurred by use of moneda feble. The poor had suffered the most because they were unable to increase the price of their labor; having little money, they would not benefit from the reimbursement. The larger merchants were mostly foreigners. They had steadily raised their prices as the value of the feble decreased. For both reasons there was little sympathy for their problems. After extensive debate, a law was passed on January 31, 1863, establishing the new coinage system. No provision was made for recall of the existing moneda feble, but the debased peso's value was established as 80 centavos worth of the new coins. The coin valued at 40 centavos was dropped because it might be confused with the 1/2 peso. The new coins utilized Britten's earlier design (fig. 13). The signing of this law on February 14 led to an immediate outcry from foreign merchants. While

the necessity of a good coinage was recognized, the failure to indemnify holders of the existing debased coins was seen as a violation of rights conferred both by the legal actions of earlier years and by practices which used the feble in payment of governmental salaries and accepted it in full payment of duties and other taxes.105 There were open threats of diplomatic reprisals; initially the English Board of Trade, not fully understanding the situation, supported the merchants' position.106 However, Christopher Robbins, the American representative in Peru, reported in May that "the impression now seems to prevail that the currency law is a wise and salutory measure...."107

13. Lima, 1 sol, 1864

A letter from the office of the customs administrator of Arica to the finance ministry, dated June 22, 1863, gives significant insight into the changed conditions under which Bolivian moneda feble was then circulating in the markets of Peru and Bolivia.108 This official, M.M. Forero, transmitted with his letter four new Bolivian coins of the same type as had been made in 1856-57 ("arbolitos") in Potosí. Forero, noting that it had been more than three years since Bolivia had made coins of other than the full legal fineness of 10 dineros 20 grains, speculated that either a new and clandestine minting of the 1856 arbolitos had begun on a large scale, or, more likely, the Bolivian government itself had undertaken the minting, using the older dies. The problem was the following: there was a scarcity of moneda feble in Bolivia and the Bolivian merchants had to make use of "los pesos Linares" (or "pesos Frias"), i.e. coins of full fineness, in order to pay for goods they purchased in Peruvian markets. The difficulty was that the coins of 1859, although of legal fineness, did not have a legal status in Peru, whereas the debased coins of 1856 did circulate at their nominal value in accordance with the decree of October 7, 1859. Thus the Bolivian merchants suffered a loss of from 4 to 10% by their forced use of the coins of full fineness.

Forero noted that the return to minting of the older, debased coins made the manufacture of counterfeit coins significantly easier. This was a problem of even greater concern, for it was by then possible to make counterfeit coins so perfect in appearance that only a detailed analysis could detect them. Forero recommended that in order to avoid this problem it was better to allow these coins of full fineness to circulate legally at the value established by the new law.

14. Potosí, 1 boliviano, 1864

By that time the Bolivian congress was meeting in extraordinary assembly at Oruro. There was a very real possibility of a war with Chile, but the reformation of the coinage was high on the congressional agenda because of Peru's continued protests.109 Two excellent summaries of the background and problems were

at hand.110 On June 29, a law was signed that provided for a decimal coinage in gold, silver, and copper coins similar to those in the recent Peruvian law. Specifically, the basic silver coin was a peso called the boliviano, 0.9 fine and weighing 500 grains, somewhat less than the 25 g of the Peruvian sol (fig. 14). The value of two tostones of the circulating feble was set at 80 centavos of the new peso. As in the Peruvian law, no provision was made for recall of existing coins. Recognizing that the new medio boliviano would have greater value than the existing tostón, but could easily be confused with it, a decree of October 26 eliminated the earlier denomination from the list of those that would be made at that time. The difference between the new Peruvian and Bolivian silver coinages was minimal; the basis of a monetary agreement between the two countries was now at hand.

A new treaty of peace and commerce between Peru and Bolivia was signed on November 5, 1863. Each country promised to emit only coins in accord with the recent laws. The treaty was approved by the parliaments of Peru and Bolivia, and completed with the Treaty of Commerce and Customs of September 5, 1864. For a short, but significant, amount of time, Bolivia adhered to that provision of the agreement; the Peruvian government was successful in launching its own program for the amortization of moneda feble. While Bolivia subsequently was to make debased coins again, these coins never posed the same problem for Peru as had the earlier coins.

Conversion of the Feble

The story of the Lima mint's operations during the period of monetary conversion is of interest in itself. Valverde has given a short summary of those operations.111 Notices offering a concession for the conversion of the feble in Peru are not known. However, on July 6, 1863, the firms of José Vicente Oyague, and Brother and Graham Rowe and Company, presented a proposal to this end. On July 8, a report of Director of National Credit José Santos Castañeda discussed this proposal favorably. During August and September, further reports on the proper way to implement the recall were submitted and additional firms offered to undertake the task.

On December 18, Oyague and Graham Rowe presented their final proposal. This was approved by an advisory vote of the Council of Ministers on January 19, 1864; the contract was published on January 28.112 It called for the recall of 400,000 to 500,000 pesos monthly of the Bolivian moneda feble until the quantity of 8 million pesos had been reached. This amount had been estimated as the total in circulation, but another provision made it possible to continue the recall if more was in circulation. Debased coins were either to be melted down or exported to Europe. The contractors were also to mint 10 million soles in coins of various denominations in accord with the law of 1863. They were to be struck at a rate of 400,000 to 500,000 soles a month, with minting to begin within two months of the signing of the contract.

A few of the new dineros (1/10 sol) and quintos (1/5 sol) dated 1863 clearly were made; they entered circulation in December of that year.113 The English consul in Lima admirably described the monetary situation at the beginning of 1864:114 The Peruvian government has, I believe, during the last three Mails exported to Europe through the House of Gibbs & Company a considerable quantity of the Bolivian Currency which they wish to get out of the country now that the new Decimal system has come into operation. But, as this proceeding has called forth complaints from the public, no other Silver Currency having been in the mean time provided to replace these exportations of the Bolivian coin, I believe orders have recently been given to desist from exporting any more on government account. This however will have no effect upon what private firms may wish to do, for as Imports exceed Exports in Peru, remittances

must be made home some how or other, and it would appear that Merchants find at the present rate of Exchange 36 1/2 pence per dollar, sending the Bolivian Currency to Europe better answers their purpose.... I am therefore not surprised to see the public entertain such fears when their money leaves the Country, or that they shew reluctance to part with even the objectionable Bolivian Coin before they behold the certainty of its being replaced by a national silver currency that may preserve them from the introduction and possible inundation of Paper Money.

These comments, as well as those of Forero, show that much of the older Bolivian feble had already disappeared from both Peru and Bolivia. The author's examination of the conversion records has shown that most of the coins actually melted in Lima were the Bolivian pieces minted in accord with the decree of 1859, i.e. of legal fineness but low weight. The varying fineness of the earlier legitimate feble increased the conversion costs; it is known that large quantities of these coins continued to be sent to Europe for melting.

Other dispatches of the English consul Jermingham described attitudes of the foreign merchants, most of whom had accepted the conversion, for "...they no doubt have taken care, according as the depreciation of the Bolivian money was occurring to find their profit in raising the price of their goods."115 However, the French chargé d'affaires did put in a claim for indemnification for French holders of moneda feble; it is improbable that this claim was of importance to the Peruvian government. Jermingham's opinion was that "the people who appear most entitled to some indemnity would seem to be the Employees of the State whose salaries are at a fixed rate of so many Dollars 'Pesos' which they have been accustomed to receive from the Treasury in Bolivian coin, there having been no other Currency for some years...."116

According to the contract, the 20 months allowed for the removal from circulation of the 8 million pesos of debased coinage had passed before the end of 1865. Finance Minister Manuel Pardo reported that 2,984,829 pesos 4 reales of moneda feble still remained to be shipped or melted in order to meet the requirements of the contract. Apparently moneda feble no longer circulated in Lima but was to be found in abundance at least in the departments of Arequipa and Moquegua. The minting of the new coins was also behind schedule, with only 6,366,671 soles 20 centavos produced by that time.117

Another progress report on the conversion of the moneda feble was given on August 3, 1866.118 By that date, 4,431,536 pesos of Bolivian moneda feble had been shipped to London and 2,068,464 pesos melted in the mint at Lima. Also, 891,958 pesos of Peruvian moneda feble had been melted, so that a total of 7,391,958 pesos of moneda feble had been retired from circulation. By the beginning of November 1866, there remained only 975,225 soles to be minted. The striking of soles and quintos in this amount was completed by April 1867.119

Conclusion

This article has traced the history of moneda feble in Peru in the period 1830-67. It has shown that the introduction of small debased coins into the internal commerce of Bolivia had consequences unforeseen by either the Bolivian or Peruvian governments of the time. The particular political and economic conditions of the time allowed the debased coinage of Bolivia to drive from circulation in Peru the Peruvian coins of full legal fineness.

I have discussed the economic and political problems created in both countries by the prevalence of the debased coins. I have also outlined the conditions under which it was ultimately possible to remove the debased coins from circulation in Peru.

Most importantly from a numismatic standpoint, it has been established that an understanding of the problem of moneda feble is the key to understanding Peruvian coinage of the period. Changes in the design of Peruvian coins as well as the number of coins minted in the period 1840-63 reflect Peruvian reaction to the increasing flood of debased coins and their counterfeits.

Nationhood through Numismatics: Latin American Proclamation Pieces

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Coinage of the Americas Conference at The American Numismatic Society, New York

What is a proclamation piece, and how does it differ from a purely commemorative coin or medal?

The line of demarcation between a proclamation piece and a regular commemorative coin is, at first glance, somewhat vague, the distinction somewhat artifical. But if we locate the proclamation piece within its historical context, we can see that it is a unique, probably necessary, step in the development of Latin American numismatics. It belongs to a particular mind-set, one which distinguishes it from purely commemorative issues, but one which also means that it has some counterparts in other, sometimes surprising, areas. For the purposes of this article, a proclamation coin will be defined as *a hybrid numismatic piece of a weight and fineness identical with ordinary coinage but which bears designs of an unusual nature which are intended by the issuers to impart legitimacy to a particular political regime*. In the case of Latin America, the proclamation piece may be expected to be found between the years 1820 and 1880.1

The inspiration for this monetary genre may be traced back to Spain, where examples of pieces of a purely proclamatory nature, tariffed to monetary weight and fineness standards, can be traced at least as far as the early years of the seventeenth century (fig. 1). Nor was Spain the only European country where proclamation coinage enjoyed favor with governments and the populace. Germany saw many such issues, as did France and Belgium. In the latter two cases, copper became an important metal for this type of coinage during two significant periods in the nineteenth century. An examination of the periods in question later will give us a clue as to the factors behind proclamation coinage in general; here, I merely observe that a base-metal proclamation issue might be a good idea, as it can be expected to reach a maximum number of citizens. In sum, this type of coinage does not have to be restricted to a single cultural area.

1. Spain, Philip IV, cast 4-real proclamation piece, 1621

And yet it is a distinctly Spanish-American phenomenon. Why should this be the case? Perhaps we have a clue in the Spanish metropolis. Here, some of the last proclamation pieces date from the confused period of the 1830s, a time of struggle for popular acceptance between two would-be monarchs—Isabel II and the pretender, Don Carlos. A struggle for popular recognition, for acceptance as the legimate political authority, is the key to Latin American proclamation coinage in general, and to its extraordinary longevity in one country, Bolivia, in particular.

In the case of Spain in the 1830s, the Carlists and those who supported the young queen were struggling for acceptance in a political climate of opinion which was not, inherently, favorable to either side. The queen was the infant daughter of the discredited Fernando VII, whose venal, autocratic ministers could be expected to continue to rule through Isabel's minority. The pretender was the unsavory brother of the late king, who was even more right-wing than the king had been. Between these two worthies, the queen and her uncle, where was the advantage to be gained by the people? Having nothing particular to offer, each side attempted to establish the fact that it had a legitimate right to be there. And one of the ways of moving in that direction was by means of the time-honored proclamation coin.

As noted above, two other European nations also witnessed nineteenth-century proclamation coinage, France and Belgium. Their issues, particularly in copper, buttress the idea of the acquisition of legitimacy which we have just seen for Spain and shall shortly see for Latin America. In France this type of coinage is most common during the reigns of Louis Philippe and Napoleon III, neither of whom had any claim, by simple right, to the allegiance of their citizenry. In the case of Belgium, the ruling house was new, had no particular ties with the land or the people, and was not especially attractive in terms of the personalities who sat upon the throne. Belgium, too, would have a coinage of legitimacy (fig. 2).

2. Belgium, Leopold 1, 10-centime wedding proclamation piece, 1853

We now shift to Latin America. If legitimacy was in doubt in Spain, France, and Belgium in the nineteenth century, it simply did not exist in most of Latin America. Significantly, the one place where it did, due to the continuation of a European house in an American setting, Brazil, was also the one place where such coinage never caught on. Elsewhere, a one-two punch was the rule.

The first blow was the extinction of three centuries of monarchical legitimacy. The kings of Spain had departed, never to return. The old habits of deference, so useful to new, generally non-monarchical regimes, ought to be retained; but how?

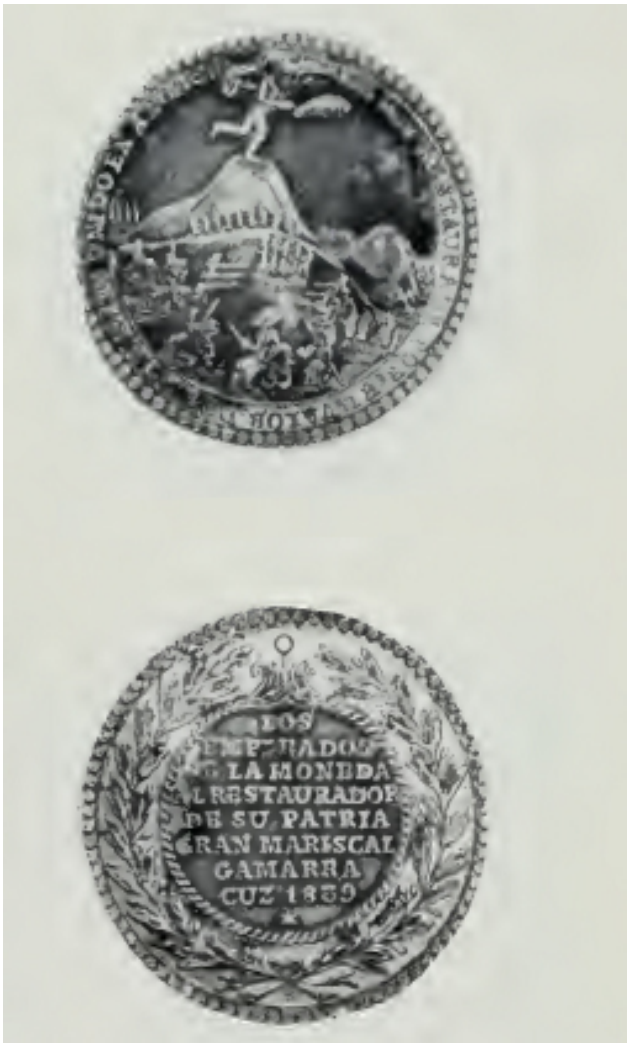
Nor was this the only problem for the new authorities. They also had to contend with a near-mythic status of the Liberators, those Bolívars, Sucres, and San Martíns who had appeared as godsends during the insurgency, but who were now removed from the new nations they had created. These men were the natural inheritors of the legitimacy of kings, but they were no longer present; power had devolved upon lesser men.

The second generation of rulers was therefore faced with major problems. Lacking legitimacy acquired naturally, it had to create something akin to it, and quickly, were it to get anyone to take it and its regimes seriously. Members of the new generation sought their legitimacy in a number of places. Control of newspapers and books was a necessity to get one's name and platform across to the influential, literate minority. An elaborate political organization, along with a purge of one's enemies, might also be useful. In South America, these elements combined in a particularly successful way in the long dictatorship (1829-52) of the Argentine Juan Manuel de Rosas. Rosas utilized a third avenue for acquiring popular support, that of Argentina's money. The coinage regularly appeared with his portrait and the slogans favored by his Federalist party. And what Rosas did, others, especially the Bolivians, also did.

3. Bolivia, 2 soles, 1825

All over Latin America, proclamation coinage made its appearance generally within a few years after independence. In several places, designs lauding new regimes actually went into circulation *before* the first "national" coinages. In Bolivia, for instance, proclamation pieces date from 1825; national coinage doesn't appear until 1827. The circulating medals had the monetary field to themselves for two crucial years, and the authorities undoubtedly wanted it that way (fig. 3).2

4. Chile, 2 reales, 1823



5. Peru, 4 reales, 1839

The earliest national proclamation pieces tended to celebrate independence itself and the first tier of liberators, especially the great Bolívar. But the demands of legitimacy soon determined a change in subject matter; within a very few years, proclamation pieces were being employed in that way which we have come to expect, with a succession of open books for new constitutions, busts for new rulers, and allegorical figures for presidential virtues and victories (fig. 4). A greater realism is sometimes attempted, as with a Peruvian piece of the 4-sol weight of 1839, which shows a Bolivian army in rout at the Battle of Ancach (fig. 5). But all the same, there is an angel surmounting the battle scene, literally proclaiming victory—just in case this piece's audience could not have made the connection from the actual design. The figure of an angel with a trumpet is a fairly recurrent one on proclamation coinage. It finds its apotheosis on a Bolivian 8-sol medal of 1852, expressing the nation's gratitude to Providence for having spared the life of President Manuel Ysidoro Belzú during an assassination attempt (fig. 6). The angel's trumpet has a banner inscribed VIVA BOLIVIA, while she also carries a wreath, within which is inscribed VIVA EL JENERAL BELZU.

The connection between ruler and nation becomes absolute with this design, and the intent of those who issued the piece could hardly have been more obvious.

6. Bolivia, 8 soles, 1852

The proclamation piece found its most enthusiastic reception in Bolivia; here, over the years between 1825 and 1879, well over 300 distinct varieties of monetary medals, struck in gold, silver, and copper, streamed from the national mints at Potosí and La Paz. Both in terms of longevity and in terms of variety, the Bolivian experience stands out, becoming in fact the most significant aspect of that country's numismatic history during the early and middle years of the nineteenth century. Why should Bolivia's rulers have emitted all those pieces? Why should their production have continued there, decades after it had been abandoned elsewhere?

The answer lies in the nature of this Andean state. Nowhere were communications more difficult, illiteracy greater, a peasant majority more disaffected, a Creole minority more isolated, and the development of caudillismo (the strong-arm rule of the military boss) more encouraged, than in the new state which bore Bolívar's name. Anyone wishing to rule Bolivia would have a distinctly difficult time of it. He could not depend on roads, newspapers, and the other, limited recourses of communication available to rulers elsewhere in the nineteenth century. Bolivia *had* no roads, and illiteracy stood at well over ninety percent. Moreover, our aspiring president would have to make his way toward legitimacy over an uncommonly uneven terrain. Most of his fellow-citizens were hardly aware that the kings had departed. They would probably not oppose our aspirant's bid for power. But they were scarcely likely to defend it, either. The new ruler would be hard-put to extend his authority any further than the most isolated garrison whose loyalty he had purchased; and he could never be certain that the garrison in question would not find a higher bidder.

Thus the problem: in order to ensure his own survival, the ruler would have to find some method of getting out the word that he was the president, was doing good things for the nation, and, most importantly, that he had the right to remain in power. In the absence of roads and newspapers, he would turn to a traditional weapon in his limited arsenal. He would turn to the designs he placed on his coinage. He would use them in an attempt to create the legitimacy which birth and circumstances had denied him.

So the proclamation piece became a prominent fixture of the politico-numismatic landscape of Bolivia. Its extreme popularity and longevity there reflected contemporary realities. Bolivia was among the most backward nations of South America, a situation which positively encouraged the retention of caudillismo. The latter in turn encouraged the retention of the monetary medal as a way of communication on the national level. When we also reflect that Bolivia was one of the largest producers of silver in the nineteenth century and therefore, unlike her rival in underdevelopment, Paraguay, obviously had the metal for coinage, regardless of the choice of design, we begin to see why the concept of proclamation coinage flourished in Bolivia long after it had been abandoned by other nations in the region.

Elsewhere, the quest for some type of governmental legitimacy as a replacement for the Spanish kings was achieving some successes after mid-century. The extraordinary fluidity of the political situation was

beginning to gel; the new rulers were more likely to be civilians than military men, and it was now becoming the norm to see them transfer their powers to legally elected successors, without the intervention of the army. This by no means indicated that everyone was allowed to vote, much less that the blessings of democracy had been extended to all. But it did mean that a set of rules had been discovered whereby the game of nationhood could be played, and that significant numbers of people were now participating in that game. As the political situation settled down (and as communications were extended, literacy increased, economies modernized), the concept of a coinage for propaganda lost much of its allure. Throughout Latin America the production of the monetary medal essentially ceased after 1850.

With the exception of Bolivia. There, this curious mode of monetary expression actually intensified after mid-century, reaching its peak of popularity during the disastrous, seven-year regime of Mariano Melgarejo. During this dictator's tenure, proclamation coinage actually became the numismatic norm, so much so that we find contemporary counterfeits of many of the pieces of the period. (If anyone ever doubted that the Bolivian pieces were intended as coins as well as medals, this particular circumstance should quiet such uncertainties.) The total number of die varieties for 1865-dated pieces alone ascends to over 100.

But even in Bolivia the days of the proclamation piece were numbered. Melgarejo struck most of his monetary medals to a greatly reduced silver standard, a crude but effective way of expanding his money supply. It is arguable whether this debased issue helped discredit the Bolivian proclamation piece in general; but it may be noted that, when the last orthodox proclamation pieces were struck, by Hilarión Daza in 1879, they adhered strictly to the traditional silver fineness of .900, in force since 1863.

Daza's inept handling of a dispute with Chile led to a disastrous clash with her, known as the War of the Pacific. Bolivia lost its direct access to the sea, and, more to the point, the type of capricious government which had helped to bring about the war and then lose it was discredited. Disillusioned with the endless stream of inept generals who represented the old caudillismo, Bolivians would turn to rule by institutions, by elected civilians. As they did so, and as their country received a modest influx of foreign capital, ushering in the beginnings of modernization, the concept of proclamation coinage would become increasingly irrelevant. We know a few medals from the 1880s and 1890s which were struck at coin weight and fineness, and which might, conceivably, have circulated. But they celebrated the homely virtues of fairs, expositions, and railroads, rather than singing the praises of military dictators (fig. 7). As was the case in the rest of South America, Bolivia's leaders would, for a time at least, seek their legitimacy through other means.

7. Bolivia, exposition peso, 1883

A Preliminary Study of the Possible Production Outside the Potosí Mint of Bolivian Mules, Pieforts, and Uniface Examples of the "Monedas Especiales" Series

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It seems wise to begin with clarification of a term that will be referred to quite frequently throughout this discourse. The series of Bolivian "special coinage" issued between 1825 and 1869 has been labeled variously as medallic coinage, monetary medals, proclamation coinage, commemorative coinage, and propaganda coinage. Such terms serve to differentiate this series from the normal, Bolivar-portrait, national coinage that was produced throughout the same time period. No one had found any documentation to substantiate either the legal production of, or a name for, the series until Horace Flatt began his ongoing study of the Bolivian "moneda feble" and its effects on the Peruvian economy. He has found reference to the 1 sol depicted here (fig. 1), in a letter from Melchor Urquidi, the prefect of Potosí, to the finance minister. In this letter, it is noted that in order to solemnize the entry of the Constitutional President into Potosí, he has been ordered to fabricate "a 'moneda Especial,' as had been observed other times" to be made from 311 marks, from which ca. 2,800 pesos of the coins were to be made.1 I shall, therefore, refer in this paper to either special coinage or special money.

1. Potosí. 1 sol, 1853

During the past several years I have been generously granted the opportunity to study many collections of Bolivian special coinage, both public and private, on both continents of the Americas. I could not help but notice the various mules, pieforts, and uniface strikings that I also encountered. Their beauty and apparent integrity impressed me; but they also aroused some misgivings on my part:

1. Whereas we commonly hear the figure of 95% holed and 5% unholed for the special coinage series, I found the proportion of holed to unholed within the mules/pieforts to be more than exactly reversed. One might merely attribute this to the fact that if they were produced as special gifts, they would have in turn received greater custodial care. However, if one studies the entire realm of Potosí historical production (i.e. medals, buttons, and decorations), one begins to realize that the hand of history has

little conservational interest in most of Potosí's output. Why then only in this one segment do we find such preservation? What is more, why is there such a great percentage found in almost mint state?

2. The production of these mule/piefort/uniface examples has variously been attributed to Belzú, Melgarejo, Patiño, and to an even-later time frame of the late 1940s:

A. Belzú: Of the ca. 190 known dies between 1825 and the middle of Córdoba's reign, only ca. 25% were utilized in the production of mules/pieforts. If President Belzú had indeed ordered these pieces as presentations, we would expect a much greater percentage of dies to have been used, especially as there seems not to have been any hesitation in using dies that gave a piece two very different dates (figs. 2-3).

2. Potosí(?). 1 sol, 1843 and 1853

3. Potosí(?). 1 sol, 1841 and 1856

B. Melgarejo: Unless we are willing to believe the "Butcher of Yungas" (he is also credited with having personally killed Belzú) suffered from a guilt complex, it is hard to explain the large number of Belzú pieces extant in relation to those of Melgarejo. Again, of ca. 150 dies in use between 1860 and 1869, only ca. 13% were utilized for this era—and in much lesser quantities than one might expect.

C. Patiño: This gentleman certainly would not have had any deep-seated personality conflicts with any of the former presidents and I should therefore have expected an even greater variety of die marriages than the average 20% found in the entire series. Certainly the quantity of pewter uniface examples extant could easily persuade one to credit them to his pocketbook. Yet when we look only at the uniface special coinage examples, we should be troubled by the disturbing fact that well over 90% are from the same dies that produced the mules/pieforts.

D. Late 1940s: A combination of all of the above factors would seem to eliminate this possibility, at least for production within the Potosí mint.

E. All of the above: That various groupings were produced at different times both within and outside of mint confines. The open-back-door realities that governed many South American countries during their various periods of economic hardship could readily have allowed dies to have left the mint or to have been discarded as one ruler toppled another.

However a number of dies may have come into private ownership, it is my contention that this is exactly what happened.

Table 1 DIES PER YEAR OF THE MULE/PIEFORT/UNIFACE COINAGE

Year	*No. of Known dies*	*Observed Results*
A	3	One die known only from mule/piefort/uniface examples
B	2	75% of specimens are of mule/piefort/uniface, as well as off-metal strikes.
C	6	Three dies known only from mule/piefort/uniface examples.
D	2	Known only as mule/piefort/uniface examples.
E	5	One die known only from uniface examples.
F	8	Two dies known only from piefort/uniface examples.
G	2	Eight of nine specimens are of mule/piefort examples.
H	2	Five of nine specimens from uniface and off-metal strikes.
I	5	Two dies known only from mule/uniface examples.
J	4	Two dies known only from piefort/uniface examples.

I have been researching the die varieties and marriages of the Bolivian special coinage series for a number of years to establish, among other things, that the estimated production would have outstripped any need for medals and could have only been required for that of circulating coinage. To date, I have identified, out of the more than 60 design types for the period 1825 through 1879 (excluding the 1/4, 1/2, and 1 melgarejos of 1865), well in excess of 300 individual dies. Beyond the percentages previously referred to for mule/ piefort/uniface examples, my studies have also produced the breakdown shown in Table 1. If we exclude thirteen dies from our totals as being highly suspicious in nature and another four as being very questionable, we are left with only 15% of the known dies accounting for the mule/piefort/uniface pieces. Once again, it seems highly improbable that anyone randomly producing various combinations of pieces would have limited himself to such a small percentage of the known dies unless the striking was done elsewhere than the Potosí mint.

The three factors of condition, limited use of the quantity of dies that should have been available, and very heavy use of certain dies, nurtured my doubts as to the Potosí mint production of these issues, especially as more and more pieces came to my attention and continued to fall into the same die groupings. Further, I had long known that the silver content of the mules/pieforts (per specific gravity testing) had proven to be much higher than that of the normal circulation special coinage. While both the national coinage (with the exception of the 8 soles) and the special coinage had shown a silver content much lower than reference sources indicated they should contain, I had not known exactly what to conclude from my information. It was not until additional research work (once again, due to the diligent pursuits of Horace Flatt)2 disclosed the reduction to .667 silver fineness per the October 1829, midnight decree, that the pieces of the puzzle really started to fall into place.

If, indeed, a number of dies had been removed from the mint over a period of time and if until very recently most people continued to believe that the Bolivian republican coinage had remained on the colonial standard

of .90267 fine silver, then naturally, when "collector" pieces were fabricated, they would have been made at the higher silver content. Now the lower silver content of the special coinage really made sense in two ways. Not only was its production tied to the 1829 decree for circulating coinage (even if not of the national type), but if both the moneda feble (the national coinage) and the special coinage came from the same crucible, so also should have the mules/pieforts—if produced within the walls of the Potosí mint. However, if produced outside the mint at a much later time by those who had not realized that the silver content had been substantially reduced, an entirely different mix of silver was to be expected.

This strong circumstantial evidence has been augmented and confirmed by metalurgical analysis. It was in April 1988 that I first read of the nuclear research studies of Adon and Jeanne Gordus at the University of Michigan and their use of the impurities in the coinage metal to "fingerprint" the production of various mints, among them Potosí. The chance to find one of the last pieces of the puzzle led to my immediate request for assistance from the Drs. Gordus. With their cooperation over the course of the next several months, a number of both "howitzer" and "streak" tests were performed on several hundred different examples of national coinage, special coinage, colonial coinage and buttons, special mules, and pieforts. The results were reported to me by letter:3 When the data for the Group I [mule/piefort coinage] are compared with the Group II [special coinage] coins it is calculated that there *is* a statistically significant difference (at the 95% confidence level, to use statisticeze) for both the %Ag average values and for the mg Au/(100 mg Ag) average values. In fact, the differences are more significant than the one chance in 20 (95% confidence). There are *less than 3 chances in 100* that the average gold impurity values are the same. Even more significant is the difference in the average %Ag data. There is *less than one chance in a million* that these average values are the same. Thus your hypothesis is confirmed on the basis of the averages and standard deviations associated with these analyses. This is a perfectly valid way of examining data when multiple examples have been analyzed, even though data for some of the individual samples may overlap between the two groups. One last thing can also be done. Using the correspondence curve for the Sasanian coins, we can estimate (for the streak average values) what the corresponding Howitzer %Ag would have been. Using Graph 2a, we get: Group I: Streak average %Ag = 91.21; therefore, expected Howitzer average %Ag = 85%. Group II: Streak average %Ag = 81.998; therefore expected Howitzer average %Ag = 72%. Even for the Sasanian coins, these correspondences probably have a plus or minus of a few percent, so that the Group I could be as high as the upper 80s to low 90s whereas the Group II could easily be as low as 67%, both of which would be in line with the proclaimed finenesses.

Additionally, reports from quite reliable sources indicate that an unknown quantity of dies has disappeared from the Potosí mint during the past 35 years. I have so far been unable either to confirm or disprove such information with Bolivian authorities. However, this possibility might explain why I have been unable to gain permission to make a study of the dies now at the mint. Those who might have had both the good fortune and pluck to have made the trek to Potosí will readily understand the difficulty of making an unofficial study under the very poor lighting and miserable display conditions that presently exist within the main numismatic gallery of the museum.

Although my research is still incomplete, I think the following conclusions largely rule out the notion that the many mule/piefort/uniface examples were either struck contemporaneously with the special coinage or fabricated within the mint:

- 1. There is no question that a small percentage of known dies produced the vast majority of mule/piefort/uniface examples.

- 2. The silver content would seem to preclude the pieces having been made during the actual 1825-69 period, unless very special mixes of silver were produced expressly for them.
- 3. The mules/pieforts obviously were not made solely during Belzú's reign and probably not during Melgarejo's either. Even if we do accept their having been made in the mint at various times, it seems unlikely that different mixes of silver, at least 15 years apart, were made to the same fineness—a fineness quite different from that of the Potosí mint of the time.
- 4. The fact that some 90% of observed uniface examples are from the same dies that produced the mules/pieforts would seem to require:
- a. An incredible chance in die selection at Potosí;
- b. Specially marked dies only for collectors' items;
- c. A small selection of dies in private hands.

As the American Numismatic Association Certification Service has stated when issuing its counterfeit alert notices—many times we find that the counterfeiters are also able to read; thus key diagnostics are changed or corrected over a period of time to avoid detection. I also faced the ANACS dilemma—to contain the above information or to release it knowing full well that it would take nothing more than holed, special coinage being melted down and recycled to make "fingerprinting" the silver impossible. Knowledge won out over the temporary advantage that those in possession of the dies might use to fabricate additional specimens using lower-grade silver. Upon the release of my book (within the next year, I hope), the specific dies involved will be identified. From then on, any and all mule/piefort/uniface examples from those dies will have to be suspect. Such is knowledge that it lights the path for both good and bad.