AZ Robotics
SURFACE METROLOGY · NUMISMATICS

REPORT AZR-COIN23
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REV C

COIN EXAMINATION REPORT

Córdoba, 1843, concessionaire J.P.P.

catalogue type 1 Real (National Coat of Arms) (KM#17, CJ#42.1, CJ#42.2, CJ#42.3, CJ#42.4, CJ#42.5, CJ#42.6, CJ#42.7; Numista #345158, 1843) · seller's attribution Janson CJ 42.2.1, obverse die A6 with reverse die R2



Obverse — National arms in an oval: clasped hands holding a pike under a Phrygian cap, two pellets, within sprays. Photograph, even light. Badge: the grade estimate, provisional and uncalibrated (method in the last section).



Reverse — Sun with a face, rays alternately straight and wavy. Photograph, even light. Badge: the grade estimate, provisional and uncalibrated (method in the last section).

CONDITION	DIAMETER	WEIGHT	FIELD DEPRESSIONS	RELIEF
≈ XF40	17.7 mm	3.37 g	0 · 1	191 µm
an AI reading of the photographs and the measured relief, not a certified grade	measured on the outline · ±1 % · this type 19 mm, its sister types 20 mm (each of the eight)	customer's balance · this type 2.80 g (+20.4 %); its sister types 3.2 g (five) or 3.5 g (three)	obverse · reverse, in the open field (§04)	the obverse's central design above its field

IDENTITY Read on the coin: PROVINCIA DE CORDOVA, dated 1843, and CONFEDERDA — a letter missing in the die — with the concessionaire's initials J.P.P. (§02); catalogue type 1 Real (National Coat of Arms) (KM#17, CJ#42.1, CJ#42.2, CJ#42.3, CJ#42.4, CJ#42.5, CJ#42.6, CJ#42.7); seller's attribution Janson CJ 42.2.1, obverse die A6 with reverse die R2.

WEIGHT 3.37 g against the 2.80 g the catalogue lists for this type (+20.4 %); the catalogue's sister types of these years list 3.2 g (five) or 3.5 g (three) (§05).

SURFACES Depressions detected in the open fields: 0 on the obverse and 1 on the reverse, at the

01 Condition map

Both faces photographed in even light. **Red circles**: each pit the detector found in the open field (away from the design; method in §04). **Numbered circles**: the densest pitting, the deepest pits on each face. Close-ups follow.



Obverse (left) and reverse (right), upright, at matching scale.

NO.	FACE	LOCATION	FINDING	MEASURED
1	Reverse	4 o’clock	Pit in the open field	0.11 mm across and 7 µm deep

CLOSE-UPS IN CAPTURED LIGHT

Each item four ways: a photograph in even light, photographs lit low from opposite sides (relief casts shadows, a pit shows a dark and a bright wall), and the measured relief. The photographs are captured frames from this examination, not retouched; each tile carries a scale bar.



ITEM 1 Pit, reverse field at 4 o'clock (circled).

02 Identification

Legends, marks and dimensions read from the measured surface, compared against the catalogue type.

ELEMENT	READ ON THE COIN	CATALOGUE (NUMISTA #345158)
Obverse legend	PROVINCIA DE CORDOVA (around the arms, clockwise from the lower left; the final A is present, a crossbar-less triangle, where the catalogue's photograph of this type ends CORDOV; no stop or ornament between it and the date 1843 at the bottom)	✓ PROVINCIA DE CORDOVA
Reverse legend	CONFEDER DA J.P.P. (the A between the R and the D is absent: a blank of smooth struck field one letter wide, with no trace of a letter, where the other letters stand evenly spaced; a small smooth pit at the blank's inner edge. A second coin from the same dies shows the same blank, so the A was not cut in the die. J.P.P. with stops at the bottom, the first initial a long stroke with its foot curled to the right)	≠ CONFEDERADA J.P.P.

The legends, the date and the arms read on the coin — a plain oval with two pellets and the cap flying to the right — agree with the Córdoba type **KM#17, CJ#42.1, CJ#42.2, CJ#42.3, CJ#42.4, CJ#42.5, CJ#42.6, CJ#42.7** (Numista #345158, 1843). The seller attributes the die pair as Janson CJ 42.2.1, obverse die A6 with reverse die R2: the arms die reading CORDOVA with the sun die whose legend lacks its second A (CONFEDERDA). A photograph of a second coin (a photograph from Río de la Plata Compañía Numismática, relayed by the owner) shows the same arms and sun dies as this coin, by eye (the owner and the examiner): the wreath, the oval with the cap, pellets and date, the sun's rays, and the same blank between the R and the D of the sun legend. The catalogue's issue list for this type pairs the CONFEDERDA spelling only with its CORDO and CORDOV dies; its own photograph of the CORDOVA issue is another die pair.

PHYSICAL

MEASURE	THIS COIN	TYPE STANDARD	Δ
Diameter	17.74 mm (obverse outline) · 17.88 mm (reverse); outline axes 17.5 × 18.1 mm (oval by 3.4 %)	19.0 mm, nominal	−6.6 %
Weight	3.37 g (customer’s balance)	2.80 g	+20.4 %
Composition	—	Silver	—

03 Condition

ELEMENT	DETAIL VISIBLE	SOFTER AREAS
Arms and sprays	the fingers of the clasped hands; the pike and the cap's tip; the two pellets; the leaves of the sprays	the sleeves of the forearms

ELEMENT	DETAIL VISIBLE	SOFTER AREAS
Sun and legend	the face's eyes, nose and mouth; the straight and wavy rays; the letters of the legend	the broad rays and the R at the upper right, flat in the die itself: a second coin from these dies shows them the same

ASSESSMENT

Detail comparable to Extremely Fine (XF40), provisional

Detail comparable to Extremely Fine (XF40), provisional: The design keeps its fine detail: the fingers of the clasped hands, the cap and pellets of the arms, the leaves of the sprays, and the eyes, nose and mouth of the sun. The legends stand with sharp edges. The broad rays and the R at the upper right of the sun side are flat in the die itself — a second coin from these dies shows them the same — and are not counted as wear. Relief of the central designs above the field around them: 191 µm on the obverse and 345 µm on the reverse. Recorded for comparison with later scans; not calibrated against graded coins.

Surfaces. Depressions in the open fields: 0 on the obverse and 1 on the reverse (§04). Their cause is not decided by the detector.

Weight. 3.37 g against the 2.80 g nominal (+20.4 %).

Scope. The table is an AI reading of the photographs and close-ups (§01, §06) for the elements listed; elements not listed were not individually inspected.

Grade estimate. Grade estimate XF40 (band XF40 to XF45): tier XF (Extremely Fine) from the reading of the photographs, checked against the measured crest flat share 0.065 / 0.128 (outside the heavy-wear band); mark load none (obverse 0.0 weighted marks per cm², reverse 0.0 weighted marks per cm²). Confidence low; uncalibrated: no certified coin of this type has been measured on this instrument. What a grading service would add: no designation found in the record. Not measured: cleaning (whether a service gives a number: a cleaned coin gets a Details designation; the hairline counts are inputs, but raised or incuse, their direction and a cleaned reference are needed to call it); strike (a weak strike is not wear: a soft centre read as wear lowers the tier; in Mint State a full strike moves the grade up one to two steps); eye appeal and toning (one to two points within a tier, and the services' plus and star designations); capture repeatability (how far the wear and mark figures move between two seatings of the coin). Luster: the LM-1 cartwheel measure is printed in the surfaces section (provisional, uncalibrated, no boundaries) and is not used in the grade; luster decides the AU / MS boundary and each Mint State step (MS-60 to MS-70 is decided by luster, marks and eye appeal), and traces of luster separate XF-45 from AU-50.

04 Surfaces: depressions

The depressions the instrument detected in the open fields: where they are, how large, how deep, and — where the measurements are comparable — how they compare with other coins.

PITS IN THE OPEN FIELD

	OBVERSE	REVERSE
Pits found	0	1
Open field examined	23 mm²	37 mm²

	OBVERSE	REVERSE
Density	0.0 per cm²	2.7 per cm²
Size across (median · p90 · max)	— · — · — mm	0.11 · 0.11 · 0.11 mm
Depth (median · p90 · max)	— · — · — µm	7 · 7 · 7 µm
Nearest-pit distance (median)	— mm	— mm
Nearest-neighbour ratio (descriptive)	—	—
Pits on the raised design (less reliable)	16	23

Face: the coin inside its own outline (the framecheck's min-over-lights outline). Open field: field pixels at least 0.2 mm from raised design, outside the holes the design encloses (letter counters, windows) and away from the rim band. A counted depression is at least 6 µm on the obverse and 6 µm on the reverse below its filled surroundings (each face's own threshold: the larger of a fixed floor and four robust sigmas of its field) and at least 0.006 mm² in area. These are detected depressions; their cause (corrosion, porosity, a strike or planchet flaw) is not decided by the detector.

OTHER COINS MEASURED WITH THE SAME CODE (PITS PER CM² OF OPEN FIELD, WHERE COMPARABLE)

COIN	OBVERSE	REVERSE	MEDIAN DEPTH
This coin	0.0	2.7	—7 µm
8 reales, chopmarked, circulated	not comparable: 69 px/mm sampling	not comparable: 69 px/mm sampling	—
Reference specimen: Silver Eagle 2001, uncirculated (one coin)	—	not comparable: 67 px/mm sampling	—

The comparison coins are examples, not a population baseline.

Hairlines. Thin straight scratches found in the curvature of the measured surface: 0 in the open field of the obverse (0.0 mm together) and 0 of the reverse (0.0 mm); the longest are numbered on the condition map (§01). Lines on the design are counted separately: an engraved line and a scratch across it are not told apart by shape alone.

Resolution. This run used the standard solve at 26 pixels per mm; depressions narrower than about a tenth of a millimetre are not resolved, so the counts are lower bounds.

Appearance. Grey silver with a light warm tone, darker in the recesses (photographs with grey-card colour balance; cover). Hairlines and reflectivity are not systematically assessed.

SURFACE: LM-1 CARTWHEEL MEASURE (PROVISIONAL)

LM-1 v2 · provisional · uncalibrated · no boundaries · not used in the grade. Values are observed within one capture of each face.

FACE · RING	STRENGTH CW [BLOCK-ROTATION CONTROL]	ORDER [BLOCK-ROTATION CONTROL; ONE RIG DIRECTION]	FIELD	LIGHTS	SOURCE
Obverse · high ring (primary)	NO DATA	NO DATA	—	15, one in 4 LEDs	lm1-v2-coin23-b-175349-run2 · raw frames
NO DATA: too little flat open field (geometric field 1.50 mm² before the fit).					
Obverse · low ring	NO DATA	NO DATA	—	15, one in 4 LEDs	lm1-v2-coin23-b-175349-run2 · raw frames
NO DATA: too little flat open field (geometric field 1.50 mm² before the fit).					
Reverse · high ring (primary)	NO DATA	NO DATA	—	15, one in 4 LEDs	lm1-v2-coin23-a-175143-run2 · raw frames
NO DATA: too little flat open field (geometric field 0.00 mm² before the fit).					
Reverse · low ring	NO DATA	NO DATA	—	15, one in 4 LEDs	lm1-v2-coin23-a-175143-run2 · raw frames
NO DATA: too little flat open field (geometric field 0.00 mm² before the fit).					

LM-1 v2 is a provisional, uncalibrated measure. On the flat open field of a face (slope under 5°, at least 0.5 mm from the design and 1.6 mm inside the rim) it takes the part of each pixel's brightness that changes twice per turn of the light around the coin and is left over by a smooth reflection model. Strength (cw) is the share of that term lying across the radius from the coin's outline centre, the direction a cartwheel pattern would take, as a fraction of the pixel's own brightness: positive across the radius, negative along it. Order (0 to 1) is how consistently its axis keeps one angle to the radius. Beside each value is its block-rotation control: the 95th percentile of the same statistic with the field's 2 mm blocks turned at random; beside the order, also the order one fixed rig direction would give on the same field. A value near its control is uninformative, not an absence. The control is not the instrument's floor: on the stationary holder beside a coin the same statistic has read up to about four times its own control. Limits: no boundaries or classes are set and no value here is a verdict on the coin's surface; boundaries will be fitted later from coins with known grades. A value from one seating does not separate the coin from the instrument. A value read through a holder's plastic includes the plastic's reflections and is not comparable with a bare coin's. LM-1 is not used in the grade estimate. NO DATA is printed with its reason.

05 Consistency checks

Each measured fact set beside the catalogue's nominal or a working tolerance chosen for this examination. These checks can raise questions; they cannot establish authenticity, and no score is formed.

INDICATORS

Outside its working tolerance: weight against the type's nominal; diameter. Unresolved: see the alternatives and the next measurement below.

CHECK	MEASURED	REFERENCE	READING
Weight against the type's nominal	3.37 g (+20.4 %)	2.80	outside the working tolerance
Diameter	17.74 mm	18.4 - 19.6 mm	outside the working tolerance
Die axis against the type's alignment	354 deg	0 deg (medal alignment)	within the working tolerance
Specific gravity	—	about 10.3 for silver of this fineness	not tested

No reference coin. No coin of this type has been measured on this instrument. The catalogue lists 19 mm and 2.8 g for this type, and 20 mm (each of the eight) and 3.2 g (five) or 3.5 g (three) for its sister types of the same years; the tolerances here are set on this type's figures, and a crude provincial flan varies more than they allow.

Next measurement. A specific-gravity measurement is the recommended next test; it constrains the alloy but cannot by itself establish identity or authenticity.

06 Detail evidence

Photographs from this examination: the coin lit low from the upper left (three captured frames averaged), shown upright, colour balanced against a grey card, each with a scale bar. Crops are at instrument resolution (26.5 pixels per mm).



FIG 1 The arms side: the clasped hands with their fingers, the pike and the Phrygian cap, the two pellets in the oval and the sprays around it.

REVERSE



FIG 2 The sun side: the face with its eyes, nose and mouth, the straight and wavy rays, and the legend around.

LEGENDS, AS READ

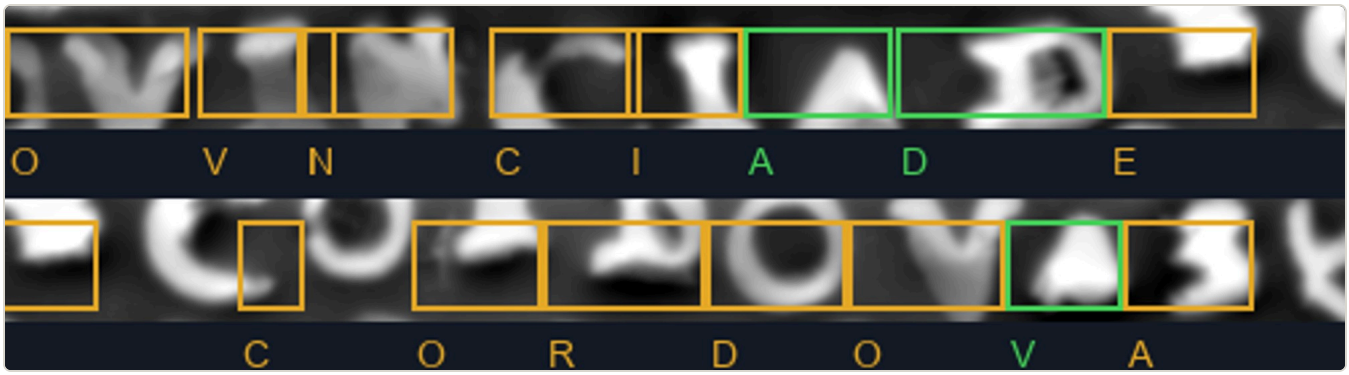


FIG 3 The obverse legend unrolled from the measured relief, each of the catalogue's letters boxed where it stands: green, read by OCR at that place (3 of 18); amber, placed between the letters read.

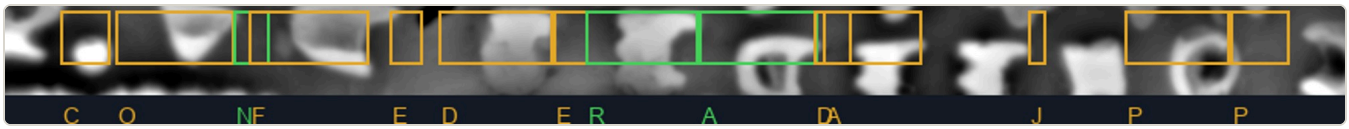


FIG 4 The reverse legend unrolled from the measured relief, each of the catalogue's letters boxed where it stands: green, read by OCR at that place (3 of 14); amber, placed between the letters read.

07 Design element maps

The design elements identified on the measured surface, shown in colour on the photograph. The outer rim lies outside the measured surface and is shown uncoloured.

Obverse (obverse) — identified design elements



DESIGN ELEMENTS

- Central design

Reverse (reverse) — identified design elements



DESIGN ELEMENTS

- Central design

08 Method and limitations

METHOD	Each face was photographed 30 times, each frame lit by one light from a known direction; the photographs here are those frames, colour balanced against a grey card. The same frames were reconstructed by photometric stereo into a measured surface at 26.5 pixels per mm (about 38 µm per pixel), on which depressions, relief and design elements are measured. Design elements were segmented automatically from the measured surface; readings and the condition assessment are AI-assisted and checked against the catalogue; the figures are generated from the examination record.
ORIENTATION	Each face was turned upright by eye from the measured relief (the arms with the cap at the top; the sun's face upright). The registration against the catalogue's photograph was tried and did not pass its margin gate, so it was not used. The die axis in the consistency checks rests on these uprights.
SCALE	Set by the instrument: 26.43 pixels per mm at the coin's face — the rig's fixed plane scale, checked against a coin of known diameter, carried to the height of this face (the coin lies loose on the drawer floor in a carrier window, its thickness taken from its weight over its outline). This coin’s outline measures 17.74 mm (obverse) and 17.88 mm (reverse) at that scale. Lateral lengths carry about ±1 % (see Uncertainty). Provisional: no caliper reading of this coin checks the scale.
REVISION	Revision C adds the seller's attribution of the die pair and a second coin from the same dies, which shows the same blank in the sun legend (so the letter was not cut in the die) and the same flat rays (so they are not wear); the open question of the issue is closed. Revision B corrected the reading of the sun legend's blank. Nothing measured has changed.
NOT DECIDED	Capture repeatability of the figures: not characterised — one capture per face in this run. It would be settled by a re-seated repeat capture of each face.
NOT SYSTEMATICALLY ASSESSED	Hairlines (noted only where a close-up shows them), reflectivity and lustre; the edge.
NOT A CERTIFICATION	This is an instrument-based examination, not a third-party grading service opinion (NGC, PCGS).
NOT DECIDED	Metal density: not measured — the coin's volume from the two faces rests on the relief amplitude, which is not yet validated on this instrument. It would be settled by weighing the coin suspended in water: the weight it loses is its volume, and its weight over that volume is its density.
GRADE ESTIMATE	The number XF40 is the examiner's reading of the photographs; the band beside it is the instrument's own range for the tier. The tier is the reading of the photographs; the measured crest flattening checks it (a disagreement widens the range one step toward the measure). The range is the Sheldon steps the grading services define for the tier, narrowed only by the measured mark load: linear marks weigh 1, hairlines a quarter, a

mark inside half the flan radius counts double; per cm² of face, heavy keeps the tier's lower half, moderate drops its top step. Designations are what the services would add, read from the record. The estimate is not fitted to certified coins; certified coins of each type across grades are the calibration it waits for.

UNCERTAINTY

Lateral lengths (diameters, offsets, areas) rest on the rig's scale, calibrated against a calipered coin: about ±1 %. Heights — relief, depression depths, steps — are relative measurements within one capture, referred to the surface around each feature; their repeatability between captures has been measured on one coin only, and absolute height accuracy is not certified. The long-range shape of a face (bowing, warp) is known less well than local relief; this solve corrects the LEDs' emission lobe with the fit measured for silver, which a flat target showed removes most of the instrument's bowl. A saddle fixed in the camera frame, measured on a flat target, is not corrected and is part of that long-range uncertainty. The solve grid is a sampling grid, not a demonstrated optical resolution.

DIGITAL SUPPLEMENT

In the delivery bundle AZR-COIN23-revC-bundle.zip, beside this PDF: the clean face photographs and animations of the captured frames (one light at a time, going round the coin).

AZR-COIN23-REVC-OBVERSE.JPG	The obverse, photographed in even light, without annotations.
AZR-COIN23-REVC-REVERSE.JPG	The reverse, photographed in even light, without annotations.
AZR-COIN23-REVC-OBVERSE_LIGHT_SWEEP.GIF	The whole obverse under each of the 15 low lights in turn.
AZR-COIN23-REVC-REVERSE_LIGHT_SWEEP.GIF	The whole reverse under each of the 15 low lights in turn.

REFERENCES

Numista #345158 (KM#17, CJ#42.1, CJ#42.2, CJ#42.3, CJ#42.4, CJ#42.5, CJ#42.6, CJ#42.7); the catalogue's sister types: Numista 111174, 417478, 417804, 418272, 418424, 418425, 418460 (1843) and 418443 (1844).

PREPARED BY

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Automated examination; no reviewer sign-off is recorded for this revision.

REPORT

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This report is complete only with all pages present.

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