The Colonial Legacy of European Mathematics in the Americas

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- LHUḴW'LHUḴW'ÁYTEN | UNCEDED COAST SALISH TERRITORIES (SFU)

- 20.03.2025
- MICHIGAN STATE UNIVERSITY
- THE LAPPAN-PHILLIPS-FITZGERALD MATHEMATICS EDUCATION COLLOQUIUM SERIES

(Accidental) motivations I

Biblioteca Palafoxiana:
The First Public Library in the Americas (1646)

Motivations II

A material-political inquiry into the histories of measurement

- *Proportion, analogy, mixture: Unearthing mathematical measurement practices* (de Freitas & Sinclair, 2022)
- As with the Aztec **Quipu**, measurement begins in this relational engagement with the world, where what 'matters' is the specific co-relation between two or more material processes that occur alongside each other.

Motivations III

EDITORIAL | 08 June 2022

Science must overcome its racist legacy: *Nature*'s guest editors speak

We are leading *Nature* on a journey to help decolonize research and forge a path towards restorative justice and reconciliation.

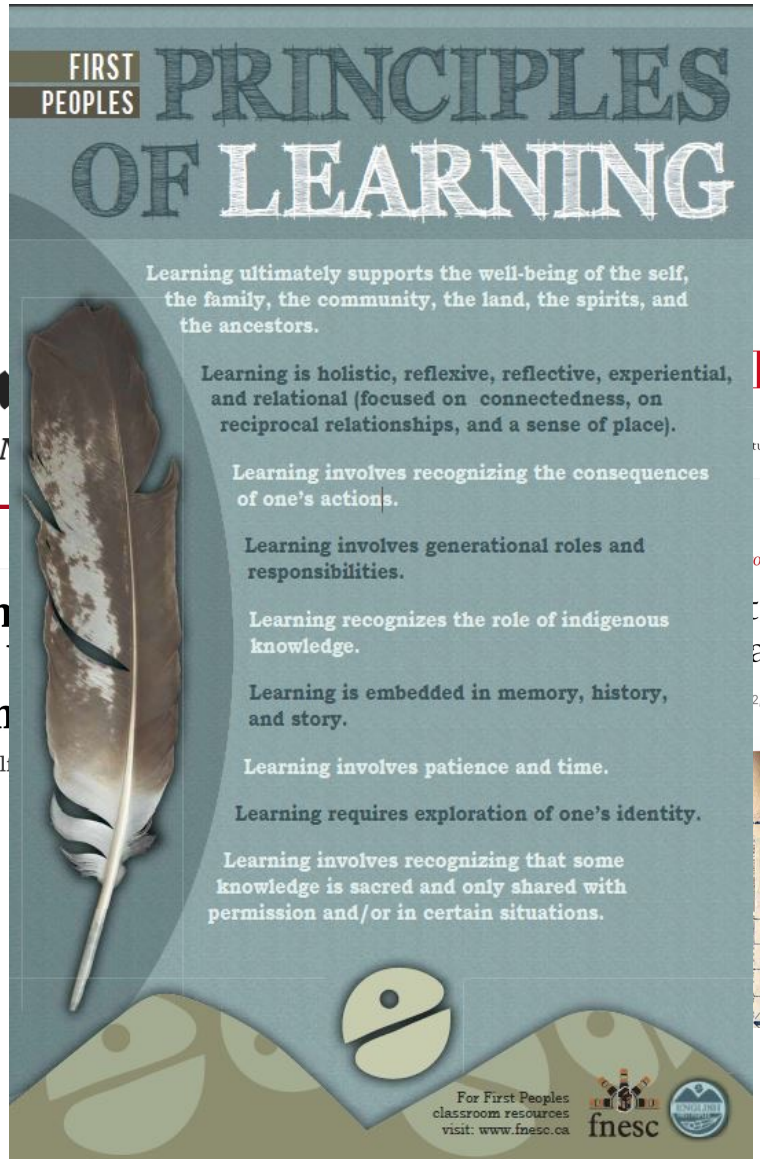
By Melissa Nobles, Chad Womack, Ambroise Wonkam & Elizabeth Wathuti

The Washin
America's

HOME \ CULTURE

Professor: Geon
white privilege
developed by an

'On many levels, mathematics itsel
Gutierrez



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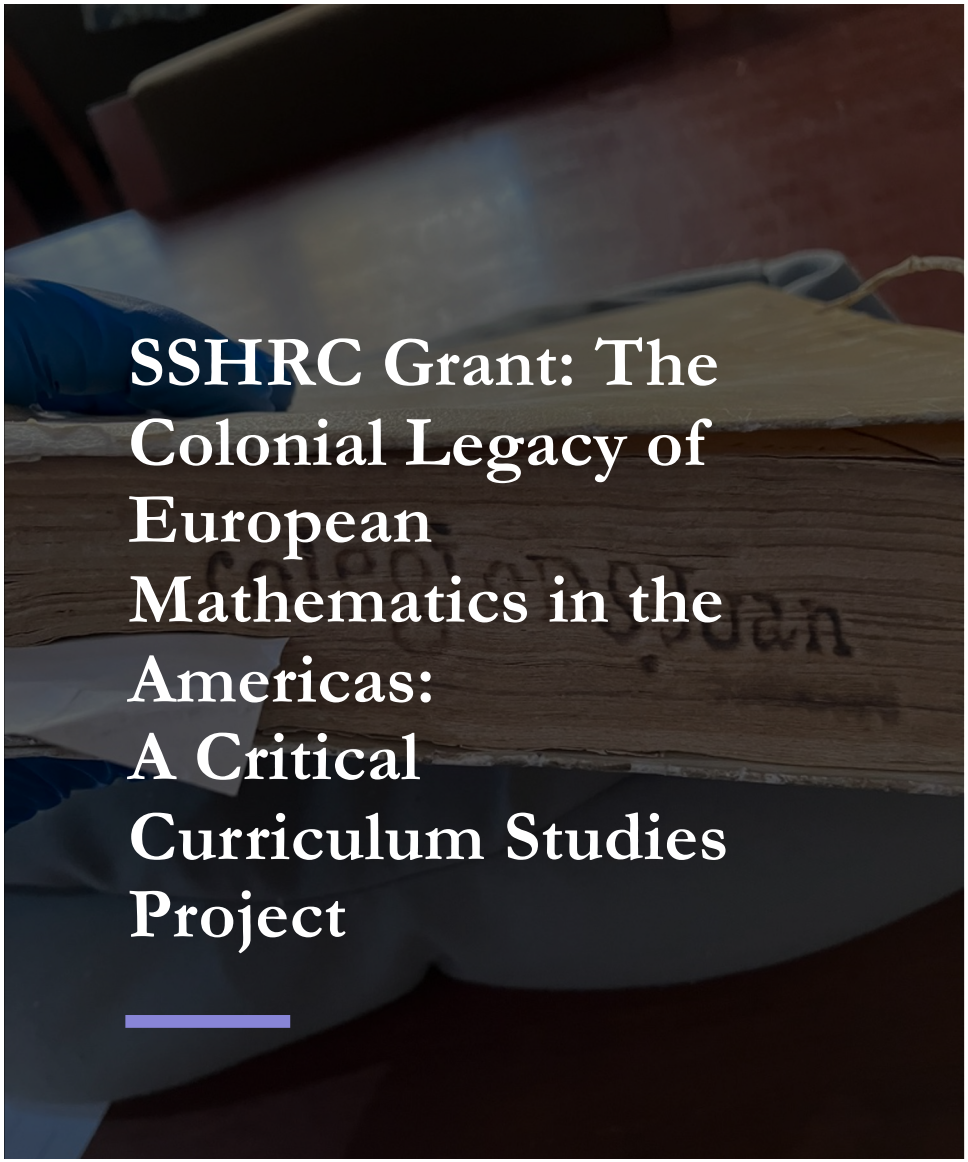
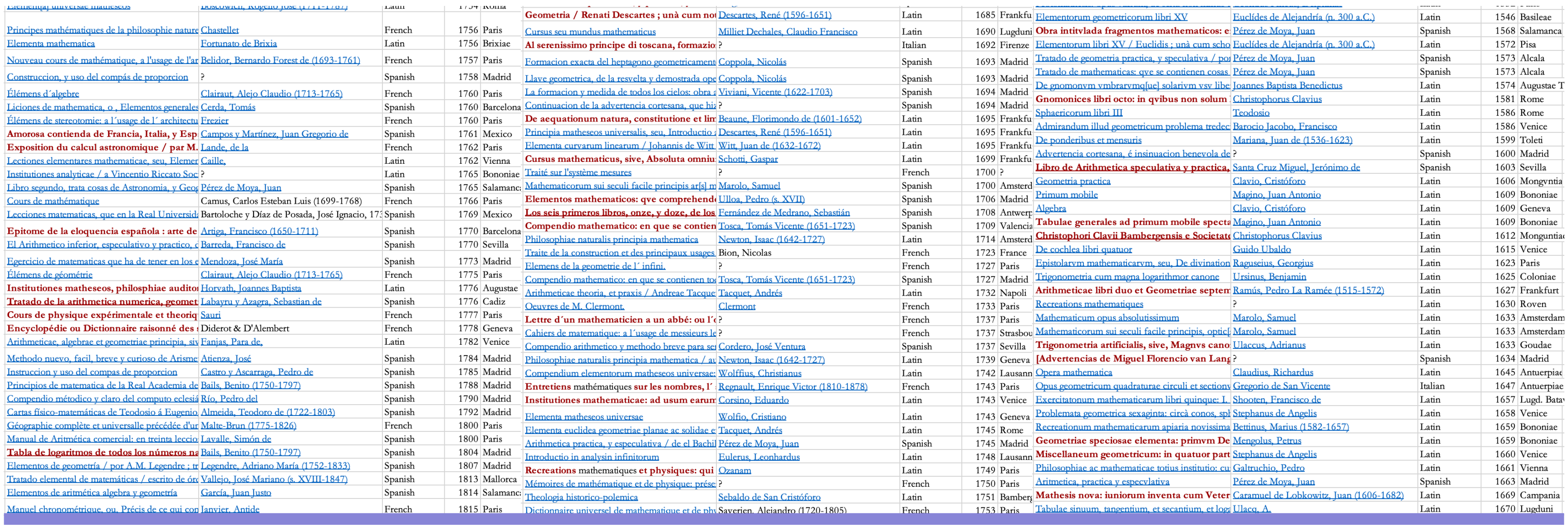


SSHRC Grant: The Colonial Legacy of European Mathematics in the Americas: A Critical Curriculum Studies Project

- Which mathematical knowledge was included in the first books of 1646?
- How were the speculative and practical aspects of mathematics expressed?
- To what extent did the needs of science (astronomy, navigation, etc.) merge with the colonial conquest (governance, resource extraction) in mathematical applications?
- What kind of pedagogical form of address was used to frame the knowledge?
- How do the commentaries and books published by *Criolli* mathematicians (Diego Rodriques, Carlos de Siguenza y Góngora, José Ignacio Bartolache, etc.) differ from their European contemporaries?



Element[a] universae matheseos	Boscowich, Rogelio José (1711-1787)	Latin	1754	Roma
Principes mathématiques de la philosophie nature	Chastellet	French	1756	Paris
Elementa mathematica	Fortunato de Brixia	Latin	1756	Brixiae
Nouveau cours de mathématique, a l'usage de l'ar	Belidor, Bernardo Forest de (1693-1761)	French	1757	Paris
Construccion, y uso del compás de proporcion	?	Spanish	1758	Madrid
Élémens d´algebre	Clairaut, Alejo Claudio (1713-1765)	French	1760	Paris
Liciones de mathematica, o , Elementos generales	Cerda, Tomás	Spanish	1760	Barcelona
Élémens de stereotomie: a l´usage de l´ architectu	Frezier	French	1760	Paris
Amorosa contienda de Francia, Italia, y Esp	Campos y Martínez, Juan Gregorio de	Spanish	1761	Mexico
Exposition du calcul astronomique / par M.	Lande, de la	French	1762	Paris
Lectiones elementares mathematicae, seu, Elemer	Caille,	Latin	1762	Vienna
Institutiones analyticae / a Vincentio Riccato Soc	?	Latin	1765	Bononiae
Libro segundo, trata cosas de Astronomia, y Geog	Pérez de Moya, Juan	Spanish	1765	Salamanca
Cours de mathématique	Camus, Carlos Esteban Luis (1699-1768)	French	1766	Paris
Lecciones matematicas, que en la Real Universida	Bartoloche y Díaz de Posada, José Ignacio, 17	Spanish	1769	Mexico
Epitome de la eloquencia española : arte de	Artiga, Francisco (1650-1711)	Spanish	1770	Barcelona
El Arithmetico inferior, especulativo y practico, c	Barreda, Francisco de	Spanish	1770	Sevilla
Egercicio de matematicas que ha de tener en los e	Mendoza, José María	Spanish	1773	Madrid
Élémens de géométrie	Clairaut, Alejo Claudio (1713-1765)	French	1775	Paris
Institutiones matheseos, philosphiae auditor	Horvath, Joannes Baptista	Latin	1776	Augustae
Tratado de la arithmetica numerica, geomet	Labayru y Azagra, Sebastian de	Spanish	1776	Cadiz
Cours de physique expérimentale et theoriq	Sauri	French	1777	Paris
Encyclopédie ou Dictionnaire raisonné des s	Diderot & D'Alembert	French	1778	Geneva
Arithmeticae, algebrae et geometriae principia, siv	Fanjas, Para de,	Latin	1782	Venice
Methodo nuevo, facil, breve y curioso de Arisme	Atienza, José	Spanish	1784	Madrid
Instruccion y uso del compas de proporcion	Castro y Ascarraga, Pedro de	Spanish	1785	Madrid
Principios de matematica de la Real Academia de	Bails, Benito (1750-1797)	Spanish	1788	Madrid
Compendio métodico y claro del computo eclesiá	Río, Pedro del	Spanish	1790	Madrid
Cartas físico-matemáticas de Teodosio á Eugenio,	Almeida, Teodoro de (1722-1803)	Spanish	1792	Madrid
Géographie complète et universalle précédée d'ur	Malte-Brun (1775-1826)	French	1800	Paris
Manual de Aritmética comercial: en treinta leccio	Lavalle, Simón de	Spanish	1800	Paris
Tabla de logaritmos de todos los números na	Bails, Benito (1750-1797)	Spanish	1804	Madrid
Elementos de geometría / por A.M. Legendre ; tr	Legendre, Adriano María (1752-1833)	Spanish	1807	Madrid
Tratado elemental de matemáticas / escrito de óro	Vallejo, José Mariano (s. XVIII-1847)	Spanish	1813	Mallorca
Elementos de aritmética algebra y geometría	García, Juan Justo	Spanish	1814	Salamanca
Manuel chronométrique, ou, Précis de ce qui con	Janvier, Antide	French	1815	Paris

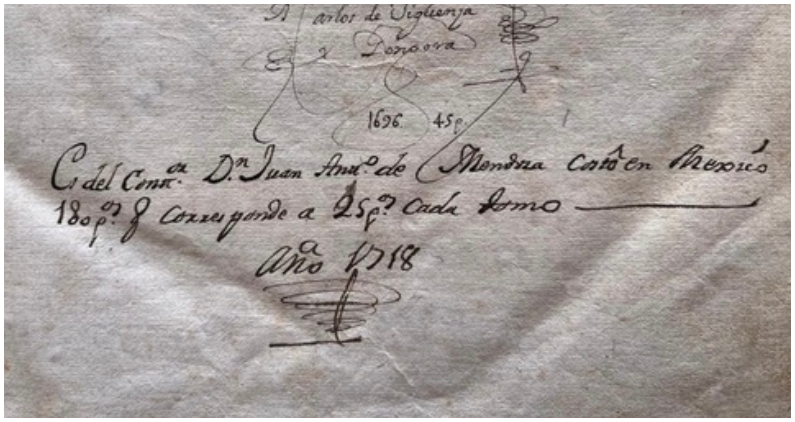
Geometria / Renati Descartes ; unà cum not	Descartes, René (1596-1651)	Latin	1685	Frankfu
Cursus seu mundus mathematicus	Milliet Dechales, Claudio Francisco	Latin	1690	Lugduni
Al serenissimo principe di toscana, formazio	?	Italian	1692	Firenze
Formacion exacta del heptagono geometricament	Coppola, Nicolás	Spanish	1693	Madrid
Llave geometrica, de la resvelta y demostrada ope	Coppola, Nicolás	Spanish	1693	Madrid
La formacion y medida de todos los cielos: obra a	Viviani, Vicente (1622-1703)	Spanish	1694	Madrid
Continuacion de la advertencia cortesana, que hiz	?	Spanish	1694	Madrid
De aequationum natura, constitutione et lim	Beaune, Florimondo de (1601-1652)	Latin	1695	Frankfu
Principia matheseos universalis, seu, Introductio a	Descartes, René (1596-1651)	Latin	1695	Frankfu
Elementa curvarum linearum / Johannis de Witt	Witt, Juan de (1632-1672)	Latin	1695	Frankfu
Cursus mathematicus, sive, Absoluta omniu	Schotti, Gaspar	Latin	1699	Frankfu
Traité sur l'système mesures	?	French	1700	?
Mathematicorum sui seculi facile principis ar[s] m	Marolo, Samuel	Spanish	1700	Amsterd
Elementos mathematicos: qve comprehende	Ulloa, Pedro (s. XVII)	Spanish	1706	Madrid
Los seis primeros libros, onze, y doze, de los	Fernández de Medrano, Sebastián	Spanish	1708	Antwerp
Compendio mathematico: en que se contien	Tosca, Tomás Vicente (1651-1723)	Spanish	1709	Valencia
Philosophiae naturalis principia mathematica	Newton, Isaac (1642-1727)	Latin	1714	Amsterd
Traite de la construction et des principaux usages	Bion, Nicolas	French	1723	France
Elemens de la geometrie de l´ infini.	?	French	1727	Paris
Compendio mathematico: en que se contienen to	Tosca, Tomás Vicente (1651-1723)	Spanish	1727	Madrid
Arithmeticae theoria, et praxis / Andreae Tacque	Tacquet, Andrés	Latin	1732	Napoli
Oeuvres de M. Clermont.	Clermont	French	1733	Paris
Lettre d´un mathematicien a un abbé: ou l´	?	French	1737	Paris
Cahiers de matematique: a l´usage de messieurs le	?	French	1737	Strasbou
Compendio arithmetico y methodo breve para se	Cordero, José Ventura	Spanish	1737	Sevilla
Philosophiae naturalis principia mathematica / au	Newton, Isaac (1642-1727)	Latin	1739	Geneva
Compendium elementorum matheseos universae:	Wolffius, Christianus	Latin	1742	Lausann
Entretiens mathématiques sur les nombres, l´	Regnault, Enrique Victor (1810-1878)	French	1743	Paris
Institutiones mathematicae: ad usum earum	Corsino, Eduardo	Latin	1743	Venice
Elementa matheseos universae	Wolfio, Cristiano	Latin	1743	Geneva
Elementa euclidea geometriae planae ac solidae e	Tacquet, Andrés	Latin	1745	Rome
Arithmetica practica, y especulativa / de el Bachil	Pérez de Moya, Juan	Spanish	1745	Madrid
Introductio in analysin infinitorum	Eulerus, Leonhardus	Latin	1748	Lausann
Recreations mathematiques et physiques: qui	Ozanam	Latin	1749	Paris
Mémoires de mathématique et de physique: prése	?	French	1750	Paris
Theologia historico-polemica	Sebaldo de San Cristóforo	Latin	1751	Bamberg
Dictionnaire universel de mathematique et de phy	Saverien, Alejandro (1720-1805)	French	1753	Paris

Elementorum geometricorum libri XV	Euclídes de Alejandría (n. 300 a.C.)	Latin	1546	Basileae
Obra intitvlada fragmentos mathematicos: e	Pérez de Moya, Juan	Spanish	1568	Salamanca
Elementorum libri XV / Euclidis ; unà cum scho	Euclídes de Alejandría (n. 300 a.C.)	Latin	1572	Pisa
Tratado de geometria practica, y speculativa / por	Pérez de Moya, Juan	Spanish	1573	Alcala
Tratado de mathematicas: qve se contienen cosas	Pérez de Moya, Juan	Spanish	1573	Alcala
De gnomonvm vmbrarvmq[ue] solarivm vsv libe	Joannes Baptista Benedictus	Latin	1574	Augustae T
Gnomonices libri octo: in qvibus non solum	Christophorus Clavius	Latin	1581	Rome
Sphaericorum libri III	Teodosio	Latin	1586	Rome
Admirandum illud geometricum problema tredec	Barocio Jacobo, Francisco	Latin	1586	Venice
De ponderibus et mensuris	Mariana, Juan de (1536-1623)	Latin	1599	Toleti
Advertencia cortesana, é insinuacion benevola de	?	Spanish	1600	Madrid
Libro de Arithmetica speculativa y practica,	Santa Cruz Miguel, Jerónimo de	Spanish	1603	Sevilla
Geometria practica	Clavio, Cristóforo	Latin	1606	Mongvntia
Primum mobile	Magino, Juan Antonio	Latin	1609	Bononiae
Algebra	Clavio, Cristóforo	Latin	1609	Geneva
Tabulae generales ad primum mobile specta	Magino, Juan Antonio	Latin	1609	Bononiae
Christophori Clavii Bambergensis e Societate	Christophorus Clavius	Latin	1612	Monguntiae
De cochlea libri quatuor	Guido Ubaldo	Latin	1615	Venice
Epistolarvm mathematicarvm, seu, De divination	Raguseius, Georgius	Latin	1623	Paris
Trigonometria cum magna logarithmor canone	Ursinus, Benjamin	Latin	1625	Coloniae
Arithmeticae libri duo et Geometriae septem	Ramús, Pedro La Ramée (1515-1572)	Latin	1627	Frankfurt
Recreations mathematiques	?	Latin	1630	Roven
Mathematicum opus absolutissimum	Marolo, Samuel	Latin	1633	Amsterdam
Mathematicorum sui seculi facile principis, optic[	Marolo, Samuel	Latin	1633	Amsterdam
Trigonometria artificialis, sive, Magnvs cano	Ulaccus, Adrianus	Latin	1633	Goudae
[Advertencias de Miguel Florencio van Lang	?	Spanish	1634	Madrid
Opera mathematica	Claudius, Richardus	Latin	1645	Antuerpiae
Opus geometricum quadraturae circuli et sectionu	Gregorio de San Vicente	Italian	1647	Antuerpiae
Exercitatonum mathematicarum libri quinque: I.	Shooten, Francisco de	Latin	1657	Lugd. Batav
Problemata geometrica sexaginta: circà conos, sph	Stephanus de Angelis	Latin	1658	Venice
Recreationum mathematicarum apiaria novissima	Bettinus, Marius (1582-1657)	Latin	1659	Bononiae
Geometriae speciosae elementa: primvm De	Mengolus, Petrus	Latin	1659	Bononiae
Miscellaneum geometricum: in quatuor part	Stephanus de Angelis	Latin	1660	Venice
Philosophiae ac mathematicae totius institutio: cu	Galtruchio, Pedro	Latin	1661	Vienna
Aritmetica, practica y especvlativa	Pérez de Moya, Juan	Spanish	1663	Madrid
Mathesis nova: iuniorum inventa cum Veter	Caramuel de Lobkowitz, Juan (1606-1682)	Latin	1669	Campania
Tabulae sinuum, tangentium, et secantium, et loga	Ulacq, A.	Latin	1670	Lugduni

~170 books and manuscripts

Methodological notes

- Disrupt centre-to-periphery focused" and "passive receiver" scholarship (Gavroglu et al., 2008; Fuentes, 1992; Glissant, 1997)
  - Not always one-way: Binary numbers
  - Agential take-up of ideas and practices
- Disrupt 'big breakthrough' focus of history to attend to translation/transformation of 'minor' actors (Boucard & Morel, 2022)
- Annotations, firemarks, provenance
- Follow the baroque (Kircher, Caramuel, Sigüenza y Góngora, Sor Juana, etc.)



Baroque Puebla:
Church of Santa María Tonantzintla

Baroque….

- Deleuze (1993) *The Fold: Leibniz and the Baroque*; the baroque as operative function, to fold, inside-and-outside; perspectivism, multiplicity of worlds, texture, infinite
- Glissant (1997) the baroque is characterized by a profusion of the real that is an antidote to the obsession of synthesis and unity that characterizes the "la pensée de l'Un"

in New Spain…

- Irving Leonard (1959): the "whorls within whorls" of "persons, places and practices"
- Carlos Fuentes (1992): new Spain always and already a place of fusion, composite culture
- Elias Trabulse (1998): focus on the baroque period 1667–1690
- Bauer & Mazzotti (2009): baroque aesthetics of the works of Sor Juana Inés de la Cruz

in Science

- Jens Høyrup (2019): Baroque Mind-set and New Science: focus on Caramuel as "a major Baroque theoretician" (ambiguity, affect)
- Koen Vermeir (2013): the baroque as a style of thinking in Kircher (analogical between nature, man and machine)
- Ofer Gal & Raz Chen-Morris (2013): "forced paradox," "distortion" "violent contrast," and "reliance on sensual detail," instrumentation, fable/artifice, passions, imagination as the mediating source for learning.

Raz Chen-Morris' thesis on Baroque Science

- The artifice of instrument displaces the sensory reliance of the human senses
- Physico-mathematical mixings
- Affirmation of fantasy and imaginary journeys as a way of coming to know the world
- Emphasis on the power of the imagination in learning
- Huygens (1629-1695) and Newton (1643-1727) are said to be the end of Baroque science
- The baroque science of Europe overlaps with the influx of books into the Palafoxiana and the beginning of Jesuit-educated criolli mathematicians

Jesuit science

- Christopher Clavius (1538-1612) advocates for a shift in curriculum and argues for the key role that mathematics should play in the Jesuit curriculum in the colleges.
- Protestant texts also make their way to new Spain (sometimes avoiding the inquisition)
- The Jesuit network of scholars and colleges is the first "global" corporate network traversing key locations in the colonial world.
- In particular, Kircher's (1602-1680) work spreads like wildfire across the Americas and onwards to Manila.
  - He conceives his work as a way of furthering the colonial process.
  - But he also seeks scholars who will send data back to him.
  - The poblanos first learn of Kircher's texts "Celestial ecstatic journey" and others on magnetism by Jesuit scholars who are crossing Mexico on their way to Manila.

(Math) education in Mexico

- Pre-Hispanic (before 1521)
  - Institutional education: the Calmécac (for children of nobility: to become priests, learning astronomy, mathematics, medicine) and the Telpochcalli (for children of commoners, to become warriors)
  - Higher education*: calculate time, draw maps, isolate silver and other metals, botany, herbal medicine, etc.
- Colonial period (1521 to ~1810)
  - Schools opened in 1524 by Franciscans with primary aim to convert Indigenous peoples
  - First higher education school opened in 1535 (Latin, grammar, including Nahuatl, rhetoric, music, medicine, etc.); books begin arriving from Spain
  - Mathematics first formally taught in 1540 (Colegio in Michoacán)
  - First math book published in New Spain in 1556 by Juan Diez Freyle
- Jesuits (youngest order, began in 1540), arrive in New Spain 1572
  - Set up many schools, which were prized for their education
  - First Chair in math (University of Mexico) in 1637: Fray Diego Rodríguez
  - Expelled in 1767 (until 1813)

Focus 1: The Kircher fan club at the Palafoxiana

- Fray Diego Rodriguez (1596-1658), criollo
- Fray François Guillot ("Ximénez") (1601-1686)
- Melchor Pérez de Soto (1606-1655)
- Alejandro Fabián (1624-??), criollo
- (Fray) Carlos de Sigüenza y Góngora (1645-1700), criollo
- Sor Juana Inés de la Cruz (1648-1695), mestiza
- Antonio de Alcala (16??-17??), criollo

alis (1650)

d new.

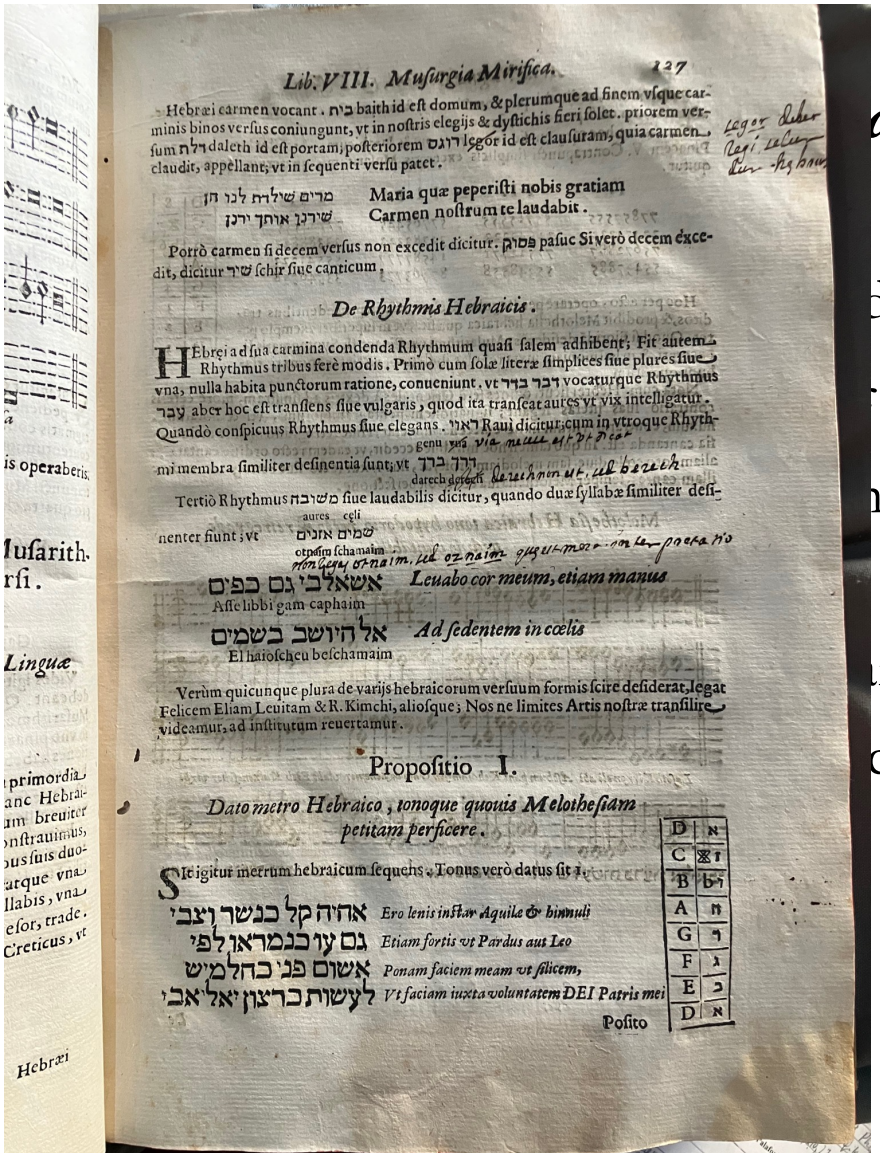
nature;

nd Ancient

Organology,

nd Modern

consonance



Lib. VIII. Musurgia Mirifica. 127

Hebræi carmen vocant . בית baith id est domum, & plerumque ad finem vsque carminis binos versus coniungunt, vt in nostris elegijs & dystichis fieri solet. priorem versum דלת daleth id est portam, posteriorem רוגס legor id est clausuram, quia carmen claudit, appellant, vt in sequenti versu patet.

מרים שילדת לנו חן Maria quæ peperisti nobis gratiam
שירנן אותך ירנן Carmen nostrum te laudabit.

Porrò carmen si decem versus non excedit dicitur. פסוק pasuc Si verò decem excedit, dicitur שיר schir siue canticum,

De Rhythmis Hebraicis.

Hebræi ad sua carmina condenda Rhythmum quasi salem adhibent. Fit autem Rhythmus tribus ferè modis. Primò cum solæ literæ simplices siue plures siue vna, nulla habita punctorum ratione, conueniunt. vt דבר ברד vocaturque Rhythmus עבר aber hoc est transiens siue vulgaris, quod ita transeat aures vt vix intelligatur. Quandò conspicuus Rhythmus siue elegans. ראוי Raui dicitur: cum in vtroque Rhythmi membra similiter desinentia sunt; vt דרך ברך darech berech

Tertiò Rhythmus משובח siue laudabilis dicitur, quando duæ syllabæ similiter desinenter sunt; vt שמים אזנים otnaim schamaim

אשאלבי גם כפים Leuabo cor meum, etiam manus
Asselibbi gam caphaim

אל היושב בשמים Ad sedentem in cœlis
El haioscheu beschamaim

Verùm quicunque plura de varijs hebraicorum versuum formis scire desiderat, legat Felicem Eliam Leuitam & R. Kimchi, aliosque; Nos ne limites Artis nostræ transilire videamur, ad institutum reuertamur.

Propositio I.

Dato metro Hebraico, tonoque quouis Melothesiam petitam perficere.

Sit igitur metrum hebraicum sequens. Tonus verò datus sit F.

D	א
C	ב ו
B	ה ט
A	ח
G	ז
F	ג
E	ב
D	א

אחיה קל כנשר ויצבי Ero lenis instar Aquilæ & hinnuli
גם עז כנמר אלפי Etiam fortis vt Pardus aus Leo
אשום פני כחלמיש Ponam faciem meam vt silicem,
לעשות רצון יאלאבי Vt faciam iuxta voluntatem DEI Patris mei

Posito

Lib. I. Anatomicus de Natura soni & vocis. 27

Musica Haut siue Pigritię Animalis Americani.

Ha ha ha ha ha ha ha ha ha ha ha.

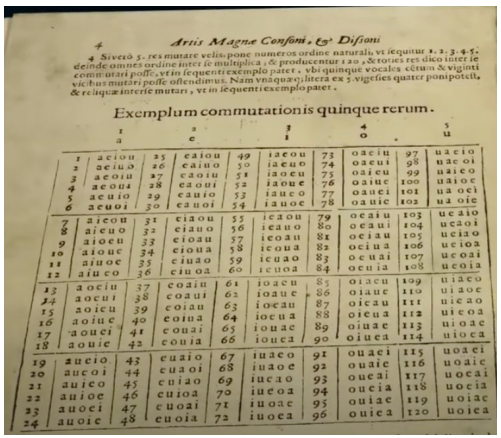
Figura Animalis Haut.

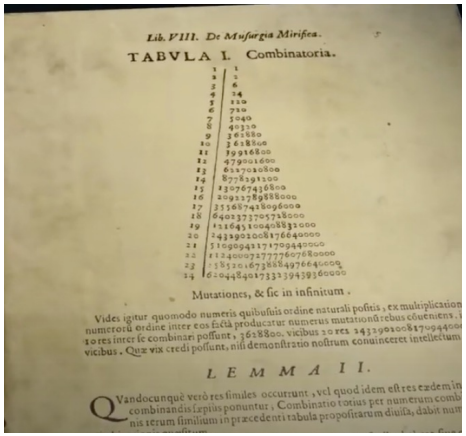
Mirum tamen, nullam huiusmodi animalis anatomiam vnquàm ab vllo confectam esse: ex interiori enim constitutione facilè de eiusdem naturalibus facultatibus coniicere poterant: Si enim os & dentes, si stomachum habeat, non video cur natura membra cibi reconditoria sine vsu ipsis assignauerit. Sed non dubito, quin mea instructione informati Patres nostri Americani exactiorem in posterum omnium experientiam sint sumpturi.

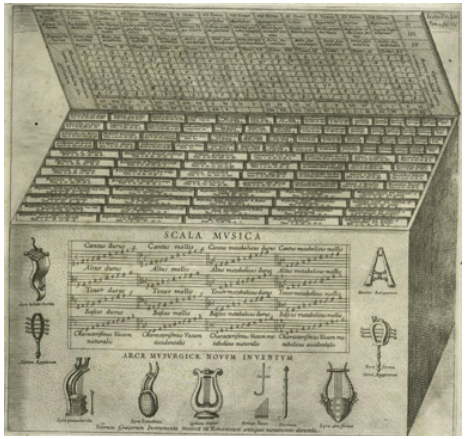
Voces cæterorum quadrupedum cùm notæ sint pusillæ, iis non inhærebimus, sed ad

Kirchner's Arca Musarithmica

- The book begins with a section on combinatorics (not present in other mathematics books of the time), though know from the 'Ramon Llulli school' (strong Arabic connections)
- Combinations and permutations are "in nature", in its "infinite variety"
- It then explains how to use the Arca, which is a wooden box that contains ~ 100 cards

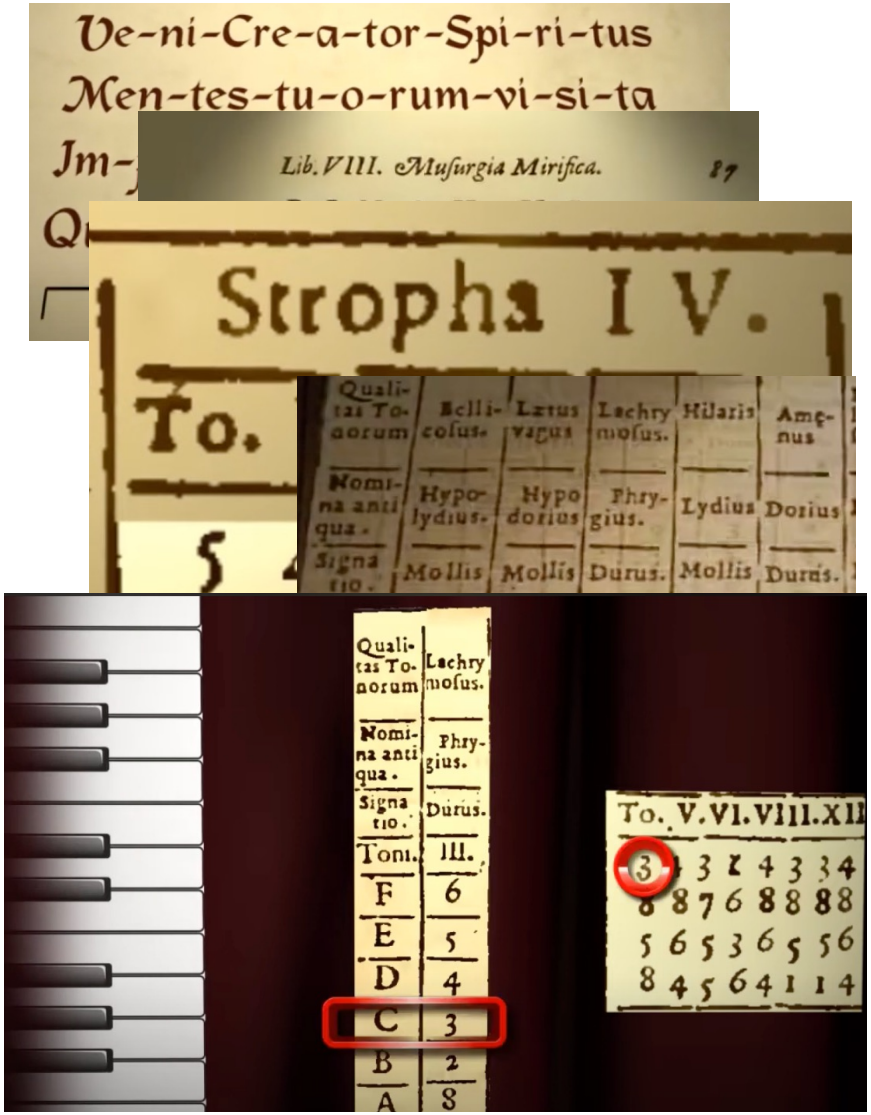






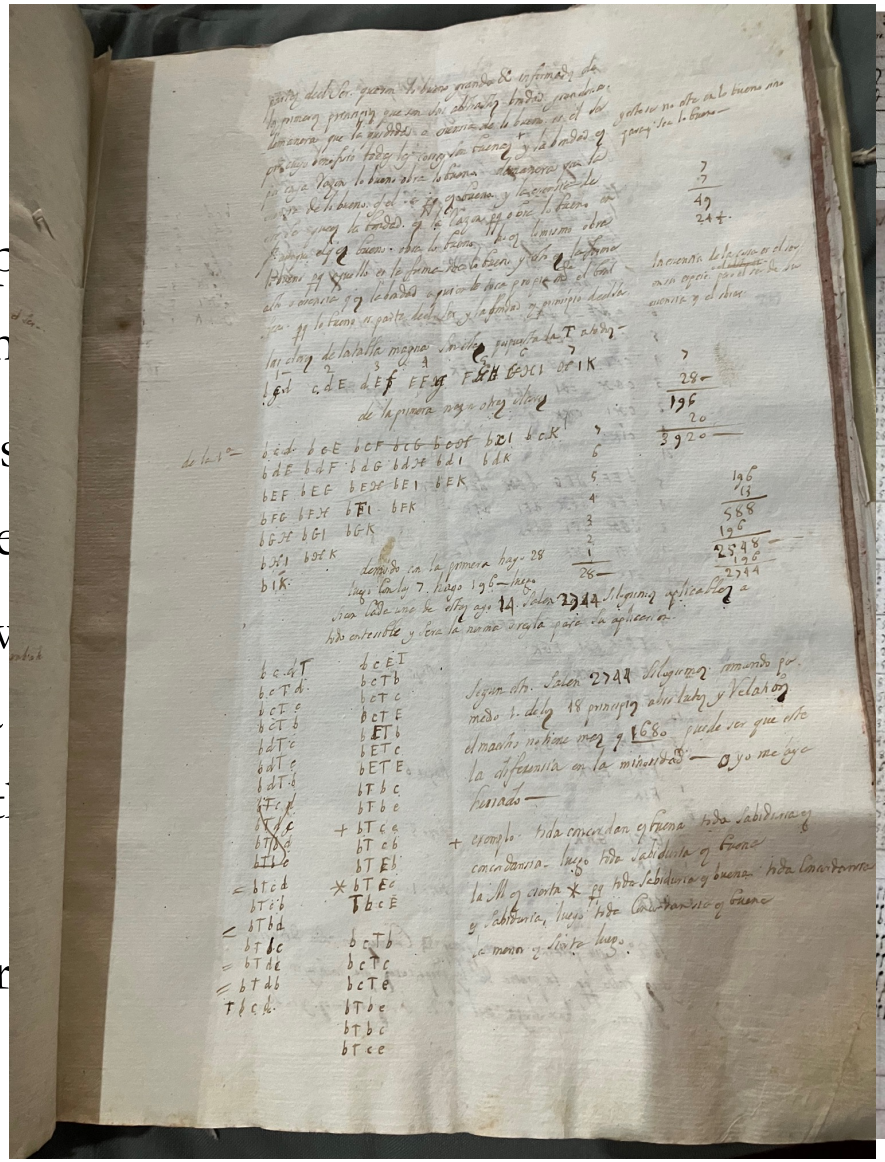
Kirchner's Arca Musarithmica

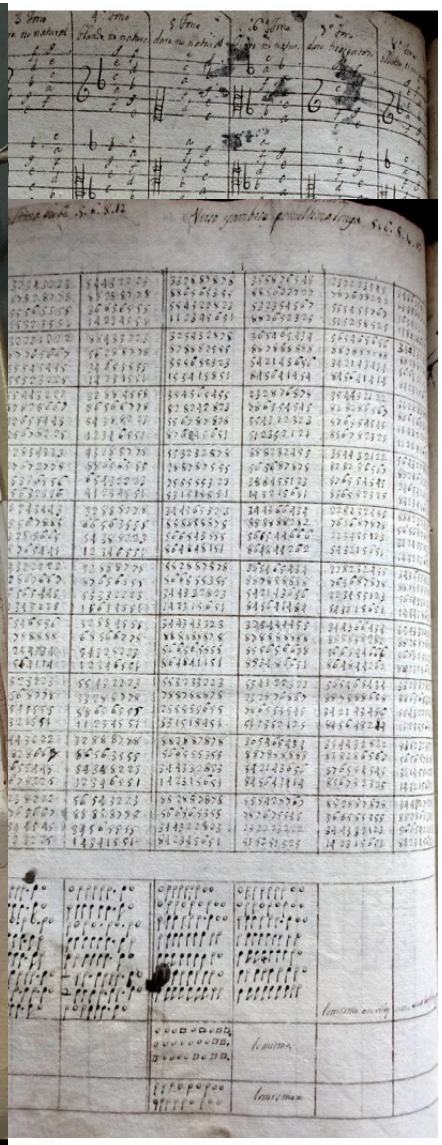
- Begin with text that will be put to music
- Choose style and instrument/voice
- Then choose the contrapunctus simplex (the sequence of 8 notes) on the Pinax
- Then choose one of 12 "moods" (bellicose, lachrymosus, etc.) and the key (minor or major).
- There is also the card for contrapunctus floris (the duration of each note)



In the Palafoxiana…

- A *manu*script containing p
  between 1690-1700 (Cash
- The Poblano (anonymous
  of Kircher's books and se
  - Choosing the ones that w
    construction of the Arca
  - Choosing only some of t
    to music)
  - Copying only enough per
- It is not the only one!

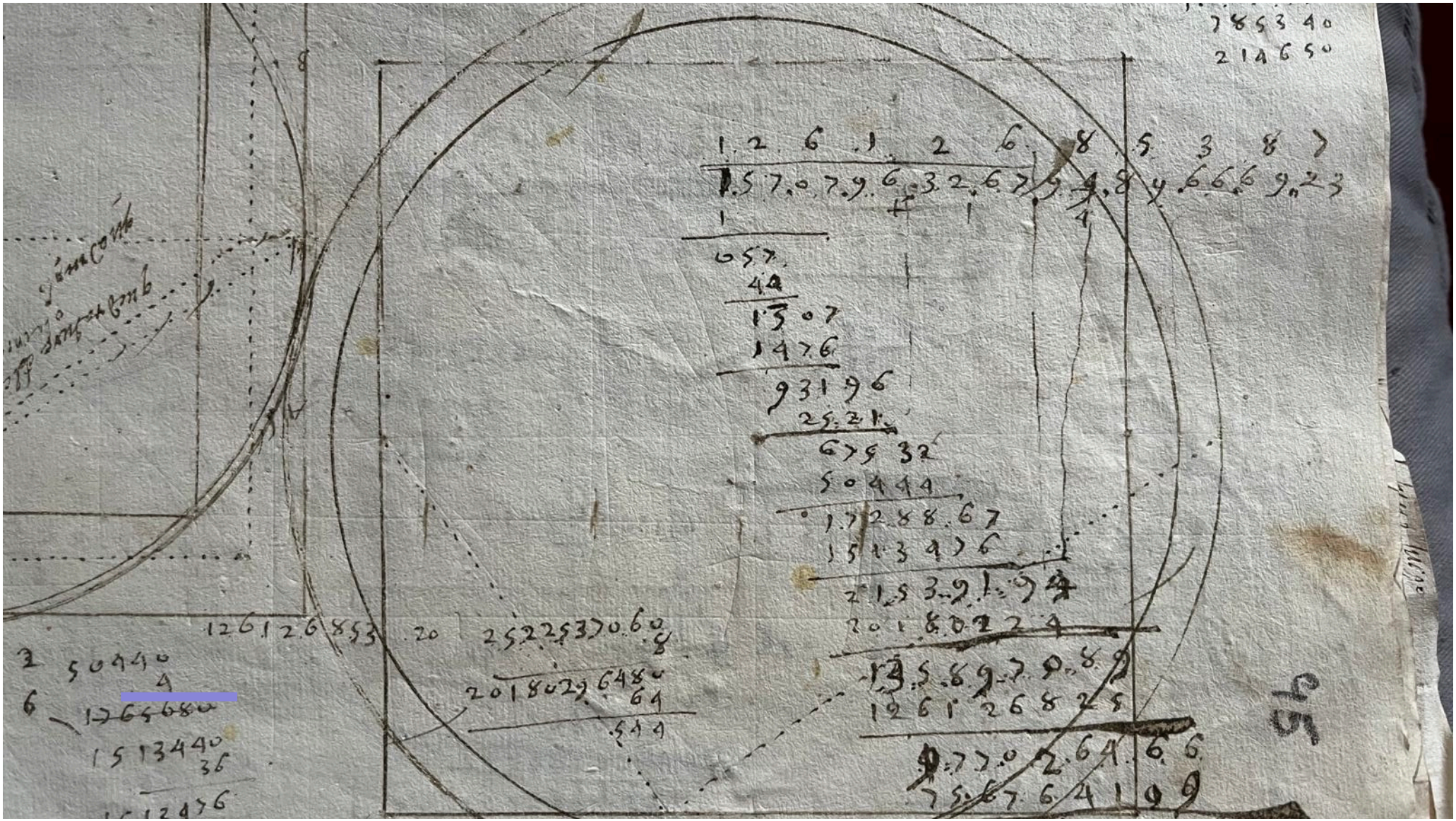


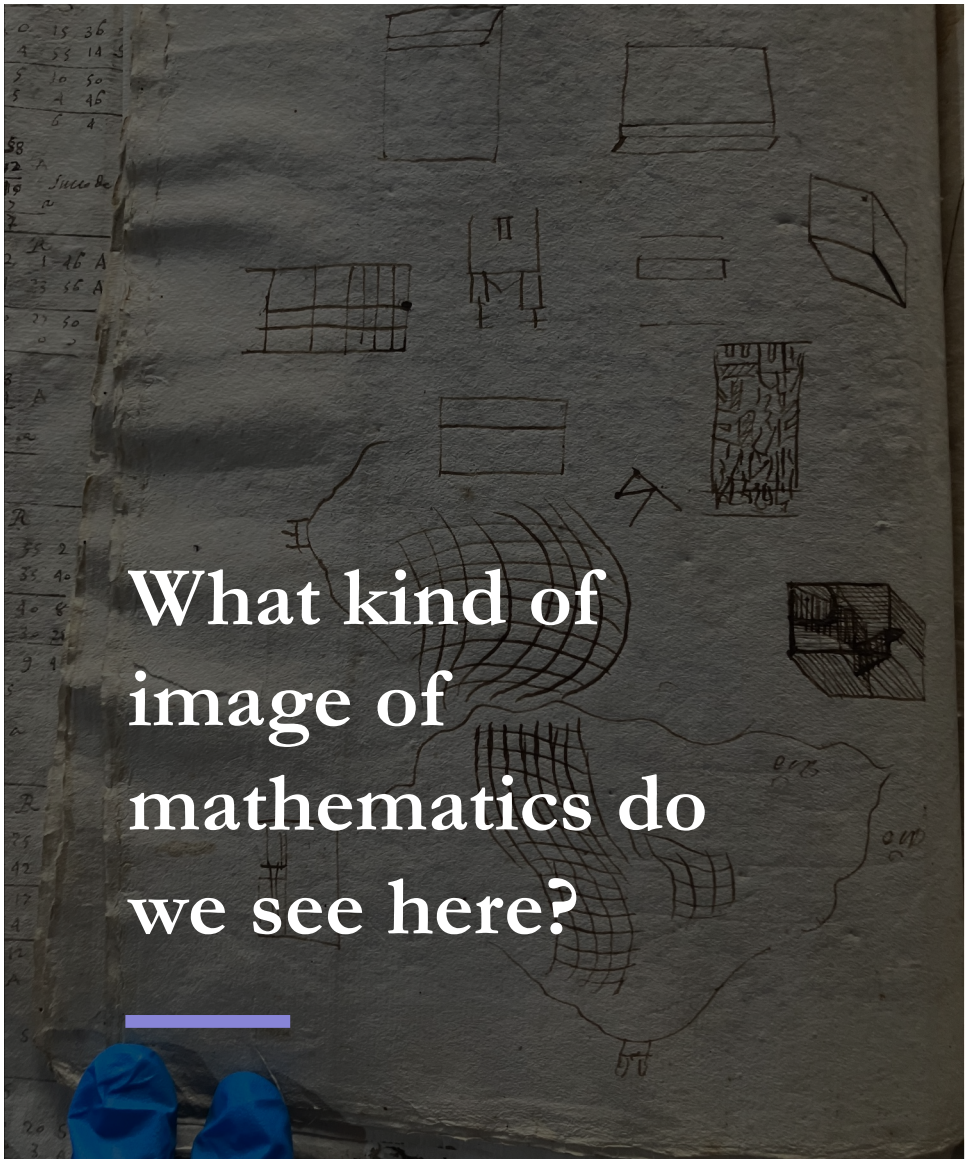


The anonymous Palafoxiana folio includes…

Topics	Folios	Heading	Description
Accounting			
Economics, law, cathedral administration	1-19	«Ordenança sacada del libro capitular numero quarto que esta en el Archivo del Cauildo de esta ciudad […]»	Copy of Puebla (1537 regarding t
Surveying	27-61	«Agrimensura y arte de medir tierras en estas indias occidentales»	Measuring land a
Weights and measures (geometry)	72r, 74	«Medidas de las aguas como se practican en estos reynos computanto una bara castellana»	Calculating liqui
Cathedral tithes	104-134	«Govierno que se tiene en la Yglesia de la Puebla de los Ang[es] en orden del estilo y distribucion de sus rentas eclesiásticas»	Official policies calculations of ti
Accounting	135-144, 149-154	«Diezmos de el ano de 1695», «Comienza 1695»	Tables of tithe re
	145-148	«Daue hecho el cuadrante de el año de 1700»	Tables of tithe re
Accounting, computation	211-259	«Algoritmologia de las quentas de las Iglesias […]»	Computational n
Geometry			
Compass/ruler	20-29	«Divicion de la línea Aritmetica»	Drawings and ca
Navigation, surveying	30-33	«Resolución de los problemas de geometria hasta oy no resuelto, con la Ynstitucion de los grados de longitud para la Nautica»	Calculation of lo
Euclidian geometry	34-45	«Toda la dificultad de la Geometria consista en el aumento o diminucion de los superficios»	Excerpt of geom of propositions, (copied from an
Compass/ruler	33, 46, 62-63	«Triceccion de el Angulo», «Lo que hace el quadrato de el circulo»	Trisecting the an diagrams and cal
Trigonometry	70, 72v, 75-78, 80-81	«Arte para inscribir en el circulo las figuras que hasta aqui llaman irregulares»	Notes and calcul theorem.
	83-102	«Triseccion deel Angulo»	More trisecting,
	155-157		Notes and calcul
Engineering			
Hydraulics, physics	64-68	«HYDROTECHNIA NOVA. Sive. Nova Machina, Artifitia quo Hydrotecnica […]»	Kircheresque La hydraulic machi
Architecture			
Urban planning, surveying	79, 82		Floorplan of a h
Music			

Topics	Folios	Heading	Description
	158v		*Mensa tonogographica* ('church keys'); *Palimpsest phonotacticum* ('clefs, signatures').
	159r		*Syntagma* 1, *pinax* 4-5.
	159v		*Syntagma* 1, *pinax* 6-7.
	160r		*Syntagma* 1, *pinax* 8 (part 1) and 1.
	160v		*Syntagma* 1, *pinax* 8 (part 2).
	161r		*Syntagma* 2, *pinax* 1.
	162r		*Syntagma* 2, *pinax* 4.
Law			
Civil, canon law	165-171	«Canones», «Juris canonici», «De el Derecho civil / De el derecho canonico»	Laws and decrees.
Music	168r	Music tablature	On same page as Latin contents list of legal topics.
Chronology	173-197	«Cronología»	Year-by-year timeline tables and prose chronicles of world history from beginning, including Biblical patriarchs, kings, Near Eastern rulers, Roman emperors, popes.
Chemistry	198-203r, 204-207, 260-270	«Quimica»	Excerpts from treatise on chemistry or alchemy.
Astrology	203v	«Astrologia»	«Astrology» written three times in different hands like a cover sheet.
Science			
Universal knowledge, natural science, physiology	208-210		Foldout sheet with universal map of knowledge, including physiological, mental, and spiritual faculties, appetites, physical substances, etc.
Theology			
Doctrinal, systematic, mystical, devotional	271-341		Topics include mystical theology, the Incarnation, outline of theological categories, and *oración mental* ('mental prayer').

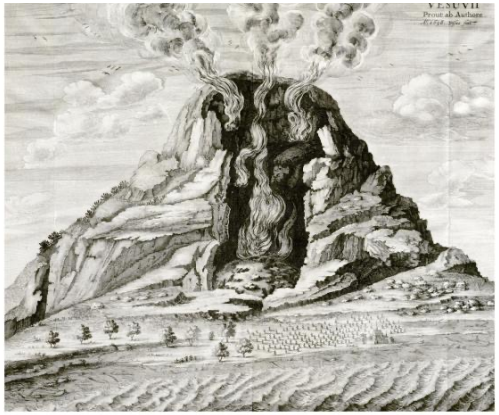




- Not an intact subject, but diffuse through and with other knowledge
- Combinatorics as general method of discovery. A permutation of possible perspectives that captures the infinite/mixed fold of Deleuze's Baroque style.
- Proliferating calculations
- A way of thinking that involves Ancient ideas (Greek, Arabic, and associated Egyptian, Babylonian) *along with* new ideas/machines/words
- A desire to solve age-old challenges, impossible tasks, break with the perfect forms of the circle, like trisecting the angle, and squaring the circle.
- To explode classical forms into the textured world of diversity and multiplicity and creolization (Glissant). A *poetic* engagement with materiality.

Mathematics in New Spain in the 17th century

- Turning to European texts, creating commentaries on compendia, where geometry and pyrotechnics are side-by-side topics, in a setting where instrumental engagement with nature (lenses, telescopes) links with the "magical realism" of 17th century Mexico (Fuentes).
- Combinatorics and permutations appeal to our Poblanos because they create a new kind of collectivity and folded fugal song, a way of merging voices from across locales and cultures, a perspectivism.

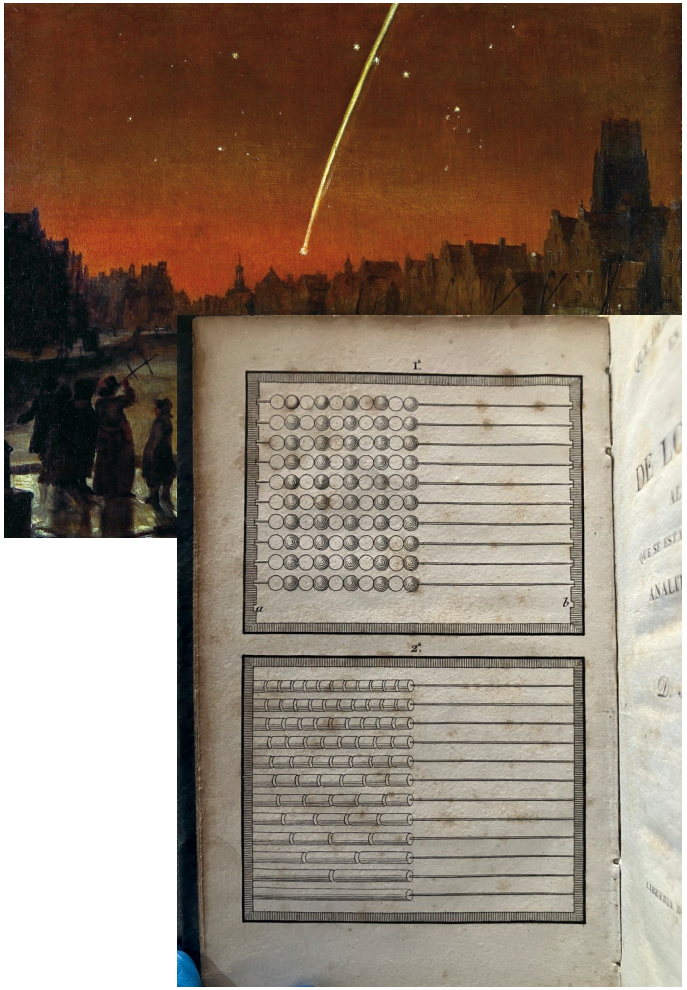


Stepping back, cautiously

- The colonial legacy is complicated, involving multiple forces (religious, capitalist, political, scientific, artistic, etc.)
- From the Palafoxiana archive, it appears that:
  - The mathematics arriving in New Spain *predates* post-enlightenment views that construct Europe as the foundation
  - It arrives from multiple sources which themselves are recognized as multiply sourced (c.f. "Greek origins")
  - It is itself a plural practices that engages both quantitative and qualitative, earthbound and instrument-rich
  - In other words, very different from the current curricula of North America.

Additional themes

- The New World contribution to probability, through the situated, moral context of probabilism (Mayer, 2016).
- The comet debate between Sïguenza y Góngora and Kino
- The access to certain books that are banned in Europe, so that the Baroque-creole mathematician seems to move ahead of the Iberian colleagues
- Looking back: How Nahua knowledge was used/transformed in the original schools, including w.r.t. non-base-10 number systems
- Looking ahead: The prevalence of Spanish texts, especially José Mariano Vallejo, who brings new instrumental and ideological ideas to the Palafoxiana, which become increasingly pedagogical.



Thank you!

- Acknowledgements to Elizabeth de Freitas (co-investigator), Carlos Hugo Zayas & Armando Solares Rojas (collaborators in Mexico) and Alan Pasos (SFU PhD student)
- Thanks to Maria, Miguel, Jose, and Dr. Matt Voigt for the invitation