A History of Science in Latin America (INTD290): Unit 1

Jordan Hanson

September 12, 2024

Whittier College Department of Physics and Astronomy

Review

Review

1. What is science?
2. Is science true?
3. Vocabulary in Nahuatl and Español
4. Geography
5. Scientific, Church, and Philosophical terminology

Summary

Summary

Indigenous and Spanish Colonial Medicine:

1. Indigenous medicine and science
2. Medieval medical theory
    - The four humours
    - Hot/cold, wet/dry
    - Relation to elements, digestion
3. Comparisons of treatments: examples of indigenous science
4. Production of treatments
    - Introduction from indigenous to colonial
    - Production and shipment to Europe

Connections Activities:

- The base-20 number system of the Maya
- The Quipu of the Inca
- Kepler's Laws

Indigenous Medicine and Science

Indigenous Medicine and Science

Huitzilin: hummingbird. A discussion of Linnaean classification. This species is completely restricted to the New World, so it would have been totally unknown to colonials.

- quetzal huitzilin (a quetzal is not a hummingbird)
- xi huitzilin ... turquiose hummingbird
- chalchi huitzilin ... light greed hummingbird
- yiauhtic huitzilin ... purple hummingbird
- tlapal huitzilin ... mixed black hummingbird
- aiopal huitzilin ... light purple hummingbird
- tle huitzilin ... hot coal colored hummingbird
- quapa huitzilin ... tawny yellow hummingbird

The Nahua believed that hummingbirds are symbols of the warrior and immortality (torpor).

Indigenous Medicine and Science

Here is what Father Diego Durán writes from conversations with Aztec people:

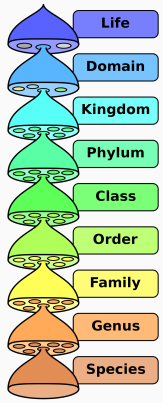
> *The sit on a branch next to the hollow, and stick their beak in it as far as they can and remain their for six months of the year - the entire winter - finding sustenance only on that tree, as if dead. When spring comes and gets new growth and gets new leaves, the bird, helped by the vigor of the tree, resuscitates and goes forth and procreates. Because of this, the Indians say they die and are resurrected. I have seen it with my own eyes in winter.*

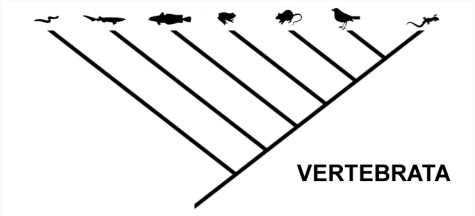
`https://youtu.be/8ObONmJ4VU8`

Indigenous Medicine and Science

Figure 1: (Left) An icon of Huitzilopochtli, “Southern hummingbird,” or, “Left-hand hummingbird.” The Aztecs oriented the world so that South was to the left. (Right) The Aztecs performed human heart sacrifices to Huitzilopochtli until the Spanish conquest. (Mention the order of the words in huitzil + opochtli).

Indigenous Medicine and Science





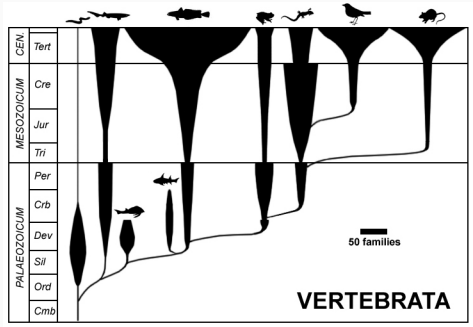


Figure 2: (Far Left) A portrait of Carl Linnaeus (1707 - 1778). (Left) Diagram of modern classification scheme. (Right) A cladogram detailing common ancestry. (Far right) Spindle diagram used for evolutionary taxonomy.

- Expedition to Lapland
- Invented modern latin binomial classification scheme
- *The Origin of Species* by Charles Darwin was published in 1859.

Indigenous Medicine and Science

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The Nahua believed that hummingbirds are symbols of the warrior and immortality (torpor).

The Four Humors

The Four Humors

The Four Humors: A medieval theory of medicine based on four classes of fluids within the body. Each had an associated color. Each color had a temperature classification, and a moisture classification.

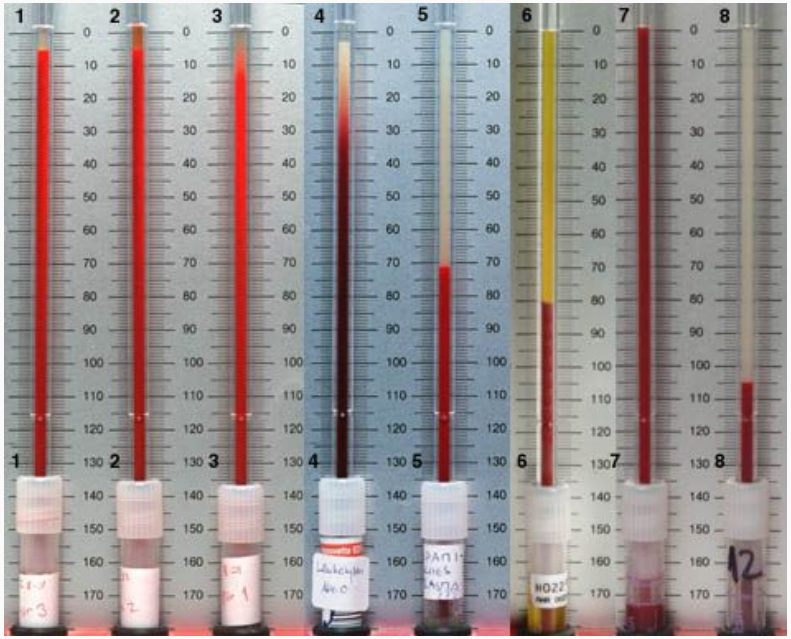

Figure 3: Blood sedimentation suggests that blood is built from sub-components that have different colors.

The Four Humors

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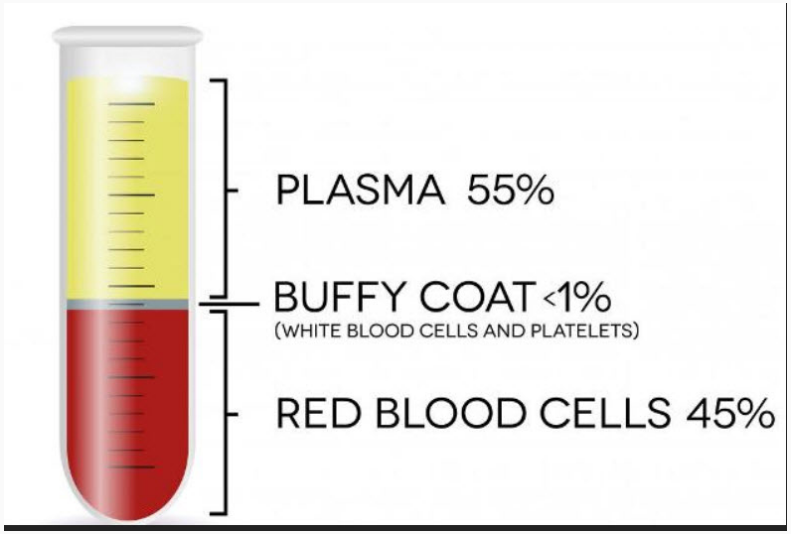

Figure 4: We now know that blood is in fact comprised of different substances: red blood cells, platelets, plasma, water, etc.

The Four Humors

The Four Humors: Medieval scholars took it a step further and tried to associate the humors with the fundamental elements, based on the idea that we consume them to live. Each food item or herb had a classification of hot/cold, and moist/dry.

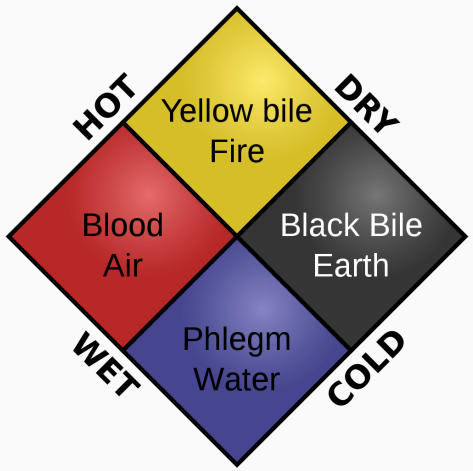

Figure 5: The four elements of the world were associated with the four humors, and further classified as hot/cold, and moist/dry.

The Four Humors

It was even common up to the 18th century to explain personality traits using humor theory. For a funny example of the intersection of popular culture and the four humors, see

`https://youtu.be/dtsmluPK7Ug`

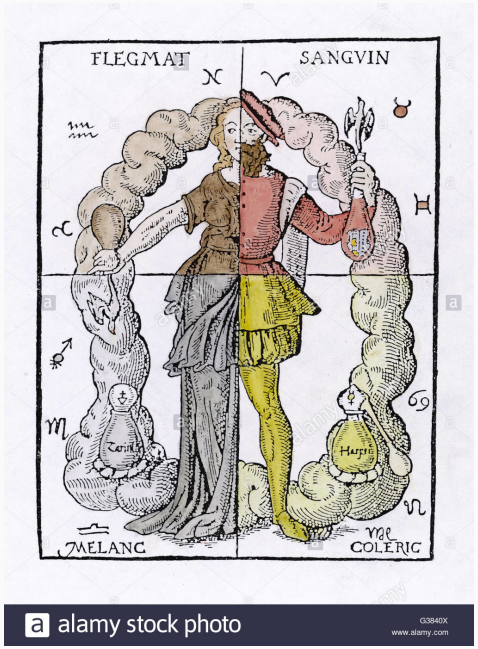

Figure 6: The four humors were also associated with personality traits.

The Four Humors

Indigenous treatments were classified into this system, but it did not always fit. According to an analysis by Juan de Cárdenas (1563-1609)[1], the classification of cacao was complex:

1. Cacao is classified as *cold and dry*, from the following observations:
    - Bowel constriction and closing urinary tract
    - Stopping menstruation
    - Digestive problems
2. Chocolate is classified as *warm and damp*, from the following observations:
    - Chocolate is roasted and ground cacao mixed with *atole*
    - Helps digestion, appetite
    - Helps bowel movement and urination

[1] `https://es.wikipedia.org/wiki/Juan_de_C%C3%A1rdenas`

The Four Humors

Indigenous treatments were classified into this system, but it did not always fit. According to an analysis by Juan de Cárdenas (1563-1609)[2], the classification of cacao was complex:

1. Chocolate is classified as *warm and damp*
2. Theorizes that cacao has *a third component, very hot and wet*:
    - When cacao is plain, the cold restrictive effects
    - Roasted and mixed with atole, mild effects, and it tastes like chocolate
    - A third part, which causes sweating, triggers menstruation and digestive effects ... I wonder if this is the *caffiene*
3. The explanation for the chemistry, though, is convoluted: the oily warm part removes some dryness from the hot part ...

[2] `https://es.wikipedia.org/wiki/Juan_de_C%C3%A1rdenas`

The Four Humors

There are 12 mg of caffeine per 5.4 grams of cacao.

> Am J Epidemiol. 1999 Mar 15;149(6):550-7. doi: 10.1093/oxfordjournals.aje.a009851.

Caffeine consumption and menstrual function

L Fenster [1], C Quale, K Waller, G C Windham, E P Elkin, N Benowitz, S H Swan

Affiliations + expand

PMID: 10084244 DOI: 10.1093/oxfordjournals.aje.a009851

- Caffeine consumption related to length of menstrual period
- Caffeine consumption related to length of cycle
- (This study is from 1999 and is part interview data, part chemical analysis)

What is interesting is how humor theory is being fit with the indigenous science.

The Four Humors

Juan de Cárdenas

Juan de Cárdenas, (1563-1609) fue un médico y científico español, establecido en Guadalajara (México) desde 1577.

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1 Biografía
2 Notas
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Juan de Cárdenas	
Información personal	
Nacimiento	1563 Sevilla (España)
Fallecimiento	1609 México
Residencia	México
Nacionalidad	Mexicana
Información profesional	
Área	médico

[editar datos en Wikidata]

Biografía [editar]

Nacido al parecer en Constantina (Sevilla),[a 1 2] Cárdenas se trasladó a México en 1577, cuando tenía catorce años. Estudió artes y medicina en su Universidad y publicó allí la obra titulada *Primera parte de los problemas y secretos maravillosos de las Indias* (1591), un volumen de casi quinientas páginas, dividido en tres libros, dedicado el primero al "sitio, temple y constelación de la tierra", el segundo a "las plantas y minerales", y el tercero a "las propiedades de los hombres y animales nacidos en las Indias". Esta *primera parte*, así enunciada en el título del tratado, se limita a "las cosas de la Nueva España", ya que su autor planeaba una segunda sobre el Perú que no llegó a publicar.


PRIMERA PARTE
DE LOS PROBLEMAS,
y secretos marauillosos de las
Indias. Compuesta por el Do-
ctor Iuan de Cardenas
Medico.
Dirigida al Illustrissimo Señor Don Luys
de Velasco, Virrey desta nueva España.
Con Licencia. En Mexico, En casa de
Pedro Ocharte. Año de 1591.

Primera parte de los problemas y secretos maravillosos de las Indias, por Juan de Cárdenas, en 1591.

Cárdenas advierte que su propósito no era redactar un libro de divulgación al estilo de Pedro Mexía : "Siendo esta historia tan varia y tocando materias tan diferentes, no hice desta una selva de varia lección indiana, para variar los gustos al lector." Tampoco se trata de un estudio descriptivo de la naturaleza mexicana, sino de enfrentarse con las "cuestiones" o "problemas" que planteaban sus "admirables propiedades" y "cualidades peregrinas". "Mi principal intento -afirma- fue dar razón y causa de lo que en cada problema se pregunta." Tanto el enfoque de la obra como su estilo se ajustan a la versión escolástica de la cultura científica europea, que Cárdenas había aprendido en la Universidad de México.[3]

Other Indigenous Treatments

Other Indigenous Treatments

Treatments for syphilis:

1. Bark of chinaberry tree
2. Root of sarsaparilla

Spawned an entire industry of export to Europe. Note in the text:

1. The Spaniards received this medicinal knowledge from the Native Americans
2. The cures worked, to some extent
3. Economic demand increased throughout the world
4. Europeans believed the cure originates near the source (not necessarily)

Indigenous Medicine and Science

1. **Xilo, xiloxochitl**: balsam, balsam tree. A general term for residue extracted from tree matter that has medicinal properties. The word balsam comes from The Balm of Gilead, in the Hebrew Bible (Genesis) for a region currently in Jordan. Why did the Spanish colonials refer to *xilo* as balsam?
2. **tzipipatli**: an herb native to Nueva España used to treat diarrhea. Compare to how the Europeans treated diarrhea. What is to be learned from the different treatments?

Other Indigenous Treatments

Usages of balsam oil:

1. The Spaniards received this medicinal knowledge from the Native Americans
2. Prevention of scabies (antiseptic)
3. Sore muscles
4. Anti-inflammatory
5. Digestion
6. Prevention of rheumatism

Cinchona bark:

1. Used in the production of quinine
2. Anti-malarial

Project ideas: the writings of Nicolás Monardes

Comparisons of Treatments

Conclusion