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Science in Latin America

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Midterm 2

Unit 3

1. Recall the fascinating story about psychological research, in which the author shares that 67 percent of psychologists who were asked to share their data did not share it. (a) Were the rates of error higher or lower in the studies for which the authors did not share data? (b) In whose favor were the errors?

- a) In the studies for which the authors withheld their data it was higher.
- b) Approximately 96% of the errors were in the favor of the authors.

2. “Recent research in behavioral economics has shown that groups are often better than individuals at finding errors in reasoning.” (a) Why do you think this is the case? (b) Can you give an example of the wisdom of crowds thus far in our study of Latin American science?

- a) When in groups, multiple perspectives can make it easier to catch errors and correct them. Groups can also correct one another on things like confirmation bias.
- b) Examples of wisdom crowds include Mining Schools or Medical Societies that encourage community involvement in an attempt to speed up the evolution of science.

3. Recall the story of cold fusion. (a) List three facets of the peer review process that went wrong in this episode. (b) How long, from start to finish, did it take for the scientific community to sort out the errors in the cold fusion research?

- a) They refused to hold a press conference for their research. They did not share their findings with other researchers. They were not able to recreate their findings.
- b) A little less than two months

4. Note that we encountered several examples of viceregal engineers becoming Latin American leaders. (a) What are some examples of professions that involve modern technical skill in Río de la Plata and Peru? (b) What is the primary profession of modern US leaders, for example, elected to The United States Congress?

- a) Professions that involve technical skill are geographic map making, mining with mercury and ship sailing.
- b) The primary professions of a person with a position in the United States Congress would consist of economic financing, or decisions about lawmaking.

5. Jos´e Mariano Moci˜no and others were ordered by the Mexican viceroy on an expedition to Nootka Island. What was the purpose of the expedition? (Take INTD255 to learn more!)

Answer: They were meant to study the abundance of natural resources in Russia.

6. In Per'u, we must take note of the work of Hipolito Unanue. (a) What are some of his other scientific contributions? (b) In Nueva Granada, we must take note of the work of Jos'e Celestino Mutis. What are some of his main contributions?

- a) Unanue studied botany and used his knowledge of plants to advance medical practices.
- b) Celestino too studied botany; he was actually a part of the expedicion botanica. He was very prolific in mathematics as well as physics.

7. (a) When did Latin American wars of independence begin, approximately? (b) Give some examples of scientists and engineers who fought and died for their countries.

- a) 1810 was when the independence movement began and the war would be fought for nearly two decades.
- b) Francisco Jose de Caldas and Jorge Tadeo Lozano were both natural scientists and mathematicians who played key roles in the war for independence, Caldas even being put to death for his "treason".

Unit 4

1. How long after Semmelweis's solution to childbed fever was germ theory introduced?

Answer: after the introduction of Semmelweis' solution to childbed fever it would be nearly two decades until germ theory came about.

2. Where did the practice of autopsies begin? In what way does performing an autopsy fit with the scientific attitude?

Answer: They began in Paris, France. In a way performing an autopsy is like carrying out an experiment to confirm the initial diagnosis prior to the death of the patient. Instead of assuming one is right to begin with, one would perform the necessary experiment to confirm findings.

3. (a) Do you think the discovery of penicillin was an accident? Why or why not? (b) Louis Pasteur is quoted as saying "chance favors the prepared mind." What did he mean by this? (c) In light of (a) and (b) do you regard the discovery of cinchona as accidental or scientific?

- a) Fleming did not mean to make the discovery at first, however once he started to see changes in the petri dishes he began to study the changes and attempt to reproduce results which fit within the parameters of the scientific attitude.
- b) The quote is Pasteur's way of saying someone has the knowledge or skill to turn things that happen by chance into something monumental.
- c) The discovery of cinchona might have been by chance but it changed into a cure that would allow for so many Europeans to further imperialize the world. That doesn't happen by chance.

4. What event catalyzed the formation of the Establecimiento de Ciencias de M'edicas in 1833?

5. (a) List some reasons the authors give to explain why medical reforms were slow to materialize in Nueva Granada, relative to the struggle for reform in Nueva España. (b) Who led the medical reform process in Nueva Granada in the 18th century? (c) When and where was the Facultad de Medicina reestablished in Nueva Granada, and what happened next?

- a) There was a lack of education in Nueva Granada at the time. Low population density also played a role.
- b) Jose Celestino Mutis
- c) It was reestablished in Nueva Granada in 1802. It later closed because of the war and wouldn't reopen until 1819.

6. (a) How many medical schools were there in Brazil in the eighteenth century? (b) What happened to the Portuguese Crown in 1807? What influence did this have on medical reform?

- a) There were none
- b) In 1807 the nobility left to escape the wrath of Napoleon, who would later increase the amount of Medical schools

7. As the generation of doctors in Columbia returned from France in the late 19th century, what three cultural institutions did they establish to enhance medical practice?

Answer: They established medical schools, medical journals, and a professional or standard practice.

8. Triangulation Suppose you observe a distant mountain from a flat plain. Suppose you walk a baseline of 1 km, perpendicular to the direction towards the mountain. The difference between the compass headings to the mountain at either end of the baseline is 5 degrees. How far away is the mountain?

9. Latitude and Longitude (a) Suppose two cities lie along a constant line of longitude. If we measure a change of 30 minutes (0.5 degree latitude) between them, how far apart are they, in km? (b) Suppose two cities lie along a constant latitude of 45 degrees North. If they are 600 km apart, what is the change in longitude between them?

Unit 5

1. (a) When were the first medical journals published in Columbia? (Give a few examples). (b) Compare this time frame to the publication of the first mining, chemistry, and physics journals in Mexico. (c) How, or through whom, were these journals connected to medical schools in Columbia?

- a) The first medical journals like *La Gaceta Medio de Colombia* in 1864 or *Lanceta* in 1852.
- b) The first journals about mining, chemistry, or physics were published in the late 18th century nearly 100 years prior to these.
- c) The connection between Colombian medical schools and these medical journals is made by the efforts of physicians trained in France Dr. Antonio Vargas Reyes being the most

prominent. He was instrumental in the founding of these two aforementioned medical journals.

2. In 1833, two Enlightenment period institutions were merged into the beginnings of a modern medical school in Mexico. What were the three institutions?

Answer : In 1833, the Facultad de Medicina of the Real y Pontificia Universidad de México and the Real Escuela de Cirugía de México were merged to form the Establecimiento de Ciencias Médicas in Mexico City.

3. Consider our major in kinesiology and nutrition science (KNS). To what extent would we consider this medicine, in the absence of modern germ theory? That is, are there other holistic forms of medical development we encountered in Latin American history besides vaccines and drugs that fight bacteria and viruses?

Answer: Taking a look at the conversations we had during the semester about pseudo science and at home remedies, it is easy to categorize the study of body movement and function, and different foods' effect on health into a sort of premodern idea without germ theory to back it up. Before vaccines and drugs herbs and other plants were used as remedies for a number of illnesses and diseases.

4. (a) What historical event in 1808 led to the creation of the first medical and surgical schools in Brazil (b) When did Brazil declare independence from Portugal? (c) How long after independence did the Brazilians introduce modern reforms into the medical schools in Bahia and Rio de Janeiro?

- a) The transfer of the Portuguese court to Brazil in 1808 was the catalyst that sparked the creation of the first medical and surgical school in Brazil.
- b) Brazil declared its independence from Portugal in 1822.
- c) It took approximately ten years.

5. In Columbia, the Escuela de Medicina was founded in 1865. It was centered on hospital-based anatomy and physiology. Consider the following quote from the text: “The second phase is notable for the slow progress of laboratory-based medicine, especially etiopathological procedures. Its final stage, starting in the 1950s, is defined by the introduction of Flexnerian reforms from North American technological medicine.” What does the quote mean by Flexnerian? Think back to our reading in The Scientific Attitude.

Answer: The term Flexnerian refers to Abraham Flexner who published a report in 1910 critiquing the state of medical education in the U.S. His report would bring about a boom of medical reformation in North America. This quote is speaking about how the ideas from the report that were made a reality in the U.S. are beginning to pick up speed in Latin America.

6. (a) What was a major driver of modern epidemiology in 19th Century Brazil? (b) What was the purpose of the Tropicalist School of medicine? (c) When did the bubonic plague enter Brazil, and how did the Brazilians respond?

- a) Overall it was the growing interest in germ theory, however the establishment of research institutions and desire to understand the spread of disease as a result of epidemics were also key role players.
- b) The Tropicalist School of medicine studied certain health disorders attributed to regions with warm climates. These regions were thought to be inherently unhealthy and the school sought to challenge this notion and actually set up a basis of research.
- c) The bubonic plague entered Brazil in 1899 in Sao Paulo; it was contained quite easily there because of medical reformation set up seven years prior. Rio was less successful because they were not as prepared as Sao Paulo, but Federal Serotherapy Institute was set up a year later in an attempt to develop a vaccine for the disease.