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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 there 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) Studies where authors did not respond to requests for data sharing tended to have more statistical errors. Less transparency makes it harder to find mistakes or biases in analyses; therefore, it becomes less likely that errors are discovered.
b) Errors in these studies were mostly in favor of the authors' hypotheses or their preferred conclusions. The trend suggests bias, which may be due to pressures to produce significant or favorable results, which are more likely to be published or looked upon favorably within the academic community.

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) Groups are better at finding reasoning errors because they offer diverse perspectives and challenge individual biases.
(b) An example is collaborative research on Amazon deforestation, where collective expertise led to innovative conservation strategies.

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) Three facets of the peer review process that went wrong in the cold fusion episode:

1. Insufficient scrutiny: The claims were announced publicly before undergoing rigorous peer review, bypassing standard scientific protocols.

2. Lack of reproducibility: Early reviewers did not adequately verify whether the results could be replicated independently.
3. Premature publication: Pressure to publish quickly led to inadequate evaluation of the data and methods.

(b) It took approximately two to three years for the scientific community to thoroughly investigate and debunk the initial claims of cold fusion, ultimately identifying errors and determining the findings were not credible.

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

a. In Río de la Plata and Perú, professions with modern technical skills included engineering, cartography, architecture, and military engineering. Those professions requiring advanced technical knowledge were of utmost importance for the construction of infrastructure and urban planning in the times of the colony.
(b) The predominant occupation of U.S. leaders in the modern era, those who have been elected to Congress, is law. More members of Congress come out of the legal profession, which stresses skills in legislation, negotiation, and public policy.

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!)

The purpose of José Mariano Mociño's expedition to Nootka Island, commissioned by the Mexican viceroy, was to conduct scientific exploration and gather information about the natural history, geography, and resources of the region. This was part of broader efforts by Spain to assert territorial claims and expand knowledge of its Pacific Northwest holdings during the late 18th century.

6. In Per´u, we must take note of the work of Hip´olito Un´anue. (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) Hipólito Unánue's contributions:

- Promoted modern medicine, wrote on Lima’s climate and health, and helped establish the San Fernando Medical School.

(b) José Celestino Mutis's contributions:

- Led the Royal Botanical Expedition, documenting plant species and advancing Linnaean taxonomy in Latin America.

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) Latin American wars of independence began around 1810.

(b) Scientists and engineers who fought for their countries:

- Antonio José de Sucre, an engineer and military leader in South America’s independence.
- Francisco de Miranda, a Venezuelan military leader and contributor to geography.
- Andrés de Santa Cruz, a general and engineer in Peru and Bolivia.

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Unit 4

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

Germ theory was introduced about 20 years after Semmelweis's solution to childbed fever. Semmelweis proposed his antiseptic method in the 1840s, while germ theory, championed by Louis Pasteur and Robert Koch, was developed in the 1860s-1880s.

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

Though the practice of autopsies started in ancient Greece, with Hippocrates and later Galen doing dissections to understand human anatomy, the practice became more formalized in Renaissance Europe.
An autopsy is consistent with the scientific attitude, in that it deals with systematic observation, empirical evidence, and a search for understanding through direct examination. An autopsy allows causes of death to be determined, contributing knowledge to medicine and biology by way of evidence and critical analysis.

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) The discovery of penicillin was partly accidental, but Fleming's scientific curiosity and observation played a key role.

(b) Pasteur's quote means that while chance events happen, a prepared mind can recognize and take advantage of them.

(c) The discovery of cinchona was both accidental (through indigenous knowledge) and scientific (through later research and investigation).

4. What event catelyzed the formation of the Establecimiento de Ciencias de M´edicas in 1833?

The reorganization of medical education in Argentina catalyzed the formation of the Establecimiento de Ciencias Médicas in 1833. This followed revolutionary reforms of the time, in a move to modernize and professionalize medical education as part of broader attempts at advancing science and education in the newly independent nation. The establishment of this institution marked a key step in the development of formal medical education in Argentina.

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 Espa˜na. (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) Reasons for slow medical reforms in Nueva Granada:

- Political instability and economic difficulties hindered reform efforts.
- A lack of infrastructure and trained personnel slowed the development of medical institutions.

(b) Leader of medical reform in Nueva Granada:
José Celestino Mutis led the medical reform process in the 18th century.

(c) Reestablishment of the Facultad de Medicina:
It was reestablished in 1827 in Bogotá, marking the beginning of more formalized medical education in Nueva Granada. The faculty contributed to the development of medical training and practice in the region.

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) Brazil had two medical schools in the 18th century, one in Bahia and one in Rio de Janeiro, both founded in 1808.

(b) In 1807, the Portuguese royal family fled to Brazil due to the French invasion, leading to reforms, including the establishment of medical schools.

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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?

In the late 19th century, returning doctors in Colombia established the Academia Nacional de Medicina, the Hospital de San Juan de Dios, and the Facultad de Medicina to enhance medical 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?

The mountain is approximately 22.9 km away.

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?

The change in longitude is approximately 7.64 degrees.

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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) First medical journals in Colombia:
The first medical journals were published in the 19th century, such as Revista de la Sociedad de Medicina de Bogotá (1829) and Revista Médica de Bogotá (1858).

(b) Comparison with Mexico's journals:
Mexico's first mining, chemistry, and physics journals were published earlier, like Revista Mexicana de Minería (1826) and Revista de la Sociedad Mexicana de Historia Natural (1829).

(c) Connection to medical schools in Colombia:
These journals were linked to medical schools, especially in Bogotá, with contributions from faculty at the Universidad Nacional de Colombia and the Academia Nacional de Medicina.

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

In 1833, the Real y Pontificia Universidad de México merged with two Enlightenment period institutions to form the beginnings of a modern medical school in Mexico. These three institutions were:

1. La Escuela de Medicina (founded in 1821)
2. La Real y Pontificia Universidad de México
3. La Academia de Medicina

This merger helped lay the foundation for formalized medical education in Mexico.

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?

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?

Without modern theories on germs, kinesiology, and nutrition, science would still hold good with holistic health practices. In the history of Latin America, besides vaccines and drugs, herbal medicine, dietary practices, and physical therapies were important and based on indigenous knowledge of the land and traditions like the Aztecs and Incas. These practices aimed for the balance of body, mind, and environment.

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, staring in the 1950s, is defined by the introduction of Flexnerian reforms from North American technological medicine.” What does quote mean by Flexnerian? Think back to our reading in The Scientific Attitude.

The term "Flexnerian" refers to medical reforms first proposed by Abraham Flexner early in the 20th century, mainly in the United States. His 1910 report precipitated major changes in medical education: standardization and scientific methods were required of medical schools, which increasingly placed emphasis on laboratory-based training.
In the context of the quote, "Flexnerian reforms" in Colombia mean that these North American principles were adopted from the 1950s onward, where medical training became more technologically advanced and evidence-based, integrating laboratory work, research, and a focus on pathology and disease causation, or etiopathology. This represented a shift from the previous focus on anatomy and physiology in hospital settings.

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) Driver of modern epidemiology in Brazil:
The outbreak of yellow fever and other tropical diseases spurred the development of epidemiology, particularly through the work of Oswaldo Cruz.

(b) Purpose of the Tropicalist School of medicine:
It aimed to create medical practices suited to Brazil's tropical diseases, like malaria and yellow fever.

(c) Bubonic plague in Brazil:
The plague entered Brazil in 1900. Brazil responded with quarantine measures, disinfection, and the creation of the Oswaldo Cruz Institute.