

Midterm - INTD 262  
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**1 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) There was a higher error rate in those papers where authors had withheld their data sets.
  - b) 96% of the errors favored the scientists.
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) This suggests that when we are placed in a group, our reasoning skills improve. We scrutinize one another’s hypotheses and criticize one another’s logic.
  - b) Scientific expeditions like the Expedición Botánica led by José Celestino Mutis involved a large team of scientists, naturalists, and local experts. They collected and documented thousands of plant species. This collective effort led to significant advances in botany.
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) (i) Lack of reproducibility, (ii) rush to publication, (iii) insufficient validation
  - b) Two months
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 Rio de la Plata and Peru? (b) What is the primary profession of modern US leaders, for example, elected to The United States Congress?*
  - a) **Examples:** Mining of mercury, cartography/geography, and sailing
  - b) **Examples:** Lawyers, doctors, and financiers

5. *Jose Mariano Mocino 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!)*

**Purpose:** Study animals, minerals, and planet wealth of the area

6. *In Peru, 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 Jose Celestino Mutis. What are some of his main contributions?*
- a) **Unánue's Contributions:** Botany (coca) and Anfiteatro Anatómico  
b) **Mutis's Contributions:** Modern math/physics and Expedición Botánica
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) The movement for independence in Latin American nations emerged in 1810.  
b) **Examples:** Francisco José de Caldas (military engineer and *Diario Político* editor) was executed in 1816. Jorge Tadeo Lozano and Lino de Pombo were also executed for being connected to the Expedición Botánica.

## 2 Unit 4

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

Semmelweis's solution to childbed fever was introduced in 1846. Germ theory was introduced in the 1860s.

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

The practices of autopsies began in Paris. Performing an autopsy fits with the scientific attitude because they were used to corroborate bedside diagnoses – they provide empirical evidence. Scientists used autopsies to draw conclusions from observable and measurable data.

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) I think the discovery of penicillin was an accident, however, the development of the drug was not.  
b) This quote means that one has to be actively looking for, capitalizing on, and analyzing the opportunities that present themselves.  
c) Like (a), perhaps the discovery of the cinchona was an accident, however, the development was not.

4. *What event catalyzed the formation of the Establecimiento de Ciencias de Medicas in 1833?*

The liberal reforms of the war for independence closed the university, created the Establecimiento de Ciencias de Medicas, and introduced the teaching of new French anatomical and clinical medicine.

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 Espana. (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) The author explained that medical reforms were slow to materialize in Nueva Granada because of the kingdom's low productivity and demographic density.
- b) José Celestino Mutis
- c) 1802 in the Colegio del Rosario after an important polemic concerning the problem of health and medicine in Nueva Granada.

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) The medical school at Coimbra was the only one in the Portuguese world.
- b) The Portuguese Crown fled to Brazil, which introduced modern medical practices, established hospitals and medical schools, and promoted public health initiatives.

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?*

(i) Medical schools, (ii) health-related policy, (iii) health research.

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?*

$$\theta = 5^\circ \times (\pi / 180^\circ) = \pi / 36 (= 0.0873)$$

$$d = b / \theta$$

$$d = 1 \text{ km} / 0.0873 = \mathbf{11.4591 \text{ km}}$$

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?*

- a) Radians = Degrees  $\times (\pi / 180^\circ) = 0.5^\circ \times (\pi / 180^\circ) = 0.0087$  radians  
Distance = Radius  $\times$  Angle = 6,371 km  $\times$  0.0087 radians = **55.5975 km**
- b)  $C = 2\pi R \cos(\theta)$   
 $C = 2\pi \times 6,371 \text{ km} \times \cos(45^\circ) = 28,305.6072 \text{ km}$   
Distance per degree =  $C / 360^\circ = 28,305.6072 / 360^\circ = 78.6267 \text{ km}$   
Change in longitude = Distance / Distance per degree = 600 km / 78.6276 km = **7.63091°**

### 3 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) **Examples:** *La Lanceta* (1852) and *La Gaceta Medica* (1864)
- b) The first mining, chemistry, and physics journals in Mexico were published in 1761 with the *Comentarios A Las Ordenanzas de Minas*. There was a one-hundred-year difference because they had to build the schools.
- c) These journals were connected to medical schools in Columbia in 1865 through Antonio Vargas Reyes. This is because he was good at translating scientific progress into educational curriculum.

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

(i) Facultad de Medicina, (ii) Real Escuela de Cinugia, (iii) Establecimiento de Ciencias Medicas

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?*

Kinesiology and nutrition science would be considered medicine in the absence of modern germ theory because there are other holistic forms of medical development.

**Examples:** Physical therapy, acupuncture, and chiropractors → Need to know anatomy

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 Portuguese court moved to Rio de Janeiro, Brazil.
- b) 1822
- c) Two 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 quote mean by Flexnerian? Think back to our reading in The Scientific Attitude.*

Abraham Flexner created the Flexner Report. He expressed a need to build medical labs with educational standards.

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) There was an interest in epidemic diseases (specifically tropical)
  - b) **Purpose:** Critique outdated medical teachings and promote original research into Brazilian diseases.
  - c) 1899; The Brazilians were skeptical.