Narratives and the Interdisciplinary Nature of Energy

Adonis Yatchew
Professor, Economics Department, University of Toronto
VP Publication, IAEE
Editor-in-Chief Emeritus (2006-2023), *The Energy Journal*

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Who does the best time-series analysis at the university – economists, engineers, statisticians?

Narratives are to historians as models are to econometricians.

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Foiled again

How the Bernoulli principle changed history

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Sailing into the Wind

- In Roman times it took two weeks to sail from Rome to Alexandria, two months to return (you had to row)

- Efficient sailing ***into*** the wind can be achieved using a triangular sail, which is not in common use until the 8th or 9th century CE.

- Air passes along the forward surface of the sail more quickly, thus reducing pressure. The sail is sucked forward (rather than being pushed from behind).

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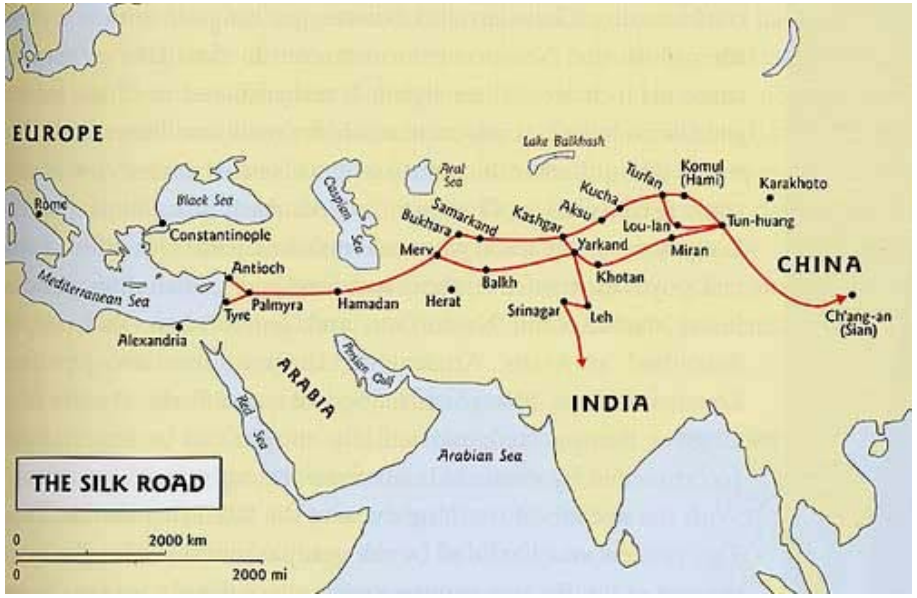
Following the Silk Road

(Han Dynasty 200 BCE – 200 CE, Yuan Dynasty ca 13 century CE (think Marco Polo visiting Kublai Khan, grandson of Genghis Khan, around 1270)



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Avoiding the Silk Road

- The rise of the Ottoman Empire and conflict with European powers
  - fall of Constantinople (Istanbul) in 1453
  - travel and trade along the Silk Road becomes an increasingly risky and costly proposition for European traders.

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Globalization

Age of ‘Discovery’ (from 1500 CE)

- Ocean routes from Europe to India, China, Indonesia – spurred by desire to avoid overland travel via the Silk Road
- Search for a ‘shorter’ westward route to China and India led to European ‘discovery’ of the Americas
- None of this would have been possible without the advances in sailing (airfoil, fore and aft rigging, stern mounted rudder) and navigation (compass,…)

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Avoiding the Silk Road

Vasco da Gama 1498

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Foil Arms

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America’s Cup / SailGP

Foiling boats are a remarkable combination of three applications of the foil:

- The conventional triangular sail at the front. This is the only sail on the vessel.
- The ‘wing-sail’ which is rigid with adjustable control surfaces.
- The horizontal portions of the dagger-boards which ‘lift’ the hull out of the water. These are the hydro-foils.

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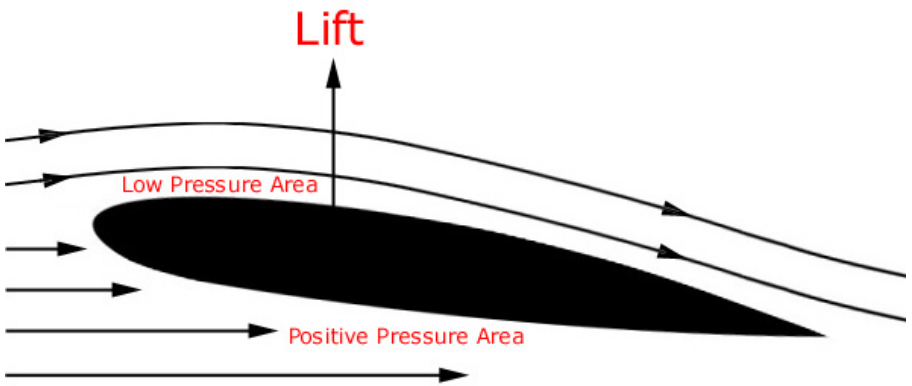
Foils

The Bernoulli Principle

How does an airplane fly? The wing is being sucked upwards.



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Teaching Strategies

- Traditional departure point for teaching: facts, theories, models.
  - Expressed verbally, visually, mathematically
- But AI permits
  - Instantaneous availability of facts.
  - Increasingly easy acquisition of theories, models and code.
- Evolving elements of teaching
  - Departure point is narratives
    - These supported by factual/empirical arguments, theories, parsimonious models
  - In large classes (40+) no papers
    - Individualized data-based assignments

  In small classes, research papers with oral/ written testing

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Comments

- Narratives are how historians make sense of complex historical events. They take massive amounts of evidence (documents, artifacts, testimonies, data) and organize them into a coherent story that explains what happened and why. Narratives simplify reality while preserving its essential causal structure and meaning.

- Models, for econometricians, serve a similar role. Econometricians take large sets of data about economic behavior and relationships and organize them into a formal representation—a statistical model—that explains or predicts phenomena. Like narratives, models are simplifications that aim to capture the key relationships in a complex system.

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Comments

- Energy policy must be understood within the long arc of history, geo/politics and society
- It is difficult to understate the role that energy has played in civilizational and geopolitical conflict
  - think bronze age civilizations confronted with stronger weapons of iron age civilizations
- What does innovation mean?
  - technological, political, social

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What are the challenges facing humanity?

- Environmental/climate change
- Erosion of democracy/human rights
- AI
- Poverty
- WMD
- Pandemics?

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Selfies

Group Selfie

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