

Oct 20

- 1. Administrative**
- 2. Studying laboratories**
- 3. Negotiation of scientific phenomena**
- 4. Reading discussion**

Small delay in feedback

- ∴ I was ill at the beginning of the week, and am still catching up on marks/feedback for discussion question submissions

Discussion question submissions feedback

- ∴ Focus on a *single* idea that can be interrogated from multiple angles
- ∴ *You must include a “motivation” section*
(see slides from Jan 28 and Feb 9 for details and examples)

Mid-term peer evaluation

- ∴ Next week, each student will receive a rubric for evaluating your group-mate's contribution
- ∴ The results *will not affect the final grade*

Studying laboratories

Studying laboratories

Scientific labs as site

In the 1970s and 1980s, STS scholars began conducting ethnographies in scientific labs.

If scientific knowledge has a social component, scholars should focus on the *process* of knowledge creation.

Study the formulation of facts in a lab just as you would study any social process—field work, ethnography, conversation analysis, interviews, ...



Themes of laboratory studies

Tacit knowledge

- ∴ A big part of scientific knowledge cannot be written down, but is embodied in skills, ‘tinkering’ (Knorr Cetina), and tacit knowledge (Collins)
- ∴ “... experiments do not work; the numbers have to be cooked, the reaction doesn't react, the phage does not grow.” (Hacking 1983, 229)

Negotiation

- ∴ Scientific observations, findings, and facts are not apparent, but must be *actively* constructed.

Translation

- ∴ Particular findings are susceptible to varied narratives.
- ∴ Scientists must engage in *translation* of facts and data for different purposes (Latour, Callon).

Negotiation of scientific phenomena

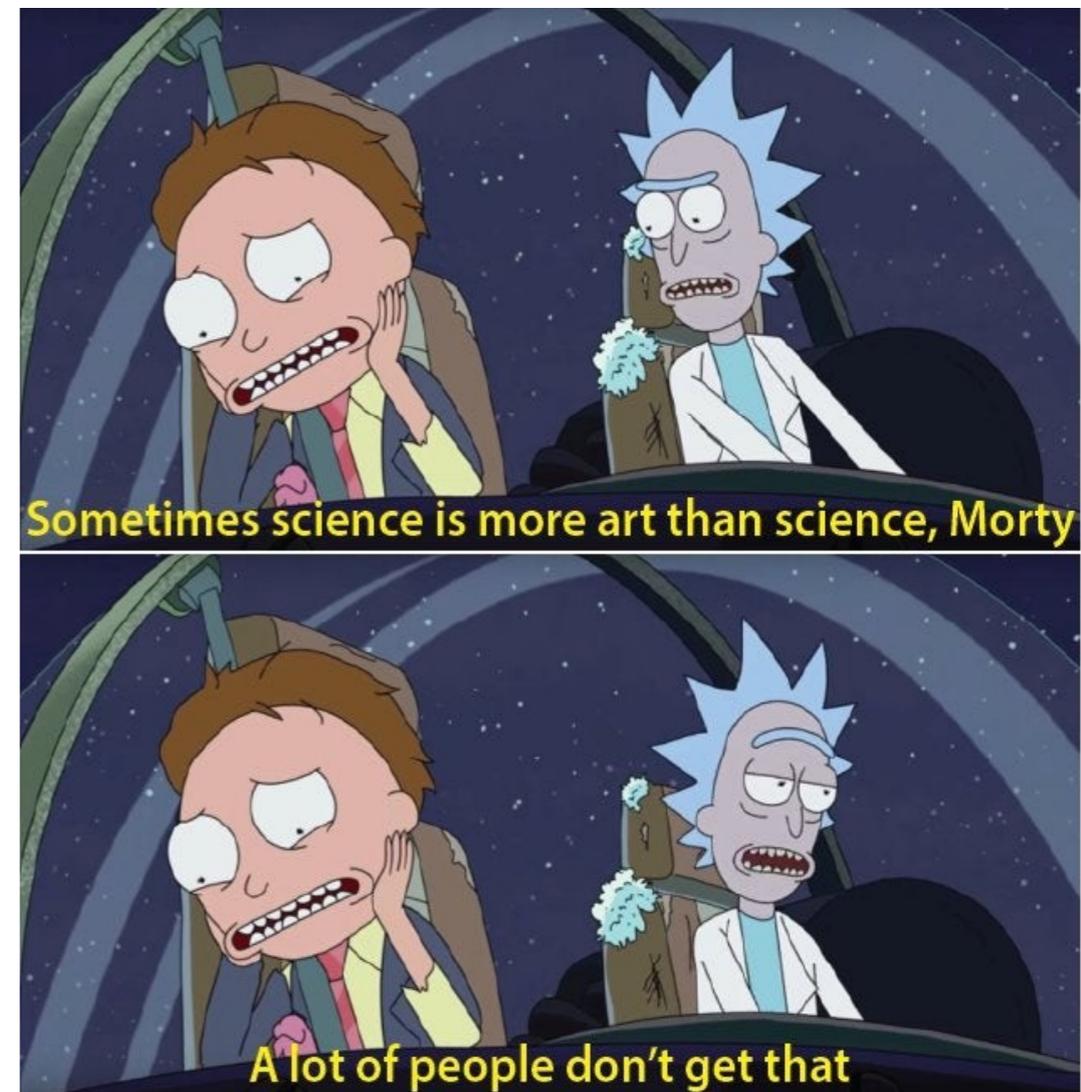
Negotiating phenomena

Transferring knowledge (Collins 1975)

Replication in science involves transmitting knowledge about a phenomena of interest.

How should we understand this process?

- ∴ **Algorithmical model:**
“a finite series of unambiguous instructions which can be formulated [and] transferred” (206)
- ∴ **Enculturational model:**
Reproduction relies on shared assumptions, categories, skills, and baseline knowledge.



The only way to tell whether knowledge has been transferred is to see if the recipient's experiment '*works.*'

Negotiating phenomena

Gravitational waves

In the 1970s, scientists had not yet settled on what a credible experiment to detect gravitational waves should look like. There was no agreement on what would qualify as “*working.*”

Detecting gravitational waves was part of the *normal science* of confirming Einstein’s general relativity.

In negotiating what constituted a “competent” *experiment* in gravitational waves, the scientists were actually negotiating the relevant *characteristics* of gravitational waves.

If gravitational waves were purely theoretical (in 1975), then *to negotiate their characteristics was to negotiate gravitational waves themselves.*



Joseph Weber (“O”) working on a resonant-mass gravitational wave antenna, or “Weber bar” (c. 1965)

Negotiating phenomena

It may not be long before the scientific community decides that the claims of the originator are completely spurious, or on the other hand, revolutionary. When that happens, and a new natural element in the scientific world has been constructed, the following section of my paper will look quaint. That is what is particularly interesting about writing it *now* before the solid existence of the facts clouds the look of contingency about their origins. (Collins 1975, 209)

- ∴ International network of large interferometers
- ∴ Agreement on “What counts as a ‘working gravity wave detector’” (Collins 1975, 211)
- ∴ Agreement on relevant properties of gravitational waves



One of the Virgo interferometers (near Pisa, Italy) used in the first ‘direct’ observation of gravitational waves in 2015

Discussion

Representing reality

Required reading:

- Amann and Cetina (1988)
The Fixation of (Visual) Evidence

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