

# SCIENCE AS PRACTICE OR: WHAT ARE FACTS AND WHERE DO THEY COME FROM?



THEORIES OF SCIENCE

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# PART I: CLASSIC DEBATE ON THE CONSTRUCTION OF SCIENTIFIC FACTS

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Collins & Yearley versus Callon & Latour



### 3 FACT OR NOT A FACT?

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- If I drop something solid, it will move down to the floor.



## 4 FACT OR NOT A FACT?

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- If I drop something solid, gravitational force will make it move down to the floor.



## 5 FACT OR NOT A FACT?

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- Climate change is real, at least in the sense that the average weather phenomena today are different than they were 100 years ago.

## 6 FACT OR NOT A FACT?

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- Climate change is the result of human action.



## 7 FACT OR NOT A FACT?

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- It is essential for human survival that we act upon climate change today.

## 8 FACT OR NOT A FACT?

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- COVID-19 vaccines have contributed to conquering the COVID-19 virus.
- The COVID-19 virus most likely came from bats.



## 9 THOUGHT EXPERIMENT

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Suppose we want to establish the following fact:

***“Smoking tobacco causes lung cancer.”***

- What would that require?
- What are the things that “go into” (or “have gone into”) this fact?
- What does/did/will the process of “arriving at agreement” look like?

*Discuss this for 5 minutes in groups of 3.*



# 10 ... WELL... THAT'S JUST AN OPINION!

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- It is not so difficult to argue about all kinds of facts that they are
  - Made up by humans
  - Constructed
  - Politically informed or even contaminated
- The interesting part is when people (you, me, scientists, presidents) drop the disputation and start acting *as if the fact were true*.
- This is the moment of **closure**.

## II CLOSURE (I)

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Closure is defined as the moment when:

- contestation of a claim stops,
- all relevant parties start accepting it as a fact,
- the controversy starts to fade out of view,
- and it starts to appear as if the fact has always been true.

## 12 CLOSURE (2)

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Closure raises questions for the social study of science:

- Why do people start to treat the fact as a fact?
  - What eliminates their doubts?
  - What makes taking-it-to-be-true more attractive/important than doubting?
- Why and how do they forget about the controversy?
- What kind of work does it take to get the fact accepted and the controversy forgotten?

Who cares???

- Well, social science is not least about *how people construct their life worlds*. Facts are important ingredients!
- And it shows *how things could have been otherwise*, and thus how power is dissipated.



## I3 CLOSURE (3)

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What does this imply?

- Of course, looking at closure as a social phenomenon *makes* it a social phenomenon. (But that is what keeps us social scientists off the street.)
- In this view, *true* is a social attribute, not a judgment passed from correspondence-model view from nowhere.
- Truth is relative to a particular culture and a particular place and time.



## 14 CLOSURE (4)

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What does this **not** imply?

- That facts are made of thin air.

But rather:

- Facts can be true in many meaningful senses, and still be argued to be ‘constructed’.
- Think of construction not so much as ‘making things up’, but as ‘negotiating with reality in all its social and natural aspects’.



## 15 WRAP UP

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- What do you think is a fact?
- What do you think of facts in politics and debate, fake news, conspiracy theories and all other ‘facts that matter out there’?
- Side question: what is the literal meaning of the Latin word ‘factum’?

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Part IB: Now we talk about the actual texts by Collins & Yearly and Callon & Latour

## 17 COLLINS & YEARLEY

## CALLON & LATOUR

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- Facts are human-made, right?
  - Right. Kind-of.
  - Ok then, more precisely: people put a lot of work in building the boundary between *false* and *true* statements.
  - Yes. Kind-of.
  - What's with this “kind of”??? Yes or no?!

## | 8 COLLINS & YEARLEY

## CALLON & LATOUR

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- Because we sociologists have specialized in human action.
  - What else can we do? A social-realist perspective is the only way to show continuity between culture and science.
- Well... How do you know what results from humans and what results from elsewhere?
  - Ah! So you first claim that you know what is human action, then you show us: look, this is human action! Clever...

## | 9 COLLINS & YEARLEY

- CHICKEN!!!

## CALLON & LATOUR

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- But the problem is: you cannot know beforehand where culture ends and nature begins.
- Oh, come on. You're the ones who cheaply buy into 'knowledge of the social'. We criticize your 'social realism' and give proper attention to the role of nature.



## 20 COLLINS & YEARLEY

- Funny. Your 'following the artifacts' is equally dependent on natural-realist accounts of nature: you assume you know nature, and hence you know what the artifacts are.
- Said so: chicken...

## CALLON & LATOUR

- We do so by 'following the artifacts' that offer important building blocks of what we call social.
- Ok, fair enough. But the real problem is that your terms are so clean that they obscure the messiness of relations.



## 2 | COLLINS & YEARLEY

- ...

## CALLON & LATOUR

- We contest hegemony of natural science just as much as you do. Just not by simply showing they are social practices, but by arguing that they unjustly assume power over the separation between *nature* and *society*.
- On a side note, how can you contest scientists' hegemony over the definition of nature, while you limit yourself to social explanations?

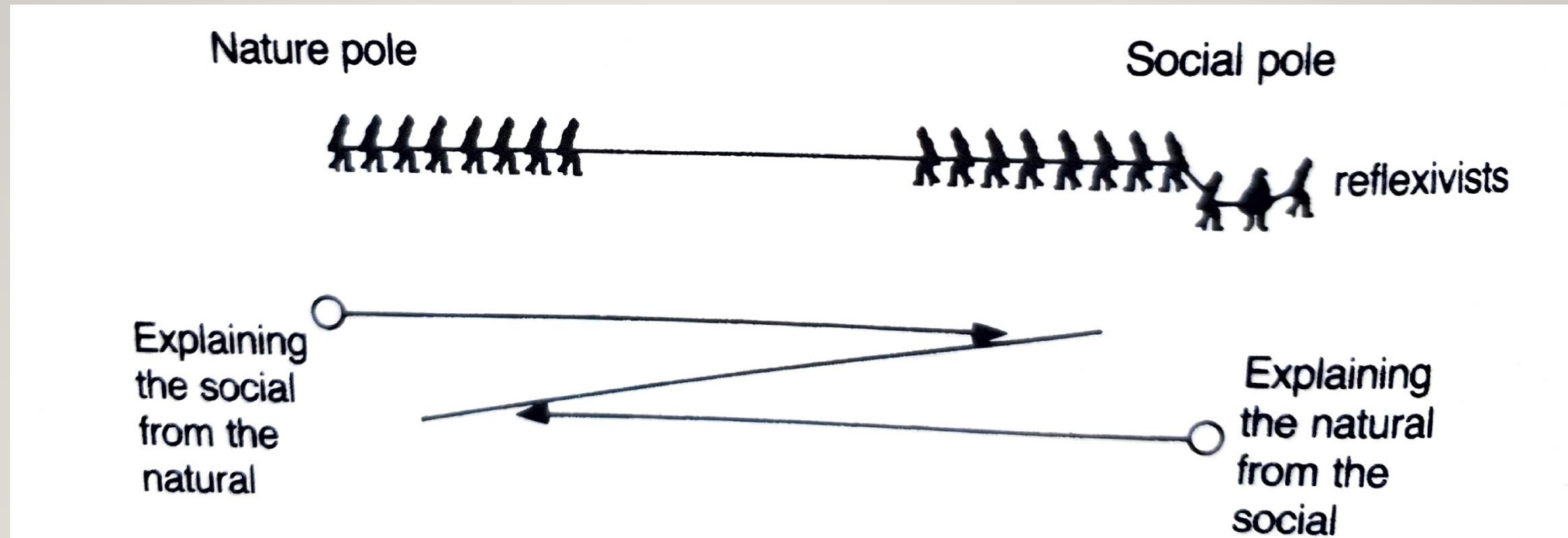
- ...

“...”, meaning: to the best of my knowledge, C&Y offer no convincing argument against this. A little bit comes in the 13th chapter, *A Journey Into Space*. There the argument seems to be that C&L’s framework is good for description, but then falls short of providing any meaning, and hence any value or action perspective. It is a big story that crumbles in face of real problems. Instead, Collins and Yearly prefer to have a system that can at least accomplish some things, while recognizing its imperfections. The main accomplishment is that it gives a proper place to the pivotal roles of humans and their meanings.

Science

- We avoid this by making the boundary between nature and society *itself* to be the explanandum, rather than the explanans.

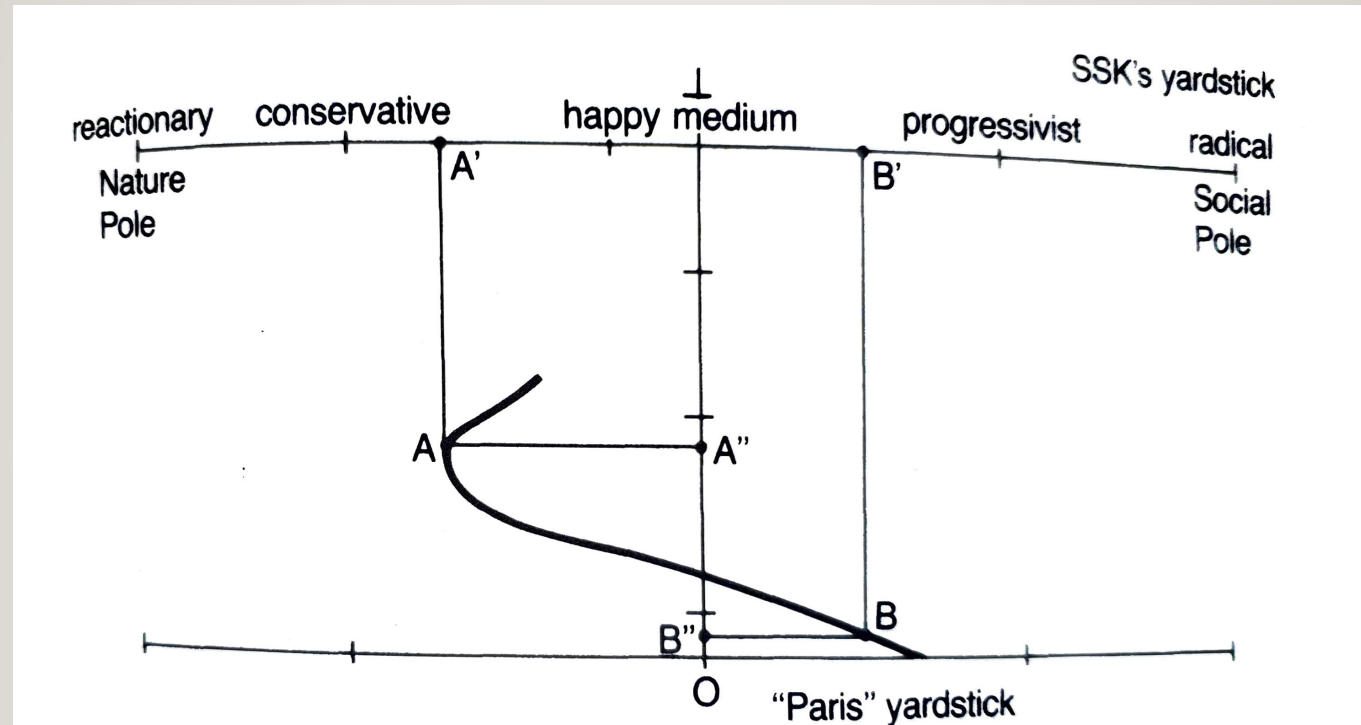
## 24 NATURAL OR SOCIAL CAUSES OF CLOSURE? (I)



From: Callon & Latour in A. Pickering: *Science as practice and culture*, p. 346



## 25 NATURAL OR SOCIAL CAUSES OF CLOSURE? (2)



From: Callon & Latour in A. Pickering: *Science as practice and culture*, p. 349

## 26 RECAP QUESTIONS

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- Is truth made up from thin air?
- What can we say about the politicization of
  - Facts in general?
  - Science in particular?
- Further to that: what can we say about the boundary between
  - Science and opinion in particular?
  - Facts and values in general?



## 27 WHY STUDY CONTROVERSIES, AND WHY STUDY SCIENCE AS PRACTICE?

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- Controversies are where *closure* is accomplished (eventually).
- Prior to closure, the inner workings of science and technology are visible.
- Only by looking at what *scientists actually do* and *how scientific facts travel and gain stability*, can you begin to glean all that goes into this closure and the production of facts.
- And, following Callon&Latour, not only look at the *scientists*, but at all the (human and non-human) relations that are established.

## 28 WHY STUDY CONTROVERSIES, AND WHY STUDY SCIENCE AS PRACTICE? (2)

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- Also: various *levels* of (potential) politicization/contestation:
  - Facts themselves
  - Agenda setting (not discussed)
  - Boundaries of *the very realm* of facts (i.e. denouncing something as political!)

*Discussion: revisit the “tobacco causes lung cancer” experiment...*

## PART 2: FACTS AND PRACTICES IN 2025

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Marres



## 30 MARRES: GETTING OUR FACTS BACK?

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Main problem:

- “Facts” in the public sphere have become unstable, denied, and fake.

Common answer:

- Let’s put fact-checkers to work!

## 3 | MARRES: GETTING OUR FACTS BACK?

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Problem-with-the-problem:

- Not so much about where the lies come from, but how truth is validated:
- Quality is no longer an attribute or property of the information itself.
- Nor is it “straightforwardly” social: more about technical procedures than about understanding, meaning, knowledge-exchange.
  - “Social media are a truth-less public sphere by design.”
- Also, the problem is not with facts as such. Experts still produce and use them. It is about dissolution of facts *specifically in the public sphere*.



CLICKS  
& ALGOS



## 32 MARRES: GETTING OUR FACTS BACK?

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Problem with common solution of fact-checking:

- Over-reliance on experts
- Re-installation of hierarchy of knowledge above non-knowledge (expert superior to lay)
  - Note that this is a form of *demarcationism* that was central to C&Y vs C&L! → Who is in charge of the boundary?
- Return to **correspondence model of truth**
- Does not provide understanding of problem of non-knowledge
  - AI makes it worse: correspondence model *without interpretation*.



## 33 MARRES: GETTING OUR FACTS BACK?

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Marres' alternative to solution of fact-checkers:

- Recognition of epistemic diversity.
- Recognition of need to validate knowledge *in public*.
  - This is the whole idea of *how knowledge relates to democracy*: knowledge is not outside democracy and on-the-shelf as 'fixed facts', but inside, as something democracies themselves need to nurture.
- Recognition that this is a dynamic (and ever-lasting) process.
- Recognition that experts cannot and should not be secure (or: complacent...) in their public authority.

## 34 CONCLUSION

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- What connections do you see between Marres, Callon&Latour, and Collins&Yearley?
- How does it (not) make sense to think of scientific research as a social practice?
- How do you, as an academic, contribute to the production of facts?
- How is your academic research connected to
  - politics?
  - opinions?
  - fake-news?