

## Logical empiricism / positivism

### Key elements of a logical positivist /empiricist conception of science

- Motivations for post WW1 'scientific philosophy'
  - viscerally opposed to speculation / mere metaphysics / idealism
  - a normative demarcation project: to show why science is and should be epistemically authoritative
- Empiricist commitments
- Logicism

## Some empiricist slogans

- Hume's 18<sup>th</sup> century book-burning passage
- Comte's mid-19<sup>th</sup> century rejection of 'speculation after first & final causes'
- Duhem's late 19<sup>th</sup>/early 20<sup>th</sup> century slogan: 'save the phenomena'
- Hempel's injunction against 'detours through the realm of unobservables'

## Vienna Circle

So - what was the motivation for this "revolutionary, uncompromising empiricism"? (Godfrey Smith, Ch. 2)

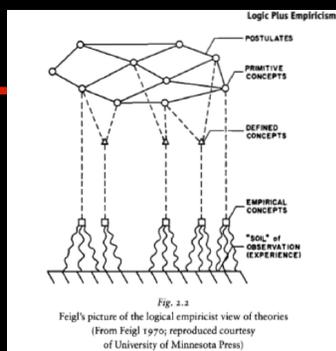
Why the "massive intellectual housecleaning"? (Godfrey Smith)

Consider the context: World War I / the interwar period

## Conflicts & Memories: The First World War Maria Marchant

- Debussy: Berceuse héroïque, Élégie  
written war-time Paris (1914), heralds the ominous bugle call of war
- Rachmaninov: Études-Tableaux Op. 39, No 8, 5  
"some of the most impassioned, fervent work the composer wrote"
- Ireland: Rhapsody, London Nights, London Pieces  
a "turbulent, virtuosic work..."
- Prokofiev: Visions Fugitives, Op. 22  
written just before he fled as a fugitive himself to the US (1917); military aggression & sardonic irony
- Ravel: Le Tombeau de Couperin  
each of six movements dedicated to a friend who died in the war

analytic : synthetic  
distinction  
verificationist theory  
of meaning and of  
cognitive significance  
\*\*\*  
empirical foundations  
universal rules of  
inference



## Key problem (1): logicism

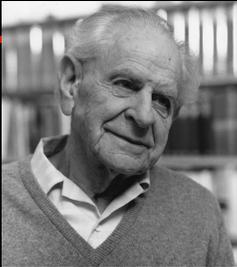
- Are there, in fact, "rules" governing inference that are rational in the sense that they compel, will be endorsed by all: formal logic / probability theory as constitutive of rationality?  
A subsidiary worry: are scientific theories systems of propositions; is logic the appropriate tool of analysis?
- And can the likely suspects do the job?  
Under-determination of (interesting/general) theories and hypotheses by (particular) observations  
= the limitations of deductivist models of confirmation / theory-evidence relations

## Karl Popper

The honourable opposition

Deductive certainty only with falsification

'If we are uncritical we shall always find what we want; we shall look for, and find, confirmations, and we shall look away from, and not see, whatever might be dangerous our pet theories.'



Lucinda Douglas Menzies

## Does falsificationism solve the problem?

Consider falsification testing of the hypothesis 'all swans are white' OR 'sore throats lead to colds'

- Are observations of counter-instances – particulars (or samples) that violate the expectations of the hypothesis – necessarily disconfirming?
- Are they as decisive as Popper thought / hoped?
- Why not?

## Key problem (2): what exactly is the empirical 'soil'?

- Holism: scaffolding and auxiliaries
- Theory-ladenness of observation
  - Does the 'fact : theory' distinction hold?
  - Is there a universal language of observation?
  - Can we avoid 'detours through the realm of unobservables?' (Hempel's 'Theoretician's Dilemma')

## Another key problem (3): facts vs values

Context of justification

Context of discovery

Context of application

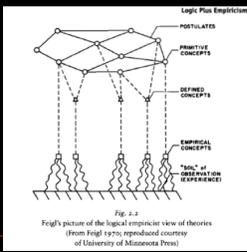
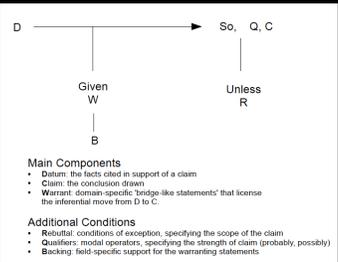


Fig. 2.1  
Foght's picture of the logical empiricist view of theories  
(From Foght 1970 reproduced courtesy of University of Missouri Press)

## Uses of argument: Toulmin schema



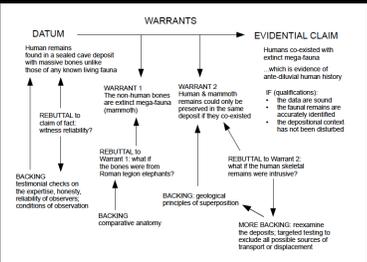
Main Components

- Datum: the facts cited in support of a claim
- Claim: the conclusion drawn
- Warrant: domain-specific 'bridge-like statements' that license the inferential move from D to C

Additional Conditions

- Rebuttal: conditions of exception, specifying the scope of the claim
- Qualifiers: modal operators, specifying the strength of claim (probably, possibly)
- Backing: field-specific support for the warranting statements

## Uses of argument – in archaeology



DATUM: Human remains found in a sealed cave deposit with multiple bones and a trace of any known living fauna

WARRANTS

WARRANT 1: The non-human bones are extinct mega-fauna (renewable)

WARRANT 2: Humans & non-human remains could only be deposited in the same deposit if they co-existed

EVIDENTIAL CLAIM: Humans co-existed with extinct mega-fauna which is evidence of late Pleistocene human history

REBUTTAL to claim of fact: witness reliability?

REBUTTAL to Warrant 1: What if the bones were from human legions elephants?

REBUTTAL to Warrant 2: What if the human skeletal remains were intrusive?

BACKING: geological principles of superposition

BACKING: geotaphic principles of superposition

BACKING: comparative anatomy

REBUTTAL to claim of fact: the expertise, honesty, reliability of observers, conditions of observation

MORE BACKING: re-examine the deposits, targeted testing to exclude all possible sources of transport or displacement