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Popper's achievement

Sir – I should like to add to Hermann Bondi's obituary (Nature 371, 478; 1994). Popper cleared away an error that had entrapped ideas about human rationality since the Greeks.

The rationality of science poses a problem: scientists judge some theories to be better than others. In doing this they reason with arguments. But how do they give that judgement rational authority? From Plato onwards, one approach has dominated: philosophers took the authority of rationality to be in some way transmitted from a source. Popper broke with this tradition. Rationality, he argued got its authority from our goals — in the case of science — the search for truth. Likewise for the rationality of politics: no source exists for the right rule of society, but we can aim for better ones.

The novelty of his innovation stands out against the history of attempts to fathom the nature of human rationality. This has otherwise been one of failed attempts to find its source. Plato suggested Forms and Ideas. Others have proposed God, Being, innate or *a priori* ideas, empiric data, monads, elementary propositions, and various types of intuitions and foundations. Sometimes the notion that rationality linked with truth has been dropped while its origin in a source has been kept: ideological superstructures, social contingencies and epistemes. Even sceptics did not deny that the authority of rationality came from a source only that it could be transmitted to our beliefs.

This pursuit arises from a basic error: the assumption that because we use sources to back our arguments, the ultimate authority made by arguing — rationality — must likewise come from one. But counter-examples exist that dissociate them. Consider air safety: aircraft designs have an authority - airworthiness — that derives from argument and sources — research findings and crash reports. But the authority they make comes from a goal — the desire to fly safe aircraft. No argument can show that an aircraft is safe (we cannot inductively infer that an accident-free aircraft will be so in the future). What argument can do is let us (or rather civil aviation bodies on our behalf) winnow out unsafe aircraft designs. The more vigorous and exhaustive that search, the more authoritative such judgements are about airworthiness.

The source approach to rationality is also rooted in human experience. As people, we often seek sources of authority to guide what we should do and believe. Children when uncertain look to their parents (social referencing). Uncertain adults, as Stanley Milgram found in his infamous obedience experiments, turn not to their own judgement but to apparent figures of authority. People in religion seek the origins of morality, existence and meaning from supernatural sources. Philosophers often sought in metaphysics a

realm of certainty to which they could turn to satisfy such needs for rational beliefs.

That was until Popper. He was the first thinker to explore whether rationality could come from our goals. Whether his suggestions how we did this — criticism, conjectures and refutations — are the right ones, he asked questions that philosophers should have been asking centuries ago. By venturing to raise and explore them in the twentieth century, he, more than anyone else since the Greeks, changed how we understand the function of reasoning in science and society.

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