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Contesting Democracy: Science Popularisation and Public Choice

Jon Adams

London School of Economics

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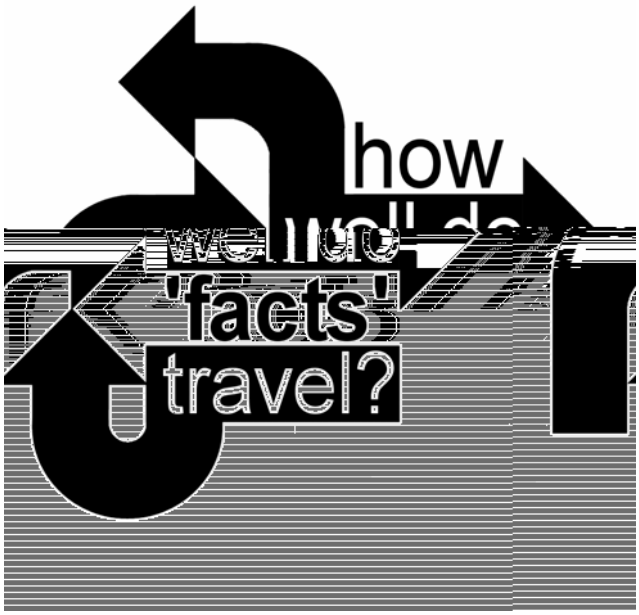

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Series Editor:

Dr. Jonathan Adams
Department of Economic History
London School of Economics
Houghton Street
London, WC2A 2AE

Tel: +44 (0) 20 7955 6727
Fax: +44 (0) 20 7955 7730

Contesting Democracy: Science Popularisation and Public Choice

Jon Adams

Abstract

During the same period in which political decisions became increasingly indistinguishe (ed – and s)Tj12 0 0 12 419.02249 595.76062 Tm(c)Tj

> concerning the fundamentals of science and of how it may affect the daily operation of our lives is both fully, accurately and widely disseminated. In no other way can we expect the great mass of human beings properly to understand that which is fundamental to their well-being or to act sanely on the basis of that understanding.[1]

Many foresaw a future where political decisions were increasingly indistinguishable from decisions about science and technology. As scientific progress outstripped scientific education, a laity at once increasingly reliant upon science and technology yet increasingly ignorant of their workings would suffer increasingly limited participation in the democratic process: fertile conditions indeed under which the type of government envisaged by *Brave New World* might plausibly emerge.

Aldous Huxley himself, writing in the 1940s, was typical in underlining the importance of science popularisation.

> Abbreviation is a necessary evil and the abbreviator's business is to make the best of a job which, though intrinsically bad, is still better than nothing. He must learn to simplify, but not to the point of falsification. He must learn to concentrate on the essentials of a situation, but without ignoring many of reality's qualifying side-issues. In this way he may be able to tell not indeed the whole truth (for the whole truth about almost any important subject is incompatible with brevity), but considerably more than the dangerous quarter-truths and half-truths which have always been the current coin of thought.[2]

The "abbreviator's business" was of no little importance: at stake was the freedom of society. Huxley's message was not that science and technology are bad, but that a society that narrows the channels of communication between those who produce technologies and those consume them risks chronic stratification.

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[1] "Science Service Conference" *Science* 76.1964 (August 19, 1932), pp. 151-158, p. 153

[2] Foreword, *Brave New World Revisited*, n.p.

The wider the gap between public and expert knowledge becomes, the less opportunity the people (on the wrong side) will have to meaningfully participate in the democratic process, and the greater the risk that a society will emerge where the scientifically literate control the scientifically illiterate – whose ignorance they are then in a position to strategically maintain. The dystopian element in both *Brave New World* and (to an even greater extent) *1984* is facilitated by the manipulation of information. For Orwell, that information was political, and manipulated using primarily literary devices: rephrasing, rewriting, fictionalising. In *Brave New World*, the information is knowledge about science and technology, and manipulated through a hierarchically organised society and the mass dispensation of narcotics. In Orwell's future, journalism was the method of suppression. In HuxleygTD.5 it(is)Tj0.00011 Tc -0.

The Origi

It is useless, E. W. argued, to think of making the world safe for democracy without thinking also of making democracy safe for itself. And both Scripps and Ritter were convinced that the only possible way of making dem

future against apocalypse, and – as the politics of the Cold War became the locus of public debate – of defining the distinctly open American society against the closed Orwellian society of the Soviets. The war had been won *with* science, and *for* democracy.

By those whose business consisted in the promotion of sci

democratic future. Yet the production of “good popularisation of science” able to do useful democratic work was problematic. Not only were there problems with the translation of increasingly sophisticated scientific information into an accessible form, but when Slosson first began work at Science Service’s Washington offices, science popularisation itself was in a poor state.

Rescuing Popular Science From Popular Taste

A professional dismay with the low standards of existing popularisation during Science Service’s first years is evident from contemporary reports. In a letter to *Science* in 1922, one disgruntled scientist (E. T. Brewster, to whom we will shortly return) writes to complain that “the world just now is being drowned in a vast wave of superstition, that is bringing in every sort of pre-scientific opinion that the nineteenth century thought disposed of for good and all.”[12] It is a charge corroborated by the work of historian John C. Burnham, who holds the quality of science popularisation to be inversely proportional to the complexity of the science being popularised; a situation that leads to an inevitable decline in the quality of science popularisation as the sciences become ever more complex. As told in his 1986 book, *How Superstition Won and Science Lost*, Burnham’

drifted away from its Victorian origins as a means of public betterment. And, as science popularisation became increasingly remote, so the "forces of superstition" were able to seize their chance, and flood the enfeebled American mind with magical thinking and nonsense. The language of biblical deluge is not accidental: Burnham really does describe the story of science popularisation in terms of an epic moral loss; reiterating what Andrew Ross once called "the myth of scientists […] standing firm against a tide of superstitions."[13] That is, rather than party to the inevitable and benign drift of taste and modes of presentation, Burnham sees the changes in science writing as evidential of rationality's weakening purchase on an increasingly infantilised public. Though the thoroughness of Burnham's scholarship is unsurpassed here, the tone of his grumblings is surprisingly commonpls87snek17 5653ds7 67

last is a complaint that would be echoed by Watson Davies, who recalls how a science report he had written for the *Washington Herald* was “corrected” in such a way that the results being reported were entirely inverted. Significantly, he recalls this being “about a year before the organization of Science Servic

simply gossip […] we have little to hope from them."[19] But if the editors had hoped to secure a larger audience through dumbing-down the scientific content of their publications, the actual effect – in the long term – was quite the opposite. Allen again: "many intelligent readers say they either do not read or do not believe the stuff peddled as science by most newspapers. Under such conditions why should the reading public take any interest in popular science writing?"[20] The "intelligent reader" was being driven away, the more difficult content was being replaced with "gossip." Popular science was being ruined by popular taste.

Amid a growing aversion to popular writing, Science Service was formed to attempt to improve the reputation of science writing among both the public (and especially the all-important "intelligent public") and – as importantly – those scientists whose work was inc1g59 565.52023 Tm(i)Tj86.690 03

wants.'" [23] Others were less optimistic. Ominously, some seemed to feel that declining standards were the result of giving the public *too much* choice. E. T. Brewster, in 1922: "our public library has to buy books, just off the press, on palmistry, handwriting, character reading and fifty seven other varieties of nonsense; while, significantly, it owns no old volumes on such topics." To illustrate how pervasive this trend to irrationalism has become, he adds: "The current number of the *Atlantic Monthly* carries the advertisement of a professional astrologer!"[24]

The Educative Limits of Popularisation

The proposed cure for this gradual slump back into magical thinking was better science popularisation and more of it. The future would be fine just so long as science could be explained to everyone. But as the science became increasingly complex, explaining it became increasingly difficult. At least some of the epistemic prestige attached to scientific knowledge stems from the sheer difficulty of its acquisition. How, agai

language can carry, and opinions differ on the explanatory limits of popularisation. Kurt Vonnegut reports overhearing Irving Langmuir, Nobel Chemist, telling someone that "Any person who can't explain his work to a fourteen-year-old is a charlatan"[26] – though Slosson himself was a little less optimistic: "We may not go so far as Tolstoy who said that you can explain Kant to a peasant if you understand Kant well enough."[27]

When Huxley called abbreviation a "necessary evil" it was necessary because knowledge must not be contained in only one place, and evil because the abbreviation would result more often than not in misunderstanding. The way Huxley saw it, by the time the material had been processed into a form suitable for public digestion, there was almost nothing of value left. Richard Feynman had once expressed a similar sentiment: asked by a journalist whether he could explain in simple terms what his Nobel Prize was for, he (is at least said to have) replied: "Listen buddy, if I could tell you in a minute what I did, it wouldn't be worth the Nobel Prize."[28] Elsewhere, Feynman wrote of the un-translatability of physics: "Physicists cannot make a conversion to any other language. If you want to learn about nature, to understand nature, it is necessary to understand the language that she speaks in."[29] The "language" Feynman has in mind is mathematics, and he is unequivocal on this point: "it is impossible to explain honestly

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[26] Vonnegut, *Palm Sunday: An Autobiographical Collage,* New York: Delta, 1981: 157. Elsewhere, Vonnegut fictionalised the same episode, adding a punchline: "'If there's something you don't understand,' urged Dr Breed, 'ask Dr Horvarth to explain it. He's very good at explaining.' He turned to me. 'Dr Hoenikker used to say that any scientist who couldn't explain to an eight-year-old what he was doing was a charlatan.' 'Then I'm dumber than an eight-year-old,' Miss Pefko mourned. 'I don't even know what a charlatan is.'" (*Cat's Cradle*, New York: Delta, 1963: 27)

[27] Slosson, "A New Agency…," 322.

[28] Quoted in Gleick, James. *Genius: Richard Feynman and Modern Physics.* London: Abacus, 1995, 378.

[29] Feynman, Richard P. *The Character of Physical Law* (1959) Cambridge, MA: MIT Press, 1990: 58.

Bricmont advocate the reading of popularisations, they are quick to stress the educative limitations:

> Obviously, it is legitimate to think philosophically about the content of the natural sciences. […] But, in order to address these subjects meaningfully, one has to understand the relevant scientific theories at a rather deep and inevitably technical level; a vague understanding, at the level of popularizations, won't suffice.

Sokal and Bricmont, again, are of special interest here. It is difficult to gauge how useful they believe popularisations are. Whilst they admit that "it is usually possible to explain [difficult scientific concepts] in simple terms, at some rudimentary level,"[36] they are quick to illustrate the limitations of such knowledge. Concerning conflicting findings by different researchers working on solar neutrino emission levels (a study outside Sokal or Bricmont's field), they claim:

> we could get a rough idea by examining the scientific literature on the subject; or failing that, we could get an even rougher idea by examining the sociological aspects of the problem, for example, the scientific respectability of the researchers involved in the controversy. … But the degree of certainty provided by this kind of investigation is very weak.[37]

This last issue of "scientific respectability" highlights another problem for the keen amateur. As Christopher Norris points out:

> one need only glance at a typical number of up-market popularizing journals like *New Scientist* or *Scientific American* to see how narrow is the line that separates "advanced" theoretical physics from the crankier versions of New Age thinking or sheer science-fiction fantasy. …[O]ne just can't be sure … which are (supposed to be) the purveyors of mere fashionable nonsense and which are reputable scientific sources.[38]

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what can be *learnt* from popularisation is necessarily superficial, but that the curiosity itself is superficial: not education but mere intellectual voyeurism.

[36] Sokal and Bricmont, 176. They add: "For example, although neither of us has any training in biology, we are able to follow, at some basic level, developments in that field by reading good popular or semi-popular books" (176-77). Regarding the difficulty of comprehension outside of specialisation, see Erwin Chargaff, "Building the Tower of Babble" in *Nature* 248 (1974): 776-79. Chargaff feared that acute scientific specialisation would eventually bring communication between scientists to a halt, and a situation would arise where nobody could ever "know more than an ever smaller portion of what they must know in order to function properly" (777).

[37] Sokal and Bricmont, 87

[38] Norris, Christopher. *Deconstruction and the "Unfinished Project of Modernity,"* London: Athlone, 2000, 197

Popularisations remain a site where unorthodox and radical theories enjoy a wide readership – to the chagrin of many professional teachers who find their students (a lay audience awaiting conversion) arrive “primed” (or, in Dawkins’s language: infected) with theories that have enjoyed popular success but little or no institutional endorsement. So, for example, although Elaine Morgan’s “Aquatic Ape” theory of human evolution was, as Adrienne Zihlman puts it, “taken about as seriously by anthropologists to explain human origins as Velikovsky’s *Worlds in Collision* was taken by astronomers to explain the origin of the earth,”

stories with weak plots." But "[r]esponsible scientific answers are much more difficult to deliver. … Lay audiences do not readily sit still for a recitation of technical details."[43] Whilst he thinks there is also a sociological component to the fondness for radical theories ("heterodox ideas feed on a suspicion of and rebellion against establishment science and other authority … there is a special appeal for peripheralized segments of the population in rejecting the authority that science and academia represent" [44]), even the enthusiastic reader who thinks highly of science and scientists faces problems. The reason why it is hard to tell the sense from the nonsense is in part due to the ever-widening gulf between science and commonsense beliefs about the world, and in part rooted in the type of understanding available to thinkers whose lack of scientific training limits their reading matter to popularisations (rather than technical journals). Unlike, say, medical ethics or even evolutionary psychology, there are no intuitions here against which to measure the feasibility of ideas like "superstrings" and "wormholes."

Speaking at Science Service's decennial conference in 1932, Arthur A. Noyes (then Director of the Gates Chemical Labs at Caltech) had complained that this inability to discriminate between science and nonsense was a problem intrinsic to popularised science:

> The great defect in the scientific infor

> publication is that one does not know whether it means anything whatever.[45]

Telling science from nonsense has a special importance for the role of popularisation as a democratic aid. The problem is obvious: in order to perform useful work for democracy, science popularisation will need to supply the public with sufficient information for them to make "safe" decisions about policies regarding science and technology. Unfortunately, co-mingled with science popularisation is fantasy and nonsense pretending to be science, and the audience for popularisations are categorically unable to distinguish between the two. Science popularisation is unable to supply its readership with enough information to assess the reliability of what they are reading.

The Boundaries of Participation

If science popularisation won't be providing sufficient cognitive grounds to assess theories, then how are its readership supposed to know if they are making a responsible decision? Sokal and Bricmont's suggestion that we assess the "respectability" of the writer is deeply unsatisfactory, and although they quickly acknowledge that this type of measure provides only the weakest sort of security, they don't have an

that keep proper science epistemically respectable are disabled by the conversion into an accessible form. (This is the evil that Huxley spoke of.) Sokal and Bricmont don’t say it explicitly, but the subtext is inevitable: if you’re not an expert, you had better not have an opinion.

Left to judge the merit of a popularisation on the basis of the

decides whether it will *sanction* Copernicanism. Policy can be decided in this fashion, but policy has no bearing upon the (epistemological) grounds for belief and so no bearing upon beliefs themselves.[50]

A democratic science would be a strange thing indeed. It seems coherent to talk about voting for one policy or another, but less coherent to talk about voting for one theory or another. If popularisation ever did have the educative, democratically useful function that Huxley and the originators of Science Service claimed for it, then it would (presumably) not be in the sense that the *content* of science should be democratically selected. Above all, "voting" for theory choice is resisted because it overturns any notion of the epistemic superiority of experts upon which the business of science popularisation is predicated. Popularisation necessarily carries information down from those who are expert to those who are not expert.[51] One consequence of this structure is that it doesn't leave much room for scepticism. Unless you have scientific training, almost all the science you learn about will be

[50] Meanwhile, there is an apparent inconsistency as regards the scepticism toward scientific practice but faith in the democratic apparatus – as Sokal and Bricmont point out,: "How, after all, does one

popularised, simplified science.[52] Without expertise, the reader of popularisations cannot decide which parts of the popularisation to believe. Or rather, they cannot have good grounds for believing Brian Greene when he is writing about relativity, but not when he is writing on quantum mechanics. The audience for popularisations are necessary credulous.

Owing to the credulity of its audience, the popularisation becomes a venue where radical, unorthaa

on the “real” threat posed by global warming. Amid all this, the “consensus” opinion of the relevant section of the scientific community is difficult to assess. The same can be put for stem-cell research, the use of nuclear power, and numerous questions arising in bioethics.

Competition from radical theories and plain hokum had long been a problem for science popularisers: E. T. Brewster, the 1922 *Science* correspondent who was aghast that the *Atlantic Monthly* carried even an advertisement for an astrologer, had recognised that the “honest” populariser had a difficult task ahead of him: “The writer with an unhampered imagination can turn out stuff that the public prefers; and he can do twice as much of it in a day.”[53] The mild reply to Brewster’s distaste is simply to say that if the public prefers it, what harm can it be doing? The stronger reply is more interesting, and points up a contradiction at the heart of the effort to employ popularisation as a tool to improve democracy: if popularisation is conveying enough scientific knowledge to enable voters to make informed decisions about policy, then surely it is conveying enough information to validate their choice of theories. And surely a public trusted to select the correct policies can be trusted to make the right choice of scientific theories?

Certainly, it is not immediately clear why popularisation couldn’t also work as a means of choosing between competing theories. The criticism is that exposure to science popularisation alone doesn’t allow for valid theory choice because it doesn’t supply sufficient information to make a meaningful decision one way or the other. Yet if this is the case then it seems to also invalidate the (apparently) useful role played by science popularisation as a means of selecting between policies. In other words, if popularisation is not capable of doing theory choice work, then it’s not at all clear how it will be capable of doing the policy

[53] Brewster, 622.

choice work. In many cases, policy choice is *de facto* theory choice,[54] so either science popularisation is useful for both roles, or it's useful for neither. It doesn't seem to make sense to allege that it is useful for one and not the other. Caught between being educationally redundant or dangerously empowering, science popularisation must be seen to be adequate to the task of selecting between policies, but inadequate to the task of selecting between theories. And it seems that achieving that balance requires fudging the content: if there is a danger of the readership choosing the wrong theory, limit the choice.

Certainly, inasmuch as they threaten the appearance of consensus, the presence of any "alternative" theories is usually regarded as intolerable. In recent years, the calls fo

pseudo-religious worldview (which is how the SSK people want to have it) or else the ID comes to seem like a respectable and serious account of the cosmos (which is what the religious leaders want). The science is made to seem of a part with the other (political) debates going on. As soon as the debat

Even if the public are offered choices about whether and how such activities are undertaken, insofar

“Proselytising should have no more place in dissemination than in research itself.”[62] Although Slosson – the institution’s very first director – would shortly afterwards claim of Science Service that “It will not indulge in propaganda *unless it be propaganda to urge the value of research and the usefulness of science.*”[63]

To this day, Scripps’s media empire retains the motto: “Give Light and People Will Find Their Ow

numerous and authentic, do not constitute science."[65] He draws attention to a necessary limit on what popularisations can accomplish:

> We may also hope to get over some idea of the relations between facts and how the scientist finds his facts and what he gets out of them. But we can not expect that the newspaper reader will acquire the habit of persistent experimentation, constant criticism, rigorous reasoning, projection of hypotheses, balancing of theories and suspension of judgement characteristic of the scientific mind. If the layman could get all this he would be not a layman but a scientist.[66]

Slosson's last comment here captures the essence of the problem: expertise can't be an entirely shared venture. The act of popularisation itself presupposes experts who know more about something than the mass of men. In other words, "scientist" and "laymen" are mutually defining terms, the existence of a category of "layman" to whom a subject-matter is being explained presupposes a category of experts from whom the explanation stems. As Turner puts it: "it is the character of expertise that only other experts may be persuaded by argument of the truth of the claims of the expert; the rest

[65] Slosson, "Popular Science," 480. The disinterested manner in which scientific research is (ideally, at least) conducted was inappropriate for – indeed, inimical to – the requirements of making the results of that research interesting and accessible. Later in his tenure as Science Service director, Slosson writes on the divergence between the agenda of science writing and the agenda of popularisation: "The aim is now to eliminate the personal element from science and reduce it to an abstract and timeless formula. This may be necessary as a scientific method but it naturally results in the decline of interest. The old textbooks are more readable than the modern. […] I am not advising that our textbooks should return to the leisurely literary style of long ago but we can not expect depersonalized science to be popular. Whatever is without 'human interest' is not interesting to humanity." (Slosson, "Popular Science," 481) By way of illustration: most people writing about Watson and Crick's announcement of the discovery of the structure of DNA in Nature in 1953 quote that paper's final sentence – "… has not escaped our notice" – and admire the restraint with which they have expressed the enormity of their finding. But whoever does quote this nearly always provides a gloss, explaining why that restraint (obvious to the suitably knowledgeable) was impressive.

[66] Slosson, "Popular Science," 480-481.

of us must accept them as true on different grounds than other experts do."[67] In the translation to popular format, the "usefulness" of science is lost. And so:

> The facts of nuclear physics, for example, are "facts", in any real sense (facts that one can use effectively, for example), only to those who are technically trained in such a way as to recognize the facts as facts, and do something with them. The non-expert is not trained in such a way as to make much sense of them.[68]

Expertise is beyond the reach of democracy simply because expert knowledge is knowledge that non-experts cannot assess. This is no mere inconvenience, but definitive of "expertise" – expertise is just that sort of knowledge that is not commonly possessed. It is by definition elitist, for "expert" is a *relational* category, not an absolute degree of competence calibrated on some external scale.

Science Service – and popularisation generally – can offer information, but it's not offered as a menu of available truths from which a reader might reject the less palatable. Science popularisation did not offer beliefs to choose betw

versions of science that seem to have been so common in the press at the time. Slosson's claim that Science Service propaganda was allowed if it was in the service of science signalled not a widening of public choice, but a narrowing, a tactical constriction. Science popularisation did not exist to supply the people with the necessary information to make *a* choice, but to supply them with sufficient information to make *the correct* choice.

Conclusion

Democracy is dangerous only if the electorate are insufficiently educated about the decisions they are required to make. The initial hope was that popularisation would remedy this potentially dangerous ignorance (for science-based issues). But unfortunately, popularisation simply isn't able to deliver the necessary information nor qualify the electorate in ways which meaningfully validate their choices. And whether those are policy choices or theory choices, the intellectual demands of each are equal – because they are versions of the same task – and beyond the capacity of the popularisation. The demand that popularisation be comprehensible means that it is not also comprehensive. The accommodations made in order to make the material accessible simultaneously made it inadequately educative. Popularisation simply lacks the intellectual bandwidth necessary to convey sufficient information to *validate* the (policy and theory) choices that the electorate in a liberal democracy are required to make. Consequently, popularisati.0031 Tc -0.00101 Tw 13.(vali)Tj13 1 Tc -0.00349 TI3067 Tm(

the way Aldous Huxley had hoped it might then it would need to do so in a most devious and paternalistic fashion.

Popularisation didn't simply aim to "disseminate" scientific facts – as was the stated goal of the Service – but rather, it aimed to promote a positive image of science and scientists. The promotion of scientific understanding was tied up with the promotion of the scientific enterprise. Popularisation's pedagogic function was inseparable from its propagandistic role. Crucially, Science Service was a service for the *scientists* as much as a service for the public. The aim of promoting science was always also an aim to suppress and eliminate superstition and non-scientific thinking. This negative agenda – popularisation's secondary function as a means for the suppression of dissenting or contradictory views – was every bit as important as the positive agenda of disseminating scientific knowledge.

Popularisations, then, didn't exist to offer choice but to *constrain* choice and offer in its place the illusion of choice. The popularisation would not be a site where02 169.57521 543.08049 Tm(ways also an ai)Tj.59

matter how effective – would not do what was required of it, and could not be offered as information on which to base free and open choice.

If popularisation ever did have the educative, democratically useful (even vital) function that Huxley and the originators of the Science Service claimed it could have, then among the available variants on orthodox scientific opinion – the aquatic ape, punk eek, the diffusionist and interventionalist theories, even the creationist story – that useful, democratic function is disabled. The process of abbreviation and translation that produces accessible science writing also strips away the mechanisms by which the scientists themselves are able to assess the reliability of a theory or the proper weight that ought to be accorded to a given fact.

Shadowing nearly all of these comments on popularisation – with the noted exception of Feyerabend – is the sense that public choice is intolerable: Huxley's fear for the "dangerous half-truths" which were the "current coin of thought," Scripps's desire to foster an "intelligent" and "safe" democracy, Brewster's concerns about the rise of astrology, and seen today in the reaction to magical thinking from popularisers like Dawkins and advocates like Daniel Dennett. Choice is intolerable because it is antithetical to (and incompatible with) a realist epistemology. Bernard Davis once called the error of thinking the other way around "the moralistic fallacy"u

which sensible policy might be decided. Even the appearance of choice is intolerable, insofar as it erodes the usefulness of the science popularisation that does exist. Being able to choose on matters of science is poor for the science and poor for the people. Popularised accounts of science can

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