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Does Science need Democracy?

COMPARISONS BETWEEN DEMOCRACY AND THE SOCIAL PRACTICE OF SCIENCE

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“Kip Schlezinger [newscaster]: *Now, after vaccinations, electric cars, and the dark magic behind Wi-Fi, I guess the big question is: should we be scared of science?*
Professor: *No.*” – The Amazing World of Gumball¹

1 Introduction

While people’s trust in the sciences has been a “hot topic” in the recent history and philosophy of sciences, the inner mechanisms that organise scientific inquiry – a social enterprise (Marjorie Grene as cited by Longino 1990, 67) – received less scrutiny. It has been well established by philosophers of science how the sciences can help the “worst form of government²” remain desirable in guiding collective decision-making processes (see for example: Kitcher 2011; or from a different angle: Dahl 2008). Democracy, it seems, needs Science. It is worth considering, however, whether the flip side is also true: does Science need democracy?

This paper is intended to explore this exact question. It will do so by examining the philosophical tenets of science as a *social* practice, while proposing that social nature of science allows for democratising its practice. Since democracy is an “essentially contested concept” (Gallie 1955, 168–69), that is a concept which cannot be agreed upon, we need to specify what elements of democratic theory we can apply to scientific practice. I will argue that we should take certain *ideals* of democratic theory to inform the philosophy of science-in-practice. In the present paper, I will focus mainly on two democratic ideals: pluralism and *active* engagement, and their implications for the sciences. Ultimately, I advocate for Hasok Chang’s (2012) *active normative epistemic pluralism*, while advancing his idea of pluralism with arguments from democratic theory. The assertions presented below, hopefully, will help further the understanding that science can be democratic, even from within. Recognising this, maybe even sceptical newscasters – like *Kip Schlezinger* – can peacefully put themselves to sleep without being woken up by their recurring nightmare: “Science.”

¹ Short segment (S5E36, from 4:50 to 5:13) from the renowned TV Series, *The Amazing World of Gumball* (*The Amazing World of Gumball* 2017).

² Winston Churchill, HC Deb, 11 November 1947, vol. 444 cc206-207, https://api.parliament.uk/historic-hansard/commons/1947/nov/11/parliament-bill#column_207.

First, I will briefly outline the nature of science as a social practice, concluding that as it is with other social enterprises, a level of organisation is inevitable. After that, I explore the role of values in science and the ways in which democracy relies on science. In this section I take a side with critiques who believe that it is insufficient for research agendas to be democratically settled, i.e. the internal democratic organisation of science is also required. Motivated by this discussion, I turn to evaluating the ideals that democratic theory can offer to scientific practice. This section is further divided into three parts: 1) a brief outline of what democracy can offer; 2) a short comparison of a version of pluralism in science and one in politics; 3) a discussion of Chang's active normative epistemic pluralism with recommendations from democratic theory. Lastly, I conclude by a questions for future consideration.

2 The Narrow Sense of Science as a *Social Practice*

Let me begin with an uncontroversial and vague definition of science that should work for the arguments to follow. Science is a practice (i.e. it consists of activities, as seen in Chang 2011, 208) which aims at generating some kind of knowledge about natural phenomena (Potochnik et al. 2024, 16 and 28). Regardless of our metaphysical conviction about the connection between the knowledge about natural phenomena and whatever we take as reality, we might also agree that a singular human mind cannot capture its entirety. This is not only because humans are limited beings whose understanding will not be able to capture the complexity and inexhaustibility of reality (Chang 2012, 255; Wimsatt 2007), but because we are also fallible (Mill 2002; Popper 1969; as cited by Longino and Rolin 2025), as our expectations and desires about outcomes prompt “basic flaws in human reasoning” (Potochnik et al. 2024, 22). If we would like to pursue a better understanding of what we believe is reality, then we soon arrive at similar conclusions to that of Charles S. Peirce (1940): a “community of philosophers” is central to the practice of the pursuit of an “ultimate philosophy.”

Hence, the limitations of the human mind (or brain, if you will) impose certain features on scientific practice. Most importantly for our discussion, science is done by a group of people, from now on “the researchers” or “the scientists.” Now, I present an incomplete account of why researchers work together, mostly for later reference. In basic terms, scientists work together to counteract the flaws of any one individual (Potochnik et al. 2024, 23). To some, this is done through collaboration: from simply

working together to share ideas, to more fundamental assertions about the only achievable type of objectivity being intersubjectivity (Longino 1990, 67). To others, this is achieved through competition. Imre Lakatos (1978), in revising Popper's demarcation criterion, gave us an idea of "Scientific Research Programmes." In this theory, he seems to suggest, that competing research programmes are beneficial to science, in order to find the "best" theory among those competing (Chang 2012, 287). To some others, any combination of these interactions – and many other – seems to work (Chang 2012, 268–84).

Furthermore, let me assume that once we accepted that science is a *social* practice, then the interaction of the scientists (me and you, as evidenced by Chang 2011, 212–14) will inevitably conform to certain "rules of the game" (North 1990, 3). Extrapolating Douglas North's (1990, 3–4) economics thesis to the field of sciences, this happens because human interaction requires structure to reduce uncertainty. By simultaneously accepting certain institutions (or norms³), researchers do not need to inquire about the trustworthiness of other scientists, as they can assume that the same rules apply to them as well. This reduces uncertainty. The picture that arises from the previous sections is what I like to call science as a social practice in the narrow sense. Scientists need to work together, according to some rules or norms, so that they can generate knowledge about natural phenomena. This paper is mostly interested in this aspect.

The institutional features of scientific practice cover a range of moral and ethical considerations⁴ (Potochnik et al. 2024, 23–25). However, similarly to the infamous "value-free ideal" in science, these considerations remain "constructed [...] relative to a social context" (Douglas 2009, 6). It is for this reason, that we need to examine how these ideals are built, organised and enforced. In the political arena, democracy seems to be accepted as a viable candidate to do this work, at least to a certain extent. The rest of the paper will attempt to show how a set of features of democracy could be utilised in organising scientific practice. Yet, to tease out the possible benefits of democracy for science as a social practice in the narrow sense, we first need to discuss

³ Here, word "institution" can be used interchangeably with "norm," as North does in the case of so-called "informal institutions" (North 1990, 4).

⁴ The particulars of these have been discussed by many more capable historians and philosophers of science, and their review would serve with little benefit to the expansion of my argument.

a different ‘direction’ in their relationship. Describing this angle at length is the topic of Section 3.

3 The Broad Sence of Science as a *Social Practice*

To start, we can turn to the second important social aspect of science. I call this science as a social practice in the broad sense. As it was hinted at implicitly before, science is done within a certain social, economic, cultural and historical framework at any given time (Douglas 2009; Foucault 2013; Kitcher 2011; Longino 1990). This leaves us with two key consequences.

3.1 The Value-free Ideal of Science

Firstly, the idea that science can be value-free should be rejected (Douglas 2009; Kitcher 2011; Longino 1990; McMullin 1982). While a lengthy discussion here is not warranted, I will still point to key arguments which will help understand my arguments later. As the “pillars of positivism” fell “one by one” (McMullin 1982, 3), so did the idea of value-freedom. McMullin (1982) argues that this is because there exist no algorithm for deciding which theory best describes natural phenomena. In lieu of such tool, “theory-appraisal” can only be seen as a “sophisticated value-judgement” (McMullin 1982, 17) – of the epistemic kind, in this case. It is because empirical evidence does not give enough ground for theories to be deemed acceptable (McMullin 1982, 14). Since objectivity, then, is not an inherent feature of science, researchers will need to find it elsewhere.

This project was largely undertaken by Helen Longino (1990), as she argued that objectivity is secured by the critical interaction of the community, i.e. “objectivity of scientific inquiry is a consequence of this inquiry’s being a social” (Longino 1990, 67). In simple terms, her argument is as follows: scientific practice is not only governed by values about the nature of inquiry, but also social and cultural values. These enter into discussion when we consider reasoning between data and hypotheses. The connections between data and hypotheses is always based on some background assumptions which scientists derive from their social and cultural setting (Longino 1990, 215). Hence, community values can remain in scientific reasoning, as social interactions will determine which ones are useful and which ones can be eliminated. This reconciles the notion of objectivity as a “function of community practices rather

than as an attitude of individual researchers towards their material or a relation between representation and represented” (Longino 1990, 216).

3.2 Science for Democracy

Secondly, not only is science regulated by certain values, but it is confined with the limitations of human capacity and material resources. Therefore, scientific practice hinges upon decisions made by a given community of scientists (Kitcher 2011). The main question in these decisions is about what kind of theories, experiments, *et cetera* the researchers should pursue, that is to afford with time and other resources. On the issue of what scientists should or should not do, we find an enlightening discussion by Heather Douglas (2009). In her pursuit to reject the value-free ideal – which is a fairly recent pursuit (Douglas 2009, 14 and 43) – she asserts that scientists have a moral obligation to mitigate the potential social consequences of making the wrong empirical risks. The uncertainty of scientific results prompts values to be included in scientific decision-making, so that they can help weigh the consequences of error (Douglas 2009, 104). Without this consideration, scientists could act as if they are morally autonomous from the society that they fundamentally affect (Douglas 2009, 7). This is true, of course, if we accept the uncontroversial wisdom that the knowledge scientists generate is to be shared with the public.

This discussion, about what scientists should or should not do, does not resolve the resource problem. If we accept both Douglas’ thesis – that scientists should, in fact, care about the society they affect – and there are limitations to human capacity and resources, we will arrive at the questions that Philip Kitcher (2001, 2011) raises about the relationship between science and democracy. His “well-ordered science” thesis provided me with the inspiration to consider what democracy can do for science, which will be apparent shortly.

Kitcher starts by juxtaposing scientific expertise on one hand and democratic values on the other. The problem, he notes, disappointment in grand theories of science granted alienation from scientific authority (Kitcher 2011, 18). It was further worsened by the fear that is probably also embodied in the question posed by *Kip Schlezinger*, the imaginary newscaster cited on the first page. The image of scientists trying to provide valuable information might seem like an organised effort in trying to replace “prior ways of thinking about the world and about ourselves” (Kitcher 2011, 18). He wishes to establish the ideal of “well-ordered science” (Kitcher 2001, 2011, 12) which

could become a way in minimising the fears discussed above. Siding with the previously discussed tradition, he also rejects the idea of a value-free science, based on his idea that in figuring out how humans can live together there are no experts (Kitcher 2011, 12). Given that we accept that democracy is the best available alternative (Dahl 2008)⁵ to govern collective life, we can conceive why it is central to Kitcher's conception of "well-ordered science." Ignorance – for which public knowledge is the proposed remedy – might lead people to act against their central interest, in the face of both identifiable (e.g. authoritarianism) and unidentifiable varieties of oppression (e.g. climate change; Kitcher 2011, 12–13). If researchers are significant contributors to public knowledge, which is a key institution against any form of oppression, then they need to embrace the idea of a "well-ordered science."

This ideal of scientific practice ensures that research agendas are democratically governed (and funded), directing the limited resources towards relevant issues for a given community. It does so by allowing the broader public into discussions about the practices of science which fundamentally affects society, as I argued above. Kitcher (2011, 13) also hopes that following this ideal, the public might be involved in the process of certification. I believe, this could help the cause of science in at least the following way. As transparency increases, the fears about a 'scientific takeover' might be reduced and the trust in scientific authority might be re-established – only now in a more democratic manner. The conception proposed by Kitcher, then, incorporates the issues of the broader sense of science as a social practice, reconciling values and limitations in capacity and resources.

This ideal, however, does not remain without its criticism. For our discussion, I resort to Helen Longino's (2002) *Reply to Philip Kitcher*. In this, she takes issue with at least three aspects of the "well-ordered science" ideal: Kitcher's conception of individualism, pluralism, and the democratisation of science policy. Siding with Longino, I argue that Kitcher's ideal fails to capture the narrower sense of the social nature of science. This is because incorporating the broader public in setting the research agenda, or in certifying scientific results do not reflect on some key questions about how scientists actually *do* their research. While the two are undeniably

⁵ The limitations of this essay do not allow me to consider the many ways in which democracy can be conceived and constructed. It is also beyond the scope of this paper to consider the desirability of democratic governance. However, Dahl's defence of democracy against different types of regimes makes his idea a seminal work in political theory.

connected, Longino (2002, 576) asserts “that the epistemic practices of the experts [...] [should] conform with the social norms of inquiry.” Regarding these norms, elsewhere she argues for the expansion of scientific norms that also apply to communities. “These are (1) the provision of venues in which critical interaction can take place, (2) the uptake of critical intervention as demonstrated in change of belief distribution in the community over time in a way that is sensitive to the critical discourse taking place within that community, (3) public accessibility of the standards that regulate discourse, and (4) tempered equality of intellectual authority” (Longino and Rolin 2025). These norms already anticipate certain features of democracy that I wish to expand upon in the later sections.

4 Democracy for Science?

In this section, I will arrive at the focus of my research. What, if at all, can democratic theory (or democracy in general) offer to the practice of science? More specifically, what can democracy offer to the narrow sense of science as a social practice? To answer these questions, let me briefly summarise what we have covered so far. Science is a social practice in two ways: it is done by groups of people (narrow sense), because human understanding is limited and fallible. It is also done within a society (broad sense). Practice in the broad sense raises two issues: the relationship between values and science, and the need to reconcile the public’s needs with scientific inquiry. Science can work for democracy, given that the public is involved in various parts of the research process, including the discussions on values. The narrow sense of scientific practice, however, is not ‘democratised’ until the epistemic practices of the experts are also considered democratically. The remainder of this paper appeals to this last point by showing possible avenues for incorporating certain ideals of democracy into the social practice of science.

4.1 What Can Democracy Offer?

Let me start by saying what democratic theory certainly cannot offer: this would be stability. Just recently, in an effort to categorise and qualify conceptions of democracy, Jean-Paul Gagnon (2021) claimed that there are “several thousand” conceptions for democracy. While it might seem like an exaggeration, it clearly points to the contested nature of the term (Gallie 1955). What it can offer, at least on a ‘meta-level,’ is a basis of comparison for debates of philosophy of science through the lens of democratic

theory (Van Bouwel 2015, 105). For the sake of simplicity, however, I will take two of the aforementioned social norms of epistemic practices (Longino and Rolin 2025) and expand their relationship to democratic theory.

Longino's first norm, critical interactions, take place on all levels of democratic governance, usually under the label of deliberation. This can be seen as an integral feature of democracy at least since Habermas (Landemore 2017, 53). Additionally, I further assert that Longino's fourth social norm is to be taken as an argument of pluralism. This is, again, a feature of contemporary liberal democracies that not many would question (Chang 2012, 258). Why I selected these exact social norms will become apparent in the following sections, in which I offer a comparison between *a* scientific pluralism and *a* political pluralism. Later I document arguments for Hasok Chang's (2012) *active normative epistemic pluralism*, which will be supplemented by recommendations from democratic theory.

4.2 A Pluralism in the Philosophy of Science

It is worth mentioning that the accounts below cannot fully grasp the intellectual depths and nuances presented by the ingenious work of the following authors. The selected arguments, however, shed light on the intricate possibilities in which democracy can inform science in practice. While I recognise that the idea of pluralism did not arrive with Feyerabend's (2002) *Against Method*, I would still start the story of pluralism with his account. This is because his critique of scientific reason has inspired comparisons between the philosophy of science and political theory (Van Bouwel 2015; Bassiri 2025).

Feyerabend seem to have been convinced that the world is a dynamic, multifaceted entity which requires science to have an "openness of worldviews" (Paul Feyerabend as cited by Bassiri 2025, 531). This conviction of his was developed in his critique of science being a rational enterprise uncovering the hidden truths of an underlying reality. Science's universality and epistemic authority, in his account, was never properly justified. Similarly to what has been teased out earlier, it is because of the conviction that humans are limited beings (Chang 2012, 255), and their experiences of the world differ (Bassiri 2025, 530–31). If we can agree with this, then we see that the "multiplicity of lifeworlds means that a knowledge of the world must begin with an openness to such a multiplicity" (Bassiri 2025, 531). Nima Bassiri (2025, 536) argues that this kind of ethical (epistemic) project – proposed by Feyerabend under the name

‘humanitarianism’ – denies the possibility that ‘Reason’ will circumvent differences. Rather, it inspires “the imperative to encounter value differences as openly and in as transformable a way as possible” (Bassiri 2025, 536).

In her criticism of the deliberative model of liberal democracy, Chantal Mouffe (1995, 1999, 2005) poignantly points out the issues embraced by *then* contemporary forms of democratic ideal. Deliberation after Habermas does not shy away from informal oppression, she notes, as it assumes that there is *one* way in which society can be organised that benefits everyone. This, in the model of deliberation, will be ‘uncovered’ through rationality (Van Bouwel 2015, 158–59). However, she observes that consensus-seeking disallows dissent which in her view is fundamentally oppressive (Mouffe 2005, 121–22). As the consensus-seeking deliberative democracy extinguishes contestation⁶, an alternative view is needed. Her view of “agonistic pluralism,” (Mouffe 1999) instead, keeps disagreement alive, rejects the idea of consensus without exclusion, allows for both diversity and dissent, and rejects the notion of complementing views incorporated through rational reasoning (Van Bouwel 2015, 159).

The criticism of both scientific authority (in Feyerabend) and of consensus-seeking democracy (in Mouffe) highlights that different social practices – that of science and of politics – can share similar (and comparable!) epistemological assumptions. Recognising this can help students of philosophy to deconstruct the isolation of science and society. It can also help change the course in which science as a *social* practice is organised. Take, for example, Katalin Karikó, a Hungarian Nobel Prize laureate in Medicine. She and her co-author struggled – for years – to get funding for research into mRNA-based vaccination, as the scientific community perceived risks of the technology. In the midst of the Covid-19 crisis, however, their results proved to be effective, prompting the award of the Noble Prize in 2023 (Bansal 2023, 1). Had there been a serious democratic consideration – of the pluralist kind – about the risks and benefits of their research, maybe we would tell different stories about the ‘Great Quarantine.’ At this point I can connect back to the criticism about Kitcher’s well-ordered science. If society decides to fund medical research of any kind, and then the ‘experts’ (universities, commissions) decide what to do with that funding, then their

⁶ Here I accept the assumption that democracy also needs to be contestable. For a succinct discussion, please refer to Whitehead’s (2002) discussion *On ‘Democracy’ and ‘Democratisation.’*

decision-making process should also be democratised. I hold that pluralism in science, for one, could have come to the rescue of mRNA research in virology.

4.3 Active Normative Epistemic Pluralism

While pluralism and deliberation have been strikingly separated by Mouffe, I still believe that we can reconcile them in a way so that Longino's social norms can be properly understood. Here, however, it is worth re-assigning the first social norm about the venues in which critical interaction takes place. Instead of deliberation, I will interpret it as active engagement. Generally, I do so for the sake of coherence with other authors. As I mentioned it in the beginning, I am hoping to reconcile two democratic ideals within the social practice of science. These were *pluralism* and *active engagement*. Yet, before I could do this, I had to show that the interaction in question is not to be understood in liberal 'deliberationist' terms. Rather, it should be understood as active engagement which I will formulate in comparing a view on scientific pluralism with a model of democracy below.

It is at this point where I would like to introduce Hasok Chang's (2012) *active normative epistemic pluralism* in the philosophy of science. In true pluralist vein, Chang (2012, 268) notes, that there are "as many pluralisms as there are pluralists" – similarly to democracy, as Gagnon (2021) would probably claim. While agreeing with Feyerabend, but working in a more programmatic fashion, Chang commits to pluralism based on ideas that we have mentioned above: nature is an inexhaustible reservoir of facts, and is more complex than what any system of practice could process (Chang 2012, 256–59). However, he further adds a sense of realistic pessimism: "not everything will go to plan, and some things [...] will fail" (Chang 2012, 259). He also accepts that science is a "progressivist" enterprise (i.e. even if things fail, it tries to improve) and that it is based on dialogue, making it a fundamentally social practice (in my narrow sense; Chang 2012, 258–59). Combining these convictions through sophisticated arguments, Professor Chang shows that pluralism in science is a viable alternative to monism⁷.

Active normative epistemic pluralism is then "the doctrine advocating the cultivation of multiple systems of practice in any given field of science" (Chang 2012, 260). Put

⁷ The chapter also considers pluralism against relativism, the monist objection of chaos, and economic viability (Chang 2012, 261–68). As enlightening as these discussions are, the argument followed in this paper does not require their examination.

more formally, Chang's pluralism is *epistemic* because the case of epistemic pluralism can be established without any commitment to any metaphysical claim. Hence, it advocates for improving the ways in which we acquire knowledge, regardless of how the world is *really* like (Chang 2012, 268). It is *normative* because if there is any field of science that is admittedly monistic, then "we should consider reforming it" (Chang 2012, 269). And most importantly it is *active* because instead of pointing to the possibilities, active pluralism aims at "actually cultivating multiple systems" (Chang 2012, 269). Eloquently, Chang's defence of pluralism makes this definition applicable to the natural sciences.

While he describes the benefits of two key consequences of pluralism (toleration and interaction), I believe he gives an incomplete account on *how* we can cultivate multiple systems simultaneously. This is where I think, the democratic ideal of active engagement can come to help us. Describing the benefits of toleration (Chang 2012, 270–78) is left out from this paper, as they mainly justify a 'passive' pluralism. Cultivating multiple, interacting systems leaves us with ad hoc integration, co-optation and competition (Chang 2012, 279–84). The first helps achieving an aim by the ad hoc integration of different systems (e.g. Newtonian and quantum physics in GPS). The second allows using ideas and results from one system to develop the other. The last – as it is assumed also in economics – could offer some positive results in developing multiple systems simultaneously, while also mitigating the removal of competitors.

While these claims are articulated clearly, in the following section of the book, Chang turns to a pluralist historiography and philosophy (Chang 2012, 284–301) leaving the question of *how* open to discussion. This is the point which I find would benefit from refinement. In doing so, I also demonstrate how democratic theory can be helpful in considering problems in the philosophy of science. Showing how different systems of knowledge could be cultivated simultaneously is no easy task. However, I suggest – as it was done in the case of pluralism (Chang 2012, 258) – that we look for answers in a social practice in which there are no experts.

Similarly to Mouffe, Bonnie Honig's ideal of democratic engagement emerges from her critique of the "virtue-style" liberal democrats, like Kant and Rawls (Glover 2012). In rejecting the rational dissonance-free ideal, she advocates for a "politics of the remainder" (Glover 2012, 93) which offers us with at least two key insights. An active pluralist engagement in scientific practice could be similar to Honig's assertion that

‘disruptions’ should be viewed not as problems to be solved but through reflecting on what problems they point to (Glover 2012, 95). Disruptions in the political could be translated into systems of scientific practice which would become rejected just because they do not follow established practices. Far from being an expert in virology, in the case of mRNA technology, I believe, an active pluralist engagement of this kind could have asked what problems different, established systems of research have missed. Hence, the benefits of interaction and Longino’s critical engagement could be ensured through self-reflection on the problems which are revealed by multiple simultaneously cultivated systems. This is in contrast with the view that multiple scientific theories are only there so that we can choose the “best” theory.

Additionally, as Honig notes, pluralism allows for the new democratic demands to become problematic for legitimate democratic order (Glover 2012, 95). Similarly, in science, new systems of practice might disrupt how already legitimate scientific practices are organised. If – as Honig argued for the case of democracy (Glover 2012, 95) – researchers actively engage with practices that challenges their epistemic foundations, they might find that these conflicts are inescapable. In practical terms, this prompts scientists not only to self-examination of their own practices, but to start building respect for the ‘other’ practices. The actions of self-reflection and the acknowledgement of conflicts within a plurality of scientific practice could be seen as real effort in cultivating multiple systems through critical interactions.

5 Conclusion

Hopefully, by this point I have achieved my goal in showcasing that the narrow sense of science as a social practice *can* be supplemented by ideals from democratic theory. With this project, I also wished to show that Hasok Chang’s active normative epistemic pluralism can be enriched by practices derived from the political arena. I started by examining why science is a social practice from within, i.e. why scientists inevitably work together. This prompted that their practice is organised similarly to other social enterprises, like organising social life through democratic means. To show how the two are connected, first, I had to describe the relationship between values and science, and science within a society. Only after this could I tease out the two democratic ideals – active engagement and pluralism – which I hoped to serve with insights for the social practice of science from within. A question, which remains unsolved for now, is how

these democratic practices can *actually* democratise science in the eye of the public. While research agendas can be governed democratically, transparency can be ensured through democratic means, and even scientist can work together more democratically, it is still unclear to me how democratisation could ensure that no more newscaster asks: “should we be scared of science?”

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