

Review

Climate Change Inaction and Post-Reality

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Abstract: Blame for climate change inaction is rarely directed at a fundamental cause, the excessive complexity of society. It has given rise to post-truth, which has been largely reduced to unflattering stereotypes of the public, and post-trust, by which the public see their national institutions as increasingly distant and ineffectual. The two comprise post-reality, by which confidence in the truth is weakened by distance from its source, a pervasive remoteness leads to a lack of accountability and indifference, and much scholarship and institutional practice is similarly prejudiced. A gross lack of proportion goes unnoticed in discourse that is innumerate, the more readily accepted by those (including many of those in public life) with a higher education that closes the mind to technical matters and thus to the seriousness of climate change. Regarding climate change inaction as an applied problem suggests a renewed emphasis on authentic public education and on activism outside the traditional ambit of scholarship.

Keywords: climate change; post-truth; post-trust; post-reality; degrowth; direct action

*Great fleas have little fleas upon their backs to bite 'em,/And little fleas have lesser fleas,
and so ad infinitum./And the great fleas themselves, in turn, have greater fleas to go
on;/While these again have greater still, and greater still, and so on.*

(Augustus De Morgan)



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1. Introduction

As the consequences of climate change inaction increase in severity it is increasingly tempting to apportion blame. National governments have the option of blaming the UN-mediated process for being ineffectual or too slow, other countries for not pulling their weight, environmental campaigners who have sometimes added to confusion, and public opinion, which for many decades is said to have voted for business-as-usual. The public can blame those in power for lack of leadership and journalists for not holding government and its inaction to account. Journalists can refer to their own professional standards, by which they are wary of didactic practice. Central bankers will say that government is solely responsible for policy, as will corporate interests. Those with fabulous riches, together with the fossil fuels and allied industries, will say that they were merely obeying market forces. Planners will say that their role was not to plan, just to go from site to site conforming to government prescription. The United Nations will say that its exhortations have gone unheeded, and its predictions watered down by political lobbying. Many commentators will feel let down that technological innovation has not eventuated in the way they had imagined, blaming a lack of investment or incompetence on the part of practitioners. Finally, climate scientists will be blamed for being poor communicators or for not predicting extreme weather events.

All can be subsumed in the lesser known but fundamental culprit, the excessive complexity of society, from which arise the ills of post-truth, post-trust and post-reality.

2. Post-Truth

Post-truth is 'relating to or denoting circumstances in which objective facts are less influential in shaping public opinion than appeals to emotion and personal belief'. It was the Oxford Dictionaries' word of the year in 2016.

Appeals to emotion over facts are the stuff of politics as well as the marketing, advertising and public relations industries, and have been evident for centuries [1]. Latterly, post-truth has come to mean that the public is so credulous as to be led astray by fake news and internet fakery, which is then amplified by social media as dubious information and ill-informed opinion are repeated indefinitely. The increasing self-centredness of the public is also said to lend itself to ignorance, even a wilful ignorance that is hostile to further enquiry, while the public is also supposed to regard itself as better informed or more competent to express opinion than it actually is [2]. Similarly, the public is said to be self-righteous and intolerant of any disparity in status, so that everyone's views are equally worthy, and disagreements are merely honest differences of opinion [3]. Some academics interpret any public questioning of universities as being partly linked '... to a wider cultural move to a less deferential society ... and the role of social media' [4].

Post-truth particularly applies to the upheavals that followed the Brexit referendum and the election of Donald Trump, by which the most basic beliefs of many of those in public life were so confounded that they suffered something like a collective nervous breakdown. In their interpretation the debates of the time had been manipulated by sinister big data companies, the demagogues and self-interested billionaires controlling them or foreign powers, so that anyone who voted to leave the EU because they wanted greater self-government for Britain must have been an atavistic nationalist [5]. Similarly, the journalist Robert Peston [6] made an impassioned case that democracy risks being subverted by technocratic geniuses with the ability to manipulate social media.

In its prevailing usage, post-truth is no more than a collection of unflattering stereotypes of the public, leaving a semantic gap to be filled by post-trust.

3. Post-Trust

Post-trust is the state in which the public see their politicians, media and other national institutions as increasingly remote, their preoccupations as increasingly ineffectual and their priorities and opinions as increasingly questionable. Nor can the public be happy with commentary that is so dismissive of themselves. If officialdom is distrusted, views incompatible with accepted wisdom are more likely to be taken seriously.

The public are also disengaged from their institutions because the values of the free market have been assimilated into them by a kind of ideological imperialism, with destructive and demoralizing social effects [7]. Contemporary discourse also lacks substance: 'The public deserves a high standard of intellectual debate ... and should command far greater respect ... We have not turned into simpletons' [8]. Groucho Marx was speaking for this view when he said 'I find television very educating. Every time somebody turns on the set I go into the other room and read a book'.

The consequence of post-trust is increasing public resentment and intolerance, a rise in populism and a progressive disengagement from the institutions of democracy.

4. Post-Reality

Post-truth and post-trust comprise what might be called post-reality in honour of the aide to George W. Bush who said that the 'reality-based community' is no longer important in politics [9].

The basic cause of post-reality is the excessive complexity of society. Confidence in the truth is weakened by repetition and distance from its source, and as in the game of Chinese Whispers it gets progressively corrupted. Quite soon it becomes impossible to verify evidence, or to fully understand it, and once its provenance is lost and the details glossed over, little confidence can be put in it whatever its degree of correctness. The digital revolution, with its capacity for indefinite repetition, adds to the difficulty of separating fact from fiction [10].

Post-reality is characterized by a sense of remoteness from the real and straightforward, the primacy of commentary and opinion over first-hand experience, and a seemingly trivial or unreliable quality in public discourse in which the real point is missed or degrees

of correctness are indiscernible. Concrete terms such as levers, instruments and tools 'deliver' abstractions. Policy anxieties are taught in school in the guise of knowledge. The economy is dominated by services often of questionable purpose. Public relations and political messages have to 'cut through' to the public. The website notice 'we care about your privacy' means the opposite. Additionally, exceptional business success is rewarded as though it were not largely owing to luck [11]. In the USA the mere possession of knowledge is so unexpected as to be a mark of elitism (Edward Luce cited in [12]), and simply recognizing reality is seen as a political position [13].

Accusations (however ludicrous) stick because their provenance is soon lost [14] and (context-dependent) humour falls flat. For example, among 23 countries there was a good linear correlation between chocolate consumption per capita and the number of Nobel laureates per capita [15], giving rise to an enduring industry of reportage, opinion, commentary and refutation, all of which was completely pointless [16].

In such circumstances conspiracy theories spread far and wide, while in small nations rumour and misinformation tend to die out [17]. Society becomes fractious [18], and from the perspective of the individual, incoherent. As a young character says in *Generation X: Tales for an accelerated culture* [19]: 'I'm just upset that the world has gotten too big—way beyond our capacity to tell stories about it, and so all we're stuck with are these blips and chunks and snippets'.

Culture wars arise as society becomes increasingly fissile, developing further into fake culture wars. For instance, inter-generational thinking has been corrupted by myth and stereotype, encouraged by those wanting media attention or selling consultancy on how employers should engage young employees. In the USA in 2015, this post-real industry was worth \$70 M [20].

Once a certain degree of size and complexity is reached, vulnerabilities and abuse appear spontaneously, and this is the degree that ensures (or seems to ensure) that those in positions of power or influence are immune from any kind of retaliation [21]. Government becomes increasingly opaque and democratic participation and oversight decrease [22], while those regarding themselves as unaccountable are tempted to easy falsehood. The deterioration in public probity is sometimes ascribed to individuals: 'Under Boris Johnson political deceit has become not just commonplace but automatic', but as Peter Osborne [23] continues, 'it's unimaginable that ... Johnson could have been chosen to lead ... in a previous era' (i.e., prior to the era of post-reality).

In one of the more depressing consequences of post-reality, 'sustainability' either means very little (through overuse) or tends to the oxymoronic (if used for some approximation to business-as-usual), yet it has become a sector of the economy in its own right. There are institutes, policy advisers, officers and administrators of sustainability, and professional bodies and private firms proclaim their compliance. Under its aegis the offsetting industries thrive and certification bodies reassure consumers, even if analysis 'tells a different story' [24]. Mischievous examples range from the cosmetic to the feeble-minded [25].

As towns and cities get bigger, interests shift from the shared objectives of the community towards self-interest, and within a country's global cities add to the remoteness. In an approximation to Zipf's law (first noted in linguistics), the biggest city of a country is often about twice the size of the second city, three times the size of the third biggest and so on. According to this regularity London is about twice as big as expected: 9.8 M compared to 2.5 M for the second biggest city, Greater Manchester. This could mean that the UK's second-tier cities are smaller than they should be [26], but the current distribution of city size is similar to that prevailing in the late 19th C and early 20th C when the United Kingdom was at the height of its global imperial power, indicating that London is still a global city, and in consequence the economy in and around London has become largely decoupled from the rest of the UK. The growing regional disparities (and associated support for independence) have been ignored until recently on the assumption that a successful

London would eventually benefit the rest of the country, but this has not happened [27]. The concerns of London and other global cities are not those of their hinterlands.

5. Indifference to Truth

A consequence of excessive complexity is indifference to truth, which is the modern phenomenon of bullshit as defined by the Princeton philosopher Harry Frankfurt: it is impossible for someone to lie unless he thinks he knows the truth, and as for the liar, it is correspondingly indispensable that he considers his statements to be false. Bullshit requires no such conviction. Practitioners are indifferent to the facts except insofar as they may be pertinent to not being found out. They just pick out the things they say, or make them up, to suit their purpose [28]. In a post-reality world bullshit is also needed to get attention, to impress or survive [1], and is said to favour extroverts with various malign social consequences [29]. In 2012 the Ig Nobel award was awarded to the academic paper 'On the reception and detection of pseudo-profound bullshit' [30].

The indifference to truth is sometimes justified on grounds that there is none. Relativism is the doctrine that knowledge and truth are not absolute but relative to culture and historical context, while postmodernism gives even less weight to facts and may question whether they exist at all [31]. 'To believe that there is an absolute truth to be told about what climate change means, or what "it demands of us", is misguided . . . we need more varied, and more active, voices in climate politics . . . ' [32]. However, until we learn what those other voices would actually say the statement is unhelpful, and seems to be a play on uncertainty in the tradition of climate denial [33]. 'Absolute truth' may be vexed, but 'a reasonable sense of proportion' is not.

To conflate science and politics is to mix the levels of a hierarchical system that are properly kept apart. For instance, if the subjective values of scientists influence their advisory practice, matters portrayed as scientific are said to be just a proxy for debate about values [34]. While this may be true (and proper) at the interface of politics and science, the one does not entirely corrupt the other.

6. Indifference at Work

David Graeber drew attention to what he called bullshit jobs, 'a form of paid employment that is so completely pointless, unnecessary or pernicious that even the employee cannot justify its existence . . . ' [35,36]. Time is wasted on unnecessary meetings, pointless disputes, bureaucracy, posturing and dealing with other people's mistakes, particularly in large organizations. Research by the Ashridge Business School found individuals in various employment sectors who appeared to be busy without getting anything done. They concentrated on making themselves look good to senior colleagues and were more likely to be highly paid and to get promoted. According to the researchers 'it's quite a depressing picture' [37].

Such research is in the tradition of Cyril Northcote-Parkinson [38], who found that work expands to fit the time available for its completion and who noted (in all seriousness) that officials seek to multiply subordinates and make work for each other. In consequence, he observed that the number employed in a bureaucracy rose by 5–7% per year irrespective of variation (if any) in the amount of work being done.

7. Indifferent Scholarship

7.1. Excessive Size

The institution of scholarship is susceptible to the ills of getting too big. In a witty critique Bernard Forscher likened journal articles (facts) to bricks to be built into edifices or theories. He lamented that making bricks had become an industry in its own right; that it had become difficult to find a suitable plot for construction (because the ground was covered in loose bricks) or to complete a useful structure (because as soon as the foundations were laid they were buried under an avalanche of random bricks); and sometimes no effort

was made even to maintain the distinction between a pile of bricks and a true edifice. [39]. This criticism has gained force in recent decades.

Academic disciplines have also proliferated. Some (those that Augustus de Morgan might have found easiest to predict) comment on others from an imagined intellectual high ground. Science, for instance, is to be held to account by other intellectual disciplines [40], particularly those influenced by postmodernism [31], and applied fields (such as agriculture and forestry) are sometimes intruded upon in the guise of academic overview by those with no first-hand experience of them.

7.2. Indifferent Administration

In the era of post-reality administrators are expected to have an increasing influence on the conduct of research by being ever more prescriptive, with the pursuit of knowledge increasingly subordinated to preoccupation with policy anxieties.

In climate science, a systemic bias tends to confine conclusions to the boundaries of the *status quo*, encouraged by the scientists' funding agencies [41].

The Advanced Research & Invention Agency, announced in February 2021 [42], will support ground-breaking discoveries 'increasing productivity and growth', and Amanda Solloway, the Minister for Science and Innovation, adds that the agency will 'unleash' our most inspirational scientists and inventors to 'drive forward' their scientific vision. However, growth is precisely what is not wanted. The agency risks being established on a foregone but erroneous conclusion.

According to the World Meteorological Organization, in their 2021 update, there is a 40% chance that annual average global temperature will temporarily reach 1.5 °C (above the pre-industrial mean) in at least one of the succeeding five years [43]. This estimate is said to incorporate the expertise of internationally acclaimed climate scientists and the best prediction systems in the UK, Spain, Germany, Canada, China, USA, Japan, Australia, Sweden, Norway and Denmark, and that combining forecasts in this way enables 'a higher quality product' [43]. However, a 40% chance is an oddly low choice of likelihood, and seems calculated to sound unalarming. It is not one a scientist would be expected to use.

In a back-of-the-envelope exercise, a simple linear regression of the last ten years of global temperature data suggests that a 1-in-5 warm year will reach +1.5 °C by mid-decade. This appears reasonably consistent with the WMO projection and gives more confidence in the second result from the regression, which is that the mean global temperature will reach +1.5 °C before the end of the decade (not between 2030 and 2052, as predicted by the Intergovernmental Panel on Climate Change in 2018 [44]).

8. Science De-Education

To be science de-educated is to have a higher education that closes the mind to science and data, and thus to environmental matters, reducing the sense of proportion and causing the seriousness and urgency of climate change to be grossly underestimated.

'Hostility, or even indifference, to science and technology ... appears to be more common in Britain than in our major industrial competitors ... reflected in a smaller proportion of senior and middle management having a scientific training' [45], and there is a long-standing tendency, particularly in British scholarship, for applied research to have a lesser academic standing than pure research. 'The difference ... has been exaggerated by those making it the basis of an intellectual class distinction, helping us to forget that it was our engineers and merchants ... who won for us that very grand position in the world from which we have now stepped down' [46]. This remoteness from practicality has worsened in the era of post-reality.

The poetic or literary impulses of the humanities have long been put above scholarship of a more methodical kind. Samuel Taylor Coleridge believed that the souls of 500 Sir Isaac Newtons would go to make up a Shakespeare or a Milton, and Keats accused science of unweaving the rainbow by explaining it. According to these Romantics, reason takes a long and winding upward path towards the truth and stops short breathing heavily,

while imagination capers lightly on towards the summit [47]. Similarly, Walt Whitman was offended by a lecture on astronomy: ‘When I sitting heard the astronomer where he lectured with much applause in the lecture-room/How soon unaccountable I became tired and sick’. He wandered off alone, and in the ‘mystical moist night air . . . Look’d up in perfect silence at the stars’. However, T.H. Huxley called this sensuous caterwauling, while Isaac Asimov pointed out how convenient it was, making it not only unnecessary but downright aesthetically wrong to try to follow all that hard stuff in science [48].

That science is dangerous is also embedded in our culture. The whole of Western literature has been unkind to scientists [49] and is filled with images of scientists meddling with nature with disastrous results. Even the ‘white-coated loonies of Saturday morning children’s television’, who are meant to communicate science, merely recall the image of the mad scientist and add to the public’s nervousness [50]. Much other journalism perpetuates this parody by portraying scientists as detached from reality and their work as incomprehensible or whacky [51], or gives headlines most readily to findings of the gee-whiz kind [52].

According to John Carey, Emeritus Professor of English Literature, ‘As science has grown so, inevitably, has the ignorance of those who do not know about it. Within the mind of anyone educated exclusively in artistic and literary disciplines the area of darkness spread enormously during the later 20th C, blotting out most of modern knowledge . . . A new species of educated but benighted being has come into existence . . . whose deprivation must be felt as a wound to the self-esteem’ [53].

Such vulnerabilities no doubt reinforce the attitudes of the science de-educated. They do not do enough to inform themselves; misunderstand that the public generally is capable of a good grasp of science; see technicalities as remote from real-world preoccupations so that too little weight is given to correctness; and fail to give critical attention to climate change, with its many intellectual challenges.

Our leaders and journalists are science de-educated, most having a qualification in a humane or social discipline. In the parliamentary term 2010–2015 only one MP, Julian Huppert, had been a professional scientist before entering parliament. He is said to have been greeted by groans and shouts of ‘Oh no’ whenever he rose to his feet in the House. At the other extreme, about 10% of MPs (rising to a third of the cabinet) studied just one course—Philosophy, Politics & Economics at the University of Oxford, said to encourage confident but empty opinion [54].

Science de-educated debate is invariably innumerate, permitting a gross lack of proportion through the avoidance of numbers, the misuse of numbers or the use of mock numbers.

9. Innumeracy

9.1. Avoidance of Numbers

Much debate is carried on with no units at all: ‘Nuclear power is a money pit’, ‘We have a *huge* amount of wind and wave’, etc. [55], often with an implicit belief that sources of renewable energy will save the day (in 2019 13% of the world’s energy came from renewable sources [56]). The true state of affairs is shown by the graph of the continuing increase in carbon dioxide in the atmosphere.

9.2. Misuse of Numbers

There are many ways to ‘lie with statistics’ [57]. A starting point may be selected to either diminish or accentuate a trend or to come to some other self-serving conclusion; the concept of variability is not understood, so that blips are clutched at with a misplaced or synthetic optimism; and the potential for technological innovation is referred to without reference to the constraints of physics. Carbon capture and storage, for instance, requires so much energy that 10 years ago it was ‘hardly worth talking about’ [55].

Among many examples, relative and absolute rates of change were confused by Hans Rosling [58] to claim that social disparities were decreasing when in fact they were increasing [59]; the rate of increase in greenhouse gas emissions temporarily slowed in 2015–2016

'bringing optimism to climate policy discussions that a peak had been reached' [60]; and unconventional units like 'cups of tea' and 'double-decker buses' are sometimes cited to make sources of renewable energy or energy savings sound impressive [55].

Real numbers may also be overridden by invoking a wider contrary trend. For instance, in November 2020, the UK government allocated GBP 4 bn to support a plan for a 'green industrial revolution', which was contrasted unfavourably with the GBP 100 bn plus for HS2 and the GBP 27 bn allocated at that time for 4000 miles of new roads. However, critics should not 'nit-pick about the precise details' of the plan, [it is] . . . far more important to endorse the direction of travel' Mike Hulme cited in [61].

9.3. Metrics

Metrics and the output of models based on faulty assumptions are mock numbers. They do not describe quantities.

In management contexts, metrics give rise to rankings and targets but encourage perverse outcomes including cheating [62]. In a well-known example, to reduce Accident & Emergency waiting times, ambulances were made to queue because their casualties were counted as waiting only after they had been unloaded.

In the field of environmental economics, metrics consisting of numerical costs and benefits are assigned to aspects of the environment, ostensibly so that policy can be enacted through 'market-based instruments'. However, as Anthony Reuben, Head of Statistics at the BBC, said: ' . . . once you start . . . combining the value of coal reserves with the value of a stroll in the countryside you are in danger of creating a meaningless big number' [63]. Reducing in nature to a therapeutic commodity is in this tradition. To appreciate nature directly and for its own sake is to recognize its intrinsic value, not any instrumental value [64].

In a notable departure, Sir Partha Dasgupta pointed out that the impressively high monetary value given to the biosphere is misplaced because if all of nature were cashed in nobody would be left to spend the money [65], and the money would be worthless anyway. In monetizing elements of the environment 'the priceless is given a price . . . [but] . . . to measure the immeasurable is absurd, . . . [and] worse is the pretence that everything has a price or, in other words, that money is the highest of all values' [66].

9.4. Models

Numbers arising from models are only as good as the model's starting assumptions. In one particularly egregious example, the work of the economist William Nordhaus shows that warming of 6 °C will reduce global Gross Domestic Product by 8.5%, and that the costs of doing anything about it will exceed the benefits until 4 °C of warming is reached. The grounds for these estimates are that much of the economy is carried on indoors and will therefore be unaffected by climate change, and that no critical tipping point in the climate will be reached within the next 300 years [67]. No doubt Professor Nordhaus's workings are internally consistent but his starting assumptions are obviously unrealistic. Yet, in 2018 he won the Bank of Sweden prize (sometimes misnamed the Nobel prize for economics) for this work, cited as having 'brought us considerably closer to answering the question of how we can achieve sustained and sustainable global economic growth'.

The mock-quantitative index used to evaluate progress towards the Sustainable Development Goals of the United Nations is similarly dubious, as is obvious from the country ranking. Sweden is top, even though its consumption rate is five times the global sustainable rate, and even the US is in the top 20% [68].

Target metrics are by definition future objects, including the two proposed by the IPCC that would limit global warming to 1.5 °C or 2 °C. As arbitrary thresholds they are no doubt helpful, but as mock limits they disregard the wisdom of King Canute, who declined to command the level of the sea. They also effectively consign climate change action to the future along the lines of 'there is still time'. However, as soon as there is no longer time, if that moment were ever agreed upon, the correct tense would instantaneously switch to the

past without any intervening interval in the present, a sure way of achieving the fatalism the targets are supposed to avoid.

Integrated Assessment Models, which mix economics with science, give market-based approaches to climate change and have been influential in guiding climate policy since the late 1990s. However, they have limited policy discussions to those most convenient to politicians and have had the effect of prolonging climate delay [69].

10. Degrowth

The era of post-reality has largely been brought about by continuing growth, at least of the post-industrial kind seen in already-prosperous countries, such as those in the Organisation for Economic Co-operation and Development. If growth continued until everyone in a future world of 9 bn people was that prosperous, the global economy would need to be $\times 15$ bigger [70].

In principle, the remedy for excessive growth is degrowth (*décroissance*), an environmental movement that began in France in the early part of the 21st century [71]. It involves ‘a down-scaling of production and consumption’ to increase human wellbeing (www.degrowth.org, accessed on 12 September 2021).

Despite efforts to put the prospect of degrowth in a positive light-less pollution, healthier lifestyles, etc., the term has negative connotations [72] because a lack of growth in GDP is the definition of recession or depression. Without growth the economy becomes unstable. Degrowth would cause unemployment, prejudice business interests, increase indebtedness, threaten free trade and result in the loss of hypothetical future wealth. Proposals to actively shrink sectors of the economy, even if those sectors are unnecessary or damaging such as advertising, single-use products and commuting [73], as well as much unnecessary travel and other consumption, would clearly meet strenuous opposition. The suggestion that the use of energy and materials could decrease while wellbeing and the environment improved, and only then would GDP decline in a benign way [74], is unpersuasive.

Degrowth also challenges globalization, and is sometimes portrayed as a primitive desire to return to a fictional Arcadian past. In a typical example of hyperbole, countries are ‘archaic constructs that are at odds with 21st century realities [so] . . . the logical destination of a movement dedicated to [national] self-sufficiency must be the atomization of humanity, perhaps into family bands, taking us back to the Mesolithic’ [75].

The first step towards degrowth is no growth, or a steady state, as envisaged by the 19th C philosopher John Stuart Mill (one of the architects of capitalism), and advocated in ecological economics. At present, growth leads to shortage, which is then a constraint on growth, so to satisfy the shortage is to opt for further growth. The state of no growth would involve breaking this endless cycle, for instance by training local staff instead of recruiting overseas or deciding that there are enough roads and buildings. Those telling us that it is too difficult a task ever to accomplish are being cynical since they also think that the colonization of space is feasible [76].

While the imperative for growth persists, the notion of degrowth appears naïve and a steady state seems equally distant. However, the longer the delay the quicker and more drastic the degrowth is likely to be, the greater the human suffering, and the more the damage to the climate and biosphere. As Herman Daly, a pioneer of ecological economics, put it, the future economy will either be smaller than at present but still sufficient for a good life for a long time, or a post-crash-and-burn state that will be much smaller (Herman Daly cited in [77]).

11. Applied Scholarship and Direct Action

Scholarship, whether or not afflicted by the ills of post-reality, has been ineffectual in countering climate change inaction. Even climate science, which has given more than enough foreknowledge to inform policy, has done little to reduce greenhouse gas emissions. If the inaction is regarded as an applied problem progress would be measured by practical effect, and at least in the social context, this grades into options for direct action.

First, public education is a basic but neglected scholarly task, particularly in relation to climate change, in which there is an enormous gap between public perception and scientific reality [78]. If ‘our institutions of learning . . . had been actively and energetically engaged in promoting public learning . . . [there is] every reason to suppose that it would have had a [beneficial] impact’ [79].

Science communication was intended for this task: ‘. . . everybody needs some understanding of science . . . and a proper science education at school must provide the ultimate basis for an adequate understanding’ [45]. ‘Public attitudes to science owe so much to the teaching of science in school . . . [yet] it has not been the focus of our attention’ [80]. Instead, its scholars are occupied with various aims and models that are said to lack conceptual clarity, while doing little to reflect on the effectiveness of communication itself [81]. They also seem to be unaware that much of what is being communicated in relation to climate change is in any case misleading [82,83].

The Department for Education in England recently published guidance banning the teaching of extreme political stances including ‘a publicly stated desire to abolish or overthrow . . . capitalism’ [84]. There has never been such a restriction in the UK even during the cold war [85], and with it all environmental science teaching will be compromised since it is obvious that continued growth, an axiom of capitalism, is a principal cause of climate change and other environmental deterioration.

Secondly, scholars could help to strengthen public deliberation processes [79]. For instance, citizens assemblies have sometimes been effective in shaping policy that is too controversial or long-term to be easily resolved by the normal political process [86], and one of the demands of Extinction Rebellion in 2019 was to have a citizens assembly on the climate emergency. One such was convened in England in early 2020 but it only made marginal recommendations such as a frequent flier tax, banning cars from city centres, more renewable energy, and housing developments with facilities easily accessible by walking and cycling [87]. Such exercises are only as good as the knowledge of the participants and their specialist briefings; in Scotland’s citizens assembly the respected Professor Julia Steinberger was excluded on grounds that she had publicly supported Extinction Rebellion, largely defeating the object of the assembly.

Thirdly, scholars and others could follow the example of Professor Chris Rapley and colleagues, who have declared that they will explain honestly and clearly the seriousness of the climate emergency, and ‘with courtesy and firmness’ will hold their professional associations, institutions and employers to the same standard [88].

Other kinds of direct action are widely advocated [89–91], including local steps towards self-sufficiency [77] (community-based agriculture, local cooperatives, community energy projects, etc.), that counteract the tendencies of post-reality without challenging them directly.

12. Conclusions

Post-reality is a reflection of the excessive complexity of society. It gives rise to a pervasive indifference and lack of accountability, a gross lack of proportion owing to science de-education and various other kinds of intellectual and moral weakness. For as long as society is committed to further growth, these will get worse. There is no ‘peak bullshit’ to be hoped for [1].

Over twenty years ago Sokal and Bricmont [31] observed that, owing to the influence of postmodernism, the demise of reason in academic circles had been radical enough to pave the way for a more extreme irrationalism, or that scholars might become reluctant to attempt any thoroughgoing critique of the existing social order to become its servile advocates. The latter prediction, if not the former, has come to pass. Even some climate scientists ‘have chosen to forgo their academic independence . . . for the appeal of being relevant within a debate that their own analyses tell them is irrelevant’ [41]. However, ‘if the scientific community censors what it says then it is not the scientific community’ [41], and ‘the malaise runs deep when even scientists start to complain that they do not trust

science' [92]. Similarly, in recent years, 'more and more [journalists] seem happy to be the mouthpieces of government, or of political parties . . . , [and] attack other journalists for refusing to fall into step with the official line' [93].

It is widely (and correctly) believed by those who have never been to Antarctica that it is populated with penguins, a cognitive short cut involving faith in the ways information is filtered and disseminated, but that faith is misplaced in relation to what is known about climate change. Different scholastic traditions come to disparate conclusions, many contributions are unavoidably opinionative, global scale generalities are difficult to disaggregate and the loss of underlying detail gives scope to colour even formal and reputable studies. As the novelist Ursula Le Guin put it, when details are lost 'how can you tell if you are being dishonest or not?' [94]. In addition, uncritical scholarship and the faulty pronouncements of maleducated authority figures sap the confidence and dim the critical faculties of the public, while the truth is suppressed, ostensibly (but unconvincingly) for the public good [82].

Honest, plain-English resources are needed, preferably supported by numbers in conventional units to assure a reasonable sense of proportion. They would be an extension of Professor Bill McGuire's proposal for an independent website, validated by a scientific institution, for findings not published by the (relatively conservative) IPCC [95]. The basics of climate science are not difficult to understand, nor the superstructure of commentary and opinion, but even if they were, the example of the Nobel prize-winning physicist Richard Feynman could be followed. To ensure his own understanding of a complex subject he would imagine explaining it to an eight-year-old [96].

In advocating better climate change education, a misunderstanding easily arises. For several decades information campaigns have been designed as if the problem of inaction were just one of getting a message across to the public [97], and similarly a 2006 guide by the UK's Department for Environment, Food and Rural Affairs stated that 'The first and most important thing is to change the way people think about the climate . . . then we can try to change their behaviour' [98]. While the education of the public is fundamental, attention is easily diverted from the failings of policy and leadership. Making the public responsible for climate change inaction easily becomes a tactic to prolong climate delay [83].

Science de-education, encouraged by the long-standing distinction between science and other disciplines, is a serious impediment to achieving a reasonable sense of proportion, particularly as climate change is 'a great blender and trespasser, sweeping back and forth between two regions traditionally referred to as nature and society' [99]. In fact, there is no need for it if scholarship is broadly defined as learning that is scrupulous and critical (the dictionary definition). The more constructive distinction would then be between knowledge that is reliable or unreliable whatever its provenance [100]. Scrupulous scholarship would relate to what is known, and the only alternative to it would be ignorance [53].

A cartoon in a recent issue of *Private Eye* magazine showed a graph plotting the increase in the numbers of people avoiding looking at the graph of global warming, a comment on the tendency, made worse by post-reality, to disregard the unpalatable. However, no-one will be glad in future that they lacked awareness or understanding of what is happening (or not happening) in their name now. It is time to question everything that is as-usual, including the traditional confines of scholarship.

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