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## **Locke on Cognitive Bias: *Of the Conduct of the Understanding* and diseases of the mind**

### **ABSTRACT**

*This chapter proposes that Locke's *Of the Conduct of the Understanding* (1706) can be read as a precursor to the recent psychological literature on cognitive biases. We begin by examining Locke's intentions and methods, as well as his conception of human reason as universal. In the second section we briefly look at how Locke's taxonomy fits with contemporary ones and then in the third look at some of the ways Locke thinks we may end up reasoning from false principles. In section four we concentrate on some phenomena Locke identifies which seem to be natural but arational psychological processes. These are forms of mind wandering and distraction, which have been a focus of some recent research in psychology. Finally, we briefly discuss Locke's probable attitude to the contemporary thought that many cognitive biases might in fact be adaptive heuristics designed for efficient cognitive function in a range of normal conditions.*

### **LOCKE'S PROJECT AND ITS PRESUPPOSITIONS**

Locke's posthumous *Of the Conduct of the Understanding* (1706) – hereafter just 'the *Conduct*' – is a curious book in both its composition and publication. Locke began writing it in April 1697 and with the intention to include it as a separate chapter in the fourth edition of the *Essay* (1699), but he appears not to have had the time to revise it to his satisfaction. Even after he had only 'written several pages' of the *Conduct*, he realised the vastness of the topic and that it would therefore 'make the largest chapter of my *Essay*' (*Correspondence* (1976-, 6: 2243). In a letter written in the final days before his death in October 1704 Locke admitted to his executor, 'All that I have done has been, as any miscarriage [of the understanding] has accidentally come into my minde, to set it downe, with those remedies for it that I could think of.' Locke ends by commenting that if it is to be published as a work in its own right 'the heads and chapters must be reduced into order' (*Correspondence* (1976-, 8: 3647). This was clearly not done. The version we have is long, repetitive, occasionally rambling, and lacking obvious structure. The reader should therefore bear in mind, that given Locke's final words, we should regard it as an incomplete work-in-progress. Yet despite that it has remained continually in print with 163 English editions and 21 translations into French, German, Italian and Russian (Schuurman, 2000, 275): it seems to have been received as a sort of self-help manual for

those interested in improving their critical reasoning. Locke's hope was that the *Conduct* would 'perhaps serve to excite others to enquire farther into [the topic] and treat it more fully than I have done' (*Correspondence* (1976-, 8: 3647). It is not unreasonable to claim that it is only in the past few decades, in the heuristics and biases literature, stimulated by the work of Tversky and Kahneman, that the topic has finally begun to receive the attention Locke thought it deserved.

In this chapter we aim to align some of Locke's observations and suggestions with our current understanding of cognitive biases.<sup>1</sup> But before we start that task, we need to comment on Locke's methodology. Locke trained as a physician and was interested in the application of the experimental method to medicine and especially Sydenham's theory of disease (Allen, 2010 and see Walmsley, this volume). His approach to the problem of cognitive bias and systematic errors of thought was very much in this vein, where the first task is to 'describe the disease' and then, where possible, to suggest 'remedies' (*Correspondence* 1976-, 8: 3647, cf. 3647, and *Conduct*, in *Works* (1823, III) §41, p. 275; §45 p. 286). Both aspects are tentative: identifying diseases by their symptoms is unreliable because we have no access to their underlying natures, no grip on how these symptoms are generated; and remedies are always experimental for the same reason. Therefore, while Locke does generally try to suggest remedies to the 'diseases' he identifies, these are advisory rather than prescriptive.

Furthermore, Locke notes that '[t]here are several weaknesses and defects in the understanding, *either from the natural temper of the mind, or ill habits taken up*, which hinder it in its progress to knowledge' (§12 p. 233, emphasis added), but he doesn't do anything systematic with this distinction. Locke also accepts that the 'great variety' in people's understandings is sometimes due to 'their natural constitutions' so that people 'of equal education' may display 'great inequality of parts', but he is also optimistic that 'a great many natural defects in the understanding [are] capable of amendment' (§2, p. 207). The amendments largely take the form of strategic habit formation, in line with Locke's views about education (see Walsh, Tabb, Nazar and Weinberg, in this volume) and note-

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<sup>1</sup> To the best of our knowledge, this connection has not been remarked upon before.

taking (See for example Richard Yeo, 'John Locke, Master Note-taker' chapter 7 in *Notebooks, English Virtuosi, and Early Modern Science*, University of Chicago Press: 2014).

The language of miscarriages, diseases and defects, terms which Locke appears to use interchangeably, suggests he is working with a model on which our cognitive capacities have a normal state which not all individuals achieve. We can get better at *reasoning* by getting more data (ideas for Locke) and by improving our memories, but *reason* itself is a fundamental capacity which does not come in degrees. Reason is, for Locke, a 'touchstone' which allows anyone 'who will make use of it to distinguish substantial gold from superficial glitterings, truth from appearances' (§3, p. 211). It is rather reasoning, namely the *exercise* of reason, which can come in degrees. Therefore, the remedies for diseases which stem 'either from the natural temper of the mind or ill habits taken up' (§12, p.233) all focus on improving reasoning. Strategic habit formation presupposes that even in the defective and diseased mind, reason remains intact and the disease merely prevents the proper use of this 'noble faculty'. Education in reasoning is largely a matter of instilling good rather than bad habits, but everyone, even the best educated, 'if he would look into himself, would find some defect of his particular genius' (§38, p. 271). This looking into oneself is not merely introspection but something much stronger, involving not merely awareness of how one has reasoned but also whether this is an instance of *good* reasoning. It is similar to Tyler Burge's account of critical reasoning: 'It is reasoning guided by an appreciation, use, and assessment of reasons and reasoning as such' (1996, 98). For Locke this is the prerequisite for mastery of one's thoughts and thus actualisation of the full power of reason, not because we need always to be engaged in critical reasoning, but because it is the tool which allows us to identify our defects and form habits to counter them. It seems that Locke is working with a distinction between competence and performance: the touchstone of reason may always be present, but its exercise depends upon the individual's education, experience, effort and context.

Despite this, Locke observes that there are some whose cognitive capacities are so different that 'their very natures seem to want a foundation to raise on it that which other men easily attain to' (§2 p. 207). What Locke seems to have in mind here are people with learning disabilities; but rather than taking their existence as a challenge to his conception of reason, as evidence that it may in fact be something which also comes in

degrees or types, he seems to set people with moderate to severe learning disabilities to one side. Also set to one side are ‘men of low and mean education, who have never elevated their thoughts above the spade and the plough’ because ‘you will find [them] no more capable of reasoning than almost a perfect natural’ (§6, p. 221).<sup>2</sup> By restricting himself to finding cures for those ‘natural defects in the understanding’ that are specifically ‘*capable of amendment*’ (§2, p. 207), Locke avoids addressing potential challenges to his conception of reason as universal.

Locke’s conception of reason is universal in another sense, namely it is not a domain specific capacity: ‘he that reasons well in any one thing has a mind naturally capable of reasoning well in others’ (§6, p. 220). However, observing that in practice people who are good at reasoning about one subject may not be so good at reasoning about another, for example when a geometer tries to do theology, Locke again makes a performance-competence distinction. The competence is not domain specific, but performance is, because one will only reason well in domains where one has had practice. It follows then that the application of the universal capacity to reason to any given question is not a trivial matter: there are skills and habits to be acquired before one will reason well on a specific topic and without that training and practice, reason is largely useless. Just as it is impossible to become a good painter or musician just by listening to rules and lectures without also practicing those arts (§4, p. 215).

## **COMPARING TAXONOMIES**

Contemporary research has identified more than 180 psychological phenomena which can be described as cognitive biases. And just as part of Locke’s method is taxonomic, there have been attempts to provide taxonomies of these. One such attempt is the widely used Cognitive Bias Codex, and it is interesting to see how that compares to Locke’s approach. There are four main branches of the CBC distinguished by very general diagnoses, although there is some notable overlap between these branches.<sup>3</sup> When we try to locate Locke’s categories under these branches, we find a similar overlap. One striking result of this exercise is that Locke’s concern with principles (see section 3 below),

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<sup>2</sup> For the 17<sup>th</sup> century meaning of ‘a natural’ as someone with substantial intellectual impairment, see “natural, n.7” in the *Oxford English Dictionary Online*.

<sup>3</sup> Here we should note that the CBC does not represent a scientific consensus and neither is it based on peer-reviewed research. But it is widely used by researchers as a handy taxonomy.

namely that we often take as a self-evident foundation a proposition which is not self-evident at all, is not such a strong concern in current research.

The first branch of the CBC concerns 'Too Much Information', i.e. cognitive mechanisms which are designed to help us manage information overload but which can result in biases. For example, things that are primed by repetition or familiarity, or by the fact that they 'stick out' more, such as the bizarre or funny, get noticed and remembered more easily than the plain and boring things. In the same way we notice change and are drawn to details that confirm our own existing beliefs. Equally we notice flaws in others more easily than ourselves. Along similar lines Locke points this out under 'Haste', 'Arguments' (listing arguments pro and con), 'Prejudice', 'Custom' (see below for detailed discussion) and 'Examine' (identifying one's own reasons).

The second branch is 'Not enough meaning': these are cognitive mechanisms for rapidly interpreting information, filling in characteristics from stereotypes, generalities and prior histories. We fill in the gaps with stories and simplify things to make it easier to talk about or understand. It is a general preference to see things in terms of what we are fond of or familiar with. Under this fall Locke's 'Principles' (see below for detailed discussion), 'Similes' (linguistic pareidolia), 'Distinction' (pigeon-holing), 'Bias', 'Presumption', 'Observation' (confirmation bias), and 'Partiality'.

The third branch of the CBC is called 'Need to act fast'. These mechanisms are for making decisions rather than forming beliefs: in order to stay focused and to get things done efficiently, we favour simple-looking options and complete solutions over complex, ambiguous options. Under this fall Locke's reflections on 'Anticipation' (going with the first option presented), 'Haste', 'Bias', 'Distinction' (using simple categories to rule out some alternatives) and 'Observation' (deciding before all the evidence is available).

The fourth and final branch concerns 'What should we remember', i.e. mechanisms which select which things we remember and how we remember them. We store memories differently depending on our state when the events were experienced, such as attention, distress, excitement. Memory storage also involves discarding specifics to form generalities, and circumstances of recall can modify memories (see Schechtman, this

volume). Under this branch fall some of Locke's comments in 'Smattering' (superficial knowledge of a subject), 'Partiality', 'Desultory' (getting bored easily), 'Bias'.

### **THE CAUSES OF REASONING WITH FALSE PRINCIPLES**

A theme which runs throughout the *Conduct* is the importance of examining one's own 'principles' or foundational beliefs. In this respect, Locke thinks all reasoning to a conclusion depends upon some 'principles', in the sense of 'a primary assumption forming the basis of a chain of reasoning' ('Principle, n.3a'). Given the arguments of Book 1 of the *Essay*, we can take it as read that these principles are acquired rather than innate (see Atherton, this volume). The problem is that many people reason with false principles. Locke therefore takes it to be a fundamental obligation of rationality to use only principles which are 'certain and evident' and that this in turn obliges the reasoner to evaluate their own principles and reject those which fall short (§11, p. 230). Thus, even the well-meaning intention of educators to instil *good* principles in their pupils is wrong because it 'amounts to no more than making them imbibe their teacher's notions and tenets by an implicit faith' (§41). Here Locke is adopting a view more often associated with freethinkers of the period such as Toland or Collins, namely that we should eschew all prejudices, where those are defined as beliefs which we have acquired without being able to demonstrate their truth (see Jorgensen, this volume). Thus, Locke is committed to the thought that, for at least 'the ingenuous [i.e. ingenious] part of mankind whose condition allows them leisure and letters and enquiry after truth', principles should be certain because they are *self-evident*. It follows that there is never any *need* to rely upon the testimony of others with respect to principles. Much of the *Conduct* can therefore be seen as an investigation of the causes of not reasoning with self-evident principles, with sections on 'Bias', 'Despondency' (giving up too easily), 'Desultory', 'Fallacies', 'Haste' (twice), 'Partiality' (twice), 'Prejudices', 'Perseverance' ('oscitancy', i.e. giving up enquiry because bored), 'Presumption', 'Reading' (too much impedes clear thinking), 'Religion' (prohibiting the questioning of principles), 'Resignation' (repeating the most recent opinion one has read or heard), 'Similes', 'Smattering', 'Wandering' (see below), 'Words' (misleading labels). The phenomena described in these sections are familiar and their bad consequences obvious (except perhaps for too much reading!).

The end of Locke's manuscript of the *Conduct* contains the beginnings of a further section, called 'Custom', which has always been excluded from published editions because it seems to make no point and anyway ends mid-sentence. In this section Locke notes that things which are initially unpleasant to the senses, such as unusual foods ('Ragous' – probably spiced food from India), perfumes or music, 'become in time pleasant and agreeable'. The unfinished sentence introduces actions which 'were at first very hard and uneasy', presumably to continue that they become easier with custom. But neither of these phenomena is a disease of the mind and in fact both seem very similar to the strategic habit formation Locke offers as a *remedy* for so many cognitive biases. So, what did he have in mind when he began to compose a section on custom? Where is the defect, miscarriage, or disease here?

In the section on Association, Locke does mention 'the habitual and prevailing custom of the mind joining [ideas] thus together in thinking' (§41, p. 277). Customary association of ideas creates the illusion of a natural, i.e. law-like, connection between them. The mechanism here seems to be a psychological process where the juxtaposition of ideas in experience creates a pathway in the mind from one to the other, giving the feeling of necessary connection (this is very similar to Hume's account of the idea of necessary connection – the main difference being that Locke thinks there are also experiences of genuine necessary connections between ideas (see Tabb, this volume). Therefore, the section on Custom could be repetition of this point, but the examples he gives there suggest something slightly different. Coming to like unusual food does not seem an analogy for the mechanism of association: what changes here is not a connection between ideas but the *evaluation* of something. The cognitive bias leading to reasoning with false principles would be when unusual or doubtful opinions come to seem obviously true by custom and repetition. As Kahneman puts it in *Thinking, Fast and Slow*, a book which has a similar purpose to Locke's *Conduct* (though Locke is more optimistic that with enough effort these defects of the understanding can be overcome):

A reliable way to make people believe in falsehoods is frequent repetition, because familiarity is not easily distinguished from truth. Authoritarian institutions and marketers have always known this fact. (2011: 63)

This is sometimes called the ‘illusory truth effect’ and its identification is often attributed to Hasher, Goldstein and Toppino (1977). For Locke, true principles acquired this way would be as bad as false ones: their self-evidence would still be an illusion. Sadly, we do not know what Locke’s proposed remedy for this was going to be, or even if he had one. However, we do get an idea of what he *might* have said in the three sections on ‘Indifferency’. This important concept for Locke is a form of epistemic humility which should protect us from wishful thinking: one ‘must not be in love with any opinion, or wish it to be true, until he knows it to be so, and then he will not need to wish it’ (§11, p. 230). In exploring this idea, Locke comes to the intriguing conclusion that: ‘ignorance, with an indifferency for truth, is nearer to it [truth] than opinion with ungrounded inclination, which is the greater source of error’ (§35, p. 269). Which is to say, one way we can protect ourselves from the effects of the repetition of falsehoods is to respect our own domains of ignorance, to accept that an admission of not knowing can be an epistemic virtue.

While Locke’s primary focus is on causes of accepting principles which are not self-evident, in section 3 on Reasoning, Locke identifies a very different sort of problem about principles. He begins this long and rambling section by identifying three miscarriages of reason. The first two, ‘those who seldom reason [for themselves] at all’ and ‘those who put passion in the place of reason’ (§3, p. 208), are clear cases of not being ‘lovers of truth’ and not engaging in reasoning at all. The third, however, is rather different, for it is ‘those who readily and sincerely follow reason, but ... have not a full view of all that relates to the question [i.e. lack total information]... From this defect I think no man is free’ (§3, p. 208). Locke’s initial suggestion of a remedy to this third defect is:

[T]alk and consult with others, even such as come short of him in capacity, quickness and penetration: for since no one sees all, and we generally have different prospects of the same thing, according to our different, as I may say, positions to it, it is not incongruous to think nor beneath any man to try, whether another may not have notions of things which have escaped him, and which his reason would make use of if they came into his mind. (§3, pp. 208-209)

The incongruity Locke has in mind is between his conception of individual reason as the universal touchstone for identifying truth and this dependence upon others if even the careful and mature reasoner is to avoid error. He goes on to note that ‘angels and separate spirits’ may not be susceptible in the same way to this defect, and that a cognitively ideal mind would have ‘perfect and exact views of all finite beings that come under their consideration’ and thus be able to ‘collect together all their scattered and almost boundless relations’ (sect 3. p. 209). These remarks would only apply if Locke was considering knowledge of substances, where there is a distinction between the real and nominal essences (*Essay*, 2.31.6; cf. 3.3.15; see Kuklok, in this volume), in which case this defect derives from the fact that we are always limited to knowing nominal essences, and as we learn more, the nominal essences we assign to things change (*Essay*, 3.2.3).

This means that however readily and sincerely we follow reason, however assiduous we are in avoiding mistakes and errors in our reasoning, our conclusions may have to be revised. Self-evidence is not a guarantee of ‘real knowledge’ of substances (*Essay*, 4.4.1). The role of other people, then, is not to make up for a weakness in our reasoning capacity, but to act as instruments, to extend the range of our experience. Locke is merely noting the possibility that talking to a farmer about animals, a whaler about fish, or a jeweller about gold, may show him that his complex ideas of those things need modifying in the light of their wider experience.

## **MIND-WANDERING AND DAYDREAMING**

While most of the sources of error and bias that Locke identifies look very much like cases where the normal and rational psychological process is interfered with or hindered by external contextual or behavioural factors, two sections stand out in that they seem to describe *psychological* processes which take us away from good reasoning, but which have no apparent purpose or function themselves. In ‘Wandering’ and ‘Transferring of Thoughts’, Locke seems to be identifying *normal* psychological processes which do *not* serve the ends of good reasoning. Locke conceives of the conscious mind as dynamic, as involving a ‘constant succession and flux of ideas in our minds’ (§30, p.259) and furthermore that this stream of consciousness has its own driving forces. He does not discuss the nature of these forces, apart from association, but he observes that they can

take our thoughts in directions which hinder our capacity to reason clearly and effectively. The phenomena he describes are closely related to what is now often called 'stimulus independent thought', where the mind wanders from the task, or is distracted by a line of poetry or loses itself in a train of thought.

In the classic paper defining contemporary research into these phenomena, Smallwood and Schooler give a definition aimed at unifying them into a single research paradigm: 'We propose that mind wandering is a situation in which executive control shifts away from a primary task to the processing of [other] goals' (2006, 946). They note that there is something paradoxical in the idea of a shift of executive control without intention, as is common in most cases of mind wandering, but observe that the shift is the 'automatic' (i.e. not intentional) response to an internal or external stimulus and that it is often not noticed by the subject.

This fits well with the phenomena Locke is thinking about here. He describes the goal of a non-wandering mind thus:

... we can by use get that power over our minds as to be able to direct that train of ideas, that so, since there will be new ones perpetually come into our thoughts by a constant succession, we may be able by choice so to direct them, that none may come into view, but such as are pertinent to our present enquiry (§30, p. 259)

It is precisely this alignment of intention and executive control which, in the Smallwood-Schooler definition of mind wandering, fails. Locke goes on, in the section on 'Transferring of thoughts' (i.e. transition from one thought to another), to identify three causes of mind wandering. The first is when we are overcome with a strong passion, love or anger, and can think of nothing else. The second is when we become obsessed with a particular idea or problem and put all our cognitive effort into it despite it being trivial, pointless, or just a waste of time. This is a broad phenomenon and many cases may not fall under the folk conception of mind wandering, but there is a clear sense that what is happening here is that attention is taken away from the tasks that, were one to reflect on priorities, should be primary, so it falls under the scope of the Smallwood-Schooler definition. The third is what Locke describes as 'a sort of childishness ... of the

understanding' (§45, p. 287) whereby our attention is grasped by a sentence, phrase, tune or some other item and we cannot get it out of our minds.

Locke's discussion of the third cause is intriguingly cautious. He explains this caution with a description of another similar phenomenon which might seem incredible to one who has not experienced it (and gives an anecdote about just that). This occurs in people lying awake in the dark with their eyes shut and consists in seeing a stream of faces passing rapidly one to another and having no ability to stop the train or retain any image. What is important about this example is neither the particular phenomenon nor Locke's suggestion it has a physiological cause, but the placing of it. By linking it to transferring of thoughts rather than, e.g. dreaming, Locke reminds us that mind wandering phenomena are involuntary not only in their triggering, but also sometimes in their continuation. Thus our ability to control our thoughts is limited not only when we lack self-awareness of how we have been distracted from the primary task but even when we are fully aware of what is happening.

The remedies Locke offers in this case do not appeal to strategic habit formation, again suggesting these are a very special set of phenomena. These are not tendencies to make mistakes in reasoning – cognitive biases – but natural processes inherent to the human mind which are, for Locke, simply arational. Thus his remedies need to be applied on a case by case basis: 'allay the present passion' (§45 p. 288), 'disturb and check' the mind that 'makes itself a business of nothing' and 'set the understanding on work with some degree of vigour' (§45, p. 288). But given the implication we drew above about the limitations of our control over these processes, saying what we need to do is a great deal easier than doing it effectively.

## **COGNITIVE BIASES AS HEURISTICS**

The variety and widespread nature of cognitive biases has led many researchers to propose that some at least may be *adaptive*, in that they get us to the right answer to a problem with minimal cognitive effort in the evolutionarily relevant contexts. Though he

would not accept the bolder 'two systems' approach of Kahneman (2011),<sup>4</sup> Locke also observes that the human mind has a natural tendency to take shortcuts, as he writes in the section on Haste:

Labour for labour's sake is against nature. The understanding, as well as all the other faculties, chooses always the shortest way to its end, would presently obtain the knowledge it is about, and then set upon some new enquiry. But this whether laziness or haste often misleads it, and makes it content itself with improper ways of search and such as will not serve the turn. (sect.16, p. 237)

Locke's attitude to these cognitive shortcuts is ambivalent: laziness and haste are clearly bad things, but so is 'lost labour' (§45, p. 286). As he further notes in his second section on Haste: 'care must be taken to avoid the other extreme ... He that will stand to pick up and examine every pebble that comes in his way is as unlikely to return enriched and loaded with jewels, as the other that travelled at full speed' (§25, pp. 252-253). He would then, it seems, be open to the idea that certain cognitive biases can be explained by heuristics which work well in the normal circumstances of their acquisition (be that social or evolutionary) even if they do not work well outside those circumstances. For example, he notes that 'the ways of discourse and reasoning are very different, even concerning the same matter, at Court and in the University' (§4, p.215), not doubting that each works well in its restricted context. His main concern is to ensure we have sufficient self-awareness that we were using such fallible heuristics and the *Conduct* is thus partly written to improve that self-awareness.

## CONCLUSION

Locke's over-riding intention in writing the *Conduct* is to tell the reader to become aware of the 'great many natural defects...which are over looked and wholly neglected' (§2 p. 207), which should be enough to at least reduce their impact. This awareness is ultimately something each of us needs to achieve for ourselves. However, as Locke admits throughout the *Conduct*, this is easier said than done. At the core of the problem lies

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<sup>4</sup> 'System 1 operates automatically and quickly, with little or no effort and no sense of voluntary control. System 2 allocates attention to the effortful mental activities that demand it, including complex computations.' (2011, 20-1)

nonetheless the great propensity one has for *not* thinking for oneself. While there may be varied causes for particular defects and miscarriages, 'the inability' of independence of thought 'is not any natural defect that makes men incapable of examining their own principles.' (§12 p. 231). Rather, it comes about because we are 'impatient of being bantered or misled by others' (§12, p. 231) and 'everyone is forward to complain of the prejudices that mislead other men or parties, as if he were free, and had none of his own' (§10 p. 228). Individuals therefore often simply fail to make the effort, and the utmost (individual as opposed to collective) endeavour that proper and successful *reasoning* often requires. 'What is the cure?' he asks, and answers:

No other but this, that every man should let alone others' prejudices, and examine his own. Nobody is convinced of his by the accusation of another; he recriminates by the same rule, as is clear. The only way to remove this great cause of ignorance and error out of the world is, for everyone impartially to examine himself. (§10, p. 228)

Bearing in mind, and here concluding in Locke's most encouraging words, that for those who make this effort there is a great reward for 'We are borne with faculties and powers capable almost of any thing such at least as would carry us farther than can be easily imagined' (§4, p. 213).

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