C5

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Recasting the "Scientism" Debate

Anthony Gottlieb

C5.P1 Here is a piece of table talk from an Oxford college in the early 1920s. To appreciate it, you need to know two items of Oxford terminology. "Greats" is a course comprising ancient Greek, Latin, history, and philosophy; and a "First" is the highest mark you can get in a British bachelor's degree. The story goes that an eminent physicist, Frederick Lindemann, who had recently arrived in Oxford, was seated at dinner next to Margaret Pember, the wife of the head of the college. Lindemann rued the lack of satisfactory scientific education in England, whereupon Mrs. Pember is said to have remarked: "You needn't worry. Any man who has got a First in Greats could get up science in a fortnight."[1]

C5.P2 Perhaps Mrs. Pember learned to change her tune a few years later when she acquired a scientist (and grandson of Darwin) as a son-in-law. Be that as it may, you will not often hear science belittled in Mrs. Pember's way now. It has in many places acquired the sort of prestige that classics once enjoyed. Indeed, some humanists feel that the tables have turned and that today's scientists are prone to a prejudice which is the opposite of Mrs. Pember's. Surely a first-class physicist or neuroscientist could get up the humanities in a fortnight?

C5.P3 It sometimes seems from popular-science books and news reports that anyone who is *au fait* with the latest scientific work can get up philosophy in a fortnight. For example, one hears that after centuries of debate, a few laboratory experiments have shown that there is no such thing as free will. And we have it on the authority of Stephen Hawking that "philosophy is dead" because it "has not kept up with modern developments in science."[2] Some other recent American and British physicists have written similar things.

C5.N1 [1] Roy Harrod, *The Prof: A Personal Memoir of Lord Cherwell* (London: Macmillan, 1959), 53.

C5.N2 [2] Stephen Hawking and Leonard Mlodinow, *The Grand Design* (New York: Bantam Books, 2010), 5.

It is notable, though, that you do not find such attitudes in the writings of Einstein or Heisenberg, who were educated in a culture that encouraged one to spend more than a fortnight on philosophy.

C5.P4 Every specialist will have a favorite gripe about an interloper who has blundered uncomprehendingly onto his or her turf. Academics seem to enjoy making such complaints and it is hard to imagine a world in which the cultivators of one field of knowledge do not engage in territorial disputes with those toiling in others. Such disputes break out within the sciences and within the humanities just as they do between these two families of disciplines.

C5.P5 The sort of gripe I am going to consider here is a less excusable and also a more philosophically interesting one. It is a general complaint about the natural sciences—I shall not be discussing social science—and it arises from the idea that science is by its nature limited in scope. Precisely because it is *science*, it can tell us only so much and not more, or so the complaint goes. I want to suggest that such a stance makes less sense than one might think. This becomes evident, I believe, once we ask exactly what we mean by "science." The trouble is that people tend not to ask that question, or do not press it hard enough. Arguments about the limitations of science tend to focus on particular shortcomings of present-day work, and then jump to a conclusion about all possible science, as if today's methods, concepts, and results define the enterprise for all time.

Debates about the limits of science often involve charges of "scientism." This term, in its current pejorative sense of an exaggerated reverence for science,[3] or an unreasonable belief in its powers, is no older than the late nineteenth century. But the theme itself, or something very like it, goes back at least as far as Plato. In two of Plato's dialogues, his mouthpiece in effect levels a charge of scientism against the investigators of nature. In the *Phaedo*, Socrates recounts how he was disappointed to find that Anaxagoras "adduced causes like air and aether and water and many other absurdities."[4] What was missing, according to Socrates, was an account that explained how some form of intelligence "sets everything in order and arranges each individual thing in the way that is best for it."[5]

C5.N3 [3] For an instance of this use of the term, see Tom Sorrell, *Scientism* (New York: Routledge, 1991), x.

C5.N4 [4] Plato, "Phaedo," in *The Collected Dialogues of Plato*, trans. Hugh Tredennick, ed. Edith Hamilton and Huntington Cairns (Princeton, NJ: Princeton University Press, 1961), 98c.

C5.N5 [5] Plato, "Phaedo," 97c (79).

C5.P6 Similarly, in his last work, the *Laws*, Plato has the Athenian Stranger speak of "the unreason and error of all who have ever busied themselves with research into nature."[6] Their main mistake, according to the Stranger, was to focus on physical qualities such as "hard and soft, heavy and light."[7] This approach was allegedly atheistical, incomplete, and probably also immoral. Echoing Plato, conservative thinkers in the seventeenth century complained that the so-called "mechanical philosophy" of Galileo did not pay enough heed to the immaterial realm or to the notion of purposeful order in the universe. Thus Leibniz wrote that he wanted to reconcile "the mechanical philosophy of the moderns with the caution of some intelligent and well-intentioned persons who fear . . . we are withdrawing too far from immaterial beings, to the disadvantage of piety."[8]

C5.P7 Despite Leibniz's mention of piety, and the fact that Plato associated natural science with atheism, we should beware of thinking that the charge of scientism in the old days was all about religion. That might get things the wrong way around, at least in some cases. Maybe some people thought: "Today's physics is too simplistic. So perhaps we need more about God in the picture," rather than: "We need more about God in the picture. So today's physics is too simplistic."

C5.P8 Allegations of scientism have in more recent times certainly not been leveled only for religious reasons. In the late nineteenth century, when Matthew Arnold and T. H. Huxley debated the proper place of "physical science" in education, and in culture, Arnold invoked the venerable idea that there is something morally suspect in paying too much attention to the investigation of nature. Arnold's suggestion was that "humane letters" served "the paramount desire in men that good should be forever present to them." One limitation of "physical science," according to him, is that it gives us facts that do not "put us into relation with our sense for conduct."[9] For this reason and others, Arnold concluded that an education focused on the physical sciences, rather than the humanities, would be incomplete. And if one had to make a choice between the two, it would be better for most people if they picked the humanities. (The exceptions were people who showed special

C5.N6 6 Plato, *The Laws*, trans. A. E. Taylor (London: J.M. Dent & Sons, 1934), 891c (1446–47).
C5.N7 7 Plato, *The Laws*, 892b (1447).
C5.N8 8 G. W. Leibniz, "Discourse on Metaphysics" [1686], in *Philosophical Essays*, ed. and trans. Roger Ariew and Daniel Garber (Indianapolis: Hackett, 1989), 18 (52).
C5.N9 9 Matthew Arnold, "Literature and Science" (Rede Lecture at Cambridge University, 1882), *Nineteenth Century*, August 12, 1882.

talent in the natural sciences. In such cases, according to Arnold, it was fair enough to focus on nature.)

C5.P9 Huxley's position was that balance was needed. He aimed to undermine the idea that culture is nurtured only by a traditional schooling in the liberal arts. But he conceded that a purely scientific education would "bring about a mental twist as surely as an exclusive literary training."[10] Huxley's notion of a scientific education, by the way, was broader than ours. He thought that a knowledge of French and German (especially German) was an essential part of it.

C5.P10 The exchange between Arnold and Huxley was polite and respectful. The same cannot be said of the next notable skirmish on this topic in the English-speaking world. This was the debate that followed a famous lecture in 1959 about "The Two Cultures," by C. P. Snow, a British champion of science and technology who was also a novelist. Snow described a gulf of incomprehension that separated "literary intellectuals" and "natural scientists." Like Huxley, he was arguing for balance. Three decades after Lindemann's encounter with Mrs. Pember, Snow felt that British society still needed to take science more seriously.

C5.P11 For some literary intellectuals, that was asking too much. Snow suggested that literary intellectuals were "natural Luddites" in their attitudes to science,[11] and one of them proved him right about this. The literary critic F. R. Leavis contemptuously dismissed Snow and his arguments. Snow, Leavis wrote, was as "intellectually undistinguished as it is possible to be."[12] Leavis also poured scorn on the idea that science can solve all our problems. Snow had not said that it could, but Leavis presumably felt that some such belief must lie behind any plea for equal treatment for the humanities and the sciences.

C5.P12 A few years ago, the spat between Snow and Leavis was played out again in the pages of the *New Republic*. Leon Wieseltier, then the magazine's literary editor, convincingly reprised the role of Leavis, and Steven Pinker largely took the part of Snow. Pinker's thesis was that science has the potential "to enrich and diversify the intellectual tools of humanistic scholarship."[13]

C5.N10 [10] T. H. Huxley, "Science and Culture" (address at the opening of Mason College, Birmingham, 1880), in *Essays: English and American* (New York: P.F. Collier & Son), 1909–14.

C5.N11 [11] C. P. Snow, *The Two Cultures: A Second Look* (Cambridge: Cambridge University Press, 1993), 22.

C5.N12 [12] See Stefan Collini's introduction to Snow, *The Two Cultures*, xxxiii.

C5.N13 [13] Steven Pinker, "Science Is Not Your Enemy," *New Republic*, August 6, 2013: https://newrepublic.com/article/114127/science-not-enemy-humanities.

In fact, he claimed that it had already done so. He wrote that "Intellectual problems from antiquity are being illuminated by insights from the sciences of mind, brain, genes, and evolution." Pinker conceded that many attempted applications of neuroscience and genetics to human affairs have been "glib or wrong, and . . . are fair game for criticism." But, he wrote, "It is a mistake to use a few wrongheaded examples as an excuse to quarantine the sciences of human nature from our attempt to understand the human condition."

C5.P13 This last point is surely reasonable. Even if, say, every purported contribution of neuroscience to the understanding of the arts had been disappointing hitherto, it would be reckless to discount the idea that it might shed some light in the future. Enlightenment has a habit of emerging from unexpected places and of taking longer than expected to arrive. On the other hand, it is hard to agree with Pinker that the humanities have already been illuminated by studies of brains or genes. He does not seem to have any persuasive examples of this, though perhaps it all depends on what you mean by illumination.

C5.P14 It is even harder to agree with the claim, made in a widely used textbook, that an evolutionary approach to psychology is already "beginning to transform" the study of the arts and religion.[14] Premature pronouncements such as this may be prompted by what one might call the "stops-at-the-neck" fallacy. Enthusiasts for evolutionary psychology sometimes diagnose resistance to their work as amounting to the idea that human evolution stops at the neck. Surely, the thinking goes, our minds are shaped by evolution just as our bodies are, so we should seek to understand our culture with the tools of evolutionary theory. But that inference is fallacious: particle physics does not stop at the neck any more than evolution does, yet nobody thinks that there must therefore be pertinent and informative explanations of culture or psychology that can be couched in terms of particle physics. Accounts of culture and psychology must, of course, not be inconsistent with evolutionary theory, just as they must not be inconsistent with particle physics. This does not entail that they can be expressed in terms of evolutionary theory or particle physics, or that these latter disciplines will necessarily illuminate them.[15]

C5.P15 To be clear: I am not arguing that evolutionary or neurological work cannot shed any explanatory light on art or religion. I am suggesting that we

C5.N14 [14] David Buss, *Evolutionary Psychology* (Boston: Allyn & Bacon, 2012), 428.
C5.N15 [15] This point is well made by Elliott Sober in *Philosophy of Biology,* 2nd ed. (Boulder, CO: Westview, 2000), 189.

resolve to evaluate any such purported explanations on their merits, and not assume either that they will never be found or that they must by now be just around the corner. Some champions of science are too quick to credit today's work on genes or brains with implications that it has not yet proved itself to have. In fairness, we should note that humanists have also been known to exaggerate the significance of their own work now and then.

C5.P16 Wieseltier, in his responses to Pinker, maintained that the "swaggering scientists"[16] are not merely too quick off the mark but are competing in the wrong stadium. He is, as he put it, "for a two-state solution" to what he sees as a conflict between the sciences and the humanities. There is, he claimed, "a basis in reality" for the traditionally established borders between the two—a "momentous distinction between the study of the natural world and the study of the human world."[17] This gulf between the two worlds is apparently something to do with subjectivity. What the "swaggering scientists" supposedly cannot incorporate into their work is "the irreducible reality of inwardness, and its autonomy as a category of understanding." Art and literature, on the other hand, can provide an "exploration of subjectivity and what is lived."

C5.P17 The idea here seems to be that there is a citadel of consciousness which is impregnable either to all science or, in a weaker form of the thesis, to present-day science. This theme appears in the influential work of the philosopher Thomas Nagel, though without the heated rhetoric of disciplinary border disputes. Nagel has argued that "The physical sciences . . . cannot describe the subjective experience of . . . organisms or how the world appears to their different particular points of view." Purely physical descriptions of neurophysiology and behavior will, he says, "leave out the subjective essence of the experience—how it is from the point of view of its subject—without which it would not be a conscious experience at all."[18] Socrates wanted science to tell him more about purpose in nature. Arnold wanted to hear more about moral values. Today people want more about consciousness and subjective experience.

C5.N16 [16] Steven Pinker and Leon Wieseltier, "Science vs. the Humanities, Round III," *New Republic*, September 26, 2013: https://newrepublic.com/article/114754/steven-pinker-leon-wieseltier-debate-science-vs-humanities.

C5.N17 [17] Leon Wieseltier, "Crimes against Humanities," *New Republic*, September 3, 2013: https://newrepublic.com/article/114548/leon-wieseltier-responds-steven-pinkers-scientism.

C5.N18 [18] Tom Nagel, "The Core of 'Mind and Cosmos,'" *New York Times*, The Stone, August 18, 2013: http://opinionator.blogs.nytimes.com/2013/08/18/the-core-of-mind-and-cosmos/. Reprinted in *The Stone Reader: Modern Philosophy in 133 Arguments*, ed. Peter Catapano and Simon Critchley (New York: Liveright, 2016), 233–35.

C5.P18 There is a difference, though, between Nagel's position and Wieseltier's. Nagel denies only that the methods of today's sciences can capture the subjectivity of experience. He does not say that no science ever could, as Wieseltier appears to believe. In fact, Nagel suggests that science might eventually remedy this defect, by widening its horizons in radical ways:

C5.P19 > [A] scientific understanding of nature need not be limited to a physical theory of the objective spatiotemporal order. It makes sense to seek an expanded form of understanding that includes the mental but that is still scientific—that is, is still a theory of the immanent order of nature.[19]

C5.P20 This invites the question: what exactly makes a form of understanding "scientific?" I think Nagel is right to use the term in an elastic way—that is, to envision a body of knowledge about nature that is significantly different from what we have today and yet might still qualify as science. This is because science seems to be an approbative rather than a purely descriptive concept. The term "science" is an honorific. When we look at the history of its employment, we see that what uses of the word and its ancestors have in common is not that they refer to a particular subject area or a particular set of methods. The term has in general been used to mark whatever was thought at the time to be the best sort of theoretical knowledge.

C5.P21 It is fairly well-known that "scientist" is a relatively new word. Although the English term was coined in the 1830s, many of the best-known British "scientists," as we now call them, still resisted it in the latter half of the nineteenth century.[20] Kelvin and Faraday openly opposed the coinage and Darwin never used it. It did not become widely accepted in Britain until after the Second World War. The word "science" has been around for much longer, and I want to draw attention to the ways in which its meaning has evolved. Unlike "scientist," which still means much the same as it did when it was coined, the meaning of "science" and its cognates is very different from what it was when the French translation of the Latin *scientia* first entered English in the Middle Ages.[21]

C5.N19 [19] Nagel, "Core of Mind and Cosmos," 235.

C5.N20 [20] See Sydney Ross, "Scientist: The Story of a Word," *Annals of Science* 18, no. 2 (1962), 65–85.

C5.N21 [21] I am indebted to Robert Pasnau's work on *scientia*. For one example, see "Science and Certainty," in *The Cambridge History of Medieval Philosophy*, ed. R. Pasnau and Christina van Dyke (Cambridge: Cambridge University Press, 2014), 1:357–69.

C5.P22 Most Latin authors, including Cicero, used *scientia* rather broadly, to cover understanding in general, or to refer to any corpus of knowledge. But philosophical writers in late antiquity, and in the Middle Ages, often used it in a more narrow and demanding sense, and it is this sense which is the root of our notion of science. This narrow sense derived from what Plato and Aristotle had said about the highest grade of *epistēmē*, or knowledge. Thus Augustine, in the late fourth century, wrote that

> C5.P23 I don't call anything *scientia* where the person who professes it is sometimes mistaken. *Scientia* doesn't consist merely in the matters that are apprehended. Instead, it consists in the fact that they are apprehended in such a way that nobody should be in error about it.[22]

C5.P24 Similarly, Aquinas—writing nearly 900 years later—held that a person who has *scientia* about something "knows that it is impossible for it to be otherwise."[23]

C5.P25 Aquinas wrote those words in his commentary on Aristotle's *Posterior Analytics*, in which Aristotle had given an account of the model or ideal form of organized knowledge. There is still some debate about what Aristotle was trying to do in his *Posterior Analytics*, and how best to translate some of his terminology. But it is safe to say that Aristotle's model form of knowledge was characterized by mathematical-style demonstrations proceeding from indubitable or self-evident principles.[24] Hence the notion that if you have *scientia* of something, you cannot be wrong about it. This idea was still around four centuries after Aquinas, when Descartes wrote that "no act of awareness that can be rendered doubtful seems fit to be called *scientia*."[25]

C5.P26 Another medieval commentary on Aristotle went so far as to say that "only in mathematics is there *scientia* . . . in the strictest sense."[26] Biology was, in medieval times, usually held to fall far beneath the standards of *scientia*,

C5.N22 22 Augustine, *Against the Academicians and The Teacher* [*Contra Academicos*], trans. Peter King (Indianapolis: Hackett, 1995), I.7.19. Translation altered to include the original Latin *scientia*.

C5.N23 23 Aquinas, *Expositio libri Posteriorum Analyticorum*, trans. Fabian Larcher, II.20: http://dhspriory.org/thomas/PostAnalytica.htm#220. Translation altered to include the original Latin *scientia*.

C5.N24 24 Aristotle, *Posterior Analytics*, Book 1, Ch. 2.

C5.N25 25 Descartes, "Meditations," in *Philosophical Writings of Descartes,* trans. John Cottingham, Robert Stoothoff, and Dugald Murdoch (Cambridge: Cambridge University Press, 1984), 2:101. Translation altered to include the original Latin *scientia*.

C5.N26 26 Grosseteste, "Commentary on Posterior Analytics," in *The History of Science from Augustine to Galileo*, trans. A. C. Crombie (New York: Dover, 1959), I.xi (31). Translation altered to include the original Latin *scientia*.

because the truths it discovered were thought to hold only for the most part. It did not seem to yield exceptionless laws. Theology, on the other hand, was widely regarded as a genuine science. A few people worried that it did not quite qualify as *scientia*, because its first principles were accepted as articles of faith; but these people were in a minority.

C5.P27 In the fourteenth century, some thinkers, including Ockham and Buridan, pointed out that weaker forms of knowledge were really quite useful. They meant the sort of knowledge that is gained by experience, rather than via mathematical-style demonstration, and which is therefore merely probable rather than absolutely certain. But Ockham and Buridan were ahead of their time. Even in the seventeenth century, when such empirical knowledge was becoming all the rage, John Locke refused to call it "science." Locke still used the term only in the old, technical sense of *scientia*. That is why he wrote that he suspected that "natural philosophy [by which he meant what we call physics and chemistry] is not capable of being made into a science."[27] However much progress we make in studying physical things, according to Locke, "scientifical" knowledge of them would still be "out of our reach."[28] Ethics, on the other hand, was capable of being turned into a science, because in Locke's opinion, some ethical truths could be demonstrated deductively. It was for partly similar reasons that Hobbes had regarded politics as a perfect example of a science. In fact, politics was for Hobbes one of only two genuine examples of science, the other being geometry.[29]

C5.P28 The entry for *science* in the French Enlightenment's *Encyclopédie* still defined it in terms of *scientia*:

> C5.P29 Science, as a philosophical concept, means the clear and certain knowledge of something, whether founded on self-evident principles, or via systematic demonstration.[30]

C5.P30 But the term and its equivalents in other European languages were certainly also being used more broadly at the time. Samuel Johnson's *Dictionary*, for

C5.N27 [27] Locke, *Essay*, IV.12.10.
C5.N28 [28] Locke, *Essay*, IV.3.26.
C5.N29 [29] Hobbes, "Six Lessons to the Professors of Mathematics" (1656), Epistle Dedicatory, in *English Works of Thomas Hobbes of Malmesbury*, ed. W. Molesworth (London: Longman, Brown, Green, and Longmans, 1845), 7:183–84.
C5.N30 [30] "Science" [1765], in *The Encyclopedia of Diderot & d'Alembert Collaborative Translation Project*, trans. Michele Pridmore-Brown (Ann Arbor: Michigan Publishing, 2003): http://hdl.handle.net/2027/spo.did2222.0000.195.

example, listed five senses of "science," including "Art attained by precepts, or built on principles" and "Any art or species of knowledge."[31]

C5.P31 A simple way to describe what happened as the traditional concept of *scientia* became displaced by our modern notion of science is that indubitability and deductive demonstration were replaced as desiderata of the best sort of theoretical knowledge by the notions of empirical testing. Instead of saying, with Augustine and Descartes, that the best type of knowledge is the sort that cannot possibly be wrong, we now say that the scientific type of knowledge is the sort that we have put most rigorously to the test. That is one key component of recent definitions of science. Another component, which is rather vaguer, is the idea that this knowledge is organized in a systematic way.[32]

C5.P32 The usage of the term "science" narrowed, and began to settle into more or less what we have today, only just after the middle of the nineteenth century. Up to that point, it had commonly been applied to all sorts of organized or well-founded bodies of knowledge, or skills. The subject matter of this knowledge was neither here nor there. Theology and rhetoric, for example, were still sciences. And in *Pride and Prejudice*, you may recall, Mr. Darcy was said to be adept at "the science of dancing."[33] We hear this as a joke, but it was much less of one in the time of Jane Austen.

C5.P33 By the 1860s, "science" was largely reserved for what were described as "physical" and "experimental" investigations. Chemistry and physics were the paradigms of this, and mathematics was included, too. Matthew Arnold, John Ruskin, and others pleaded against this tide. Here is Ruskin, from a series of lectures given in Oxford in 1872:

> C5.P34 [I]t has become the permitted fashion among modern mathematicians, chemists, and apothecaries, to call themselves "scientific men," as opposed to theologians, poets, and artists. They know their sphere to be a separate one; but their ridiculous notion of its being a peculiarly scientific one ought not to be allowed in our Universities.[34]

C5.N31 31 *Samuel Johnson's Dictionary*, ed. Jack Lynch (Delray Beach: Levenger Press, 2004), 455.

C5.N32 32 See Peter Godfrey-Smith, *Theory and Reality* (Chicago: University of Chicago Press, 2003), 71.

C5.N33 33 Jane Austen, *Pride and Prejudice* (1813), Ch. 6.

C5.N34 34 John Ruskin, *Ariadne Florentina: Six Lectures on Wood and Metal Engraving*, 1872, quoted in Ross, "Scientist," 70.

C5.P35 Ruskin complained that ethics, history, grammar, music, and painting were sciences just as much as chemistry was. Similarly, Matthew Arnold declared that "all learning is scientific which is systematically laid out and followed up to its original sources . . . a genuine humanism is scientific."[35]

C5.P36 I am not going to suggest that we should belatedly follow Ruskin's lead and lobby universities to move their artists and theologians into the science buildings. Arnold and Ruskin lost that battle and there is no going back. And I would not go so far as to call our present arrangements "ridiculous." But perhaps reflecting on the way that the development of the concept of science has been intertwined with changing ideas about the best type of knowledge can free up our thinking about scientism. It may encourage us to look askance at the notion of intrinsic limits to the sciences. For if science is just what we call the best kind of theoretical knowledge, and physics, chemistry, and biology are paradigms of it because of their rigor, not because of their subject matter, then what sense is there in supposing that "scientific" methods can take us only so far?

C5.P37 It may be said that what sets significant limits to science, given our current conception of it, is precisely its stress on rigorous testing, since some topics are not amenable to such treatment. For example, ethical considerations limit our experimentation on humans, so there may be some things we shall never discover about them in that way. There are also practical considerations that constrain the type and amount of testing we can do. It may well be that no researchers will ever replicate Irene Pepperberg's work on the linguistic abilities of parrots, because they will not be willing to devote so much of their lives to talking with birds. If so, then some of her results will never enter the canon of scientific knowledge even if they are correct.[36] And the complex social context of human action may well set de facto limits to what we can learn about it scientifically (and in particular to what we can learn about free will), because it may never be possible to construct sufficiently sensitive and controlled experiments in this area.

C5.P38 If someone were to argue that topics in the humanities tend to be too complex to be subjected to the sort of testing and generalization to which today's natural sciences aspire, I would have no quarrel with them. It is, though, perhaps worth pointing out that this line of thought cannot provide the basis

C5.N35 [35] Arnold, "Literature and Science," 22.

C5.N36 [36] Irene Maxine Pepperberg, *The Alex Studies: Cognitive and Communicative Abilities of Grey Parrots* (Cambridge, MA: Harvard University Press, 2002).

for a distinction between the sciences and the humanities, or between the natural and social sciences. For one thing, the natural sciences suffer from the same limitations, at least sometimes. The complexity of living bodies may, for instance, be such that there will always be large mysteries in medicine: perhaps we shall never be able to discover enough to predict and control our health in the way that medicine would like to be able to do. And Irene Pepperberg is, after all, a psychologist.

C5.P39 But limitations imposed by the complexity of phenomena, and by the demands of gathering sufficient data, are merely contingent anyway. For any given difficulty of this sort, it is surely not impossible that ways to overcome them will eventually be found. So they do not seem capable of grounding Wieseltier's "momentous distinction between the study of the natural world and the study of the human world." Those, like Wieseltier, who believe in a "two-state solution" evidently think that there is some deeper divide between the realm of the sciences and the realm of the humanities.

C5.P40 As I noted, this divide is commonly thought to have something to do with subjectivity. In a recent book, Roger Scruton put the matter as follows: "the science of human biology . . . sees us as objects rather than subjects, and its descriptions of our responses are not descriptions of what we feel."[37] Expanding on this, Scruton puts weight on the notion of an individual perspective, which, it is alleged, science necessarily omits:

> C5.P41 As a self-conscious subject I have a point of view on the world. The world *seems* a certain way to me, and this "seeming" defines my unique perspective. . . . When I give a scientific account of the world, however, I am describing objects only. I am describing the way things are and the causal laws that govern them. This description is given from no particular perspective. It does not contain words such as *here*, *now*, and *I*; and while it is meant to explain the way things seem, it does so by giving a theory of how they are. In short, the subject is in principle unobservable to science, not because it exists in another realm but because it is not part of the empirical world. It lies on the edge of things, like a horizon, and could never be grasped "from the other side," the side of subjectivity itself.[38]

C5.N37 [37] Roger Scruton, *On Human Nature* (Princeton, NJ: Princeton University Press, 2017), 46.
C5.N38 [38] Scruton, *On Human Nature*, 32.

C5.P42 But in what sense does biology not see people as subjects? Scruton must intend biology to include empirical psychology, and empirical psychology plainly does deal with persons as feeling and thinking beings—i.e., as subjects of experience. It tries to explain why they think and feel as they do. In the course of their professional activities, doctors and psychologists have, after all, regularly been known to ask people how they feel.

C5.P43 As for individual perspectives, scientific accounts do indeed aspire to explain things objectively—i.e., "from no particular perspective." But one thing they try to explain is perspective itself. They aim to account for the fact that what you see depends on where you stand, both literally and figuratively. So what, exactly, is supposed to be missing?

C5.P44 A famous thought experiment by the philosopher Frank Jackson may help here.[39] We are to imagine a scientist, Mary, whose field is color perception. Thanks to her assiduous research, she knows everything that science can currently teach us about colors and how we see them. Oddly, she has never left her windowless house, which does not have a television or computer and which contains only black, white, and gray objects. Even her body is painted in monochrome. Now suppose that one day she ventures outdoors and sees the colors of the rainbow for the first time. It seems natural to say that she thereby learns something about color that she did not know before, even though she was already an expert in the science of color.

C5.P45 Some treatments of this thought experiment argue that what Mary learns when she steps outside is not a set of new facts but a set of new skills.[40] She acquires, for example, the ability to distinguish the colors of objects just by looking at them. Leaving aside the question whether she learns new facts or new skills (or both), let us agree that the liberated Mary is newly acquainted with what Nagel calls "the subjective essence" of color. She now knows at firsthand what it feels like to see colors, and it seems that this is something which science could not tell her while she was confined to her bizarre house. Does the case of Mary exemplify the sort of limit to science that we have been looking for?

C5.P46 I think not. Consider some ways in which it might be said that science cannot tell you something:

C5.N39 [39] Frank Jackson, "Epiphenomenal Qualia," *Philosophical Quarterly* 32 (1982), 127–36. See also Jackson's "What Mary Didn't Know," *Journal of Philosophy* 83 (1986), 291–95.

C5.N40 [40] See David Lewis, "What Experience Teaches" (1988), reprinted in *Papers in Metaphysics and Epistemology* (Cambridge: Cambridge University Press, 1999), 262–90; D. H. Mellor, "Nothing Like Experience" (1993), reprinted in *Mind, Meaning and Reality* (Oxford: Oxford University Press, 2012), 10–21.

C5.P47 (1) Science cannot tell you how many pages there are in my edition of *War and Peace*.

C5.P48 (2) Science cannot tell you how to ride a bicycle.

C5.P49 (3) Science cannot tell you what it feels like to eat an egg sandwich.

C5.P50 Nobody would take the first example to count as a substantive limitation of science. To ask a scientist for professional help with this question would not even be a case of using a sledgehammer to crack a nut: no corpus of scientific knowledge is even relevant to the matter at hand. All that is needed in order to answer the question is access to my copy of the book, plus the ability to read or count. The second example is roughly similar: scientific knowledge is not what is needed to tell you what you want to know. Any normal person who can ride a bicycle will be able to show and explain to a novice how to do it (though it is not impossible that research in physiology will one day lead to new tips for everyday riding, as it perhaps already does for racing).

C5.P51 Now for the third example. What ought we to expect science to be able to tell us about the experience of eating an egg sandwich? Quite a lot. We would like physiology and psychology to explain why egg sandwiches do not, to a normal person, generally smell of fish or taste of cotton wool or feel like stones. That is, we expect an account of how and why eating an egg sandwich produces the sensations that it does and not other sensations. Ideally, we would also like scientists to understand the mechanisms of sensation well enough to let them help someone with a defective sensory apparatus to experience egg sandwiches in the way that others do, by mending that apparatus.

C5.P52 And what if someone with normal taste buds wanted to be told what it feels like to eat an egg sandwich? A scientist could tell him a few things about what it is like and what it is not like, but the most effective answer would be to advise him to go to a sandwich shop. If he eats an egg sandwich, he will know, and the question of what it is like to eat one will have been resolved for him. Thus the third example is like the first one: getting the best answer is primarily a matter of access—i.e., of being in the right position to learn what you want to know. Similarly, if Mary wonders what it feels like to see colors, all she has to do is step outside. She will then be acquainted with the "subjective essence" of color which Nagel believes that science leaves out. The complaint that scientific descriptions of experiences do not capture their subjective essences seems to amount to a demand that they produce some sort of verbal substitute for firsthand experience—i.e., a description of an experience which is such that anyone who reads it will come to know what it is

like to have the experience, in the way that the liberated Mary comes to know what it is like to see colors. And why should one expect science to be able to do that?

C5.P53 Perhaps it will be said that literature can provide a sort of verbal substitute for firsthand experience, by stimulating us to imagine experiences which we have not had, so that the humanities may thus be said to do what science cannot. No doubt they can, but I am of course not out to establish that science can take the place of poetry, music, and the other arts. I am suggesting that it is no part of the remit of science to recreate subjective experiences on the page.

C5.P54 I hope I have cast some doubt on the idea of a citadel of consciousness that cannot be breached by science. I suggest that we have not yet been given good reason to believe that it is impervious to the advances of present-day science, as Nagel believes, let alone to those of any future science. And the overall contention of this chapter is that it is not clear how any topic in the domain of theoretical knowledge could be judged to be beyond the scope of scientific illumination. No doubt inflated claims will continue to be made about particular branches of science and about particular scientific results, as they will about much else. But that is another matter.

C5.S1 Acknowledgments

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