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The End of Plasticity

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Paul Churchland has become famous for holding three controversial and interrelated doctrines which he put forward in early papers and in his first book, *Scientific Realism and the Plasticity of Mind* (1979): eliminative materialism, the doctrine of the plasticity of perception, and a general network theory of language. In his latest book, *The Engine of Reason, the Seat of the Soul* (1995), Churchland aims to make some results of connectionist neuroscience available to the general public and explores the philosophical and social consequences that neuroscience is likely to have. I argue that these results of neuroscience refute the three doctrines that Churchland advocated in his earlier works. Yet youthful dreams do not die easily and Churchland is reluctant to relinquish his early views.

Naturalism is the prevalent orientation of much work in contemporary analytical philosophy. Now suppose a speculative philosophical naturalist turns into a real scientist. What will happen to the set of her or his initial beliefs? This is the question that I shall raise with regard to Paul Churchland's work. Let me first define my terminology.

By 'naturalist' I mean a philosopher who claims that scientific method is also the method of philosophy, so that philosophical epistemology, for example, 'should be conducted along the lines of any other natural science'.[1] A naturalist is 'speculative' if he or she nevertheless continues to practise philosophy in the manner of traditional metaphysics, using a priori arguments rather than doing empirical research or contributing to the development of plausible and testable theoretical hypotheses. The speculative naturalist wants to have it both ways, decorating the relative ease of metaphysical armchair thinking with the aura of intellectual progress that is associated with solid science. His or her naturalism is in fact nothing but a deceptive ideology, an instance of false consciousness.

In a long article published in 1990, I argued that Paul Churchland's early work – that is the papers that appeared in the years 1970–88 and his first book, *Scientific Realism and the Plasticity of Mind* (1979) – belongs largely to the genre of speculative naturalism.[2] Sensational doctrines such as eliminative materialism, the thesis of the plasticity of perception, and the generalized network theory of language were not made plausible on the basis of empirical science or by using scientific method. Churchland rather tried to substantiate them by a priori arguments based on assumptions of traditional speculative epistemology, such as the representational theory of perception.

According to my diagnosis, Churchland's early position was an attempt to rescue both empiricism and scientific realism from the phenomenalist dangers inherent in the representational theory. It belonged to the tradition of armchair epistemology and structurally resembled neo-Kantianism.[3]

In his new book *The Engine of Reason, the Seat of the Soul*, Churchland abandons speculative naturalism. He has become a real scientist, or at least a philosopher who wants to make 'scientific developments available, in a lucid and pictorial fashion, to the general reading public', and to explore 'the philosophical, social, and personal consequences' that these developments are likely to have.[4] In this he succeeds admirably, and I strongly recommend reading the book.[5] One might wonder, however, to what extent Churchland's early speculations survive his gradual transformation from a speculative naturalist into a popularizing scientist, and, indeed, to what extent they *ought* to survive this transformation. These are the issues that I shall address here. In order to do so, I shall (i) summarize Churchland's early doctrines, (ii) specify to what extent these doctrines can be evaluated in the light of empirical science, (iii) determine whether they are corroborated or falsified by the scientific results that Churchland summarizes in his new book, and finally (iv) discuss those remnants of his old speculations that Churchland still seems to foster.

I

We usually characterize ourselves and our fellow humans as *persons* who have specific *wants*, *desires*, and *ambitions*, who *perceive* and *imagine* things, who *think* that so-and-so is the case, who have *feelings* and are in a certain *mood*, and who *act* upon their *desires* and *beliefs*. Let us call the entire conceptual framework that we use daily in describing and explaining the behaviour and mental life of human beings the *P-framework*, where 'P' stands for 'person'. It is an important question in philosophy of mind what will happen to this framework when neuroscience, which is still in its infancy, reaches a more mature stage. Traditionally, philosophers have explored two possibilities.

First, it may be that the P-framework is *neither reducible to nor replaceable by* any materialistic theory of the structure and functions of the human nervous system. This might be the case for different reasons, for instance because the P-framework enables us to describe adequately a relatively autonomous dimension of reality, the realm of mental phenomena, or because the P-framework is used to describe specific functional states that may be instantiated by many different material systems, whereas there is no substantive theory about all of these systems and their functions to which the P-framework can be reduced. Or perhaps using the P-framework is partly

constitutive of what it is to be human, so that one cannot replace it and remain human.

Secondly, it may be that the P-framework is *both reducible to and replaceable by* a more mature neuroscience, and this is the view of type identity theory (*micro-reductive materialism*). Type identity theory is nothing but the anticipation that, as neuroscience progresses, feelings, thoughts, and desires will turn out to be 'identical' to specific states or events of the central nervous system in the same complex way in which temperatures of bodies, liquids, or volumes of gas turned out to be identical to the mean kinetic energy of their constituent molecules. Such a perfect reduction of the ontology of the P-framework to the ontology of mature neuroscience would make the P-framework replaceable in principle: we might use neuroscientific descriptions and explanations in lieu of descriptions and explanations in terms of the P-framework. Whether the P-framework will in fact be replaced when the anticipation of identity theory becomes realized is quite another matter, because the conceptual integrity of this framework is not endangered by reduction.[6] In most situations replacement will be pragmatically counterproductive, and we expect that people will continue to use the P-framework in daily life, just as they continue to use the vocabulary of temperatures even though that vocabulary is replaceable.

Notoriously, in *Scientific Realism and the Plasticity of Mind* and in papers such as 'Eliminative Materialism and the Propositional Attitudes' (1981), Churchland advocated a third view which had already been suggested by Paul Feyerabend and Richard Rorty, called *eliminative materialism*. Eliminative materialism holds that the P-framework *will not be reduced and yet will be replaced*, for the reason that it is in fact a *false theory*.

> When we finally manage to construct an adequate theory of our neurophysiological activity, that theory will simply displace its primitive precursor. The P-theory will be eliminated, as false theories are, and the familiar ontology of common-sense mental states will go the way of the Stoic pneumata, the alchemical essences, phlogiston, caloric, and the luminiferous aether.[7]

To many philosophers, this eliminativist expectation sounded like a doomsday prophecy. It implied that human culture as we know it, including morality, law, literature, and the human sciences, will be exterminated. Would this not amount to an elimination of humanity itself? But Churchland was elated by his speculation. The P-framework, he said, when compared to its properly scientific competitors, turns out to 'suffer explanatory failures on an epic scale', and to have been 'stagnant for millennia'.[8] 'Why not exchange the Neolithic legacy now in use for the conception of reality embodied in modern-era science?'[9] 'The magnitude of the conceptual

revolution . . . should not be minimised: it would be enormous', he defiantly observed.[10] And the reason Churchland advocated this revolution is that, according to him, the most excellent theories will all be of the 'Pythagorean type' exemplified by mathematical physics, whereas the P-framework cannot be of this type, because it contains so-called propositional attitude concepts.[11] Only by eliminating the P-framework and replacing it by a Pythagorean theory of the nervous system would we be able to construct a unified scientific *Weltanschauung*. This is what seduced Paul Churchland, as it had seduced Carnap and Quine, and he compared his scientistic conceptual revolution to a final homecoming of mankind: 'should we ever succeed in making the shift, we shall be properly at home in our physical *universe* for the very first time.'[12]

Critics were quick to point out that the eliminative materialist talks nonsense because he misuses the word 'theory': can we really call the P-framework a 'theory' which competes with neuroscience and of which we can meaningfully imagine that it will be eliminated in the course of scientific progress? Are the terms of the P-framework not more like 'fire' than like 'phlogiston'? Surely the idea that there are fires (or mountains or trees or animals) had not been eliminated by the advance of science?[13] But in raising this objection, the critics underestimated the depth of Churchland's naturalistic speculations. Churchland did not simply misuse the word 'theory'. He rather defended a view of language according to which all words, even the most 'observational' terms, function in the way in which theoretical terms function according to later Logical Positivism. When reduction of theoretical terms to observation language turned out to be impossible, Logical Positivists concluded that the meaning of these terms must be determined by their place in a conceptual network. Churchland generalized this view to all words of a language, and held that the semantics of each and every word is entirely determined by its place in the relevant linguistic network. This generalized or absolute network theory of language implies that language is entirely 'theoretical' and that all linguistic frameworks are theoretical frameworks. Because these frameworks are theoretical, they may be eliminated in the course of scientific progress. And because Churchland held *à la* Quine that ontological commitment is a function of the theories that one accepts, elimination of the P-framework would imply the elimination of persons, wishes, desires, thoughts, and feelings from our ontology. Churchland's eliminative materialism turns out to make sense only if the absolute network theory of language is true. Therefore, this latter theory must be considered as the philosophical foundation of Churchland's early philosophy of psychology, and indeed of his early scientific realism.

In order to see why the absolute network theory of language seemed so very exciting to Churchland, we have to grasp two of its corollaries: the

causal theory of observation sentences and the doctrine of the plasticity of perception. Churchland's absolute network theory implied that there is no semantical distinction between theoretical terms and observation terms. From the semantical point of view, all terms are theoretical terms. Yet, as an empiricist, Churchland could not dispense with a notion of observation statements, because these statements are the empirical court of appeal for scientific theories. For this reason, Churchland adopted a non-semantical, *causal* theory of observation sentences, according to which such sentences express 'singular theoretical beliefs acquired as spontaneous non-inferential responses to sensory states of the perceiver'.[14] Feyerabend and Churchland held that the empirical evaluation of theories can continue as long as there remain systematic *causal* connections between kinds of sensory states and kinds of singular sentences that we are trained to utter whenever these states obtain.[15]

The causal theory of observation sentences implies that learning to utter such a sentence when we are in a specific 'sensory state' provides that sentence with no semantic identity.[16] Terms acquire a meaning only as they come to function in a network of beliefs and correlative patterns of inference. The observation term 'white', for instance, might come to mean *white*, or *hot*, or any of an infinity of other things, depending on what that acquired network happens to be.[17] However, the causal theory has a paradoxical implication. It seems that observation statements need not be *about* things that we are able to observe, because Churchland held that reference is determined by meaning. We might be trained to utter the sentence 'The bipolar cells in my retinae are now firing in the pattern XYZ' (where 'XYZ' is a specification of several pages in length) whenever we visually perceive a chimpanzee, so this sentence is an observation sentence in the sense of the causal theory, although we shall never be able to see or otherwise perceive these firing patterns. As a result, we will not necessarily be able to find out by (aided or unaided) observation whether an observation statement is true. But this prevents these statements from having their traditional role as a court of appeal for scientific theories, so that the causal theory of observation does not suffice to rescue empiricism.

In order to avoid the paradoxical consequence that observation statements need not be *about* observables, Churchland endorsed a second corollary of the absolute network theory of language, the thesis of the plasticity of perception. According to this thesis, the linguistic network or theory that we adopt will *determine* what we are able to perceive. Perception, said Churchland, 'consists in the conceptual exploitation of the natural information contained in our sensations or sensory states'.[18] Supposing we are in a specific sensory state, *what* we perceive will be a function of the conceptual network (or theory or language) which we use to 'exploit the natural information contained in' these states. Churchland assumed that our

sensory states somehow contain 'natural information' about all their causes.[19] Accordingly, adopting a linguistic network would enable us to perceive any causal antecedent of a sensory state, provided the network contains the conceptual resources needed to conceive of this antecedent. It follows that the relevant observation sentences, which are embedded in the network, would be *about observables* after all.

This view resembles the old Kantian thesis that our categories constitute the phenomenal world. But there are two differences between Kant and the early Churchland. Whereas Kant made a distinction between constitutive a priori categories and empirical concepts, Churchland held that all concepts are constitutive. And whereas Kant thought that we cannot change our categories, Churchland believed in conceptual revolutions *à la* Kuhn.

We now understand Churchland's excitement. On the basis of the absolute network theory of language and the doctrine of the plasticity of perception, he could hold out the hope that, by learning a new conceptual network, we might learn to *perceive* the world 'in ways other than those supplied by our present culture . . . Perception might take place within the matrix of a different and more powerful conceptual framework'. As he said, 'the obvious candidate here is the conceptual framework of modern physical theory . . .', and 'it must be a dull man indeed whose appetite will not be whet by the possibility of perceiving the world directly in its terms.'[20] According to the doctrine of the plasticity of perception, a conceptual revolution implies a perceptual revolution. If eliminative materialism became true, learning the new neuroscience would perhaps enable us actually to *perceive* the hundred billion neurones in our brain and their firing patterns![21] Who would *not* get excited by this science fiction prophecy?

II

It is not difficult to see that the doctrines which Churchland cherished in his earlier career suffer from absurdities and conceptual incoherence. Eliminative materialism does not make sense without the absolute network theory of language, which says that all terms are 'theoretical'. This theory of language cannot be formulated without using the P-framework.[22] Yet, eliminative materialism proclaims the need for a conceptual revolution that will eliminate the P-framework as a 'radically false theory'. Thus, if Churchland's eliminative materialism is true, his semantics must be false. And if his semantics is false, eliminative materialism is nonsensical. It follows that if eliminative materialism is true, it is nonsensical. Therefore, it is false or nonsensical.

This paradox is but one drop in the deluge of inconsistencies and conceptual confusions which shipwrecked Churchland's early philosophical

doctrines.[23] One will wonder why Churchland came to embrace the absolute network theory of language and its corollaries in the first place, since that theory is largely responsible for the difficulties. As is shown by his argument for the absolute network theory in section 2 of *Scientific Realism and the Plasticity of Mind*, Churchland implicitly endorsed a representational theory of perception. According to this theory, perceiving a white object consists, *inter alia*, in being conscious of a *sensation* of white in us which is *caused* by physical antecedents such as a reflecting surface and light of different wavelengths. Being imprisoned within the intellectual confines of the representational theory, Churchland raised the question of what entity the term 'white' refers to: to our private sensation of white or to its physical causes? He argued that the first alternative leads us into difficulties, so that we have to adopt the view that terms for perceptual qualities such as 'white' are used to refer to physical *causes* of our perceiving white things. But because, according to the representational theory of perception, we are *not perceptually conscious* of these causes, Churchland concluded that even observational words such as 'white' are theoretical terms that refer to theoretical posits. Granted that the network account of theoretical terms is correct, this conclusion automatically yields the absolute network theory of language.[24]

If Churchland had ruminated more over his own doctrines, he would have seen that his argument for the absolute network theory was essentially based on the representational theory of perception and that, by rejecting the latter theory later on, he destroyed the reasons for adopting the network view of language. The absolute network view was an intellectual fantasy in the spirit of speculative naturalism, based on mistaken or even nonsensical assumptions which belong to traditional nonscientific epistemology.[25] This does not imply, however, that the absolute network theory of language and the doctrine of the plasticity of perception do not have testable implications. For according to these theories, all perception must be language-dependent, so that language has to be fundamental to all our cognitive skills.

This thesis of the language-dependency and the 'theory-ladenness' of all perception is highly implausible from the empirical point of view. How could we ever learn a language if all perception presupposes our possessing a linguistic network? In chapter 5 of *Scientific Realism and the Plasticity of Mind*, Churchland defended a quite other and much more realistic picture of the role of language in cognition. There he argued that 'language use is a dimension of activity acquired only after an enormous amount of prior cognitive development on the part of the human infant', so that 'language appears as a peripheral phenomenon' if one wants to study cognition in humans and other mammals.[26] But clearly, this more realistic view contradicts the absolute network theory of language and its corollary that perception is plastic, for these latter doctrines imply that language has a

fundamental role in cognition. One might resolve the contradiction by arguing that we have an innate language, a 'language of thought', which enables us to perceive things before we learn a natural language, but Churchland correctly rejected this move as 'an *ad hoc* assumption of negligible testability'.[27] He tried to resolve the inconsistency in another way, without, however, succeeding in doing so.[28]

We may now raise the question which of the two mutually exclusive parts of Churchland's early philosophy accords better with recent empirical knowledge of the brain and its activities, to the extent that this knowledge is made available to the general reading public by Churchland in *The Engine of Reason*. Does this book substantiate the absolute network theory of language and its corollaries? Or does it rather refute these speculations, corroborating the view that language, however important it may be for human cognition, cannot play a constitutive role in each and every perception?

III

In order to answer these questions, I shall first go into what Churchland says about the perception of colours, odours, and faces in chapter 2 of *The Engine of Reason*. He argues there, correctly to my mind, that 'our capacity for verbal description comes nowhere near our capacity for sensory discrimination'. This disparity arises, he conjectures, 'from a fundamental difference between the coding strategy employed in language and the coding strategy employed in the nervous system'.[29] Colours, for instance, are supposedly coded by the nervous system in a 'colour space' of three dimensions, one for each of the three types of photo-sensitive cones in our retinae. If the brain uses ten different positions along each of the three axes of colour space, it will be able to discriminate among 1,000 different colours. We are in fact able to discriminate roughly 8,000 distinct colours, so that we must assume that the brain uses about 20 different positions along each of the three axes. Smells are coded in a vector space of at least six dimensions, one for each type of olfactory receptor. The use of only ten positions along each of the six axes would yield an overall capacity to discriminate 10^6 or one million distinct aromas. Discrimination of faces uses a vector coding system of a yet much greater number of dimensions, which explains how humans are able to discriminate millions of faces. Our capacity for verbal description falls drastically short of these capacities of perceptual discrimination. This is inevitable, because language employs a relatively small set of discrete names, instead of vector coding along real number continua.

Churchland concludes that there is a priority of the preverbal over the verbal in almost all domains of cognitive capacity.[30] That there is such a priority is further confirmed by the study of specific brain lesions. For

instance, if a lesion occurs at the bottom rear of the temporal lobe, close to the visual cortex, the patient loses the ability to apply his colour vocabulary, although he can still discriminate colours perceptually.[31] It follows that there is a basic level of perception where perceptual discrimination does not depend on any language and is not 'theory-laden' in the sense of Churchland's early speculations. This result refutes the absolute network theory of language and the thesis of the plasticity of perception. Not all knowledge is 'theoretical' in the sense of the word 'theory' that Churchland adopted in *Scientific Realism and the Plasticity of Mind*, and perception is not plastic as a function of learning new theories, even though these theories may teach us to describe what we perceive in new ways.[32]

Churchland's instructive analysis of stereoscopic vision points to the same conclusion. The fixation cells in our brain will become active when, at a specific fixation depth, a significant part of one retinal image finds itself matched perfectly with the corresponding part of the other retinal image. This correspondence, registered at the visual cortex, is a 'robust indicator of the existence of an object positioned exactly at the current fixation depth of the eyes', as Churchland says.[33] Experiments show that our brains are able to detect an area of left–right correspondence even if we do not recognize any object or known shape. Our ability to see depth turns out to be independent of language. The same seems to be true for the attribution of mental states to other human beings, as Alan Leslie's work on autistic children suggests. His results indicate that the ability to attribute mental states to others is not a matter of general intelligence or a cultural achievement, but something like a specialized capacity. This refutes Churchland's early view that attributing mental states is a theoretical activity, a view which was entirely motivated by a priori considerations in the philosophy of mind.[34]

Clearly, we must reject the absolute network theory of language and its corollary that the phenomenal content of one's perception is constituted by the linguistic network that one accepts. This implies that we must repudiate the speculation of eliminative materialism as well, because the assumption that the P-framework is a *theoretical* framework which might be eliminated during the evolution of science made sense only on the basis of the absolute network theory of language.[35] It is no wonder, then, that in *The Engine of Reason*, Churchland radically shifts his position concerning the relation between mature neuroscience and the P-framework along the continuum of possible 'inter-theoretic relations' from the pole of elimination towards the pole of reduction. In effect, he is inclined to endorse the type identity theory, rejecting both dualism and functionalism as before. Talking about the vector coding of tastes, he says, for example, that 'the subjective taste *just is* the activation pattern across the four types of tongue receptors'.[36] Admitting that cognitive neuroscience still has to discover 'systematic neural analogs for all of the intrinsic and causal properties of mental states',[37] he argues that

neuroscience is well on its way to doing so and that the prospects for the identity theory are promising indeed.[38]

We come to the conclusion that, as a mature neuroscientific philosopher, Churchland has replaced the exciting naturalist speculations of his youth by solid (and very exciting) connectionist neuroscience and a type identity theory. There is no serious attempt in *The Engine of Reason*, however, to solve the conceptual problems which used to haunt identity theorists, such as the problem how it is possible to reduce norms and rules to causal regularities, or the problems about 'aboutness' which were raised, among others, by Fodor and LePore.[39] And in some passages, traditional epistemological lore contaminates the text and turns Churchland's lucid and elegant prose into gibberish. Discussing Frank Jackson's thought experiment, for instance, Churchland writes that if Mary sees a ripe tomato, 'the object of Mary's auto-connected knowledge is one of her own sensory states', which is 'something physical in her', that is, in her brain.[40] But if Mary sees a ripe tomato, neither the tomato nor its red surface is in her brain, and what she knows, namely that there is a red tomato over there, is not in her brain (or anywhere else) either.

In this passage, Churchland is still under the spell of the representational theory of perception. The implicit argument seems to be that an instance of red *cannot* be a feature of things in the material world. Because one will not deny that one is conscious of an instance of red when one perceives a red tomato, one concludes that red-as-perceived must be a sensation in the perceiver, caused by some physical mechanism. According to the identity theory, sensations are identical with brain states. It follows that when we perceive red, we are really perceiving one of our brain states. However, it does not make sense to say that red is a sensation or that we have sensations of red. Colours are properties of bodies in the world around us which we may *perceive visually*, whereas typical sensations such as itches and pain cannot be visually perceived: they are *felt* and located in our body. Obviously, we should resist the first premise of the traditional argument for the subjectivity of phenomenal secondary qualities, the premise that colours cannot be features of things in the material world. As Churchland once said wisely, we should not kick the secondary qualities inward in the first place. I recommend re-reading books such as J. L. Austin's *Sense and Sensibilia* or P. M. S. Hacker's *Appearance and Reality*, in order to prevent one relapsing into the conceptual confusions of traditional epistemology.

IV

We saw that Churchland's youthful dream of a radical conceptual revolution which would eliminate the P-framework and make us feel 'at home in our

physical universe for the very first time' does not make sense apart from eliminative materialism, and that eliminative materialism presupposes the absolute network theory of language and its corollaries. These early doctrines are incoherent, I argued in 1990, and I am happy to discover that in *The Engine of Reason* they are replaced by a more mature scientific account of cognition. Yet, dreams do not die easily. Churchland's 'philosophical journey into the brain' seems to culminate in the very same anticipation of a scientistic conceptual revolution which excited him so much in his earlier works.

According to our present folk psychology, Churchland says on pages 322–4 of *The Engine of Reason*, the basic units of cognition are thoughts, beliefs, perceptions, desires, and preferences. But 'these bedrock assumptions are probably mistaken'. For 'in humans, and in animals generally, it is now modestly plain that the basic unit of cognition is the activation vector'. Similarly, 'the basic unit of computation is the vector-to-vector transformation' and 'the basic unit of memory is the synaptic weight configuration'. This would mean that 'our traditional language-centered conception of cognition is now confronted with a very different brain-centered conception, one that assigns language no fundamental role at all'. Churchland thinks that in the future this brain-centred conception will 'contribute to, or even constitute, a new folk psychology – one firmly rooted, this time, in an adequate theory of the brain'. And because it is so firmly rooted, it will bring with it, 'unlike its hollow precursors . . . a real grip on the structure of cognitive reality'. The new framework of connectionist neuroscience 'will generally work its way into the general population' and 'become the property of folks generally', Churchland predicts.[41]

It is not easy to get this prediction sharply into focus, for it is systematically ambiguous. What, exactly, is 'probably mistaken' according to Churchland? One candidate is the view of Fodor, for instance, that all cognitive activities, even unconscious ones, have to be understood on the model of language. This is a highly speculative hypothesis in cognitive psychology which surely is not part of common sense. On the other hand, if Churchland intends to say that talking in terms of thoughts and beliefs about *conscious* cognitive activities such as reasoning, discussing, inventing scientific theories and testing them, which is indeed part of common sense, is 'probably mistaken', then he is merely repeating the worn-out nonsense of his eliminativist years.

It is important to see why this is nonsensical. Human beings will never stop using language, and Aristotle had a point when he defined humans as language users. Now there are at least two reasons why the P-framework, which contains the propositional attitude words, will always be indispensable. First, when we utter sentences of the forms 'I am arguing that . . .', 'I promise you that . . .', 'I would that . . .', 'I am stating that . . .', 'I ask you

whether . . .', we are typically *doing* things with words and we often use propositional attitude verbs as performatives. If we stopped using the P-framework to do such things, our social fabric would fall apart. In other words, using the P-framework is partly *constitutive* of the human form of life. Second, the P-framework is indispensable for describing what people are doing when they are using language. For instance, when a person claims that *p*, it is trivially true that this person is claiming that *p* and also that the person believes that *p*, unless there are reasons to assume deceit. Consequently, whenever the P-framework is used to describe what people argue, promise, want, or assert, it is not used as a *theory* the truth of which depends on the existence of specific theoretical entities or events. That humans are language users is not a theoretical assumption, but an obvious fact which interlocks with their mental life in multifarious ways.[42] We must conclude that Churchland's prediction suffers from an ambiguity in the expression 'folk psychology', which he uses to refer both to the P-framework as such and to specific theories that psychologists have stated in terms of this framework, such as the hypothesis of a 'language of thought'. We may reject these specific psychological theories, but we cannot reject the P-framework itself. And if a unified scientific *Weltanschauung* is not possible unless we reject the P-framework, then such a *Weltanschauung* is impossible.

Will the vocabulary of sophisticated neuroscience ever gain general use among the population at large, as Churchland seems to expect? He claims that 'some of his colleagues' who 'find this idea implausible' are mistaken. He also says that he is encouraged by the fact that the vocabulary of Freudian psychology and the New Age psycho-babble 'spread through the population like a wildfire'. But at this point of the book, at its very end, Churchland seems to have forgotten his own explanation of the fact that Freud's theory could have become widely accepted 'on the basis of no systematic evidence or critical experiments, and in the face of chronic failures of therapeutic intervention in all the major classes of mental illness'.[43] The explanation was that Freud 'attempted to redeploy the central family of *common-sense* cognitive prototypes – beliefs, desires, fears . . . – in a new domain: the Unconscious'. Freud's idea that we might fathom the hidden mechanisms of our personality just by using common-sense conceptual resources is what made his psychology so attractive and easy to absorb.[44] Assimilating the complicated mathematics and intricate conceptual structures of mature sciences is a very different matter. Some people will like reading popular writings about science such as Churchland's latest book. But only a few will have the time and the intelligence needed to master these sciences themselves to a substantial extent. Mature neuroscience will be really understood only by specialists, as is the case with all mature sciences, and each specialist will understand through and through only his or her minute specialization.

This brings me back to the naturalist conception of philosophy. Let us suppose the naturalist has unmasked his or her early speculative fantasies as just another version of metaphysical hocus-pocus. What, then, remains on the naturalist's philosophical agenda? Writing popular books about special sciences? Becoming a scientific specialist like any other? Playing the role of a go-between in order to reinforce the links between adjacent sciences? Or what?[45]

NOTES

1 Cf. Paul M. Churchland, *Scientific Realism and the Plasticity of Mind* (SRPM) (Cambridge: Cambridge University Press, 1979), p. 124.
2 For Churchland's papers 1981–88, see P. M. Churchland, *The Neurocomputational Perspective: The Nature of Mind and the Structure of Science* (Cambridge, MA: MIT Press, 1989).
3 Herman Philipse, 'The Absolute Network Theory of Language and Traditional Epistemology', *Inquiry* 33 (1990), pp. 127–78.
4 *The Engine of Reason, the Seat of the Soul: A Philosophical Journey into the Brain* (ERSS) (Cambridge, MA: MIT Press, 1995), p. xi.
5 For a review, see C. Taliaferro, 'Saving Our Souls', *Inquiry* 40 (1979), 2, pp. 77–90.
6 Even though reduction will show limits to its precision and to its applicability. Cf. SRPM, pp. 131–3 and 82–83. Cf. also P. M. Churchland and P. S. Churchland, 'Intertheoretic Reduction: A Neuroscientist's Field Guide', *Seminars in the Neurosciences* 2 (1990), pp. 249–56.
7 SRPM, p. 114.
8 Paul M. Churchland, 'Eliminative Materialism and the Propositional Attitudes' (EMPA), *The Journal of Philosophy* LXXVIII (1981), pp. 75, 76.
9 SRPM, p. 35.
10 Paul M. Churchland, *Matter and Consciousness. A Contemporary Introduction to the Philosophy of Mind* (Cambridge, MA: MIT Press, 1984), p. 45.
11 SRPM, pp. 100–7, and EMPA.
12 Cf. SRPM, p. 35.
13 Cf., among others, Geoffrey Madell, 'Neurophilosophy: A Principled Sceptic's Response', *Inquiry* 29 (1985), pp. 164–8; William S. Robinson, 'Towards Eliminating Churchland's Eliminationism', *Philosophical Topics* 13 (1985), pp. 61–8; K. V. Wilkes, 'Pragmatics in Science and Theory in Common Sense', *Inquiry* 27 (1984), pp. 339–61; K. V. Wilkes, 'Nemo Psychologus nisi Physiologus', *Inquiry* 29 (1986), pp. 169–72. Cf. also Bas van Fraassen, *The Scientific Image* (Oxford: Clarendon Press, 1980), pp. 13–19. The proposal of eliminative materialism conjured up a vast literature. See, e.g., S. M. Christensen and D. R. Turner (eds), *Folk Psychology and the Philosophy of Mind* (Hilldale, NJ: Lawrence Erlbaum, 1993) and J. D. Greenwood (ed.), *The Future of Folk Psychology* (Cambridge: Cambridge University Press, 1991).
14 SRPM, p. 2. Incidentally, it is mysterious how Churchland could differentiate between causality and semantics within the naturalistic framework of SRPM.
15 SRPM, p. 15.
16 At this point, Churchland disagrees with Quine, who does not distinguish between causality and semantics at the level of observation sentences.
17 SRPM, pp. 13–14.
18 SRPM, p. 7. Cf. pp. 15, 24–25, 39–40, §13 and §16.
19 Cf. on Churchland's use of the word 'information' my 'The Absolute Network Theory', op. cit., pp. 166–7.
20 SRPM, p. 15.
21 As I argued in 'The Absolute Network Theory', op. cit., Churchland's doctrine of the plasticity of perception is ambiguous between what I called the strong and the weak

plasticity thesis. According to the strong thesis, *perception itself* is plastic, because our conceptual framework determines what we are able to perceive. The weak thesis says, however, that only our perceptual *judgments* are plastic. This ambiguity is, I said (in note 15 of that paper), a powerful rhetorical device. For both these theses are implausible, but they are implausible for different reasons. As soon as the reader is about to conclude, from the weak thesis (or the causal theory of observation statements), that according to the absolute network theorist observation sentences are not necessarily used to describe what we can perceive, the author will seem to affirm the strong thesis, which implies that they are so used because any causal antecedent of a perceptual state can be observed given an appropriate conceptual network. And as soon as the reader is ready to infer from the strong thesis that he might learn to perceive for instance the micro-structure of his retinae simply by learning about the physiology of the eye (that is, by acquiring the relevant conceptual network), the author will seem to reject such an absurdity because the plasticity thesis is not really concerned with perception but only with perceptual *judgments*.

22 Cf. SRPM, §§7–8. The network theory cannot be formulated without using propositional attitude verbs, and these verbs belong to the P-framework.

23 Cf. my 'The Absolute Network Theory', op. cit., for details.

24 Cf. 'The Absolute Network Theory', op. cit., sect. iii and v.a, for an analysis of Churchland's argument.

25 Cf., again, ibid.

26 SRPM, p. 137.

27 SRPM, p. 130.

28 Cf. SRPM, pp. 137 ff., where he notices the contradiction himself: 'It may appear to some readers that the position here taken – on the relatively peripheral role that linguistic structures will play in fundamental epistemology – is inconsistent with the very substantial role ascribed to language as the bearer and shaper of cognitive/perceptual categories back in chapter 2.' For the reasons why Churchland's solution to the contradiction fails, see my 'The Absolute Network Theory', op. cit., pp. 165–9. His solution consists in retreating to the weaker position that only our perceptual *judgments* are plastic, and then jumping back to the stronger claim that perception itself is plastic, as if nothing had happened. But this backward jump restores the very contradiction that Churchland wanted to remove.

29 ERSS, p. 22.

30 ERSS, p. 144.

31 ERSS, p. 159.

32 In SRPM, Churchland defined a theory as a linguistic structure, a 'framework of sentences', or as a 'network of beliefs, assumptions, and principles' (p. 37). However, in *The Churchlands and their Critics*, ed. by Robert N. McCauley (Oxford: Blackwell, 1996), Churchland tries to save the thesis that all knowledge is 'theoretical' by implicitly re-defining the word 'theory' as a specific point in an individual's synaptic weight space (pp. 266, 121, 124–5). This new stipulative definition merely obscures the fact that Churchland has implicitly relinquished his earlier thesis of the theoreticity of all knowledge.

33 ERSS, p. 63.

34 Cf., for references, Patricia Kitcher in McCauley, op. cit., pp. 60–61. Cf. also SRPM, §§12–13.

35 The Churchlands answer as follows in McCauley, op. cit., pp. 254–5: 'the eliminativist does not need an explicitly discursive sense of "theory", and the real issue is located elsewhere. The bottom-line claim of the eliminative materialist is and always has been that *the content and the character of our social practices in the domain of mutual perception, explanation, anticipation, and behavioral interaction are going to change, and change substantially, with the dawning of a truly adequate neuropsychology*' (italics in the original). I agree that some practices will change, but will we *perceive* each other differently?

36 ERSS, p. 23, my italics.

37 ERSS, pp. 203–8.

38 ERSS, pp. 221–6. Cf. also 'The Rediscovery of Light', *The Journal of Philosophy* XCIII (1996), pp. 211–28.

39 Jerry Fodor and Ernie LePore, 'Paul Churchland and State Space Semantics', in McCauley, op. cit. In his answer, Churchland does not resolve Fodor and LePore's dilemma that *either*

his models of state spaces are just psychophysical models without any bearings on semantics *or* attributing semantical import to these models tacitly presupposes an empiricist principle.

40 ERSS, p. 202.

41 As he says in McCauley, op. cit., p. 255, 'this prospect . . . sends a *frisson* down my own spine'.

42 ERSS, pp. 269–71.

43 ERSS, p. 181.

44 ERSS, p. 182.

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