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**NOAM CHOMSKY'S CRITIQUE
OF MATERIALISM: AN
APPRAISAL**

Abstract: *This article examines the critique of materialism in the work of Noam Chomsky which treats the doctrine as lacking in any clear content. It is argued that Chomsky's critique is a coherent one drawing on an understanding of the Newtonian revolution in science, on a modular conception of the mind, and on the related conception of epistemic boundedness. The article also seeks to demonstrate the limits of Chomsky's position by drawing attention to his use of the third-person point of view in considering the mental and his resulting failure to make good sense of consciousness. Finally, a dual-aspect theory is recommended which would incorporate Chomsky's agnosticism about the nature of matter.*

Keywords: *matter; materialism; Chomsky; Hempel's paradox*

**Zhodnocení kritiky materialismu
u Noama Chomského**

Abstrakt: *Článek zkoumá a hodnotí kritiku materialismu v díle Noama Chomského, podle níž je materialismus doktrínou bez jasného obsahu. Ukazuje se, že Chomského kritika je koherentní v tom, že uvádí do souladu interpretaci newtonovské revoluce v přírodní vědě s modulárním pojetím mysli a související teorií kognitivní omezenosti. Dále se tento článek snaží poukázat na problematický rys Chomského kritiky, spočívající v tom, že uznává při zkoumání mysli pouze hledisko třetí osoby. Toto omezení vede k podcenění úlohy a významu vědomí. Závěrem autor navrhuje, že tento nedostatek by bylo možné opravit tím, že bychom Chomského agnostické stanovisko vůči hmotě propojili s teorií dvou aspektů (dual-aspect theory).*

Klíčová slova: *hmota; materialismus; Chomsky; Hempelův paradox*

JAMES HILL

Filosofický ústav AV ČR

ÚFAR, Filosofická fakulta Univerzity Karlovy

Nám. J. Palacha 2, 116 38, Praha 1

email / james.hill@volny.cz

Noam Chomsky has expressed reservations about physicalism in many places in his writings and, when viewed together, these different comments amount to a systematic critique. Unlike other philosophical themes in Chomsky's work, such as his innatism, his modular theory of the mind or his arguments against behaviourism, the critique of materialism has received relatively little attention. One prominent critic of Chomsky is even able to nonchalantly pass him off as a materialist.¹

The principal aim of this paper is to show that Chomsky's opposition to physicalism is backed up by historical and theoretical considerations which make it a powerful and coherent critique. Chomsky draws on findings in different fields, including linguistics, neuroscience, psychology and the history of early-modern science. In parts 1–5 I will explore the character of Chomsky's position, and I shall show how two particular themes in his work combine to bolster his case against physicalism. One theme is an understanding of scientific progress and an interpretation of what Chomsky calls the "Newtonian revolution"; the other is a theory of human cognitive capacities and their biological grounding. In the final two parts, 6 and 7, I shall point to what I take to be an important limitation of Chomsky's critique of physicalism which relates to phenomenal consciousness, and I shall make a suggestion how this might be remedied.

1. What is physicalism?

The term "physicalism" is of relatively recent origin, coined by Otto Neurath in the 1930s. Sometimes it has been preferred to "materialism" which has been associated with a metaphysical understanding of matter. We shall not be distinguishing between physicalism and materialism here. After all, the distinction is often denied by those who are signed up to the doctrine – by David Lewis, for example – and it seems to play little role in Chomsky's critique.² Physicalism, for our purposes, is the claim that everything in the

Work on this study, which is a part of the project "The Concept of Consciousness: Its Unity and Variety", has been financially supported by the Czech Science Foundation (GAČR, P 401/12/0833), and has also been supported by Charles University (*Program rozvoje vědních oblastí na Univerzitě Karlově č. P13 Racionalita ve vědách o člověku, podprogram Poznání a normativita*).

¹ Daniel Dennett writes that Chomsky, as a scientist, is "presumably a materialist". Daniel DENNETT, *Darwin's Dangerous Idea*. London: Penguin 1991, p. 387.

² For a discussion of this terminological issue see Daniel STOLJAR, *Physicalism*. London – New York: Routledge 2010, Introduction.

universe, including the mind itself, is constituted by the physical. Everything is either physical or in some way reducible to the physical. It is this claim that Chomsky finds to be problematic.

Now, Chomsky does not reject physicalism because he thinks it can be empirically refuted by pointing to some entity that is indisputably non-physical. Nor does Chomsky find the assertion of physicalism to involve any internal contradiction, or to otherwise be inconsistent. Chomsky's objection is that the doctrine has no clear content. He thinks that those who advocate physicalism *and* those who would endeavour to prove it false are both wrong in thinking that there is a substantive doctrine at issue. Chomsky holds this general view about physicalism because he also holds the more particular view that the concept of the "physical" (or the "material"), which must inevitably enter into any characterisation of physicalism, is devoid of clear meaning. At best, talk of "the physical" acts as a placeholder for whatever we discover, or could discover, to be true about nature. He writes:

There is no longer any definite conception of body. Rather, the material world is whatever we discover it to be, with whatever properties it must be assumed to have for the purposes of explanatory theory.³

Chomsky does allow that the terms "physical", "material", or "body" may serve as "honorific designations for what is more or less understood at some particular moment in time".⁴ He writes: "Since the Newtonian revolution, we speak of the 'physical' world much as we speak of the 'real' truth: for emphasis, but adding nothing."⁵ Chomsky also allows that the term may have motivational force, expressing and enjoining an endorsement of the methods of natural science. Some physicalists, notably Jeffrey Poland, find this to be enough, and Poland is happy to sign up to a so-called "methodological physicalism".⁶ But methodological physicalism is little more than an attitude or approach—it is not a fact-stating claim about the world that is susceptible of truth. For this reason most physicalists would find it a thoroughly inadequate rendition of their doctrine, and they would agree with David Papineau when he writes: "Contemporary physicalism is an ontological

³ Noam CHOMSKY, *Language and the Problems of Knowledge*. Cambridge, MA: MIT Press 1988, p. 144.

⁴ See Noam CHOMSKY, "Mysteries of Nature: How Deeply Hidden?" *Journal of Philosophy*, vol. 104, 2009, no. 413, p. 183 (167–200).

⁵ See *ibid.*, p. 185.

⁶ See Jeffrey POLAND, "Chomsky's Challenge to Physicalism." In: ANTONY, L. M. – HORNSTEIN, N. (eds.), *Chomsky and His Critics*. Oxford: Blackwell 2003, pp. 36–45 (29–48).

doctrine rather than a methodological doctrine. It claims that everything is physically constituted, not that everything should be studied by the methods in physical science.”⁷

It is this ontological doctrine that we will be discussing. We should note, however, that Chomsky fully endorses the methods of natural science, and indeed it is this dedication to natural science that leads him doubt that there is any determinate meaning to the physical. He has consistently voiced a preference for the term “methodological naturalism” to express attachment to scientific method. This, he argues, avoids confusion with the kind of physicalism that Papineau is referring to. So Chomsky is a thoroughgoing naturalist—he accepts a foundational role for the methods of science in investigating the world and establishing our ontology—but he is no physicalist.

2. Chomsky and the “Newtonian Revolution”

Many people would object at this point that the materialism can be given a more or less clear definition if we treat it as that the subject-matter of the core sciences, particularly physics itself, but also chemistry and perhaps parts of molecular biology. They would look upon this part of science as providing us with a base to which other parts of science and knowledge can, in principle at least, be reduced. But Chomsky resists this attempt to give determinate content to the term because he holds a historical thesis about the progress of science. This thesis, perhaps most fully explored in his article “The Mysteries of Nature: How Deeply Hidden?” (2009), distinguishes Chomsky’s critique of physicalism from that of others, such as Carl Hempel, Bas van Fraassen, Tim Crane and Hugh Mellor, who have also claimed that the term “physicalism” lacks clear meaning. Chomsky is not primarily moved in his rejection of physicalism by the exotic content of quantum mechanics. He holds that the developments in science of the last hundred years merely confirm what should have been apparent long ago. Physicalism, in Chomsky’s view, was already vacuous in the wake of the publication of Newton’s *Principia* in 1687.

Chomsky holds that Newton, by attributing to bodies a universal power of attraction, abandoned an ideal of intelligibility that science had hitherto imposed upon itself. This ideal had been enshrined in the mechanical philosophy with its intuitive conception of matter as extended, mobile stuff, cohering in bodies of different shapes and sizes. The mechanists claimed

⁷ David PAPINEAU, “The Rise of Physicalism.” In: Carl GILLETT – Barry LOEWER (eds.), *Physicalism and its Discontents*. Cambridge: Cambridge University Press 2001, p. 3 (3–36).

that body could only act by perspicuous contact-action such as pushing, resisting, deflecting, or dividing. Body could not act by attraction or repulsion because such forces would not flow transparently from the intuitive nature of body. For the same reason bodies could not act at a distance, but must act only where they are: that is, by mechanical impulse.

Newton, in Chomsky's view, introduced a different approach to the methodology of science. The aim now was not to follow the dictates of a pre-determined conception of what the physical is, but rather to posit attributes and powers with a view to achieving adequate explanation of the manifest principles operating in nature. Science was no longer concerned to reduce phenomena to some prior understanding of the physical, but rather:

To construct intelligible explanatory theories, taking as "real" what we are led to posit in this quest, and hoping for eventual unification with the "core" natural sciences: unification, not necessarily reduction.⁸

On Chomsky's reading, the progress of science associated with Newton's theory of gravitation was made possible by a deliberate suspension of judgement about the real nature of "matter" and its action. Chomsky expresses this point in the terminology of Hume, by saying that the Newtonian revolution is one of "mitigated scepticism".⁹ Newton wished to push on with discovering and describing the manifest laws in nature, unrestricted by some preconception about the essential nature of the stuff under investigation. Indeed, Chomsky is fond of quoting Hume's verdict on Newton:

While Newton seemed to draw off the veil from some of the mysteries of nature, he shewed at the same time the imperfections of the mechanical philosophy; and thereby restored [nature's] ultimate secrets to that obscurity, in which they ever did and ever will remain.¹⁰

Newton's scepticism was shown by his reluctance to elucidate the *modus operandi* of gravitation, or explain how the force acts – a defiant stance that is conventionally associated with the slogan "*hypotheses non fingo*". But, to scientific enquiry, this scepticism is not obstructive, but rather liberating. It

⁸ Noam CHOMSKY, "Language and Nature." *Mind*, vol. 104, 1995, no. 413, p. 2 (1–61).

⁹ The term was, of course, made famous by Hume. See David HUME, *Enquiries Concerning Human Understanding and Concerning the Principles of Morals*. Cambridge University Press 1975, section XII, pp. 161–165.

¹⁰ David HUME, *History of England, from the Invasion of Julius Caesar to The Revolution in 1688*. Vol. 6. Charlottesville: InteLex 2000, p. 542.

allows scientists to draw up laws that can express the manifest phenomena without having to conform to a conception of body predetermined by folk intuition.

The underlying concept of matter and motion – based on conceivability, intelligibility, and common-sense understanding – had to be abandoned, and science had to proceed on an entirely new course in investigating the simplest phenomena of motion, and all other aspects of the world, including mental life ... The legitimacy of the steps is [now] determined by criteria of depth of explanation and empirical support, not conceivability and intelligibility of the world that is depicted.¹¹

Newton's new approach to physics, Chomsky notes, was disturbing and paradoxical to scientists at the time and for a long time after. He reminds us that Newton himself was never comfortable with the counter-intuitive implications of his physics, and at times was even moved to denounce attraction-at-a-distance as an "absurdity".¹² Chomsky also points out that the hope lingered for almost two centuries after Newton's *Principia*, that a mechanistic, or quasi-mechanistic, grounding would be given to the principle of gravitation and to other forces, and that something close to the intuitive conception of the physical might be reinstated.¹³ But, despite these qualifications, Chomsky remains convinced that Newton's achievement in drawing up robust, mathematical laws of motion – unconstrained by any narrow conception of the physical – has immensely positive consequences as an exemplar of scientific advance.

3. The modular theory of the mind

Now the particular strength of Chomsky's position is that he sees a connection between the mitigated scepticism of Newtonian physics and a naturalistic view of the mind that is part of the scientific view. Chomsky argues that we need to abandon a conception of mind which he associates with Descartes, who wrote in his *Discourse* that our rational nature is a "universal

¹¹ CHOMSKY, "Mysteries of Nature," pp. 172 and 177 (167–200).

¹² See *ibid*, p. 171 where Chomsky quotes the famous letter to Richard Bentley of 1693 in which Newton writes that action at a distance is "so great an Absurdity, that I believe no Man who has in philosophical matters a competent Faculty of thinking, can ever fall into it."

¹³ Noam CHOMSKY, *Language and Problems of Knowledge*. Cambridge, MA: MIT Press 1988, p. 144.

instrument which can serve for all contingencies".¹⁴ On this view – which is as much characteristic of the previous Aristotelio-Scholastic tradition of the “rational soul” as it is of Descartes¹⁵ – there are, in principle, no limits to what the mind can understand in nature because it is not a structural part of the organism, but is rather a faculty of the non-material soul. Rejection of this “universal instrument” view of the mind is a key point on which Chomsky, the author of *Cartesian Linguistics*, diverges from strict Cartesian rationalism.

The reader may, at this point, think that Chomsky is fighting a battle that has already been long won. Who today, one might ask, would agree with the “universal instrument” conception of reason, with its anti-naturalistic ontology? It may survive here and there, but it is hardly mainstream philosophy. And yet, while few may explicitly endorse Descartes’ immaterialist ontology, many implicitly assume that human intellect has the universal range with regard to the natural world that Descartes ascribed to it. It is not hard to find an attitude in contemporary philosophy that takes for granted that there are, in principle, no obstacles to our knowing and understanding all aspects of nature. Indeed, it is not uncommon to come across references to a “theory of everything”, and to find philosophers and scientists who are optimistic about such a theory being achieved.¹⁶ Chomsky thinks this is a sign that many have not learnt the primitive lesson of evolutionary biology: “[...] the theory of evolution places humans firmly within the natural world, taking humans to be biological organisms, much like others, hence with capacities that have scope and limits *including the cognitive domain*.”¹⁷

¹⁴ DESCARTES, *The Discourse on the Method* (1637). Chomsky cites the older English translation, *The Philosophical Works of Descartes*. Translated by HALDANE, E. S. –ROSS, G. R. T. Cambridge: Cambridge University Press 1931, vol. 1, quoting p. 116. In the more recent translation, *The Philosophical Writings of Descartes*. Translated by COTTINGHAM, J. – STOOTHOFF, R. – MURDOCH, D. Vol. 1. Cambridge University Press 1985, p. 140, it is rendered as “a universal instrument which can be used in all kinds of situations”.

¹⁵ “It is necessary [...] since the intellect thinks all things, that the intellect be unmixed.” ARISTOTLE, *De anima*. London: Penguin 1986, III. 4., (429^a).

¹⁶ For a trenchant statement of this view, see Alex ROSENBERG, *The Atheist's Guide to Reality*. London – New York: Norton 2011. He writes that “science’s understanding of the world is correct in its fundamentals [and] when ‘complete’, what science tells us will not be surprisingly different from what science tells us today” (*ibid*, chapter 1). This suggests that there are no limits to our ability to arrive at a complete understanding of the fundamentals of nature, despite our minds having arisen from a blind evolutionary process that cannot guarantee that our belief-forming processes really track the truth.

¹⁷ Noam CHOMSKY, “What Kind of Creatures are We? Dewey Lectures 2013.” *Journal of Philosophy*, vol. 110, 2013, no. 12, p. 683, emphasis JH. This thought is, for Chomsky, an obvious

Just as our bodily organs, as adaptations, allow us to digest, respire, sense (etc) certain objects and not others, so our cognitive abilities are primed to cope with certain tasks, and are not adapted for others. This inevitably means that there will be some conceptions and hypotheses that are quite beyond the ability of our faculties to entertain or frame.

In rejecting the universal instrument view, Chomsky also defends a more specific thesis about the nature of mind. The mind, he argues, is constituted by a set of cognitive “organs”. The word “organ” here is not intended in the full literal sense. Chomsky is not committed to mental faculties being embodied in neatly-demarked units in the brain, just as the liver and the heart are separable parts of our bodies below the neck. Whatever the exact nature of their structural instantiation, however, Chomsky does hold that individual mental faculties have a semi-autonomous ability to function that is captured by the technical term “module”. In Chomsky’s view the different modules of the mind develop and grow in relative independence from one another, and their operations are, to a significant extent, dissociable from one another and from the central systems that monitor or collate their activity. This is especially clear in the case of the linguistic faculty which may remain functional in patients who otherwise suffer from severe mental impairments.

A modular approach to the mind has, of course, been spelt out and defended in detail by others, particularly by Jerry Fodor. It would be wrong, however, to treat the views of Chomsky and Fodor as identical. Chomsky is less ready than Fodor to reduce the modules of the mind to encapsulated *computational* systems. Also, and more importantly, Chomsky finds Fodor’s modularity too restricted, as it concerns only the peripheral input and output mechanisms involved in perception and motor response. Chomsky goes much further than Fodor when, for example, he talks of a module equipped to originate scientific hypotheses (“the science-forming faculty”), and a module for moral judgement.¹⁸

and banal one, which he describes as “a truism that is sometimes thoughtlessly derided as ‘mysterianism’.” Noam CHOMSKY, “Opening Remarks.” In: PIATTELLI-PALMARINI, M. – URIAGEREKA, J. – SALABURU, P. (eds.), *Of Minds and Language: A Dialogue with Noam Chomsky in the Basque Country*. Oxford: Oxford University Press 2009, p. 18 (13–43).

¹⁸ Chomsky is quoted as saying: “There’s some instinctive mechanism we have that is a kind of theory construction module of the brain [...] that maps – that constructs – theoretical interpretation from scattered data. And we do it instinctively. And then we check it out by induction and methodology of science and all that kind of stuff.” Michael HALEY – Ronald LUNSFORD, *Noam Chomsky*. New York: Twayne 1994, p. 182. See also Noam CHOMSKY, “Reply to Lycan.” In: ANTONY, L. M. – HORNSTEIN, N. (eds.), *Chomsky and His Critics*. Oxford: Blackwell 2003, p. 256.

Fodor and Chomsky agree, however, in drawing a similar epistemological conclusion from modularity which Fodor has termed “epistemic boundedness”. The selective focus of the different modules of the mind means that while certain kinds of natural properties are highly amenable to human comprehension, other aspects of reality must inevitably transcend our cognitive capacities, “just as rats cannot deal with a prime number maze”.¹⁹ Highly penetrative faculties that can pick out aspects of the environment, or excogitate precise models or hypotheses, bring with them limits of scope and blind spots. There will inevitably be some concepts or hypotheses that are not available to us. As in a baroque painting, centres of intense illumination are produced by deep shadow in the surrounds. Fodor writes:

If each “mental organ” is pretuned to the solution of computational problems with a specific sort of structure, then it is surely in the cards that there should be some problems whose structure the mind has no computational resources for coping with [...] it is entirely compatible with a modularity theory that there should be endogenously determined constraints on our mental capacities such that the best science – the true theory of the structure of the world – is not one of the theories we are capable of entertaining.²⁰

Chomsky, like Fodor, holds that the intelligence of a mental organ or module is the result of a preformed internal structure, without which there would be no useful focus. He makes the following biological comparison: “If a zygote had no further genetic instructions constraining its developmental path, it would at best grow into a creature formed solely by physical law, like a snowflake, nothing viable.”²¹ And more recently he has written:

[I]f the genetic endowment imposed no constraints on growth and development of an organism it could become only a shapeless amoeboid creature, reflecting accidents of an unanalyzed environment. The conditions that prevent a human embryo from becoming an insect play a critical role in determining that it can become a human, *and the same holds in the cognitive domain.*²²

If preformed internal structure is responsible for the viability of the cognitive powers of a module, then it also limits that viability. The internal structure may enable a module to have selective focus, but to select is also to limit and

¹⁹ CHOMSKY, “Mysteries of Nature,” p. 185.

²⁰ Jerry FODOR, *The Modularity of Mind*. Cambridge, MA: MIT Press 1983.

²¹ CHOMSKY, “Mysteries of Nature,” p. 185 (167–200).

²² CHOMSKY, “What Kind of Creatures are We?” p. 684, emphasis JH

exclude what comes into one's purview. So, for example, if a child's language module is equipped to anticipate the hierarchical syntactical structure of a human language, then it will probably be quite unprepared for a non-human "Martian" language, with whatever special forms of grammar that might have.

Now, epistemic boundedness is hardly a new idea in philosophy. John Locke and Immanuel Kant are two thinkers who present philosophical outlooks that stress our cognitive limits. But both Locke and Kant, in their different ways, thought that these limits can be traced by philosophical reflection, and that the *non-plus-ultra* boundaries of human enquiry can therefore be fairly clearly and definitively stated. For Locke, it is his empiricism with its two "fountains" of simple ideas, which limits what we can think about and understand. For Kant it is the forms of sensible intuition, as well as the specific categories of the understanding, that determine how we conceive and experience the world, and which limit our grasp of how things are "in themselves". Chomsky has no doubt been influenced by adaptations of the Kantian tradition, not least as expressed in the ethology of Nikolaas Tinbergen and Konrad Lorenz.²³ But his position is also significantly different from an even loosely-Kantian one on this issue. This is because Chomsky thinks that we can never delineate the bounds of our cognition with anything approaching certainty. Although the ongoing investigations of science intimate to us, with a greater or lesser degree of probability, where our limits may lie, no conclusive claims should be made. It will never be infallibly certain what is a "puzzle" (a problem that is in principle solvable by our cognitive powers), and a "mystery" (a problem that is not humanly solvable).

The reasons for this indeterminacy are clear. We know so little about how the brain works that it would be foolish to make any systematic attempt to plot the limits of its powers. And the reason we know so little about the brain presumably is on account of the modules of the brain not having been developed for investigating the brain itself. Thus Chomsky's position ends up being more open and tentative when reflecting on our limits than, say, the position that has been described by Colin McGinn's with the term "cognitive closure". Though it has clearly been inspired by Chomsky, McGinn's view

²³ Lorenz writes, for example, that "the 'a priori' apparatus of possible experience with all its forms of intuitions and categories is not something immutably determined by factors extraneous to nature but rather something that mirrors the natural laws in contact with which it has evolved in the closest reciprocal interaction ..." Konrad LORENZ, "Kant's Doctrine of the A Priori in the Light of Contemporary Biology." In: RUSE, M. (ed.), *Philosophy after Darwin*. Princeton: Princeton University Press 2009, p. 232 (231–247).

is actually much closer to Locke and Kant because he is willing to offer us *a priori* reasons for excluding the possibility that we might come to a scientific solution of the mind-body problem.²⁴

4. The Internal coherence of Chomsky's opposition to physicalism

We have described two themes in Chomsky's thought that underwrite his sceptical attitude to physicalism. The first is an understanding of the Newtonian revolution which introduced an open, evolving scientific ontology, unconstrained by any fixed conception of the physical. The second is the modular theory of the mind, which brings with it epistemic boundedness, and faculties that are capable of grasping only certain aspects of the natural environment. These two themes seem to have been developed separately in Chomsky's thinking, but they also turn out to be mutually supportive and together they make his opposition to physicalism much more than a definitional quibble. We are dealing with a reflected and coherent critique of the doctrine.

Its coherence is reinforced by internal lines of support that connect the separate theses. A first line of support goes from Chomsky's modular theory of the mind to his historical understanding of science. On the modular view, it is only to be expected that there is an intuitive concept of the physical which shapes both the common-sense view of the world and early scientific hypotheses. This is presumably the result of a biological module for understanding physical objects in our environment. Chomsky thinks that this module predisposes us to the concept of matter in early-modern mechanistic science – a space-filling stuff that acts by motion and contact. The attempts to cling to this view by Newton's mechanist opponents, as well as the later attempts to find a quasi-mechanical underpinning for physics in the invisible ether, all show the power of this innate cognitive disposition.

In addition, the fact that natural sciences have not always made progress by giving us more transparent descriptions of the workings of nature, but also by abandoning attempts to elucidate certain key phenomena, is precisely what we should expect on Chomsky's modular view of the mind. After all, human science is an investigation carried out by our modular brains,

²⁴ Colin McGINN, "Can We Solve the Mind-Body Problem?" In: *The Problem of Consciousness*. Oxford: Blackwell 1991, pp. 1–22. Here, for example, McGinn is able to invoke Kant's view about spatiality being the form of outer sensibility to help exclude the possibility of any humanly-accessible solution to the mind-body problem (see p. 12).

with their inevitable blind-spots and cognitive limitations. The history of scientific progress, with its uneven focus, and its increasingly patchy intelligibility, thus acts as confirmation of the Chomskian modular theory of the mind. Chomsky's favoured examples of problems which were never solved, but rather dropped in a tacit admission of their intractability, are free-will, and the very phenomenon of motion.²⁵ We lack a module, he thinks, that might begin to explicate these phenomena.

Support is also to be found in the opposite direction: Chomsky's understanding of the progress of science backs up his modular theory of mind. The most important evidence for the modular view, as we have said, comes from Chomsky's work on language. He has consistently maintained that our acquisition of language cannot be explained by general mental competences or dispositions, such as association or inductive reasoning. Such general competences would never suffice for the child because of the poverty of the linguistic stimulus available to it during its period of learning. So an innate organ for language must be postulated. This language module has not yet been successfully located in the brain, nor has its evolutionary emergence been adequately accounted for, but it is a necessary posit, according to Chomsky, given the manifest principles of linguistic competence and what we know from our analytical study of grammar. To reject the module of language because it has not yet been incorporated into neurophysiology or evolutionary theory is to risk playing Leibniz to Newton. Chomsky implies that critics who take this line are like the conservative Hanoverian who grumbled about Newton's force of gravitation being an "occult" or miraculous power because he could not make it fit into his mechanistic physics.

I don't mean to imply that Chomsky denies that the language module will ever be explicable in terms of neurophysiology and evolutionary theory. He would almost certainly allow that possibility, particularly if those two parts of science were to undergo currently-unforeseen developmental shifts. But the important point for Chomsky is that the manifest principles are evidence enough for the language module, and that cognitive science should not be harassed or bullied by theorists from other disciplines who demand a too hasty reduction. After all, the first task must be to give an adequate description of the faculty that is to be the target for reduction.

²⁵ See, for example Noam CHOMSKY, "Reply to Lycan," p. 262 (255-263); and Noam CHOMSKY, "Reply to Poland." In: ANTONY, L. M. – HORNSTEIN, N. (eds.), *Chomsky and His Critics*. Oxford: Blackwell 2003, p. 267 (263-265).

It is part of the post-Newtonian heritage, Chomsky thinks, that we lack a clear and certain conception of the essence of matter on which all the different parts of science can rest, and which they must conform to. Special sciences are now free to develop in relative autonomy. Their incorporation into other sciences, particularly core sciences, may take a variety of forms, one being the expansion, or transformation of the core sciences themselves. Chomsky treats the example of chemistry as informative. After the mechanical philosophy was abandoned in the wake of Newton, chemistry was able to develop as an independent discipline because no reduction of chemical elements to a circumscribed domain of physics was demanded. Chemistry was made properly consistent with physics more than two centuries later after the quantum-theoretic revolution so transformed physics that it could become “unified with a virtually unchanged chemistry”.²⁶ So we might say that in this case it was the “lower” part of the edifice of natural science that re-invented itself so that accommodation to the “higher” part was made possible. Or – since the lower part is often associated with the very meaning of the term “material” – we might say that chemistry became reducible (in principle) to physics only because our conception of the material evolved.

5. The distinctive power of Chomsky's opposition to physicalism

We are now in a position to say something more precise about Chomsky's rejection of physicalism and how it differs from other closely-related critiques of the doctrine. Let us compare Chomsky's critique with what is known as “Hempel's dilemma”.

Carl Hempel, like Chomsky, held that physicalism is a vacuous doctrine. He argued his case by way of a dilemma which might be put like this:

Either the physicalist will define “the physical” by (i) the contents of contemporary physics, or (ii) by the contents of ideal physics. If physicalism is defined with reference to contemporary physics, it is clearly false, as no one thinks that physicists now know the whole truth about the world. But if physicalism is defined with reference to ideal physics then it is an indeterminate doctrine because it is unclear what would be ruled in and what would be ruled out.²⁷

²⁶ CHOMSKY, “What Kind of Creatures are We?” p. 669.

²⁷ See STOLJAR, *Physicalism*, chapter 5 for an in-depth interpretation of Hempel's Dilemma along these lines.

Let us take this dilemma as a starting point for expressing Chomsky's rejection of physicalism. Chomsky's emphasis on the open and evolving nature of the core sciences since the Newtonian revolution sharpens the dilemma. Contemporary physics becomes open to possible expansion in the future and a complete physics is more obviously indeterminate from the standpoint of the present.

But that is only a starting point, for Chomsky would also be keenly aware of an unclarity in the expression "ideal physics" in (ii), the second horn of the dilemma. It is not specified whether we are being asked to consider an "ideal *human* physics" or an ideal physics *per se*. These two concepts were not perhaps distinguishable for Hempel with his positivist background. But for Chomsky who, as we have seen, emphasises our cognitive boundedness, they cannot be treated as coinciding as a matter of course. If an ideal physics *per se* is meant, then we have no reason to think that it is within the cognitive reach of the biologically-fixed modules that constitute our minds. By the same token, if an ideal human physics is meant we have no reason to assume it will be complete. Indeed, on the contrary, we should expect such physics, given our nature and origin, to be partial and constrained by our contingent biological make-up. This is the message of Chomsky's remarks about evolution, as we have already quoted him above as saying: "[...] the theory of evolution places humans firmly within the natural world, taking humans to be biological organisms, much like others, hence with capacities that have scope and limits including the cognitive domain."²⁸

The overall result is that the gap between the two horns of Hempel's dilemma is indefinitely widened. This undercuts a possible physicalist response to the dilemma that would say that the current state of physics is sufficiently close to completion to guide us in judging which entities and processes will figure in an ideal physics. The central claim of physicalism, that the mind is itself constituted by the physical, thus becomes quite vacuous. We have no way of determining whether a complete physics would include an expansion of the physical to include the mental in a non-reductive way. We therefore have no argument at our disposal to foreclose speculation about possible paradigm-shifts in our understanding of the physical, as presented by, say, panpsychism, the quantum theory of consciousness or Russellian monism. It is simply dogmatism on the part of physicalism to assume a rigidly non-mentalistic conception of the physical.

²⁸ CHOMSKY, "What Kind of Creatures are We?" p. 683.

6. The mind and consciousness

In the final two parts of this paper I would like to say something more about the relation of the mental to natural science in Chomsky's work, and about the broader question of his understanding of the mental. We have already said that he approaches the mind within a naturalistic, biological framework. But we must add a further important methodological assumption which needs to be made fully explicit.

In Chomsky's 1959 review of B. F. Skinner's *Verbal Behavior*, the classic critique of the behaviourist account of linguistic competence, sometimes seen as marking the beginning of "cognitive science", he voiced two fundamental and abiding features of his approach to the mental. The first is widely celebrated. Chomsky rejected Skinner's minimalist approach to cognitive architecture. For Skinner, the child's mind was essentially unstructured – a black box that was thought to react to external stimuli in accord only with certain primitive and universal psychological laws such as aversion and reinforcement. This behaviourist approach, Chomsky wrote, makes the fundamental mistake of "refus[ing] to study the contribution of the child to language learning".²⁹ Chomsky's alternative was, and is, to attribute to the mind a rich internal structure that processes information and has innate cognition of universal grammar and other information at its disposal.

The second feature of Chomsky's position is less often remarked upon. It is a crucial point of agreement with Skinner. Chomsky endorses Skinner's understanding of the data that is to be explained by any science dealing with the "higher mental processes", of which language competence is a part.³⁰ Skinner is perfectly right, Chomsky argues early in the review, to take outward behaviour as the raw material for a science of mind.

nssofar as independent neurophysiological evidence is not available, it is obvious that inferences concerning the structure of the organism are based on observation of behaviour and outside events.³¹

²⁹ Noam CHOMSKY. "A Review of B. F. Skinner's Verbal Behavior." *Language*, vol. 35, 1959, no. 1, p. 58 (26–58).

³⁰ Commenting on a reprint of the review, Chomsky reflects that his reaction to Skinner's work was intended "as a more general critique of behaviorist [...] speculation as to the nature of higher mental processes." Noam CHOMSKY "Preface to A Review of B. F. Skinner's Verbal Behavior." In: JAKOBOVITS, L. A. – MIRON, M. S. (eds.), *Readings in the Psychology of Language*. Englewood Cliffs, NJ: Prentice-Hall 1967, p. 142 (142–143).

³¹ CHOMSKY. "A Review of B. F. Skinner's Verbal Behavior," p. 27.

Here, Chomsky implies that there are two legitimate kinds of data that are the foundation for a science of the mind: data about the brain and its activities (neurophysiological evidence), and observation of the behaviour of the phenotype. Given the paucity of neurophysiological data in the 1950s, when the review was written, Chomsky felt able to endorse Skinner's concentration on behavioural data. In *Language and Mind*, Chomsky reminds us that:

No sane person has ever doubted that behavior provides much of the evidence for this study [science of the mind] – all of the evidence, if we interpret “behavior” in a sufficiently loose sense.³²

This emphasis on behaviour in the study of mind is also evident in Chomsky's idiosyncratic yet highly stimulating reading of René Descartes, a version of which has recently been defended in detail by Desmond Clarke.³³ Most readers of Descartes on mind concentrate on the importance of our awareness of inner mental states as expressed in the *Meditations*. Not Chomsky. He focuses on the *Discourse* where Descartes argues that it is the creativity of linguistic behaviour that is crucial in distinguishing human minds from animals and machines. Chomsky argues that Descartes was recognising his own inability to explain this creativity using *res extensa* and it was this that led him to posit the immaterial substance of *res cogitans*. Descartes, on this interpretation, approaches the mind with the eyes of a natural scientist coming upon a complex phenomenon in the environment, not as an introspective meditator who peers into himself.

Oddly enough, it seems to be precisely this third person view of the mental, so often associated with physicalist orientations, which figures in Chomsky's *rejection* of physicalism. Chomsky thinks that we should not treat mental phenomena as somehow special in comparison with other parts of nature:

I understand “mental” to be on a par with “chemical”, “optical”, or “electrical”. [...] We do not seek to determine the true *criterion of the chemical*, or the *mark of the electrical*, or the *boundaries of the optical*.³⁴

³² Noam CHOMSKY. *Language and Mind*. Cambridge, MA: MIT Press 2006, p. 57. The “loose sense” of behaviour presumably allows for neurophysical activities that are becoming increasingly easy to monitor.

³³ Desmond M. CLARKE, *Descartes's Theory of Mind*. Oxford: Oxford University Press 2003, see esp. chapter 6.

³⁴ CHOMSKY, “Language and Nature,” p. 1.

More recently, Chomsky underlines this view, opining that we should not seek any special methodology when studying the mind. In particular we should resist

a curious tendency to treat mental aspects of the human organism differently from so-called "physical" aspects, a kind of methodological dualism, which is more pernicious than Cartesian metaphysical dualism.³⁵

So, for Chomsky, the mental is a natural phenomenon, like the chemical, the optical or the electrical, which presents certain third personal data to the scientist which must be explained, with the ultimate hope that the explanations can be unified with other parts of scientific theory, particularly the core sciences. Chomsky thinks there is nothing methodologically peculiar about mental phenomena from the scientific view. He holds that examination of mental phenomena is examination of the body, as it behaves, and, more recently he has put emphasis on research into the brain. "I use the term 'mind'", he tells us, as referring to "study of the body – pecifically the brain –conducted at a certain level of abstraction".³⁶

Now this assumption not only determines method, it also determines the nature of the phenomena that can be treated by the method. The third personal point of view inevitably excludes the felt quality of experience. After all, felt qualities, like, say, the taste of lemon or the characteristic feelings anxiety or nostalgia, are known directly only from the first-personal point of view, when the mind is turned inwards, to the content of its own experience. With the recent interest in the problem of consciousness, the importance of felt qualities – sometimes called qualia – has met with wider recognition. There are some signs that Chomsky is responsive to this interest in consciousness which makes his previous attachment to third-personal data problematic.³⁷

³⁵ CHOMSKY, "What Kind of Creatures are We?" p. 665.

³⁶ CHOMSKY, "Reply to Lycan," p. 257.

³⁷ Chomsky's interest in the problem of consciousness is visible in the aforementioned exchange with Galen Strawson in *Chomsky and his Critics*, and in his recent Dewey Lectures where he takes very seriously Thomas Nagel's objections to materialist neo-Darwinism, which are founded – most prominently if not exclusively – on the problem of consciousness. Chomsky's positive assessment of Nagel's thesis is worth quoting at length because of its intrinsic interest: "Thomas Nagel, in recent work that has been highly controversial, writes that 'Mind, I suspect, is not an inexplicable accident or a divine and anomalous gift but a basic aspect of nature that we will not understand until we transcend the built-in limits of contemporary scientific orthodoxy.' If that turns out to be true, it would not be much of a departure from the history of science." Noam CHOMSKY, "What Kind of Creatures are We?" p. 670.

Recognition of phenomenal consciousness brings with it recognition that the mental, as a natural phenomenon, *does* have a notable peculiarity that other natural phenomena lack. Unlike the chemical, optical, electrical phenomena that Chomsky lists, the mental is known, at least some of the time, from the first-person point of view. If one limits oneself to the third-personal point of view one will either tend to treat felt-qualities as lying outside the domain of science or one will have to smuggle such qualities into what has been called the “heterophenomenological” approach, by inadvertently taking for granted the empathy of the experimenter, or one’s own empathy as reader of the experimental work.³⁸

7. A proposal

While this is not the place to provide detailed argument for a particular view of the mind, I would like to conclude with a suggestion. It is this: Chomsky’s case against physicalism may be adapted to the framework of a dual-aspect theory. This would involve departing from the assumption about the data of science that we have just mentioned. We would assert, *pace* Chomsky, that the mental is peculiar in having two aspects. While chemical, optical and electrical phenomena do not have an “inner aspect” (as far as we know), the mental does. It is knowable not only from an external, third-person point of view, but also from an internal, first person point of view – there is “something it is like to be” (to use Thomas Nagel’s phrase) in a mental state. Once we have recognised the two aspects of the mental, we can then fully endorse Chomsky’s scepticism about “the physical” and his open-minded attitude towards the possibility that the mental may be downwardly incorporated into some modification or transformation of the core sciences.

Dual aspect theory is not metaphysical dualism: it does not assert the existence of two quite disparate, and ontologically independent, substances. Rather, it acknowledges that, at our current level of knowledge, the mental has an internal and an external face. This fact is among the fundamental data that a naturalistic theory of mind should explain. Once that is acknowledged, dual aspect theory may then join Chomsky in remaining agnostic on two further points: (i) whether humans will ever be able to gain an insight

³⁸ For the proposal of the heterophenomenological method (phenomenology of *hetero*—the other) see Daniel DENNETT, *Consciousness Explained*. London: Penguin 1991, pp. 66–98. Dennett states that a theory of consciousness “will have to be constructed from the third-person point of view, since all science is constructed from that perspective,” (*ibid*, p. 71) and it seems that Chomsky would have little reason to dissent.

into how mental phenomena might be unified with the core sciences; and (ii) whether that unification would inevitably mean reduction of the mental to existing physical theories, and not rather an expansion of the physical theories to somehow encompass mental phenomena. Thus a Chomskian dual-aspect theorist would not cut mind off from the rest of nature, nor would he or she ignore the peculiar difficulties of incorporating mental phenomena into a wider naturalistic system. Instead a mitigated scepticism, of the kind that Chomsky associates with our Newtonian heritage, may be consciously embraced, allowing us space to develop a proper appreciation of mental phenomena without rushing into a premature reduction of mind to that most mysterious entity, “matter”.