

En hommage au Président Evandro Agazzi

## QUINE'S PHYSICALISM\*

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### Abstract

In this paper we briefly examine and evaluate Quine's physicalism. On the supposition, in accordance with Quine's views, that there can be no change of any sort without a physical change, we argue that this point leaves plenty of room to understand and accept a limited autonomy of the special sciences and of other domains of disciplinary and common-sense inquiry and discourse. The argument depends on distinguishing specific, detailed programs of reduction from the general Quinean strategy of reduction by explication. We argue that the details of the relations of particular sciences, disciplines and domains of discourse depend on empirical evidence and empirical-theoretical developments and that the generalized approach of reduction by explication is also subject to related empirical-theoretical constraints. So understood, physicalism lacks much of the controversial force and many of the implications sometimes associated with it.

### 1. Introduction

Quine advocates physicalism in several of his works. The philosophical doctrine he calls by this name varies slightly from place to place. In this essay we shall try to provide a unified picture of Quine's physicalism. Understanding Quine's physicalism has proved to be of some import in understanding and evaluating many of his other chief philosophical doctrines, including his behavioristic methodology and his distinctive semantic themes centered on the indeterminacy of translation, the inscrutability of reference, and ontological relativity. One central Quinean claim is that where there is "no fact to the matter," regarding alleged differences in meaning, reference, or ontology, this amounts to holding that there is no fact to the matter by physicalistic lights.

For the purpose of understanding Quinean physicalism, we shall closely examine Quine's *Immanuel Kant Lectures* delivered at Sanford in 1980. An Italian translation due to Michele Leonelli, *La Scienza E I Dati di Senso* appeared in 1987 with an Introduction of 46 pages. A German translation, also preceded by a

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long Introduction and due to one of us (H.G. Callaway), came out in 2003 bearing the title *Wissenschaft und Empfindung. Die Immanuel Kant Lectures*. Initial drafts of that translation had been discussed with Quine in 1997, two years after the publication of Quine's *From Stimulus to Science* which was the last book Quine published during his life time.

There are differences between the versions of physicalism advocated by Quine in *Pursuit of Truth* or in *From Stimulus to Science* and that advocated in his *Immanuel Kant Lectures*. One might conjecture that the *Immanuel Kant Lectures* contain the conception of physicalism that Quine subscribed to at the end of his life. Whether this is so or not is a problem to be tackled by historians of Quine's philosophy. While he was willing to turn over the rights for a German translation to H.G. Callaway, Quine stated at the time that he did not want to publish the *Immanuel Kant Lectures* in English or in a dual English and German edition, since he had already borrowed from them in various of his English publications.

Whatever the answer that will eventually be given to the historical question, surveying the changes undergone by Quine's conception of physicalism over the years is a rewarding task which shows how Quine gradually modified and refined a doctrine which occupies a central position within his thought. Such an investigation remains to be done.

First we shall recall the successive versions of Quine's physicalism. Subsequently we shall discuss (1) *interactionist dualism*, a doctrine considered by some as a viable alternative to physicalism, (2) raise the question of whether physicalism can do justice to chemistry, and (3) inquire into the relationship between physicalism and *folk psychology*.

## **2. The development of Quine's physicalism**

In "Two Dogmas of Empiricism" (1951), Quine did not bestow a privileged status on physical objects. He expresses his belief in them, qua lay physicist, but he holds that in point of epistemological footing physical objects and the gods of Homer, while differing in degree, do not differ in kind. Both are equally posits, and as he later put the point, "to call a posit a posit is not to patronize it." One would certainly notice that he had his preferences among posits, but it is perhaps not to his point concerning holism and the web of belief to emphasize his preference among posits in the article.

In "On Mental Entities" (1953) external macroscopic objects acquire a privileged status. They are viewed as fundamental both in the origins of language and in the continued learning of language. In the same essay, Quine repudiates mental entities as such. He does not contend, of course, that we are anesthe-

tized. Consciousness retains a place, but it becomes a state of a physical object. The traditional epistemological privilege of sensation or sense data is rejected.

In *Word and Object* (1960) Quine mitigates or refines his position. He stresses that the physicalist who identifies mental states with states of a physical organism is less (thorough-goingly) reductive than Frege's logicism which identifies numbers with classes of classes. Logicians explain numbers away and translate arithmetics into the elements of an independently recognized theory (second-order logic). Physicalists of Quine's stripe do not *explain away* mental states in detail—they do not generally resolve mental states into the independently recognized elements of a physiological theory. Yet explication of mental states as states of the physical organism may still fairly be viewed as a matter of dispensing with mental states in favor of bodily ones. There is no difference, on Quine's view, between eliminating, or dispensing with mental states, in favor of physical states of the organism and explaining (or explicating) mental states as physical states of the organism. In the narrower sense of carrying through detailed analyses of all other concepts and laws by reference to physical concepts and laws, this position is not reductive; but in the broader sense of explication, by paraphrasing out of the mental in favor of physical concepts and laws, Quine's approach to the mental, his physicalism, is reductive.

In his review of J.J.C. Smart's *Philosophy and Scientific Realism* in 1964, Quine endorses Smart's defense of the preeminent position of physics. He fully agrees with Smart's claim that the laws of physics seem to be truly universal in contrast with the propositions of biology and psychology which Smart describes as local generalizations on a par with natural history and geography, or with consumer reports.

In "Wither Physical Objects?" (1976), Quine considers the possibility of revising the ontology of physical objects and sets he had taken up in his paper "The Scope and Language of Science" (1954). He describes an experiment in microphysics which supports a field theory in which physical entities such as elementary particles and matter itself go by the board and are replaced by states distributed over space-time regions.

Two years later, in 1978, reviewing Goodman's *Ways of World Making*, Quine spells out a new argument supporting the privileged status of physics and by the same token provides us with a new justification of physicalism. Replying to Goodman who asks why we should manifest a special deference to physical theory, Quine observes that nothing happens in the world, not the flutter of an eyelid, not the flicker of a thought, without some redistribution of microphysical states. This claim reiterates the universality of physical law.

The adoption of an ontology of *physical states* as opposed to physical *entities* called for a reformulation of physicalism. Quine carries it out in “Facts of the Matter” (1979). Restating the claim made in the review of Goodman’s book, Quine equates physicalism with the claim that there is no difference in matters of fact without a difference in the fulfillment of the physical-state predicates to space-time regions. The task of finding a catalogue of elementary physical states—namely states such that there is no change without a change in respect to them—as Quine puts it—is incumbent upon the physicists today as it was in the past.

Here again Quine warns us that his physicalist stance should not be read as a universal program of detailed reductions. He refrains from presuming that anyone will ever be in a position to enumerate the appropriate state predicates for the pertinent regions in any and all particular cases. Details, we expect, will continue to go missing. It is a “utopian dream” to aim to specify all mental events in physiological terms, and the groupings of events in mentalistic terms need not stand in any systematic relation to biological or physiological groupings. Quine’s physicalism is instead a matter of applying mentalistic predicates directly to persons as bodies. We need not venture dubious hopes of the detailed reduction of all other disciplines. We must notice at this point that the question arises of the systematic position of the mentalistic predicates and of what we say by use of them. Mentalistic vocabulary is not a part of the vocabulary of physics, the predicates are not found in generalizations of physics; and the same might be emphasized concerning other special vocabularies and disciplines. Quine’s physicalism maintains that there is no mental change without a physical change, and further since physics is the basic science, it would seem to follow that there is no chemical, or biological, or psychological change without a physical change. But even so, as long as we lack detailed reductions of other sciences and disciplines to physics, the reigning tendency in the special sciences is to locate their specific vocabularies and generalizations as the proprietary vocabulary of distinct sciences and disciplines. The question of reductionism by explication, then, arises again.

If we allow or admit that there is no genuine chemical, biological or psychological change without some physical change, still, lacking detailed and compelling reductions, we would presumably depend on the special sciences and disciplines themselves in our account of the reality of states and events falling within their domains. For those who regard semantics as a special science, encompassing a sub-domain of empirical linguistics, Quine’s skepticism regarding meaning and meanings will come in for special attention: the lack of detailed reductions of empirical semantics *alone* (including results of lexicography, for instance) would be a dubious rationale for the elimination of meanings. Quine’s additional arguments do not center on physicalism but instead relate to the demand for identity conditions of meanings, or presumably,

identity conditions of posits of other special sciences, and here the argument from proxy functions is especially prominent.

“A proxy function is any explicit one-to-one transformation  $f$ , defined over the objects of our purported universe.” In general terms, if we have a theory  $T$  which calls for objects of the sorts,  $G$ ,  $H$ , and  $I$ , then a proxy function will reinterpret the theory by reinterpreting its vocabulary. While “ $Hx$ ” originally meant that  $x$  was an  $H$ , the proxy function reinterprets “ $Hx$ ” as meaning that  $x$  is  $f$  of an  $H$ . For instance, in “Ontological Reduction and the World of Numbers” (Quine 1964), a proxy function shows how we can escape an ontology including “impure numbers,” such as 30 degree centigrade, as in “ $x$  has the temperature  $n^{\circ} C$ ” by reinterpreting the predicate expression, from “ $x$  has the temperature  $n^{\circ} C$ ,” ranging over “impure numbers,” to “ $x$  has the centigrade temperature  $n$ ” ranging over just place-times and pure numbers. Similar procedures may be applied to all predicates whether single-placed, two-placed, or higher. Quine comments that a theory subjected to a therapy of proxy function may be left as it was, “letter for letter,” though he sometimes allows for other than one-to-one relations. Thus, “the observation sentences remain associated with the same sensory stimulations as before, and the logical inter-connections remain intact.” Yet, in view of the reinterpretation, as Quine puts the matter in *Pursuit of Truth* (1990), “the objects of the theory have been supplanted as drastically as you please.” For a short critical analysis of the argument from proxy functions, see H.G. Callaway’s Introduction to the *Immanuel Kant Lectures*. Though an alternative produced by means of a proxy function may sometimes enjoy theoretical advantages not enjoyed by the theory we start out from, and may therefore be adopted on the ground of some particular theoretical advantage, where there is no evident theoretical advantage to the new alternative, reinterpretation by proxy function amounts to speculative paraphrase.

In 1980, a year before publishing “Facts of the Matter,” Quine delivered the *Immanuel Kant Lectures* at Stanford University. In these lectures a very detailed physicalistic treatment of mental events is presented. Quine’s views on the topic are partly in agreement with those expressed initially by his student Donald Davidson in three papers, namely “Mental Events” (1970), “The Material Mind” (1973) and “Psychology as Philosophy” (1974), which we are going to recall here, since they set the stage for a presentation of Quine’s original contributions to the subject.

To make a long story short, we can say that in the three above-mentioned papers, Davidson marshals new arguments, often based on Quine’s theses (like the indeterminacy of translation or the irreducibility of intentional to non-intentional discourse), to support a position which he calls *anomalous monism*. This is

*monism* because it holds that psychological events are physical events, and the position is termed *anomalous* because psychological events do not fall under *strict laws* when described in psychological terms. Davidson also holds that although every psychological event and state has a physical description, it is hopeless to search for a physical predicate, however complex, which would have *the same extension* as a given psychological predicate and still more hopeless to try to relate a physical predicate to a given psychological predicate by a *psycho-physical law*. Although every exemplification of a psychological predicate also exemplifies a physical predicate, there are no law-like relations of the physical and the psychological. Davidson's anomalous monism "is a doctrine of token physicalism," as Quine remarks in the first of the *Immanuel Kant Lectures*, borrowing from Daniel Dennett, "and type dualism."

In his *Immanuel Kant Lectures*, Quine applauds Davidson's materialistic monism which he had himself defended several years before. He shares Davidson's misgivings about the possibility of generally tying psychological predicates to coextensive physical predicates. However he mitigates Davidson's uncompromising claim about the impossibility of stating *psycho-physical laws*. Quine does not rest content with reacting to Davidson. He also lays down an elaborate physicalistic theory of mental events or states which will be examined in the following paragraphs. In general terms, Quine aims for detailed physicalistic reductions of the mentalistic vocabulary of perception while sharing a Davidson-like anomalous monism concerning the broader realms of mentalistic vocabulary—consistent with his prior commitment to physicalistic explication or reinterpretation by proxy functions.

Quine starts his inquiry by examining a category of mental events whose importance for epistemology need not be argued, namely *perceptual events*. He first considers perceptual events taken in isolation. Each such event, Quine says, is specifiable in neurological terms at no exorbitant length, even if we do not yet quite know how. In other words, each single perceptual event is a mental event which falls under a neurological term or description. More challenging is the question whether when we consider a class of distinct perceptual events, there exists,—although undiscovered,—a neurological formulation of reasonable length which assembles all those perceptual events and nothing else.

If we embrace Davidson's anomalous monism, the answer is "no." Quine answers "yes" as far as *perception* is concerned, in contrasted with *belief* or *thought*. In his third *Immanuel Kant lecture*, Quine spells out a detailed account of classes of perception in a *physicalistic setting*. Consider the contrast between seeing a bowl and perceiving its reflection in a mirror. Some philosophers would say that in the

second situation, we do not perceive the bowl itself but only a *sense datum*. Quine should be praised for supplying an explanation which does not bring in that dubious notion.

On Quine's account we perceive the bowl in the two situations. The difference between the two perceptions lies in a difference in *focus*. Between perceiving the bowl reflected in the glass and perceiving the glass itself there is a tension of the eye muscles; and the focal distance of the bowl is the total distance from the eye to the glass and thence to the bowl. Quine adds that the same criterion of focus serves to distinguish between seeing something through a glass darkly and seeing dark glass. What binds all the miscellany of the various senses and associated classes of perceptual events together is, as Quine puts it, a trait of *higher order*: a trait of the *learning process* itself. "Each such class is a class of perceptual events by which the subject can be taught to name the object in question or otherwise relate to it." We see here something of the special role which Wittgenstein's argument against private language has in Quine's *Immanuel Kant Lectures*. *Reports* of perception must be something which we can learn and teach, if such reports are to count to publicly acquirable language. Moreover, however vague or imprecise this may be in ordinary speech, the process of the acquisition of perceptual language must also, by the same argument, be open to scientific study and explanation.

A careful examination of Quine's physicalistic account of the contrast between "Tom perceives that it is raining" and "Tom perceives that it is snowing" will help us to see to what extent he endorses Davidson's anomalous monism. Quine claims that for each of those sentences, a coextensive physicalist sentence exists even if it is never discovered. This point is closely related to Quine's thesis that the possibility of learning observation sentences depends on innate standards of subjective similarity. His disagreement with Davidson's anomalous monism turns on these points. But Quine also believes that between the physicalistic renderings of "perceives that it is raining" and "perceives that it is snowing" there is no systematic connection which can even in principle be formulated in physicalistic terms. Here Quine clearly agrees with Davidson's anomalous monism and, as we shall show, rightly so.

Suppose that advances in neurology are such that the neurologists finally succeed in identifying the neural states associated respectively with the observation sentences "it is raining" and "it is snowing" and other sentences of their ilk. Quine claims that no study of these neural states will ever enable us to translate back these physicalistic sentences into the natural language sentences they correspond to. That untranslatability is part and parcel of Davidson's Anomalous Monism. Quine's original contribution resides in the explanation he gives of untranslatability. That explanation can be found in *Pursuit of Truth* (1990).

To fully appreciate the originality of Quine's position in that book, we have to set it off against a contention made in *Word and Object*. In that book, Quine asserts that Brentano's thesis of the irreducibility of intentional idioms can be interpreted either as showing the indispensability of the intentional and the importance of an autonomous science of intentions, or as showing the baselessness of the intentional idioms and the emptiness of a science of intention. At that time, Quine opted for the second thesis. He claimed that the alternative was incompatible with his findings concerning indeterminacy of translation.

In *Pursuit of Truth*, Quine still holds that there are no objective meanings out there to be captured by translation, and he fully maintains the indeterminacy of translation defended in *Word and Object*. But meanwhile he has discovered a reason to treat the bifurcation between physicalistic talk exemplified by "it is raining" and mentalistic talk exemplified by "Tom perceives that it is raining" as *irreducible*. He came to that conclusion by examining the way children *learn* observation language. Consider a boy, Tom, learning the meaning of "it is raining" by ostension from his nurse Martha. Clearly Martha will not merely encourage Tom to utter the sentence "it is raining" whenever it is raining in Tom's presence. Something more is required. She has to observe that Tom observes that it is raining. Hence as Quine puts it, Tom's mastery of the physicalistic sentence "it is raining" hinges on Martha's mastery, virtual if not yet explicit, of the mentalistic sentence "Tom perceives that it is raining." To sum up, although we can dispense with the substance mind we cannot dispense with mentalistic language. Mentalistic language is a precondition of the learning of physicalistic language. But on Quine's account of the matter, not all mentalistic language will have the same status as that which reports perception.

In *From Stimulus to Science* (1995) Quine goes even further. He notices that the irreducibility of second-order thought to first-order thought holds even before the learning of a language. As he says, perception of another's unspoken thought is older than language.

Notice that the recognition of the perception of another agent's unspoken thought is perfectly compatible with Quine's claim that translation is undetermined. The predicament of the indeterminacy bedevils the translation of standing sentences such as "Snow is white" or "John is married" (whose meaning cannot be learned by ostension alone). It leaves *occasion observational* sentences such as "It is raining" or "Tom perceives that it is raining" unaffected. Here, for Quine, there is a fact to the matter.

Quine's acknowledgment that if there were no regularities in the relationship between perception and the objects of perception we would be unable to learn a language leads to a decisive revision of Davidson's general thesis of the anomaly of the mental. As one of us pointed out in the Introduction to the *Immanuel*



*Kant Lectures*, recognizing these regularities amounts to recognizing *psycho-physical regularities* that are subject to scientific inquiry and this renders Davidson's general thesis of the *anomaly of the mental* problematic.

### 3. Physicalism in Question

Physicalistic monism is opposed to Mentalistic monism and to Interactionist dualism. Few authors, if any, defend Berkeley's Mentalistic monism nowadays. There are however philosophers and scientists who still subscribe to Interactionistic dualism. In *The Self and its Brain* (1973), Popper and Eccès give equal status to the world of matter-energy and to the world of subjective experience, dreams and hallucinations. They advocate a dualism of mind and brain as sharp as that of Descartes and defend *interactionism*—which can be seen as an alternative to Quine's physicalism.

In "The effect of silent thinking on the cerebral cortex" (1987) J. Eccès comes to grips with the difficulties encountered by the hypothesis that immaterial mental events such as silent thinking can act on material structures such as neurons. Materialist critics claim that such a presumed action is incompatible with the *conservation laws of physics*. This objection Eccès writes, could be sustained by 19<sup>th</sup> century physicists, and in accordance with a mechanistic conception of causality, but it loses its bite if we take a result of quantum physics into account, namely that some fields such as the probability field of quantum mechanics carry neither energy nor matter. That result was brought to the foreground by the quantum physicist Margenau in *The Miracle of Existence* (1984).

Following Margenau, Eccès puts forward the hypothesis that brain-mind interaction is analogous to the effect of a probability field of quantum physics which has neither mass nor energy but which can nevertheless cause effective action at micro-sites when mental concentration involved in intentions or attention occurs. More precisely, he claims that mental events such as intention, attention, or silent thinking change the probability of synaptic vesicular emissions. Later Eccès examines and proposes how experiments could be designed for testing the predictions of the dualist interactionist hypothesis.

Should those experiments be conclusive, they would force us to *revise* the claim that "nothing happens in the world, not a flutter of an eyelid, nor the flicker of a thought, without some redistribution of microphysical states" and to replace the *asymmetric correlation* between mental and physical states by a *reciprocal action*.

In the Introduction to the German translation of the *Immanuel Kant Lectures*, one of us rejects this issue, stressing that neither the conservation laws of physics nor the second law of thermodynamics forbids the creation of new order in the world of physics, including the development of new biological or cultural orderings—such as new species, reproducing regularly after their kind, or developments in the regularities of culture (including even something such as Kant’s kingdom of ends). None of this requires any departure from the universality of the laws of physics or any violation of causal law and regularity. We shall return later to Eccles’ contention that the universality of physical law is incompatible with the recognition of free action and responsibility.

A short turn into the philosophy of chemistry will help us find another alternative to physicalism. In *Science, Perception and Reality* (1963), W. Sellars contrasted two images of mind and the world which Chr. Hookway nicely formulates in this way: the scientific image which is physicalist—we are nothing but mere matter in motion—and the manifest image which welcomes familiar concepts of folk psychology such as belief, desire and reasoning. Like Quine, Sellars granted ontological priority to the scientific image which alone captures the ultimate structure of reality.

The recent developments of the philosophy of chemistry exemplified by several papers published in the philosophical journal *Epistemologia*, edited by Prof. E. Agazzi culminate in J. van Brakel’s book, *Philosophy of Chemistry* (2000). These recent developments blur the sharp contrast between the scientific image and the manifest image of the world. J. van Brakel raises the following question: “where does chemistry fit with respect to the contrast of the scientific versus manifest image?” He replies that chemistry, which unquestionably qualifies as a *hard science*, is primarily the science of manifest substances. Should molecular chemistry turn out wrong, this would not disqualify our proto-scientific knowledge of ice as frozen water at the manifest level.

Prof. E. Agazzi points out that Sellars’ contrast rests upon a utopia which in principle fails to account for the way the scientific images emerges. The latter E. Agazzi says, “*non può costatarsi se non a partire dal senso comune e della sua immagine del mondo...*” (Agazzi, 2004). Quine would have agreed with Agazzi, since for him science improves upon common sense. The development of science has sometimes changed, brought us to revise, matters of common-sense understanding, and this implies a certain autonomy of the sciences in their relation to common sense—they develop from it, but are not always fully determined by it. In a somewhat similar way, while allowing that chemistry is constrained by respect for

physical law, and even supposing that every chemical state or event has a physical description, the special science of chemistry, related as it is to the common sense of substances in the world, also has its own distinctive concepts and directions of development only partly attuned to physical accounts of chemical properties and events. An ecumenical way of reconciling the manifest with the scientific image can be found in J. van Brakel's proposal: "we could be tolerant enough to leave equal ontological room for manifest water, water in terms of the thermodynamic theory of substances, the molecular structure of water ('constructed' out of spectroscopic measurements), the 'proper' quantum mechanical equations for an isolated water molecule, and experiments with isolated water molecules which, depending on the measurement technique, show more or less of 'the classical' molecular structure" (van Brakel 2000, pp. 147-148). Physicalists can agree with J. van Brakel but with a restriction. He wants to preserve some sort of asymmetry between physics and chemistry: chemistry is constrained by respect for physical laws. Not the other way around. Lacking detailed evidence of conflict or contradiction between physical and chemical accounts of a given phenomenon, however, we hold that both accounts may be accepted and continue under distinctive development within their specific disciplines.

Psychology is yet another field in which alternatives to physicalism may be offered. When we want to explain why on the battlefield a soldier who has noticed that an enemy is approaching, slowly takes his or her gun, aims at the target and finally pulls the trigger, we usually seek an account of that sequence of actions in *folk psychology* which operates with concepts such as perception, belief and desire. The explanatory power of folk psychology over the domain of human action proves much greater than that of the neurosciences. The following question arises at this juncture: is this appeal to folk psychology compatible with physicalism? We think it is, though Quine's skepticism about chief concepts of folk psychology and about the concept of cognitive meaning represents a generalized challenge to the cogency of our related discourse where we depart from reports of perception. His suggestion is that the only reality is constituted by the universality of physical law and that common-sense discourse and the discourse of the special sciences are intrinsically problematic in relation to physics.

In *Our Place in the Universe* (1989) J.J.C. Smart acknowledges that for explaining the behavior of human beings we have nothing better than folk psychology. Instead of taking the latter to be an alternative to a physicalistic account, however, Smart sees the two accounts as *overlapping*. A physicist who believes that his or her mental states are brain states can swap talk about beliefs and desires, sense experiences, pains and itches with a Catholic priest who adheres to the metaphysics of St. Thomas Aquinas or with a

Presbyterian minister who believes the soul to be an independent spiritual substance. The reason why the three can agree lies, according to Smart, in their sharing a common core of beliefs and assumptions. From this and related perspectives, folk psychology is an element of common-sense belief and discourse which functions in the communication of distinctive perspective and also in the communication of various results of specialized sciences and disciplines. While allowing for variation in the specific interpretations given to the vocabulary of folk psychology, and allowing as well that it may easily descend into speculative excesses and in-group cant, it continues to function in the coordination of human activities and in communication of results of the sciences—in spite of all vagueness.

In the passage Ecclesiastes quoted above, the opposite view is defended. Ecclesiastes claims that reductionist physicalism is untenable, because it forces us to renounce the concepts of freedom and responsibility. We will argue that physicalism is capable of formulations immune to that criticism. Quine emphasizes the role of learning in human beings. Now even the most primitive form of learning—associative learning—takes us far beyond mechanical causality (in terms of *vis a tergo*). Conditioned reflexes differ widely from simple reflexes. In his *Immanuel Kant Lectures*, and in his other books, Quine stresses that man is a *forked animal* divided between his focus on the natural world and another focus on other human beings. Thanks to *empathy* and *imitation* children acquire the sort of *self-control* that they admire in their elders' behavior. Swayed by reward and approval they *learn*, among other things, the *sense of duty*. When they have reached that stage it may happen that their actions are determined by their *desire to do what they ought*. As J.J.C. Smart observes this does not constitute an argument for bringing in the notion of “freedom of the will” understood as “contra-causal freedom” (J.J.C. Smart, *Ibid.*, pp. 143-146).

Looking at the neural events correlated with human actions does not enable us to distinguish those which are praiseworthy from those which are blameful anymore than looking at the number of pixels on the computer screen of the written signs of a proof can enable us to tell whether the proof is valid or not. Many objections against physicalism rest upon *conceptual muddles* and *irrelevant expectations*. Still physicalism is best presented as a matter of the universality of physical law—no change of any kind, chemical, geological, biological, psychological, semantic, etc. without some physical change. As we have seen, this is consistent with some limited autonomy of distinctive special sciences and with some limited autonomy of common-sense categories and discourse. Physicalism moves in the direction of onerous or speculative reductionism when it places such autonomy in question merely on the grounds of the limited character of domains of discourse of the special sciences, or the lack of exceptionless or unconditioned universality of

generalizations within such special domains. We may surely expect anomaly regarding the generalizations or laws of any special science or discipline under unusual physical conditions, and that is also a reason not to expect detailed reductive analyses of these generalizations or laws to those of physics.

Finally, it is worth noting that our conception of human freedom recognize that freedom depends in part on the expansion of human powers connected with our coming to understand the world around us. Often enough precisely in view of the growth of knowledge, we become able to do what we could not do before. Though new patterns of human action and culture may thus arise (say, travel into space or, eventually, regular commerce with the planets, or even better, extended periods of peace among constitutional democracies), we do not ordinarily suppose that there is anything counter-causal in this. Just as regularities of chemical reactions could only arise once the original soup of particles has sufficiently cooled after the big bang, and just as observed regularities of biological entities depends on a certain physical and chemical environment, so too, the phenomenon of specifically human growth and freedom depends on specific social conditions—including, importantly, those which facilitate inquiry and the growth of knowledge. We need not suppose that there is anything counter-causal in the emergence of new regularities of nature or of new regularities of human life.

Basically, we are free when we can do what we want, though provision must be made as well for change in our desires, little by little, for better or worse. Certainly it is clear that we can never do all that we want, or might come to want, to do. Nor should we. This is just as clear as the fact that we can always accomplish some of what we want. Nature and human society both facilitate and frustrate our desires and aims, and lacking omnipotence, they always will. In a more pregnant or expanding sense, human freedom involves creative solutions to outstanding problems, both problems of societies, and problems of individuals in those societies. Crucial to freedom, then, are the social conditions supportive of the growth of knowledge including that amount of free association, disassociation and emergent or alternative association required for evolving social and institutional support of innovative inquiry, specialized development and testing of results, and for practical implementation of results of inquiry in the solution to problems. Since supporting, free association in research is appropriately judged on the basis of details of the development of research and inquiry, intrusively mandated (dis-)association, like intrusive political, economic or ideological regulation of inquiry, always represents a, greater or lesser, threat to intellectual freedom and integrity and to the growth of knowledge. Where the autonomy of inquiry is not respected and supported as a matter of

principle, some excuse will always be found for extrinsic interference or suppression—arising from exploitation of normal, and, normally otherwise harmless, human competitions.

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