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Author(s): Ruth Garrett Millikan

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IN DEFENSE OF PROPER FUNCTIONS*

RUTH GARRETT MILLIKAN†

*Department of Philosophy
University of Connecticut*

I defend the historical definition of “function” originally given in my *Language, Thought and Other Biological Categories* (1984a). The definition was not offered in the spirit of conceptual analysis but is more akin to a theoretical definition of “function”. A major theme is that nonhistorical analyses of “function” fail to deal adequately with items that are not capable of performing their functions.

Several years ago I laid down a notion that I dubbed “proper function” (Millikan 1984a) which I have since relied on in writing on diverse subjects. I have never paused to compare this notion with other descriptions of “function” in the literature, or to defend it against alternatives. That may seem a large oversight, amounting even to irresponsibility, and I wish to take this opportunity to remedy it.

It does not seem to be so much the details of the definition of “proper function” that need defense as its basic form or general plan, which looks to the *history* of an item to determine its function rather than to the item’s present properties or dispositions. At any rate, it is this historical turn in the definition that I propose to defend. To understand this defense, you will not need to know the details of the definition I have given. Let me just say this much about it.

The definition of “proper function” is recursive. Putting things very roughly, for an item *A* to have a function *F* as a “proper function”, it is necessary (and close to sufficient) that one of these two conditions should hold. (1) *A* originated as a “reproduction” (to give one example, as a copy, or a copy of a copy) of some prior item or items that, *due* in part to possession of the properties reproduced, have actually performed *F* in the past, and *A* exists because (causally historically because) of this or these performances. (2) *A* originated as the product of some prior device that, given its circumstances, had performance of *F* as a proper function and that, under those circumstances, normally causes *F* to be performed by *means* of producing an item like *A*. Items that fall under condition (2) have “derived proper functions”, functions derived from the functions of

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the devices that produce them. Because the producing devices sometimes labor under conditions not normal for proper performance of their functions, devices with derived proper functions do not always have normal structure, hence are not always capable of performing their proper functions—a fact, I claim, that is of considerable importance.

This disjunctive description is extremely rough and ready. To make it work, “reproduction” must be carefully defined, the kind of causal-historical “because” that is meant carefully described, “normal conditions” defined, and various other niceties attended to. (The full description of proper functions consumes two chapters of Millikan 1984a.) But this rough description should make clear what I mean by saying that the definition of “proper function” looks to history rather than merely to present properties or dispositions to determine function. Easy cases of items having proper functions are body organs and instinctive behaviors. A proper function of such an organ or behavior is, roughly, a function that its ancestors have performed that has helped account for proliferation of the genes responsible for it, hence helped account for its own existence. But the definition of “proper function” covers, univocally, the functions of many other items as well, including the functions of learned behaviors, reasoned behaviors, customs, language devices such as words and syntactic forms, and artifacts. Moreover, if my arguments in (Millikan 1984a) are correct, explicit or conscious purposes and intentions turn out to have proper functions that coincide with their explicit or conscious contents. I have built a naturalist description of intentionality on the notion “proper function” (Millikan 1984a, 1986a, 1989, forthcoming a).

I do have an excuse for having delayed my defense of the notion “proper function”. The fact is that it is not crucial for the uses to which I have put the notion, whether or not its definition is merely stipulative or, if it is not merely stipulative, in what sense it is not. The point of the notion “proper function” was/is mainly to gather together certain phenomena under a heading or category that can be used productively in the construction of various explanatory theories. The ultimate defense of such a definition can only be a series of illustrations of its usefulness, and I *have* devoted considerable attention to such illustrations (Millikan 1984a, 1984b, 1986a, 1989, forthcoming a, b). However, although it makes no material difference for the uses to which I have put the definition whether it is or is not merely stipulative, I believe that it is *not* merely stipulative, and that it is clarifying to understand the sense in which it is not. Besides, even if “proper function” were to be taken as a merely stipulative notion, the best way to understand it, though not to evaluate it, would surely be to see how it compares with other notions of function that have been described in the literature.

Some writers on function, teleology, and related matters have been

explicit that they were attempting to provide conceptual analyses of certain idioms in current usage. For example, Andrew Woodfield states at the outset of his book *Teleology* (1975) that his project is to provide necessary and sufficient conditions for application of various kinds of sentences containing “in order to” and equivalent phrases. Many other writers simply take for granted that the project is conceptual analysis. Giving a germane example, Larry Wright (1976, p. 97); Christopher Boorse (1976, p. 74); Ernest Nagel (1977, p. 284); and Bigelow and Pargetter (1987, p. 188) each argue against an account of biological function that presupposes evolution by natural selection on the grounds that Harvey didn’t know about natural selection when he proclaimed the discovery of the heart’s function, or that evolutionary theory would have to be conceptually true to play any such role in the definition of function.¹ Such criticisms are valid only if the project is analysis of the *concept* of function.

Now I firmly believe that “conceptual analysis”, taken as a search for necessary and sufficient conditions for the application of terms, or as a search for criteria for application by reference to which a term has the *meaning* it has, is a confused program, a philosophical chimera, a squaring of the circle, the misconceived child of a mistaken view of the nature of language and thought. (Not to appear opinionated. But this prejudice is painstakingly defended in Millikan (1984a, chaps. 6, 8, and especially 9) so I have, I think, a right to it.) Still, I think that Woodfield and Wright, especially, have done good jobs of putting large portions of the area of this particular circle into a square, whether or not they have used only compass and rule in doing so. That is, theories of meaning to one side, each has done a fine job of collecting and systematizing various things that, without doubt, often *are* in the backs of people’s minds when applying notions like “in order to” and “function”, a fine job of spelling out analogies that commonly lubricate our transitions with these terms from one sort of context to another. Luckily there is no need to compete with Woodfield and Wright. My purpose, my program, is an entirely different one from that of conceptual analysis. An indication of this is that I do need to assume the truth of evolutionary theory in order to show that quite mundane functional items such as screwdrivers and kidneys are indeed items with proper functions. It is true, of course, that common persons make no such assumption when attributing functions to these items, nor does my thesis imply that they do.

It is traditional to contrast three kinds of definition: stipulative, descriptive, and theoretical. Descriptive definitions are thought to describe

¹Karen Neander’s “Teleology in Biology”, from which I originally got the page references in the above passage to Wright, Boorse and Nagel, contains a brilliant defense of the “etiological” account of function while remaining within the tradition of conceptual analysis.

marks that people actually attend to when applying terms. Conceptual analysts take themselves to be attempting descriptive definitions. Theoretical definitions do something else, exactly *what* is controversial, but the phenomenon itself—the existence of this kind of definition—is evident enough. A theoretical definition is the sort the scientist gives you in saying that water is HOH, that gold is the element with atomic number 79 or that consumption was, in reality, several varieties of respiratory disease, the chief being tuberculosis, which is an infection caused by the bacterium *bacillus tuberculosis*. Now I do have a theory about what theoretical definitions are, a theory about how the theoretical definition of “theoretical definition” should go. Unfortunately this theory rests upon a theory of meaning that rests in turn on the notion “proper function”, the very notion under scrutiny. But assuming that you at least countenance the *phenomenon* of theoretical definition, let me say that my definition of “proper function” may be read, roughly, as a theoretical definition of function.² It may be read as a theoretical definition of function in the context “The/a function of _____ is _____” (the function of the heart is to pump blood), though *not* in the context “_____ functions *as* a _____” (the rock functions as a paperweight). The definition of proper function may also be read as a theoretical definition of “purpose”.

Now jade turned out to be either of two compounds, nephrite or jadeite, these being chemically quite distinct, and there are two quite different kinds of acidity and several alternative ways to count genes, if current chemical and genetic theory are correct. Similarly, there would be no reason to suppose *in advance* that “has a function” must correspond to a unitary of non-disjunctive kind. But my claim is that “has a function” *does* as a matter of fact correspond, in a surprising diversity of cases, to having a *proper* function. Further, the various properties, the various analogies, which are influential in leading us to speak of quite diverse categories of items as having “functions” are properties or analogies that are, characteristically, *accounted for* by the fact that these items have coincident *proper* functions. It does not follow, nor is it my claim, that there are no *logically* possible cases in which analogy might lead us to speak of an item’s function when the item in fact had no proper function. Nor does it follow that every *logically* possible case in which an item has a proper function is a case we would recognize offhand as a case of having a function. The technique of testing a definition by a search through possible worlds, by ingenious construction of fictional counterexamples, is not appropriate for theoretical definitions. There are also logically (or,

²More accurately, the definition is intended to express the “sense” of this notion rather than describing its “intensions”, where “sense” and “intensions” are interpreted as described in Millikan (1984a). That is, according to my theoretical definition of “theoretical definition”, what a theoretical definition analyzes is (Millikanian) sense.

at least, conceptually) possible worlds in which water does not turn out to be HOH.

A particularly glaring example of the failure of my definition to cover logically possible cases that strike many as legitimate cases of having purpose or function is the example of accidental doubles. According to my definition, whether a thing has a proper function depends on whether it has the right sort of history. Take any object, then, that has a proper function or functions, a purpose or purposes, and consider a double of it, molecule for molecule exactly the same. Now suppose that this double has just come into being through a cosmic accident resulting in the sudden spontaneous convergence of molecules which, until a moment ago, had been scattered about in random motion. Such a double has no proper functions because its history is not right. It is not a reproduction of anything, nor has it been produced by anything having proper functions. Suppose, for example, that this double is your double. Suddenly it is sitting right there beside you. The thing that appears to be its heart does not, in fact, have circulating blood as a proper function, nor do its apparent eyes have helping it to find its way about as a proper function, and when it scratches where it itches, the scratching has no proper function.

Contrast this historical notion of proper function with any description of function that makes reference only to *current* properties, relations, dispositions or capacities of a thing. Contrast it, for example, with any of the various contemporary descriptions that have been offered of purposive behavior as goal-directed, or with descriptions of purposiveness as involving negative feedback mechanisms, or of the purposive as that which tends toward the “good” of some creature, or contrast it with Jonathan Bennett’s (1976) description of purposive action in terms of dispositions to act given dispositions to “register” situations in which “instrumental predicates” apply, or with Robert Cummins’ (1980, 1984) description of the function of an item within a system admitting of a functional analysis. According to each of these conceptions of function, if anything has a function, of course its double must have a function too—the same function. To many this seems an obvious truth, one that any respectable theory of function should entail. So in the case of your double’s heart, eyes and scratchings, all of these contemporary definitions seem to be *headed* in the right direction, my definition in the wrong direction. What am I to say about that?

What I’m going to say, rather brazenly, is that such cases are like the case of fool’s gold, or better, since the case is fictional, like the case of Twin Earth water. Perhaps lots of people have taken fool’s gold for gold, people in perfectly good command of their language. And if suddenly transplanted to Twin Earth, you would take XYZ to be water. Similarly, even though many people would be prone to say it did have a purpose,

that apparent heart in your double's body really would not have a purpose. It would merely display enough *marks* of purposiveness to fool even very sophisticated people. Without any question, there has never in fact existed anything within several orders of magnitude of the complexity of your fictional double, anything that was as neatly engineered to further its own survival and reproduction, that did not also have a history of the right sort to bestow upon its various parts the relevant proper functions. Nor do there *in fact* exist complicated goal-directed items, or items displaying complicated negative feedback mechanisms, or items that do anything like "registering" situations, or items with interesting Cummins functions, that do not *in fact* have corresponding proper functions. Having the *right sorts* of current properties and dispositions is in point of *fact*, in *our* world, an infallible index of having proper functions. If you like, it is criterial—as criterial, say, as the red of the litmus paper is of acidity. But it is not turning litmus paper red that *constitutes* acidity, nor is it having the right sort of current properties and dispositions that *constitutes* a thing's having a purpose. To the degree that each of these contemporary descriptions in terms of current properties or dispositions is successful, each describes only a *mark* of purposiveness, not the underlying structure.

The definition of "proper function" is intended as a theoretical definition of function or purpose. It is an attempt to describe a unitary phenomenon that lies behind all the various sorts of cases in which we ascribe purposes or functions to things, which phenomenon normally *accounts for* the existence of the various analogies upon which applications of the notion "purpose" or "function" customarily rest. My claim is that actual body organs and systems, actual actions and purposive behaviors, artifacts, words and grammatical forms, and many customs, etc., all have proper functions, and that these proper functions correspond to their functions or purposes ordinarily so called. Further, it is *because* each of these has a proper function or set of proper functions that it has whatever marks we tend to go by in *claiming* that it has functions, a purpose, or purposes.³

I have said that the definition of "proper function" is intended to explain what it is for an item to *have* a function or purpose, but not what it is for an item to function *as* something. Robert Cummins (1980, 1984) has given us a definition of function that is probably best construed as a theoretical definition, but a theoretical definition of "function as", in some

³Suppose that there really is a planet on which something as complex and apparently functional as your double is created by accident. I don't mean to rest my case wholly on the overwhelming unlikelihood of such an event. Similarly, there *may* be some very queer circumstances under which litmus paper turns red in a ph-neutral environment. Then the "criteria" commonly used to determine purposiveness or acidity are fallible indices, but the natural phenomena that correspond to these notions remain the same. For a theory of the relation of intension to extension that supports this kind of claim, see Millikan (1984a, 1986b, 1989, forthcoming a).

contexts of use, rather than of “function” meaning purpose. Cummins’ project is to explicate what “contemporary natural scientists” are describing when they offer a certain kind of explanation of the performance of an item within the context of a system. Very roughly, what these scientists do, according to Cummins, is to explain why the system as a whole has the capacity to do some complex or sophisticated task by appealing either to its capacity or to the capacities of its parts to do a series of simpler tasks which add up, flow chart style, to the original complex capacity. Cummins calls this kind of explanation “functional explanation”, and claims that the various elementary capacities appealed to in such explanation correspond to “functions”, within the system, of the elements having these capacities.

This notion of function is a highly illuminating one. But it does not correspond, nor does Cummins take it to correspond, to that basic sense of “function” that hooks function to purpose. For example, according to Cummins’ definition it is, arguably, the function of clouds to make rain with which to fill the streams and rivers, this in the context of the water-cycle system, the end result to be explained being, say, how moisture is maintained in the soil so that vegetation can grow. Now it is quite true that, in the context of the water cycle, clouds function to produce rain, function *as* rain producers; that *is* their function in that cycle. But in *another* sense of “function”, the clouds have no function at all—because they have no purpose.

Cummins explicitly waves aside all reference to “purposes” and all “appeals to the intentions of designers and users” in describing a thing’s function, at the same time acknowledging that such appeals are of course made in many contexts in which we apply the term “function” (Cummins 1980, p. 185). By Cummins’ definition, in order to *have* a function an item must actually *function* in a certain way, function *as* something or other, or at least must have a disposition or capacity so to function: “. . . if something *functions as* a pump in a system . . . then it must be capable of pumping . . .” (Cummins 1980, p. 185, emphasis mine). But it is of the essence of purposes and intentions that they are not always fulfilled. The fact that we appeal to purposes and intentions when applying the term “function” results directly in ascriptions of functions to things that are not in fact capable of performing those functions; they neither function *as* nor have dispositions to function *as* anything in particular. For example, the function of a certain defective item may be to open cans; that is why it is called a can opener. Yet it may not function *as* a can opener; it may be that it won’t open a can no matter how you force it. Similarly, a diseased heart may not be capable of pumping, of functioning *as* a pump, although it is clearly its function, its biological purpose, *to* pump, and a mating display may fail to attract a mate although

it is called a “mating display” because its biological purpose is to attract a mate.

There is another way of viewing the definition I have given of “proper function”, which throws the spotlight not on purpose but on *function categories*. Every language contains nearly innumerable common nouns and noun phrases under which things are collected together in accordance *not* with current properties, activities or dispositions, but in accordance with function. For example, consider the categories thermometer, can opener, heart, kidney, greeting ritual, mating display, fleeing behavior, stalking behavior, adverb, noun, indicative mood sentences, and word for green. Anything falling in one of these categories is what it is, falls in the category it does, by reference to function. One way to focus on the problem that the definition of “proper function” is designed to solve is to ask how items that fall under function categories are grouped into types.

Now an obvious fact about function categories is that their members can always be defective—diseased, malformed, injured, broken, dis-functional, etc.,—hence unable to perform the very functions by which they get their names.⁴ Nor will it do (as a surprising number of people have done) merely to point out that the typical or normal items falling in a function category actually do or can perform the function that defines the category. The problem is, how did the atypical members of the category that cannot perform its defining function *get* into the same function category as the things that actually can perform the function? Besides, it is not always true that typical items falling in a function category perform that function. It is quite possible, for example, that the typical token of a mating display fails to attract a mate, and that the typical distraction display fails to distract the predator.

Nor is mere similarity to other items that perform a certain function either necessary or sufficient, by itself, to bring an item under a function category. No matter how similar a piece of driftwood is to an oar, this similarity does not, by itself, make it into an oar. No matter how similar the mating display of one fish may be to the aggression display of another, this does not make the mating display into an aggression display. And no matter how similar the scratches that the glacier left on the rock are to a token of the English word “green”, they do not thereby compose a token of a word for green. Also consider: exactly what rules would articulate the *kind* of similarity to functioning members of a category the non-functioning members should have? For example, exactly *what* sorts of (current) properties must an item have in common with some func-

⁴Defective sentences and words? The easy examples are mispronunciations. For example, the child that pronounces “sin” like “thin” *mispronounces* the word “sin”. She does not correctly pronounce the word “thin”.

tioning token or other of a can opener in order to count as a “can opener that doesn’t work”? The question is absurd on its face. Indeed, a thing that bears no resemblance to any can opener previously on earth—suppose it has been designed in accordance with a totally new principle—may still *be* a can opener, and may be one despite the fact that it doesn’t work. Remember the train brake that Christopher Robin made that “worked with a string sort of thing”? “It’s a very good brake, but it hasn’t worked yet,” said Christopher. What’s amusing about that is not that Christopher claims it’s a brake, but that he claims it’s a very *good* brake.

There is a tendency, I think, to believe that the phenomenon of defective members of function categories is a superficial phenomenon, that it is only by some sort of extension or loosening up of basic criteria in accordance with which things are placed in function categories that defective members are admitted as members at all. But note how different the notion “defective” is from, say, the notion “borderline case” or the notion “case only by courtesy”. Monographs may be only borderline cases of books, or may be books only by courtesy, but surely monographs are not *defective* books. The notion “defective” is a normative notion. The problem is, what makes the defective item fall under a *norm*? Surely, not just that it *reminds* one of things that do serve a certain function, so that it makes one wistful?

That members of function categories can be defective is coordinate with purposes as, essentially, things that may not get fulfilled. Function categories are *essentially* categories of things that need not fulfill their functions in order to have them. Just as the characteristic mark of intentionality is that intentional items can be false, unsatisfied, or seemingly “about” what does not exist, so the characteristic mark of the purposive, of that which has a function, is that it may *not* in fact fulfill that purpose or serve that function. For example, your randomly created double exhibits no purposive behaviors and has no purposive parts because there is no way that any of his/her states or parts could be *defective* or might *fail*. That creature of accident, wonderful as he or she may be, falls under no norms.

The intimate connection between function category and purpose and the essential connection of these with norms, hence with possible failure, is easily obscured, however, when we turn to the analysis of purposive *behaviors*. This is because the vast majority of our categorizations of behaviors, the vast majority of our simple descriptions of behaviors, employ success verbs rather than verbs of trying. We tend to categorize behaviors according to the purposes they actually *achieve*. Indeed, we often ignore purpose altogether, classifying behaviors in accordance *merely* with effects of these behaviors, whether purposive effects or not. For example, I can bump you with my elbow either purposefully or by accident. On the other hand, merely trying to bump you and failing doesn’t

count as bumping at all. Of course verbs of trying do exist in the language. Consider “fleeing”, “stalking”, “fishing”, “hunting”, “looking”, “bidding for attention”, and, of course, any ordinary action verb prefaced by “trying to”. *These* action categories are function categories, defined by reference to purposes rather than achieved effects. What makes a behavior fall into one of *these* categories?

The question is seldom tackled head on. Rather, investigators typically begin with the question, “What makes purposive behavior purposive?” (or, say, “goal directed?”) and then take as their *paradigms* of purposive behavior not trying behaviors but behaviors described, as it is most natural to describe behaviors, by success verbs. Only later do they attempt to loosen up or stretch the model they have already built for successful purposive behaviors to cover the unsuccessful cases (if they ever recognize these cases at all). The result is that unsuccessful trying behavior is described as though it were a loose or borderline case of purposeful behavior, purposive only by courtesy. Or purposiveness is described as though it admits of degrees, the distinction between the purposive and the non-purposive appearing to need drawing at an arbitrary place. Let me give an example.⁵

Early in his discussion of goal-directed behavior, Wright tells us that

. . . successful teleological behavior, directed behavior that actually achieves its goal, provides us with the best paradigm; it gives us the sort of case from which all others can be seen as natural derivatives. (Wright 1976, p. 37)

Soon after, Wright gives us the following formula:

S does *B* for the sake of *G* iff:

- (i) *B* tends to bring about *G*
- (ii) *B* occurs because . . . it tends to bring about *G*. (p. 39)

Context makes it clear that this formula is a modification of a simpler formula covering only successful purposive behavior and containing “does bring about” in place of the looser “tends to bring about”. Wright comments that the phrase “tends to bring about” in his formula “represents the entire ‘family’” of which other members are “is the type of thing that brings about” (compare: is similar to items that *do* function to bring about—the wistfulness again), “is required to bring about”, “is in some way appropriate for bringing about” (1976, p. 39), etc. (Later Wright seems

⁵I have a special reason for using Wright’s views as my foil in the following paragraphs. Various published remarks to the contrary, there is no overlap at all between Wright’s analysis of function and mine. A reason for the confusion, I believe, is Wright’s peculiar usage of the term “etiological” which does *not*, in his vocabulary, make reference to causes or origins—see below and, for example, note 7.

to imply that “might easily be mistaken for something that would bring about” may have to be included in this “family” too (1976, p. 49). A loosening up indeed!) The unpacking that Wright then produces of “*B* occurs because it tends to bring about *G*”, in this context, is dispositional. What he describes under this heading is a strong *correlation* between behaviors to which *S* is disposed and behaviors that “tend to bring about *G*”. His claim is that the existence of such a correlation, *taken alone*, licenses us to infer, or to say, that the behavior occurs *because* of the tendency. This “because”, it is important to notice, is *not* a causal-historical “because”, but a special teleological “because”.

Now suppose that we set aside problems that may arise with other members of the “tends to bring about” family. And suppose that we set aside questions about the reference class within which the statistics for “tends to” are to be gathered. (More about that in a moment.) We must still answer these questions. First, how *strong* a correlation must there be between what *S* is disposed to do and behaviors that “tend to bring about *G*” for us to attribute purposiveness to *S*? Second, how *strong* does a tendency have to be to count as a tendency, to count as helping to strengthen the correlation? And how would one decide either of those questions but arbitrarily? This kind of *intrinsically* fuzzy and arbitrary distinction between the purposeful and the purposeless—quite different, notice, from admission of borderline cases between clear paradigms—is just wrong. It not only is bad theory, it is not good conceptual analysis, not an accurate reflection of how most people *think* of purposiveness. But where writers acknowledge at all that purposive behavior may fail, this kind of fuzzy result is typical.⁶

Because investigators have assumed that the paradigm cases of purposive behavior are cases of successful behavior, they have been led to give descriptions of purposiveness that are variations on dispositional themes; to give one example, led to locate purposiveness in mechanisms, such as feedback mechanisms, which will produce dispositions to reach some goal or state. True, Wright takes the dispositions that evidence a behavior as being purposive to license a peculiar sort of inference to a peculiar sort of *explanation*, namely, the behavior occurs *because* of its tendency to lead to the goal. But Wright gives this kind of “because” or “on account of” no explication besides saying that it *is* the kind of “because” we make inferences to when we discover dispositions of the sort he describes. Possibly something like this is correct on the level of con-

⁶According to my own definition of “proper function”, borderline cases do exist. These are always cases either of *derived* proper functions, or of functions of members of “higher order reproductively established families” (Millikan 1984a, chap. 1), and it is not the failure of the functional device itself but a partial failure of its producer which results in the vagueness.

ceptual analysis. But on the level of *theory*, it leaves us with no useful distinction between an animal's having the right dispositions, and its having them in accordance with the right explanation, no useful distinction between the dispositions that count as *evidence* for teleological structure, and that which they evidence—the teleological structure itself.⁷ My position, by contrast, is that although discovery of the sorts of mechanisms and/or dispositional structures that Wright and other theorists describe usually does license inference (inductive yet empirically certain inference) to a peculiar sort of explanation, this explanation is a straightforward *historical* explanation. Things just don't turn up with inner mechanisms or with dispositions like that unless they have corresponding proper functions, that is, unless they have been preceded by a certain kind of history. Moreover, being preceded by the right kind of history is *sufficient* to set the norms that determine purposiveness; the dispositions themselves are not necessary to purposiveness.

My claim has been that accounts of purpose or function in terms of present disposition or structure run afoul exactly when they confront the most central issue of all, namely, the problem of what failure of purpose and defectiveness are. But what leads me to conclude that *historical* analysis is what is needed instead? The fact that a historical analysis *works*, of course. The historical analysis I have given does cover all of the actual cases in which we ascribe functions to things. But prior to that, there is a strong clue that suggests that a good look at the historical dimension is needed for this kind of analysis.

Notice that talk of functional mechanisms and of dispositions that characterize purposive items is always talk accompanied, implicitly, by *ceteris paribus* clauses. My desk lamp has a disposition to give off light when its switch is depressed, but not of course when unplugged, when under water or when at 1000 degrees Fahrenheit. The mouse may have a disposition to take measures that will remove it from the vicinity of the cat, but not if under water, at 1000 Fahrenheit, in the absence of oxygen, while being sprayed with mace, or just after ingesting cyanide. Indeed, there are thousands of stressful conditions under which the mouse might be placed, which would extinguish its escaping behavior; you merely have to be sadistic enough to think of them. Nor can we plead that the mechanism must be under conditions such that it operates "properly", for "op-

⁷Wright's discussion of goal-directed behavior differs, in this respect, from his analysis of the functions of body organs. In the case of body organs, he reads the "because" in "X is there because it does (results in) Z" (1976, p. 81) more like a causal "because", but still not as a causal-historical "because". Wright says that the formulation "because X does Z" does *not* reduce to "because things like X have done Z in the past" (pp. 89–90). Rather, we are asked to accept that X might be there *now* because it is true that *now* X does or X's do result in Z. How the truth of proposition about the present can "cause" something else to be the case *at present* is not explained.

erating properly” is merely operating as it is “supposed” to operate, that is, in accordance with its design or purpose.

Increasingly I find in the literature on purpose (and on various subjects connected in one way or another with the related phenomenon of intentionality) handwaving, when things get rough, toward the relevant *ceteris paribus* clauses under the heading “normal conditions”. On pain of circularity, “normal conditions” cannot mean “conditions under which the thing operates properly”. What then *are* “normal conditions”? Are they average conditions? Where? Not throughout the universe, surely, for the average conditions there are being in nearly empty space at nearly absolute zero. Average conditions on earth? Conditions on earth have varied enormously throughout its history and they vary from place to place.

More central, note that what count as normal conditions for mouse behavior, shark behavior, robin behavior, earthworm behavior, and tapeworm behavior are quite different. Being underwater *is* a normal condition for shark behavior. The dispositions that express goal-directedness toward, say, obtaining food, are dispositions defined against quite different background conditions in the cases of the various species.

Are normal conditions for a mouse, perhaps, just conditions that mice, on the average, are in? Then if we tossed all mice but Amos into outer space, our listing of Amos’ “dispositions under normal conditions” would have to change, the main one left to him being, I suppose, to explode.

Perhaps normal conditions under which Amos’ dispositions are to be described are those under which his design is optimal for survival and proliferation? But *those* conditions include living in a world without cats. Also, of course, the wonder drug that prevents cell aging must be in Amos’ water just as oxygen must be in his air; if Amos happens to be diabetic, someone who is disposed to administer insulin must be available; if Amos is neurotic, some useful reward must be found for his neurotic behavior.

To explain what “normal conditions” are is surely going to take us on an excursion into history. At the very least, we must make a reference to something like conditions in which mice have *historically* found themselves, or better, found themselves when their dispositions actually aided survival. And if a listing of Amos’ relevant dispositions depends on an implied reference to his species, then the question of what makes him fall into the category “mouse” needs to be raised. But the question of Amos’ species is itself a question that diverts us through history. Mice must be born of mice. Consider: if a seeming mouse were born of a fish, what would set the “normal conditions” for manifestation of its relevant disposition?

But a more telling question, perhaps, than, Why look at history when trying to describe what functions and purposes are? is the question, Why

not look at history? Why is there so much resistance to looking at history? There is an univocal answer to this question, I believe, and bringing it into the light of day proves very instructive.

We take consciously intentional action to be a paradigm of purposiveness. And that is correct; it *is* one paradigm (among others). But the idea that a consciously intentional action could have the purpose it does *not* by reference to anything merely present, let alone anything present in *consciousness*, runs strongly against the grain. Indeed, it runs against one of the most entrenched beliefs of both philosophers and laymen. This is the belief that the consciousness of one's own intentions is an *epistemic* consciousness, that is, in the case of one's own explicit intentions at least, what one intends is *given*, simply and *wholly* given, to consciousness. But historical facts, certainly facts about one's evolutionary history, clearly are not simply *given* to consciousness. Hence, what one's explicit conscious intentions are could not possibly depend on facts about one's history. Q.E.D.

The belief that the intentional contents of one's explicit intentions are "given" to consciousness is just one strand of a tangle of entrenched beliefs which I have called "meaning rationalism" (Millikan 1984a). Meaning rationalism, in its various forms, has gone unquestioned in the philosophical tradition to such a degree that, to my knowledge, no arguments have ever been adduced to support it. However, a large portion of Wittgenstein's *Philosophical Investigations* is devoted to an attempt to *dispel* the notion that what one intends, especially when one intends to follow a rule, is given in what appears before consciousness. And a considerable portion of the Wilfrid Sellars corpus is built on the motif that *nothing* is, epistemically, given to consciousness. More recently, Hilary Putnam (1975) and then Tyler Burge (1979) have argued that what one means by a word is not, certainly not always, determined by the contents of one's head, but by relations *between* one's head and the world. But it is hard to see how *any* relation between one's head and the rest of the world could be a relation that is simply and wholly given to consciousness. If these philosophers are right, and meaning something or intending something or purposing something depends on relations *not* packed inside an epistemic consciousness, then why are historical relations not as good candidates for this position as any other relations?

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