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## **What it is like to be a Bat**

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Twenty years ago, Thomas Nagel presented a talk at the Chapel Hill Colloquium entitled “What is it like to be a bat?”. I commented on it, with a response entitled “What is it like for there to be something it is like to be something?” In it I tried to show what was wrong with his central claim. He didn’t believe me, and I guess it’s just as well, for he went on to publish the paper, in *Phil. Review*, 1974, and it has become perhaps the most famous and influential paper in the philosophy of mind, widely known outside of philosophical circles. I may have had something to do with the spread of its fame, since ten years ago, in *The Mind’s I*, Doug Hofstadter and I reprinted Nagel’s paper, along with some reflections, mainly by Hofstadter, which went a lot further (we thought) to show what was wrong with it. But apparently few believed us, for the paper’s influence has continued to grow.

It is surely the most widely cited and influential thought about consciousness. Nagel answers his title question by claiming that it is impossible for us to imagine what it is like to be a bat. This claim is congenial to many, apparently; one sometimes sees his paper cited by scientists as if it were that rarity of rarities, a philosophical “result” --a received demonstration of a fact that any theory must subsequently accommodate.

But I was right the first time, I think, and so, once more, I will address his question, only this time, instead of simply arguing about what is wrong with it, I will try to show you how to answer it. Not only is it not impossible; we can already answer many of the most interesting questions about what it is like to be a bat. Is, there, however, an ineliminable residue of unanswerable questions, are there unimaginable secrets, about what it is like to be a bat? I will argue that there is nothing worth nothing in the way of such inaccessible leftovers.

Nagel chose his target creatures well. Bats, as fellow mammals, are enough like us to support the conviction that *of course* they are conscious. (If he has written “What is it like to be a spider?” many would be inclined to wonder what made him so sure it was like anything at all.) But thanks to their system of echolocation--bats can “see with their ears”-- they are also different enough from us so that we can sense the vast gulf. Had he written a paper called “What is it like to be a chimpanzee?” or, more to the point, “What is it like to be a cat?” the opinion that his

pessimistic conclusion was *obvious* would not be so close to unanimity. There are more than a few people who are supremely confident that they know *just* what it's like to be a cat. (They are wrong, of course, unless they have supplemented all their loving and empathetic observation with vast amounts of physiological research, but they would be erring on the wrong side, from Nagel's point of view.)

For better or worse, most people seem quite cheerful about accepting Nagel's "result" regarding the inaccessibility to us of bat consciousness. I am not the only naysayer. Some other philosophers have challenged it, and for good reason (Not only Hofstadter, but Hardin, 1988, Leiber, 1988, Akins, 1990). For one thing, Nagel puts forward, so far as I can detect, no arguments in support of the result. After the question is posed and clarified, Nagel simply declares, as if it were obvious, that of course there is just no knowing what it is like to be a bat. The arguments in his paper concern the implications-- for science or philosophy-- of this axiom he plucks out of thin air. But in any case, just which "result" is it? It is that we human beings don't have the wherewithal, the representational or conceptual machinery, to represent to ourselves what it is like to be a bat. It is not just the epistemological or evidential claim that even if someone succeeded ("by accident") in imagining what it is like to be a bat, we would never be able to confirm that this successful feat of imagination had occurred.

The distinction is important, as I will now illustrate with an intra-species example.

Consider what it must have been like to be a Leipzig Lutheran churchgoer in, say, 1720, hearing one of J. S. Bach's chorale cantatas in its premier performance. There are probably no significant biological differences between us today and German Lutherans of the eighteenth century; we are the same species, and hardly any time has passed, from a biological perspective. But, because of the tremendous influence of culture, our psychological world is quite different from theirs, in ways that would have a noticeable impact on our respective experiences when hearing a Bach cantata for the first time. Our musical imagination has been enriched and complicated in many ways (by Mozart, by Charlie Parker, by the Beatles), but also it has lost some powerful associations that Bach could count on. His chorale cantatas were built around chorales, traditional hymn melodies that were deeply familiar to his churchgoers and hence provoked waves of emotional and thematic association as soon as their traces or echoes appeared in the music. Most of us today know these chorales only from Bach's settings of them, so when we hear them, we hear them with different ears. If we want to imagine what it was like to be a Leipzig-Bach-hearer, it is not enough for us to hear the same tones on the same instruments in the same order; we must also prepare ourselves somehow to respond to those tones with the same heartaches, thrills, and waves of nostalgia.

It is not utterly impossible to prepare ourselves in these ways. A music scholar who carefully avoided all contact with post-1720 music and familiarized herself intensively with the traditional music of that period would be a good first approximation. More important, as these observations show, it is not impossible to know in just what ways we would have to prepare ourselves whether or not we cared to go to all the trouble. So we could know what it was like “in the abstract” so to speak, and in fact I’ve just told you: the Leipzigers, hearing the chorale cantatas, were reminded of all the associations that already flavored their recognition of those chorale melodies. It is easy enough to imagine what *that* must have been like for them--though with variations drawn from our own experience. We can imagine what it would be like to hear Bach’s setting of familiar Christmas carols, for instance, or “Home on the Range.” We can’t practically do the job precisely, but only because we can’t forget or abandon all that we know that the Leipzigers didn’t know.

To see how crucial this excess baggage of ours is, imagine that musicologists unearthed a heretofore unknown Bach cantata, definitely by the great man, but hidden in a desk and probably never yet heard even by the composer himself. Everyone would be aching to hear it, to experience for the first time the “qualia” that the Leipzigers would have known, had they only heard it, but this turns out to be impossible, for the main theme of the cantata, by an ugly coincidence, is the first seven notes of “Rudolph the Red-Nosed Reindeer”! We who are burdened with that tune would *never* be able to hear Bach’s version as he intended it or as the Leipzigers would have received it. (When I chose this example I didn’t realize how apt it was; those first seven notes, given a different rhythm, are the opening notes of the fine old hymn “Rock of Ages.” It is not all that hard to imagine a Bach cantata that opens majestically with the hymn theme and moves through variations, in tempo and rhythm, that land us, with a sickening jolt of recognition, with Rudolph! My own desultory attempts to compose this evil pastiche have not yet delivered anything presentable, and I encourage others to try their hands at it.)

A clearer case of imagination-blockade would be hard to find, but note that it has nothing to do with biological differences or with “intrinsic” or “ineffable” properties of Bach’s music. The reason we couldn’t imaginatively relive in detail (and accurately) the musical experience of the Leipzigers is simply that we would have to take ourselves along for the imaginary trip, and we know too much. But if we want, we can carefully list the differences between our dispositions and knowledge and theirs, and by comparing the lists, come to appreciate, *in whatever detail we want*, the differences between what it was like to be them listening to Bach, and what it is like to be us. While we might lament that inaccessibility, at least we could understand. There would be no mystery left over; just an experience that could be described quite accurately, but no directly enjoyed unless we went to ridiculous lengths to rebuild our personal dispositional structures.

The epistemological problem is difficult, but straightforwardly addressable by the usual sorts of research. Figuring out just what sorts of experiences they would have had, and how these would differ from our experiences of Bach, is a matter of historical, cultural, and psychological and, maybe, physiological investigation. We can figure out some of this quite readily, including some of the most striking differences from our own experience, but if we were to try to put ourselves into the very sequence of experiential states such a person would enjoy, we would face diminishing returns. The task would require us to subject ourselves to vast transformations--forgetting much of what we know, losing associations and habits, acquiring new habits and associations. We can use our "third person" research to say what these transformations would be, but actually undergoing them would involve terrible costs of isolation from our contemporary culture--no listening to the radio, no reading about post-Bach political and social developments, etc. There is no need to go to those lengths to learn about Leipziger consciousness.

We *could* go to those ridiculous lengths, but it would be a foolish enterprise; every serious question we want answered could get an answer by less arduous and personally costly routes of investigation. Our inability to experience in our own imaginations the experiences of the Leipzigers is, first of all, only a practical, not a metaphysical or absolute barrier, and moreover, it is precisely because we *do* know--or can know--what the differences are between us and the Leipzigers, and the bearing of those differences on our respective dispositions to react to music, that we can confirm, and explain, the hypothesis that it is practically impossible for us to relive those experiences.

The same is true about imagining what it is like to be a bat. We should be interested in what we can know about the bat's consciousness (if any), not where we can turn our minds temporarily or permanently into bat minds.

One of the rhetorical peculiarities of Nagel's paper is that he chose bats, and went to the trouble to relate a *few* of the fascinating facts about bats and their echolocation, because, presumably, those hard-won third-person-perspective scientific facts tell us *something* about bat consciousness. What? First and least, they support our conviction that bats *are* conscious. (He didn't write a paper called "What is it Like to be a Brick?") Second, and more important, they support his contention that bat consciousness is very unlike ours. The rhetorical peculiarity of Nagel's paper can be captured by an obvious question: if such third-person facts suffice to establish (or at least render rationally credible) the hypothesis that bats are conscious (but not in just the way we are), why wouldn't further such facts be able to tell us in exactly what ways bats' consciousness isn't like ours, thereby telling us what it is like to be a bat? What kind of fact is it that only works for one side of an empirical question?

Nagel claims that no amount of third-person knowledge of physiology and the like could tell us what it is like to be a bat, and I flatly deny that claim. How might we shed light on this dispute? We could dramatize it with the help of a burden-shifting exercise that starts out as child's play--a game of sorts, in which the first player imagines what it is like to be *x*, and the other player then tries to demonstrate, using the sorts of objective, third-person facts that are the standard fruits of scientific research, that there is something wrong with that particular exercise of what I call heterophenomenology: phenomenology of the *other*.

Here are some simple warm-up exercises:

A: Here's Pooh the teddy bear, thinking how nice it would be to have some honey for breakfast!

B: Wrong. The teddy bear has no provision for distinguishing honey from anything else. No operating sense of organs, and not even a stomach. The teddy bear is filled with inert stuffing. It is not like anything to be a teddy bear.

A: Here's Bambi the deer, admiring the beautiful sunset, until the bright orange sky suddenly reminds him of the evil hunter's jacket!

B: Wrong. Deer are color-blind (well, they may have some sort of dichromatic vision). Whatever deer are conscious of (if anything) they don't distinguish colors such as orange.

A: Here's Billy the bat perceiving, in his special sonar sort of way, that the flying thing swooping down towards him was not his cousin Bob, but an eagle, with pin feathers spread and talons poised for the kill!

B: Hand on--how far away did you say the eagle was? Bat's echolocation is only good for a few meters.

A: Um, well, ... And the eagle was already only two meters away!

B: Ah, now this is harder to say. Just what are the resolution limits of a bat's echolocation? Is it used to identify objects at all, or just as an alerter and tracker for capture? Would a bat be able to distinguish pin feathers spread from pin feathers closed just using echolocation? I doubt it, but we will have to design some experiments to see, and also, of course, some experiments to discover whether bats are capable of keeping

track of, and reidentifying their kin. Some mammals can, and others, we have good reason to believe, are utterly oblivious of such matters.

The sorts of investigation suggested by this exercise would take us a long way into an account of the structure of the bat's perceptual and behavioral world, so we could rank order hetero-phenomenological narratives for realism, discarding those that asserted or presupposed discriminatory talents, or reactive dispositions, demonstrably not provided for in the ecology and neurophysiology of the bat. For example, we would learn that bats would not be bothered by the loud squeaks they emit in order to produce their echoes, because they have cleverly designed a muscle that shuts down their ears in perfect timing with their squeaks, not unlike the timing devices that permit sensitive radar systems to avoid being blasted by their own outgoing signals. A lot of research has already been done on these issues, so we can already say much more, for instance about why bats use different frequency patterns for their squeaks, depending on whether they are scanning for prey, approaching a target, or homing in for the kill (Akins, 1989, 1990).

Simply to digest and interpret the phenomenological telling research that *already been done* on bats would be a lengthy and informative exercise for any philosopher who thinks it is "just obvious" that we cannot know what it is like to be a bat. The illustrations I have used are only the trivial beginnings of a process that would take us deep into bat neurophysiology, behavior ecology and ethology. Instead of amassing such details now, let us just suppose, for argument's sake, that we have engaged in the project. What would happen?

We might just keep learning more and more and more, replacing one heterophenomenological narrative after another, becoming ever greater authorities on what it is like to be a bat. Eventually we might arrive at heterophenomenological narratives that no critic could find any positive grounds for rejecting. At that point, we should accept them--tentatively, pending further discoveries--as accurate accounts of just what it is like to be a bat.

That, after all, is how we treat each other. In recommending that we treat bats and other candidates for interpretation the same way, I am not *shifting* the burden of proof but extending the normal, human, burden of proof to other entities.

We could use these investigations to dispel all sorts of overly romantic illusions about bat consciousness. We know that Randall Jarrell's delightful children's book, *The Bat-Poet* (1963) is fantasy, because we know that bats don't talk! Less obviously fantastical claims about their phenomenology succumb to less obvious, but still public, facts about their physiology and behavior. These investigations would show us a great deal about what a bat could and could not be conscious of under various conditions, by showing us what provisions there were in their nervous systems for representing this and that, and by checking experimentally to make sure the

bat actually put the information to us in the modulation of its behavior. It is hard to imagine how much can be gleaned from this sort of research until you actually look into it. (For a surprisingly detailed preliminary investigation of what it is like to be a vervet monkey, for instance, see Cheney and Seyfarth, *How Monkeys See the World*, 1990.)

Now presumably Nagel agrees that by such exercises we would indeed learn a great deal about what it is like (and what it isn't like) to be a bat. After all, he himself relies on a few moves in just such a game in order to secure our agreement that it is like something to be a bat. Where though, would further rounds of the game lead?

Nagel says: "one would reach a blank wall." He doesn't say why, but we can adopt the usual line taken by qualophiles (believers in qualia). No matter how much "merely dispositional" or "merely behavioral and neurophysiological" knowledge you garnered about the bat, according to this line, this wouldn't tell you anything about the *intrinsic* properties of bat experience, the qualia that really constitute "what it is like". Suppose this were true.

This invites an obvious objection: these investigations would show us a great deal about brain organization and information-processing in the bat, but they would show us only what bats are *not* conscious of, leaving entirely open what, if anything, bats *are* conscious of. As we know, most of the information-processing in nervous systems is entirely unconscious, so these methods of investigation will do nothing to rule out the hypothesis that bats are... flying zombies, creatures it is not like anything to be! (Wilkes, 1990, p.224, wonders whether bat echolocation is sort of blindsight, not like anything at all.)

Ah, the bat is out of the bag. This is indeed the ominous direction in which this discussion seems to be sliding, and we must head it off. Richard Dawkins (1986), in an illuminating discussion of the design of echolocation in horseshoe bats, gives us a clear version of the image that is lurking.

The Doppler Effect is used in police radar speed-traps for motorists ... By comparing the outgoing frequency with a frequency of the returning echo the police, *or rather their automatic instrument* [my emphasis], can calculate the speed of each car .. By comparing the pitch of its cry with the pitch of the returning echo, therefore, the bat (*or rather its on-board computer in the brain*) [my emphasis] could, in theory, calculate how fast it was moving towards the tree. (p.30-31)

It is tempting to ask: is there something in the bat that is situated relative to *its* "on-board computer" (which operates without a smidgen of consciousness) as the police are situated relative to their "automatic device"? The police don't have to calculate the Doppler shift

consciously, but they do have to experience, consciously, the readout on their device that says, in bright red LED symbols: “75MPH”. That is their cue for leaping on their motorcycles and starting up their sirens. We may plausibly suppose that the bat also does not consciously calculate the Doppler shift--its onboard computer takes care of that--but then isn't there a role left over, in the bat, for something like the experiencing cop, a witness to appreciate (consciously) the “output” of the bat's Doppler-effect-analysis computer? Note that we could easily enough replace the police officers with an automatic device that somehow records the registration number of the offending vehicle, looked up the operator's name and address and sent him or her a ticket. There is nothing special about the task the police are doing that shows it could not be done without any experiencing of anything. The same holds, it would seem, for the bat. A bat might be a zombie. It would be a zombie--so this line of reasoning suggests--unless there were an inner observer in it that reacts to an inner presentation in much the way the officers react to the flashing red lights on their instruments.

Don't fall in the trap. This is an old nemesis, the Audience in the Cartesian Theater. *Your* consciousness does not consist in the fact that your brain is inhabited by an inner agent to whom your brain presents displays, so our inability to find such a central agent in the bat's brain should not be seen to jeopardize its claim to consciousness, or our claim to be able to say what its consciousness was like. In order to understand a bat's consciousness, we must simply apply the same principles to the bat that we apply to ourselves.

But what could a bat do, then, that would be special enough to convince us that we were in the presence of genuine consciousness? It may seem that no matter what fancy output users we situate behind the bat's Doppler-transducer, there could be no convincing, from the outside, “third person” reason to grant the bat conscious experience. Not so. If the bat could talk, for instance, it would generate a text from which we could generate a heterophenomenological world, and that would give us exactly the same grounds for granting it consciousness that serve for any person. But, as we just noted, bats can't talk. They can, however, behave in many nonverbal ways that can provide a clear basis for describing their heterophenomenological world, or, as the pioneer researcher von Uexküll (1909) called it, their *Umwelt und Innenwelt*, their Surroundworld and Innerworld.

Heterophenomenology without a text is not impossible, just difficult (Dennett, 1988a, 1988b, 1989a, 1989b). One branch of animal heterophenomenology is known as cognitive ethology, the attempt to model animals' minds by studying--and experimenting on--their behavior in the field. The possibilities and difficulties of this sort of investigation are well represented in Cheney and Seyfarth (1990), Whiten and Byrne (1988) and in Ristau (1991), a festschrift dedicated to Donald Griffin, the pioneer investigator of bat echolocation and the creator of the field of cognitive ethology. One of the frustrating difficulties encountered by these

investigators is that many of the experiments one dreams of running turn out to be utterly impractical in the absence of language; one simply cannot *set up* subjects (and know that one has set them up) in the ways these experiments would require without conversing with the subjects (Dennett, 1988a)

This is not an epistemological problem for the heterophenomenologist; the very difficulty of creating the requisite experimental circumstances in the natural environment demonstrates something more fundamental about the minds of languageless creatures. It shows that the ecological situations of these animals have never provided them with *opportunities* for the development (by evolution, by learning, or by both) of many of the advanced mental activities that shape our minds, and so we can be quite sure they have never developed them. For instance, consider the concept of a *secret*. A secret is not just something you know that others don't know. For you to have a secret you need to know that the others don't know it, and you have to be able to control that fact. (If you are the first to see the approaching stampede, you may know something the others don't know, but not for long; you can't *keep* this bit of privileged information secret.) The behavioral ecology of a species has to be rather specially structured for there to be any role for secrets at all. Antelopes, in their herds, have no secrets and no way of getting any. So an antelope is probably no more capable of hatching a secret plan than it is capable of counting to a hundred or enjoying the colors of a sunset. Bats, who engage in relatively solitary forays during which they might be able to recognize that very isolation from their rivals, meet one of the necessary conditions for having secrets. Do they also have interests that might be *noticed* by them to be well-served by exploiting secrets? (What could a clam do with a secret? Just sit there in the mud, chuckling to itself?) Do bats also have habits of stealth or deception in hunting that might be adapted for more elaborate secret-keeping activity? There are in fact many questions of this sort that, once raised, suggest further investigation and experiments. The structure of a bat's mind is just as accessible as the structure of a bat's digestive system; the way to investigate either one is to go back and forth systematically between an assay of its contents and an assay of the world from which its contents were derived, paying attention to the methods and goals of the derivation

Wittgenstein once said "If a lion could talk, we could not understand him." (1958, p.223) I think, on the contrary, that if a lion could talk, that lion would have a mind so different from the general run of lion minds, that although we could understand him just fine, we would learn little about ordinary lions from him. Language plays an enormous role in the structuring of a human mind, and the mind of a creature lacking language--and having really no need for language--should not be supposed to be structured in these ways. Does this mean that languageless animals "are not conscious at all" (as Descartes insisted)? This question always arises at this moment as a sort of incredulous challenge, but we shouldn't feel obliged to answer it as it stands. Notice that it presupposes the assumption that consciousness is a special

all-or-nothing property that sunders the universe into two vastly different categories: the things that have it (the things that it is like something to be, as Nagel would put it) and the things that lack it. Even in our own case, we cannot draw the line separating our conscious mental states from our unconscious mental states. While the presence of language marks a particularly dramatic increase in imaginative range, versatility, and self-control (to mention a few of the more obvious powers), these powers do not have the *further* power of turning on some special inner light that would otherwise be off.

When we imagine what it is like to be a languageless creature, we start, naturally, from our own experiences, and most of what then springs to mind has to be adjusted (mainly downward). The sort of consciousness such animals enjoy is dramatically truncated, compared to ours. A bat, for instance, not only can't wonder whether it's Friday; it can't even wonder whether it's a bat; there is no room for wondering to play in its cognitive structure. While a bat, like even the lowly lobster, has a biological self, it has no selfy self to speak of--no center of narrative gravity, or at most a negligible one. No words-on-the-tip-of-its-tongue, but also no regrets, no complex yearnings, no nostalgic reminiscences, no grand schemes, no reflections on what it is like to be a cat, or even on what it is like to be a bat. This list of dismissals would be cheap skepticism if we didn't have a positive empirical theory on which to base it. Am I claiming to have proven that bats *could not* have these mental state? Well, no, but I also can't prove that mushrooms *could not* be intergalactic spaceships spying on us.

Isn't this an awfully anthropocentric prejudice? Besides, what about deaf-mutes? Aren't they conscious? Of course they are--but let's not jump to extravagant conclusions about their consciousness, out of misguided sympathy. When a deaf-mute acquires language (in particular, sign language, the most natural language a deaf-mute can learn), a full fledged human mind is born, clearly different in discoverable ways from the mind of a hearing person, but capable of all the reflective intricacy and generative power--perhaps more. But without a natural language, a deaf-mute's mind is terribly stunted. (See Sacks, 1989, especially the annotated bibliography.) As the philosopher Ian Hacking notes in a review of Sacks' book, "It takes a vivid imagination even to have a sense of what a deaf child is missing." One does not do deaf-mutes a favor by imagining that in the absence of language they enjoy all the mental delights we hear human beings enjoy, and one does not do a favor to non-human animals by trying to obscure the available facts about the limitations of their mind.

And this, as many of you are aching to point out, is a subtext that has been struggling to get to the surface for quite a while: many people find Nagel's nihilistic thesis congenial because they fear that if we succeed in explaining the truncated consciousness of bats and other animals, we will lose our moral bearings. Maybe we *can* imagine a conscious computer (or the consciousness of a bat) but we *shouldn't try*, they think. If we get into that bad habit, we will

start treating animals as if they were wind-up toys, babies and deaf-mutes as if they were teddy bears, and--just to add insult to injury--robots as if they were real people.

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