

WHY SCIENTISTS HATE PHILOSOPHERS

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Clearly the above title exaggerates the truth. Not all scientists hate philosophers. They are not even always mutually exclusive people – some scientists consider themselves philosophers just as some philosophers consider themselves scientists. And, for every Leibniz and Einstein who would like to be claimed by both groups, there are countless others who would gladly not be claimed by either. Of course we might be tempted to believe there are easy to determine characteristics, like the amount of time one spends in which area, or what one does as a profession, that give us sufficient criteria for making absolute distinctions here but then but we could argue that someone like Isaac Newton was in ways neither – that he was more truly a theologian or more truly a Master of the Royal Mint, etc. No, it is obvious that strict categorization is absurd.

But, despite the attention grabbing device and oversimplification of the title I've used, I would not also say that the title itself is absurd. The hatred of philosophy is a very real phenomenon and extends to all kinds of persons. However this hatred, this dislike, this repugnance, whatever term you want to use for it in all its various forms, is especially interesting and significant when it manifests itself in a scientist. Philosophy and science are such similar activities, compared to say parasailing or competitive eating, that either side's hostility to the other must have a genuinely profound reason. By using the term reason here I intend to mean exactly that, I mean some form of intellectually developed justification. I would say that scientists definitely have good reasons for hating philosophers – I want there to be no ambiguity regarding my acknowledgement of this. In fact, everyone has good reason to hate philosophers. And not just bad philosophers. To the contrary, the best ones the more so. Wherever philosophy manifests itself in an honest form it will be calling into question things that are cherished and happily believed. Who wouldn't hate that whenever it means their own beliefs? Ignorance after all is always a great comfort right up until it isn't.

This gives us the general outline of the situation now but there is a lot more that can be elaborated on in terms of specifics. Because I would like to be as comprehensive as possible, while still remaining concise, I'm going to limit myself to a few fundamental issues here. These will consist of the following:

- 1) What the differences are between science and philosophy*
- 2) How philosophy can legitimately be critical of science*
- 3) How science is so often able to function without philosophy*
- 4) What can be done to harmonize philosophy and science*

(1)

The first of these issues is definitely the most crucial since it will define the boundaries of all the following issues I will be addressing. As such I will make the greatest effort to be thorough and exact now. Beginning with science, we are already presented with a formidable difficulty. Not only is there not even total agreement among elite scientists here but I have personally observed in debates and discussions that individual scientists will speak of science with varying broadness and narrowness in the span of a single event. I don't mean to use too judgemental a tone in this regards though because trying to define science perfectly is as quixotic as any intellectual endeavor humans are likely to undertake. Science is simply too immense a concept – it is as immense as the whole universe it all its mystery. Nevertheless I think I can offer a good working definition for the present purposes.

Science, in all its forms, involves the investigation of the natural world. The motives for these investigations can be various but two are of the greatest interest – the desire for understanding in itself and the desire for knowledge that can be put to practical use. At their heart, these two desires amount to the desire for clarity and the desire for control. From here on out I will refer to these two different scientific approaches as philosophical science and technological science. I'm sure that some readers will perceive a bias in my giving the former its chosen name but honestly I think using another term would only obscure the truth about the fundamental connection between science and philosophy. Many critics of philosophy, among them notable scientists, have asserted that doing philosophy has little to no practical value in most regards – granting that this is certainly the case when what is practical is taken to mean what has direct application for manipulating the physical structure of the world, it only makes sense to call any

scientific enterprise that is not primarily concerned with direct applications for manipulating the physical world, philosophical science. Knowledge ultimately begins in wonder, in the sheer questioning of things, before any methods can be established. In such a state no well-defined or structured methodology is possible and, as such, no program for obtaining practical results. One cannot even attempt to build anything before one has any scheme to do so. Additionally, certain schemes require the pre-existence of tools which themselves also require other schemes just to make them. In the end we are ultimately lead to the question – how do schemes and tools emerge in the most original sense? Through blind curiosity. Through groping and wonder. The significance of this in defining science is that at its most original, science remains just as blind and curious. In the height of its sophistication, science is still filled by the same groping spirit of wonder.

This is precisely what doesn't distinguish philosophy and science however since philosophy is even less constricted by specific methodology and more inclined to sheer questioning. Having a proper concept of science though requires that we recognize the real boundaries of the scientific domain – that being of course the natural world. Is mathematics a science? It has logical principles and is a practice founded on rigorous methods of inquiry so we might be tempted to immediately say that it is – it's certainly not mere philosophy. However not all mathematical objects need to have a real counterpart in the natural world. We can imagine a polygon with ten to the power of ten thousand sides and in doing so we've conceived something that likely has no physical counterpart. Now, it can be argued that such things represent the metaphysical aspects of the natural world, after all physical laws are not themselves physical objects either, but in doing so it would then be logical to admit all abstract objects as parts of nature. Every physically possible phenotype then becomes a part of "nature" – including creatures resembling dragons, unicorns, and chimeras. So, fantasy creatures. If this wasn't ridiculous enough, we should also then admit fictional people because even though they are mere abstractions there is nothing physically impossible about them. Science then suddenly includes Mowgli and Sherlock Holmes as its proper elements. Given that science has not now, or ever before, admitted into its field of study questions regarding literary characters, we can do scientists the courtesy of not trying to abuse their discipline in this way. Sure, the concept of science can be stretched, but if we go too far the result will be grotesque.

Nature therefore is appropriately limited to actual physical reality – this being at its most abstract still restricted to actually operating physical laws. What we are left with is a concept of science that is broad enough to include biology, neurology, chemistry, physics, etc – even economics and sociology, in as much as they manifest themselves in physical ways. We have a fairly broad concept of science then that doesn't mutilate it and, at the same time, preserves its factual preoccupation and grounding in the objective world. Perhaps to some people's chagrin we've had to do this while granting a partial independence from science to the disciplines of mathematics and logic, what with their permissiveness of every coherent abstraction, but that really can't be helped. The alternative is to allow a phantasmagoria of abstract monsters into the gardens of science and to ultimately dissolve the boundaries between science and even magical realism. That said, this does not entail that all abstract constructs are fictions, since that would make all possible thoughts fictions, but rather we distinguish mathematics and logic from fiction by acknowledging that the former investigate the metaphysical structure of reality, the abstract, while the latter invents specific scenarios within the realm of abstraction that are not restricted to mere factual representation. Fiction can contain facts but fiction must always be something more than what exists. Science on the other hand can never exceed what exists since it has something like a rigid moral requirement to only ever represent the world to the best of its abilities.

The voluntary confinement of science to physical realities is of course its greatest virtue. It does not follow though that confinement to physical reality is itself the standard of all other virtues. We can honor a ballerina for practicing her discipline without also committing ourselves to a program of universal conscription for ballet. Science has a particular and important function in society. Science is furthermore central to modern civilization. At their greatest, scientific achievements are indeed entirely worthy of the highest reverence and admiration. They are beautiful creative achievements. The beauty of science though does not exhaust beauty itself – rather science fulfills an immense but still incomplete portion of beauty. Creativity for example is more than science and not merely in a trivial sense. Creativity in fact is the unscientific part in the apparatus of any scientific theory. Yes, scientific theories involve extraordinary acts of creativity, but they aren't even comprehensive of all forms of knowledge about reality, as has been already determined, and the creative originality in said theories also will itself still always be a creativity introduced from outside the

established parameters of previously proven scientific knowledge. Creativity comes from the void, from that which is was not already being, and so appears in the very heart of our ignorance. Every epiphany has to arrive spontaneously, otherwise we must simply be using some existing method to derive inferences that are not themselves radically new. So we see here that the growth of science depends on a principle that is not itself amenable to scientifically comprehensive understanding. In the end, science, like every other constructive discipline, depends upon curious ignorance and ambiguously formed questions. Just as every human is traceable to an emergence from the lagoons of unicellular ancestry, so too every scientific achievement, if it is radical enough, depends upon acts of philosophical contemplation.

As challenging as it was to adequately define science, it will be inversely more easy to define philosophy. To some extent this is because I have already had to introduce some concept of philosophy in order to delimit the boundaries of what is properly scientific, but in addition I think the simplicity of defining philosophy results from it lacking rigid methodological characteristics. Philosophy is to some degree just thinking at its least shackled. While it is true that not every speculation is afforded equal respect by philosophers, this is because historical philosophizing has been done to provide a certain amount of confidence in particular philosophical ideas, in ideas like reason and causality and sincerity etc. We have an amount of confidence in these ideas because philosophers have thought a lot about them and their opposites and, while we don't have any perfect certainty, in many situations we are prepared to accept said ideas as sufficient operating assumptions. A philosopher though can always decide to be more skeptical than they normally would be on any given occasion and question ideas they might otherwise employ with conviction and that is perfectly valid. Just as a mathematician can use an estimate of pi when that's all they need, just as a physicist can satisfy themselves with the macroscopic properties of an object without including the microscopic details when that's all they need, so too philosophy can speculate in admirable ways with varying levels of skepticism. At its most impressive though, philosophy will generally make stricter demands on what is intellectually allowed to serve as an unquestioned postulate.

The absence of certainty and agreement among philosophers is a popular means of denigrating it but I would argue that these are essential virtues to philosophy. What philosophy shares with mathematics and logic more than any of

these shares with science is an emphasis on the pre-eminence of perfect truth. In science, if you have enough truth to do this or that, to describe the functions of a neuron, to land an astronaut on the moon, then you usually have enough truth. Science only starts to grow anxious for more truth when its established systems of explanation can no longer account for all known phenomenon. Science then is fundamentally reactive in some sense – it requires external prodding to stimulate its own sense of inadequacy. Science is fine if there are no problems. In areas of pure reasoning though like mathematics and logic, or in philosophy which isn't so much within pure reasoning itself as it is the edge of reasoning's own boundary, there is always a desire to problematize the discipline operating within itself. Even if every known problem is solved, new problems would be eagerly sought. These philosophical engagements, and of course this actually includes the philosophical treatment of any discipline, including science, seek either to collide with an immutable boundary of perfect truth or to simply sail forever into the infinite. Nothing else can satisfy the desire for questioning.

This should be enough now to clarify the differences between science and philosophy. Science is a methodical treatment of the physical world that primarily seeks to establish facts within specific finite contexts. Science can be infinite, if the physical world it is concerned with turns out to be infinite, but still it restricts itself to accumulating knowledge through finite amounts of demonstration and evidence. Philosophy conversely is the unrestricted questioning of all beliefs that is able to adopt different assumptions at different times in order to maximize its own capacity for questioning. Philosophy then is fundamentally infinite in a unique way because it literally has no specific domain and no unquestionable principles that would exclude any direction of inquiry. These definitions of course make determining good science much easier than good philosophy. If philosophy can be judged by any criterion at all it may be that the best philosophizing allows for the fewest assumptions involving weakly constructed justifications. In this sense one can philosophize badly by relying on nonsensical ideas that have previously undergone logical evisceration while nevertheless offering no new justifications for retaining them. Science meanwhile is more concerned with simply systematizing a particular domain of reality consistent with a certain set of beliefs, the ones fundamental to accepting the existence of a physical world, and only formulating problems for itself when they are required to address some inexplicable aspect newly evident in physical reality. Despite these differences, it should be clear both activities, done sincerely, can coexist and uphold each other.

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If I have shown how compatible science and philosophy are to anyone's satisfaction, it must come as a surprise to many of them then that any hostility could emerge between these two disciplines. And, to be fair, it is not something that can all be blamed on the scientists. Philosophy is in many ways jealous and resentful of science, or at least corrupt forms of philosophy are, since science has acquired an authority and eminence that many self-identified philosophers skulkingly lust after. The average person has more respect for technology and experimental evidence nowadays than they do ontology and infinite regressions though so unhappy philosophers here have only themselves to blame. If you want authority you shouldn't devote yourself to a tradition that questions every form of authority. Yes, being able to dispose of false authorities has a certain quality of authority to it, but ultimately any attempt to replace said authorities with oneself will always result in a profound act of self-negation as an authentic philosopher. The philosopher can never truly become an authority because they can never settle into authority. A good way to cripple a king in fact is to get them to love philosophy – because for every rare Marcus Aurelius whose commanding nature can survive philosophical immersion intact, there will be incomparably more whose self-questioning will interfere with their worldly duties to ignorance. It is strange that Plato never realized this. He even knew of Diogenes.

A sincere love of philosophy is intellectually and spiritually dangerous but this is the opposite of a condemnation of philosophy because it is precisely this dangerousness which allows for radical self-improvement. Human history has in so many ways shown that great things depend on risk and courage – why wouldn't intellectual greatness demand of us similar sacrifices and perils then? To the contrary, of course it must, and philosophy is what challenges us to the core of our own being. Participating in this challenge we may fail with wounding, even fatal, consequences. We may think ourselves into a wasteland of values that we become lost in, we may discover fearful ideas from which we cannot escape, but if we never take up the challenges of philosophy we will be making a lasting peace with our own poverty. Philosophy is simply the only way to really get underneath anything and investigate it at a fundamental level – given this it should be obvious that philosophy can be of great service in all intellectual areas.

With respect to science, philosophy can be useful where existing scientific methods by themselves are not sufficiently adequate to scientific ambitions. Here philosophy can do many things. It can point out where fundamental confusions have taken residence. It can outline solutions that can be investigated and tested. And it can even alter the domain of science itself and give science new missions to undertake. In all these things, philosophy would be working with scientific principles and scientific values to serve scientific aims. So here we see that philosophy can be the best friend science could ever have. Nothing can do more for science than honest and astute philosophy. At the same time, we must admit that philosophy is not partial to science. True philosophy does not hold sacred even the foundational tenets of science, the very things without which science cannot exist. In this we have uncovered another, maybe the deepest, reason for the hostility that can arise between these two disciplines. Philosophy is simultaneously eager to preserve what is most truthful in science and destroy what is least truthful. Here the scientist is confronted with a kind of gestalt decision. Is science better fundamentally intact or is it better as a radically evolving form of inquiry? I suspect that most scientists would say the latter is truer to the spirit of science but saying something is different than believing it enough to practice it. In this situation a scientist has no recourse but to philosophically wrestle with themselves and their own values.

The truth is we can imagine worlds which are not amenable to scientific inquiry, worlds where circumstance prevents the thinking individual from ever testing their hypotheses regarding nature, but wherever thought itself is possible we cannot imagine that philosophy is impossible. Even the prisoners of Descartes demon or the modern day simulation version of this argument have a real basis for inquiring into truth. While many individuals may not have any patience or sympathy with such outlandish skepticism, they can be so only by a lack of real fidelity to the truth. What is true must be able to answer all questioning – even where undecidable questions are possible it makes no sense to say that there will be no answer for why this is so. There must be something which explains our incapacities in as much as our incapacities can be described at all. To describe something is to recognize its limits and these limits are themselves the answers to all the deep questions about it.

In as much as science is concerned with real truth and not simply the cataloguing of appearances or the power over apparent realities, science is a

movement in the direction of philosophical science. Philosophical science naturally finds its culmination in something that is almost pure philosophy – in a minimal concern for power in the world, for authority. Technological science in contrast moves away from philosophy because it is inclined to accept what is given and focus on how to manipulate it. Only doubts that promise an expansion of control are invested in. This of course cannot be a path to real truth. We may very well have no control over reality at a fundamental level and, even if we do, this can never be fully determined unless we are willing to be fair to both possibilities. This is not to argue for the abandoning of technological science however since even if we exist in a world of the most extraordinary illusion still, being able to alter the illusions to our own preferences is preferable. Only, if we do in fact desire and respect truth, we owe it to ourselves to admit that the foundations of truth will necessarily transcend the limits of technology. To illustrate this, I'd like you to imagine living in a simulation. Certainly it is possible to invent technologies in such a world if it is sufficiently well structured enough. In fact there are already plenty of computer games which allow their users to do this very same thing. Users can invent constructs which have utility in these virtual worlds. Clearly though utility in a world, the basis of technology, cannot provide the full context for the truth about the nature of said world. Here the person of honest inquiry must resort to radical speculation and doubt.

What we find here is evidence of the fact that philosophy forms the basis for all creativity. When a person creates something they bring into existence something that they formed some concept of in their mind. They of course didn't have total understanding of their own creative process but in as much as their creation is truly their own creation it is a product of their own forethought and insight. What emerges from a person beyond their own intention is purely an event of unconscious growth, not a creative act. Women don't create their infants in the womb, they give birth to them. So too, if we throw a bucket of paint at a canvass we are less responsible for the creation of the result than if we use the finest paint brush to select every detail. Scientific progress meanwhile obviously depends most of all on actual creativity even as we must admit the vital role that unconscious growth will play in it. In both kinds of progress, philosophy reveals itself to be crucial. Philosophy provides for the basic initiative of the former and the means to recognize and capitalize on the latter. Again, within these two contexts, just as elsewhere, science must turn to philosophy in order to critically assess the state and success of its own enterprise.

It can be seen now that philosophy surrounds science, that science is immersed in the ocean of philosophical inquiry. Philosophy then connects with science at the foundations of science, at the zeniths of science, and even in the interconnections within the different elements of science. In relation to all these, philosophy is essential to the critical evaluation of scientific achievement. Even where the basic values and principles of science are not put to question, the actual activities of science still require philosophy in order to determine whether these values are being properly served and whether these principles are being adhered to. Philosophy then is a vital principle of science itself in all its own truth seeking. Any neglect of philosophy is a neglect of science in this respect.

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In a deep sense it is evident now that science cannot function in the absence of philosophy. However science very often seems to get along without philosophy so that by itself calls for some explanation. For example, how is it possible that some elite scientists can be as successful as they are while remaining hostile to philosophy? Part of it has to do with the fact that they simply don't acknowledge the amount of philosophy they themselves do, that they don't connect specific activities of theirs with their own conception of philosophy. In this respect they might use terms like hypothesizing and critical thinking to describe acts of philosophical inquiry within science. Another part though has to do with the fact that much of science is so concerned with organizing the enormous mess of things that are already accepted as known, that science actually has to go out of its way to address a lot of what is still truly unknown. Before Newton, the variety of motions among heavenly bodies was mysterious but the motions themselves were beyond dispute. The problem lay in explaining the variety itself. Likewise, science in general can very easily limit its concern to the legions of apparent mysteries rather than making an extra effort to inquire into the fundamental nature of said mysteries or other things not regarded as so mysterious. Nothing is unusual until you really think about it. Who is mystified by water for example? Not many people. And yet many more people are unable to explain the nature of water and the various things they observe in water. It's like that with all of nature because there is an animal power in us that is completely indifferent to idle speculations – it is preoccupied only with brute existential concerns. It is this animal in us which best functions without philosophy.

Of course philosophy can fall under the sway of the animal force too and end up clinging to this or that detrimental assumption but, since philosophy is by virtue of its own radically critical nature the one intellectual activity most opposed to assuming convenient beliefs, it retains the greatest resources of skepticism to draw on in resisting said force. Science, being more vulnerable to becoming content with the world providing that the immediate problematic mysteries of the world are answered, is just slightly less resilient here with respect to the pursuit of truth. That said, when there are obvious gaps in our knowledge, science doesn't need philosophical prodding in order to investigate them – for example, no philosophy is needed to recognize when certain elementary particle collisions have not been documented. Then science is able to proceed in a straightforward manner using cyclotrons to smash said particles together and record the results. Gaps in our knowledge however can often be incredibly subtle. As such it requires a greater philosophical sensitivity to speculate more deeply about where and how we still remain ignorant. It also requires more philosophical effort to find reasons to postulate new hypotheses, and in proportion to their scope. As data piles up it becomes easier to recognize the larger areas where data is absent but with deeper philosophical reflection one can make deeper inferences in general. The theory of special relativity is a very good example of this since it was born in part from the questioning of the basic concept of simultaneity. The need to question simultaneity though wasn't obvious at all. That simultaneity was central to certain questions about the nature of moving bodies required an intellectual leap, a philosophical willingness to explore a territory of ideas unconstrained by known facts. No external factors demanded this specific inquiry though.

We can see then why science functions so well without philosophy a lot of the time. The compulsion provided by the uncertainties of the physical world generally bestow enough incentives, enough momentum and direction, for the scientific enterprise to take place. It is only when things get really strange and difficult, like they are now with quantum mechanics or they were previously with electrodynamic phenomenon before Maxwell's unifying equations, that an exceptional instance of adaptation is called for. Then science is confronting its own stagnation and so requires a great act of conceptual ingenuity in order to open up new avenues of progress. These situations are not typical though since they require the exhaustion of existing powers of methodology. In such situations even the least amount of progress then requires revolutionary insight. From this

the existing pool of methods and principles is eventually expanded and science then continues on in a normal way until it arrives at the next fundamental obstruction. Because these circumstances are so rare though an apathy towards philosophy can begin to permeate the scientific community in the intervening period – this is analogous to how physical atrophy occurs in limbs that are not exercised. When the programs of science proceed smoothly for long enough, a whole generation of scientists can become contemptuous of thinking in a philosophical manner. In any case though it is only a matter of time before science returns to philosophy once again. Still, science would be better served if it didn't become forgetful in the first place.

Now, when debates on the merits of philosophy occur, one of the things that is commonly held against it in one way or another is the idea that philosophy tends to devolve into an infinite regress of question begging. In the context of the practical problems of science, beyond purely technological science too since questions regarding even the most abstract of matters must settle within some given framework, this is obviously unacceptable. For example, it's absurd when someone is trying to answer questions about the nature of quasars to first require of them that they prove the existence of causality etc before going any further. Science here can rightly expect an amount of leeway in its own search for truth. At the same time, science has no good basis for condemning the philosophical questioning of the assumptions it has used when the context of discussion elsewhere shifts to a more fundamental focus. A scientist might say that science is justified by its results, by their obviousness. This is like saying that physical matter is really and truly solid because we can kick it with our foot – but science has shown that physical matter is in fact quite the opposite. Again, a scientist might say that science is justified by its agreement with common sense and that radical skepticism is simply pathological. I have heard this actually stated by elite scientists, individuals far more knowledgeable about the bizarreness of quantum mechanics than myself. How they were able to make their claim given this is beyond me. My impression of quantum mechanics is that, if any of its core assertions are true, common sense is dead. Not just dead either but beyond all fantasies of resurrection. If so then it is evident that science can be successfully practiced even by individuals holding deeply contradictory beliefs about the area of their own greatest expertise.

Given the depth of cognitive dissonance that pervades all areas of human life, and the ability to cope with cognitive dissonance that must certainly develop as a result of this, one should not expect any area of human endeavor, including of course science and philosophy, to dissolve into complete dysfunctionality as a result of contradictory convictions. And since the justification of science is itself a philosophical action, one should not expect scientists hostile to philosophy to be especially good at doing so. Unfortunately in some respects, philosophers who are not themselves scientists can do nothing for science. In many areas of science the level of technical specialization is so great that the philosophical problems which will arise there can only be formulated in a language comprehensible to other specialists. Even a philosopher of the most profound genius has nothing to offer someone whose problems cannot be stated in a shared language. In such circumstances it becomes imperative then that these specialists cultivate an appreciation for philosophy within themselves. They can be assisted in this of course by philosophers capable of communicating the general value of philosophy for all disciplines but, even then, their receptiveness remains their own responsibility. At some point, to appreciate anything, you must come to it with a completely open mind. Again, it is a question of ultimate desires.

It may be that the existing methods of science are sufficiently powerful enough so as to be capable of producing an infinite amount of future scientific knowledge. It will be knowledge that is infinite in quantity though, not quality. If science at any point truly rids itself of the desire for knowledge of greater depth, if it manages somehow to content itself entirely with a search limited strictly to knowledge in breadth, it will be perfectly consistent of it to abandon philosophy completely then. But until that happens it does itself injury by not embracing philosophy with real enthusiasm. Even as different areas of science are mutually improved by their respective discoveries – think of the ideas of evolution and natural selection here and their broader influence – they are more fundamentally improved by the more fundamental inquiry of philosophy. In some sense philosophy is the whole game because philosophy is entailed in the very valuing of truth. If science cannot be rejected without rejecting truth itself then certainly philosophy even less so. Where science rejects philosophy then it rejects truth in the wholeness of the nature of truth, and a thing can only truly be desired in its wholeness. To desire only a part of something is to not really desire it at all.

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I have spent the larger portion of my efforts here making a case for the merits of philosophy with respect to science rather than vice versa but that is primarily because I believe the merits of the former are less generally accepted to the latter than vice versa. I have extraordinary difficulty trying to imagine the reputation of science diminishing in any significant degree. The healing powers of modern medicine will kill all the Luddites. People in general are just so concerned with worldly matters that something with such worldly power will likely always be held in high esteem. And, as the presence of technology increases, this can only grow. Philosophy meanwhile is less conspicuous in its value. I certainly don't think there's any chance of it going extinct but I do believe it's possible that it could one day have an overly marginalized presence in society. This would be to the detriment of society. People all have different amounts of passion for the truth but I think everyone has some significant level of desire for it. An appreciation of philosophy then is essential to everyone's own personal self-fulfillment.

It is on this basis that an arrangement can begin for the harmonization of science and philosophy. I have already made my case that philosophy is essential to science but this by itself is probably not enough to convince skeptical scientists about the merits of philosophy as an independent and separate discipline. Many elite scientists currently regard this kind of philosophy as a worthless relic already pillaged by science of all its intellectual treasure. These scientists I imagine regard philosophy as having reached its culmination around the beginning of the contemporary scientific era. In a time of neuroimaging and genetic reengineering it might seem that philosophy is not really relevant – maybe it can be allowed to talk about unsystematic things like art and culture, but certainly not anything as rigorous as current scientific research. I would agree to some extent actually that philosophy has no business to attend to in well-constructed systems – in as far as said systems are truly well-constructed. Philosophy however usually avoids things of this kind on its own. Chemistry and trigonometry for example attract little philosophical attention because they are more or less exhausted of philosophical problems. A philosopher might ask how chemistry and trigonometry are possible but that is already to go beyond the scope of the things themselves and to enter into a more general investigation.

The scientific research that is being done presently is, like any possible form of research, something that is preoccupied with its own ignorance. Given that philosophy is essentially a tool for defining and instigating the self-realization of ignorance, it would seem highly relevant to all forms of research. Relevance here should not be taken to mean only where philosophy asks specific questions still unanswered in an area of uncertainty either. The style in which philosophy is done is very important to a proper appreciation of it. A person can read ancient philosophers and still profit by this. The ancients in fact may have a better facility with ignorance than we do because they had to cope with so much more of it. Anyone back then who wanted to ask questions about the nature of anything would be doing so in an intellectual arena of total freedom. When we find ourselves faced with an area of uncertainty that restores our own intellectual freedom, doesn't it make sense that we can learn a great deal from those who have the greatest experience in such situations? The best dead philosophers show us how to think in the most general possible manner. As such, in the most widely relevant possible manner. It is not an incidental thing that Einstein read Kant – one can see, in the way that the former re-contextualized how certain questions were being asked, the influence of the latter. And of course Kant's own work owes something to the spirit of Copernicus, which he himself at least indirectly acknowledged. So it is also evident here that both science and philosophy are continuously responsible for each other's mutual stimulation. I would like to add, and this is very important, that it is the nature of stimulation to always come from an outside source. Just as an inertial body does not act on itself, so too no individual concept is capable of inducing its own change unless it contradicts itself. But all our concepts of things need to be expanded and amended if our knowledge is to grow. Science and philosophy then serve themselves in the best and most selfish manner by allowing for the generosity of their counterpart. What shuts itself off in an intellectual sense will ultimately only serve to strengthen its own intellectual poverty.

Of course not everything is good to listen to. To be indiscriminate is to be engulfed in sheer noise. Ignorance preaches even more loudly than truth and the hatred of philosophy by any individual scientist then can certainly come from philosophers saying ignorant things about science. Hatred here though can also result simply from the fact that philosophers are posing questions a scientist doesn't feel comfortable having to answer – perhaps because they aren't practiced in philosophizing and so aren't able to be as confident as they'd like in

that format of inquiry, perhaps because their temperaments or values make them impatient with questions of that nature. Regardless of what it is, it is something these individual scientists will have to address within themselves if they want to. Otherwise though being honest with themselves will mean acknowledging that they are only interested in their own scientific subject matter in a less than exhaustively truthful way. Which is not in itself inherently reprehensible.

A harmony between science and philosophy will only ever be fulfilled to the extent that philosophers become scientists and scientists become philosophers. Communication between two groups with completely separate preoccupations is not enough. Wittgenstein once said that if a lion could speak we would not understand it. Why? If nothing else, because we wouldn't share the same values. For example, how would I be able to appreciate a lion telling me about the pleasure of sinking one's teeth into the throat of a gazelle? It would be impossible unless I could find a personally satisfying analogy that shared in something more fundamental. Communication itself then depends on shared values. Think about it. How would you communicate the significance of anything without appealing to values at some point? Even straightforward factual information is impossible to communicate if the other party has absolutely zero interest in it. Furthermore, values themselves cannot be justified in any way except by appealing to a deeper common value. In the end, some basis of value must simply be present as is. The question then follows though – do science and philosophy share any basic values? Yes. At least one if they claim to desire truth. In so far as any scientists or philosophers want truth then, they will embrace the truthfulness in both their disciplines. The desire for truth is ultimately the one determining factor – no amount of debate or education can replace this desire. Science and philosophy then will be reconciled only in as much as both sacrifice themselves to truth.