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MIRACLES AND THE SHROUD OF TURIN

Stephen Griffith

Using the scientific investigation of the Shroud of Turin as an extended example, it is argued that miracles are best understood not as violations of natural law, but as scientifically inexplicable events. It is then argued that even though we can imagine circumstances in which science itself might provide us with good grounds for believing that an event is scientifically inexplicable, these grounds would at best provide us with circumstantial evidence that the event was miraculous, and would in any case be inconclusive.

For several centuries, philosophical discourse concerning miracles has largely consisted of trying to determine whether the concept of a miracle could be defined in such a way that miracles could be (1) logically possible, (2) consistent with the predominant secular (scientific) worldview, and (3) known to occur. Putting it this way puts the very idea of the miraculous on the defensive, since we *presuppose* the secular worldview and then ask whether this worldview leaves any room for miracles. I suggest that we consider the possibility of presupposing a theistic worldview which includes at least the possibility of miracles and then ask what implications this has for science. For the purpose of this paper, I shall simply assume that such a theistic worldview can be shown to be inherently rational, and that there are no sound *a priori* arguments against the possibility of miracles. After sketching roughly what a theistic account of miracles might look like, I shall discuss whether scientific investigation can provide us with evidence for or against the occurrence of miracles, using the image on the infamous Shroud of Turin as an extended example.

It would be beyond the scope of this paper to attempt to describe or defend a theistic worldview to any great extent. For our present purposes it will suffice to note that according to any standard interpretation of the theistic worldview, God is both the creator and sustainer of the physical universe. If we then suppose that there are "ultimate constituents" of the universe, i.e., entities of which it is ultimately composed, whether they be atoms, intelligences, monads, leptons, or "strings", it follows that God is the creator and sustainer of these constituents. If we further suppose that these entities, which I shall henceforth refer to as "theons", have certain inherent properties, some of



which are causal powers which determine how these theons interact, it seems reasonable to suppose that God must continually supply theons with whatever properties they have.¹ In other words, at any given moment, the physical world consists of entities which are at that moment being sustained by God, and these entities have properties which are at that moment being supplied by God.

Since we observe regularities in the physical world, regularities which have been discovered and described in increasingly precise mathematical detail by modern science, it follows as a matter of empirical fact that if the world does in fact consist of theons, both the existence and the nature of most theons must be fairly stable. Within the context of the theistic model of creation sketched above, what this amounts to is that, for the most part, God continuously sustains the same set of theons and continuously supplies them with the same sets of properties. From this theistic point of view, it is only because God acts in this way that science as we know it is even possible. If God frequently and randomly created new theons or failed to sustain existing ones, or changed their inherent properties, it is difficult to see how human beings could even function or survive, much less engage in the process of formulating and testing general hypotheses concerning the nature of the physical universe, activities which are central to and at least partly definitive of the modern scientific enterprise. The existence of the above-mentioned regularities, often referred to as the laws of nature, is thus not only consistent with, but can also be explained in terms of, a theistic worldview, in that it can simply be regarded as resulting from the continuous typical action of God in creating and sustaining the universe. Why, then, should there be any tension between theism and the scientific worldview concerning the possibility of miracles?

The source of tension here is twofold. In the first place, philosophers have persisted in thinking of the laws of nature as absolutely exceptionless universal generalizations. In the second place, despite the lack of any scriptural or theological justification for doing so, philosophers have persisted in thinking of miracles as "violations" of the laws of nature, where the term "violation" is understood in such a way as to make it logically impossible for miracles to occur in a world entirely governed by such laws. Thinking of the laws of nature and of miracles in these ways has in turn made it seem to many philosophers that if there are true laws of nature, there must be no miracles, and vice-versa.

As the scientific enterprise and our understanding of it evolve, however, it becomes increasingly unclear whether there really are any Humean laws of nature, or if there are, whether they can play the central role they were once thought to play in our understanding of the physical world.² It thus becomes correspondingly clear that it is at best inappropriate if not perverse to continue to define miracles as violations of natural law in this sense. To the extent that we understand scientific laws in the non-Humean way that scientists themselves typically do, we can readily imagine the occurrence of physical events which are "violations" of such laws, which clearly leaves open the possibility of miracles, even if we restrict our attention to those miracles which are exceptions to the

commonly perceived regularities in nature.³

But even if we remove the particular source of tension mentioned above, it does not follow that there is no tension between scientific and theistic worldviews concerning the possibility of miracles. On the contrary, this tension reappears in the form of a question as to whether there are (or could be) scientifically inexplicable events. Those committed to a scientific worldview are wont to think that all events in the physical world must be scientifically explicable, at least in principle, whereas at least some of those who subscribe to a theistic worldview are wont to think that at least some purported miracles are miraculous at least partly because they are scientifically inexplicable.

The nature and significance of scientific explanation is philosophicaly problematic, and it would be beyond the scope of this paper to discuss it in any detail. It is noteworthy, however, that most theories of scientific explanation incorporate in one way or another the idea that individual events in the physical world are to be explained by subsuming their descriptions under general laws, whether these laws are deterministic or indeterministic, statistical or non-statistical. Within the context of the version of theism sketched above, however, these general laws are to be explained entirely in terms of the fact that God seldom creates, fails to sustain, or changes the causal powers of His theons. Thus, to explain an event scientifically is in effect simply to show that it is ultimately the result of God's *typical* behavior as creator and sustainer of the universe. There is no reason, scientific or otherwise, to believe that God always behaves in this statistically typical manner, much less that He must do so. Miracles, within this framework, can be understood simply as events which occur when and because God, sometime after the First Instant, if there was one, creates, fails to sustain, or changes the inherent properties of one or more theons, which He might do in answer to a prayer, to provide the faithful with a sign, or for various other reasons. To say that miracles are impossible, within this context, would be to say that God (after the First Instant, if there was one) can neither create new theons, refrain from sustaining existing ones, nor change their inherent properties, but what reason could anyone have for saying any of these things? Neither science nor common sense tell us that these things cannot happen. The most they can tell us is that we have no reason to believe that they happen frequently, but this is not only consistent with theism, but also tends to support it to the extent that a high degree of orderliness in the universe has often been thought to suggest divine creation. Moreover, there does not seem to be any theological or scriptural reason for objecting to the account sketched above.

Assuming that we are willing to take the above account of miracles seriously, it would be difficult if not impossible to show that miracles were impossible, but could we ever have good reason to believe that a miracle had occurred? It follows from the account of miracles suggested above that miracles, if they occur, will not necessarily be subsumable under natural law⁴, since, by hypothesis, natural laws are simply regularities based on the typical continuous action of God in the world, and miracles are, by hypothesis, exceptions to this continuous action. Thus,

to the extent that scientific explanation depends upon our ability to subsume events under these natural laws, it follows that miracles will typically be scientifically inexplicable. If, then, we have good reason to believe that some particular event is scientifically inexplicable in the relevant sense, we also have at least some reason to believe that the event in question is miraculous, but there are several important qualifications which must be made at this point.

To say that something is "scientifically inexplicable" is presumably to say simply that it cannot be explained by science, but there are several different senses in which science might be incapable of explaining something. There is a fairly weak sense in which a wide variety of physical phenomena are scientifically inexplicable. In some cases, we lack sufficient data or, at the opposite extreme, our data is so extensive that it is technologically unmanageable. No scientist, for example, could predict the exact path taken by a feather dropped from the top of a tall building on a breezy day, nor could the same scientist explain this path *in detail* after the fact. In other cases, we are unable to offer a definitive scientific explanation of a phenomenon simply because there are *too many* possible explanations for it, each of which is consistent both with all of the available data and with currently accepted scientific theory. There are so many technologically feasible methods of glazing pottery, for example, that it is often technologically impossible to determine which method was used on some particular sample of ancient pottery. At the same time, no one regards either the path taken by the feather or the glazing as scientifically inexplicable in any meaningful sense. The reason for this is that in both cases we are confident that the phenomena in question are *in principle* scientifically explicable, even if they are not so in fact. In the case of the feather, we are confident that its downward path can in principle be explained in terms of the shape and weight of the feather, the motions of the air surrounding the feather, and the various laws of motion applicable in this case. In the case of the glazing, we are confident that if we had more data, such as how many times the pottery was heated and to what temperature, and in what order, we would be able to choose the correct explanation from our list of possibilities. In both of these cases, and in all cases in which phenomena are scientifically inexplicable in the weak sense currently under consideration, our confidence that these phenomena are scientifically explicable in principle is based on the fact that they give us no reason to believe that we must add to or change any of our currently accepted scientific principles in order to explain them.

Let us suppose, however, that we encounter certain phenomena that are not so easily dealt with. Suppose, in particular, that we have collected data that would ordinarily be regarded as more than sufficient to explain some particular phenomenon within the context of currently accepted scientific theory, but are nevertheless unable to explain it. Suppose that we have no reason to believe that additional data would be helpful. Better yet, suppose that the data which we already have seems to rule out any conceivable explanation of the phenomenon in question in terms of currently accepted scientific theory. It will simply not do to say that phe-

nomena of this sort cannot or do not occur. Scientists can and do deal with such phenomena, and would make no progress without doing so, since it is precisely phenomena of this sort, when authenticated and *repeatable*, which force scientists to re-examine and revise their theories.⁵ Once the theories are revised, of course, the phenomena in question are no longer inexplicable, which is precisely the point of the revisions. But what if a particular phenomenon is thoroughly authenticated but *not* repeatable? Suppose, for example, that a man calling himself Jesus began to walk on water, and we could scientifically authenticate that He was in fact doing so? Would we then revise our scientific theories to accommodate this event, or would we simply regard this event as scientifically inexplicable? It would seem that any phenomenon fitting this description would be scientifically inexplicable in a much stronger sense than that described above. It would also fit the theistic definition of miracles sketched above, because the very fact that it was scientifically inexplicable strongly suggests that at least some of the theons participating in the event in question have causal powers other than those they normally have. It would thus appear that in a case like that described above, science might not only be consistent with theism, but actually provide evidence that a miraculous event had occurred. It could, for example, provide quite ordinary and acceptable scientific evidence that the substance being walked upon is ordinary water (assuming that God has not changed the theons which compose the water), and that the man called Jesus has a body like other human bodies with respect to those properties which normally determine buoyancy, but which, inexplicably, does not sink in this particular case. We do not, of course, have any evidence of this sort for this particular miracle, and some would claim that there are in fact no examples of such an event. It is easy, however, to imagine such a case, and I will now attempt to illustrate this fact by means of an extended discussion of the Shroud of Turin.

The Shroud of Turin is a sizable piece of linen cloth which bears the image of a recently crucified man. It is known to have been in existence since at least 1354 A.D. and is believed by some to be the actual burial shroud of Jesus of Nazareth. Because Jesus died more than nineteen centuries ago, public interest in the Shroud waned significantly when it was announced that carbon-14 dating tests conducted by three supposedly reliable laboratories had indicated that the Shroud was only a little more than six centuries old. Prior to the carbon dating tests, however, scientists had subjected the Shroud to numerous non-destructive tests and measurements in an effort to determine both the nature and the origin of the image which it bears. For most of these scientists, and for others who understand the implications of their work, the results of the carbon dating tests simply deepen the mystery of the image on the Shroud.

Marvin Mueller is a research physicist at the Los Alamos National Laboratory. He is familiar with many of the visual characteristics of the image on the Shroud, but unfamiliar with the results of many of the scientific tests performed on it. Even before the carbon dating tests were done, Mueller was convinced that the Shroud was a medieval work of art. In a published paper, he says the following:

“There are only three classes of possibilities for the image formation: by human artifice, through natural processes transferring the image to the linen from a real crucified corpse, or by supernatural means.”⁶

As a scientist, he immediately rejects the possibility that the image was produced by supernatural means, because he believes that if we take this possibility seriously, “all scientific discussion and all rational discourse must perforce cease”.⁷ He then goes on to say that, based on the visible characteristics of the image itself, “natural processes...can be ruled out *definitively* [his italics]...”, presumably on theoretical grounds of an extremely general kind.⁸ In other words, he argues for the first leg of his trichotomy, i.e., for the claim that the Shroud is a work of art, primarily by rejecting the other two. The problem is that the STURP scientists⁹, who have worked most closely with the Shroud, are almost unanimous in rejecting any possibility of human artifice, simply because the best interpretations of the substantial data which they have collected count strongly against this possibility.

Let us now suppose that the trichotomy suggested by Mueller is legitimate, as it certainly seems to be. Let us further suppose that Mueller can justify, on scientific grounds, his rejection of the possibility that the image on the Shroud was produced naturally without human artifice. Finally, let us suppose that the STURP scientists can justify, again on scientific grounds, their rejection of the possibility that the image was produced by human artifice. In other words, let us suppose that we have strong scientific grounds for rejecting both the possibility that the image is the result of human artifice and the possibility that it is the result of natural processes not involving human artifice. Would we then be justified in regarding the Shroud image as “scientifically inexplicable”, and would we then have strong scientific grounds for accepting the third leg of Mueller’s trichotomy and believing that the image was produced by supernatural means?

Let us begin by examining Mueller’s trichotomy more carefully. Although Mueller talks as if he is referring simply to different sorts of processes (of image formation), it is clear from the context that he is thinking primarily of *explanations*. But this presupposes that there are objective facts here which need to be explained. Is this really true?

With regard to the image on the Shroud, it is clear that it is not a purely subjective phenomenon like the visions of Mary and Jesus often reported by believers. Although faint, it is nonetheless visible to the naked eye for normally sighted human beings and can be photographed using any standard (and many non-standard) photographic techniques. It is, in short, a completely objective feature of the cloth. Moreover, although it is logically possible that the image is just an “accidental” feature of the cloth in the same way that outcroppings of rock sometimes look like human faces in profile, this possibility does not deserve serious consideration in the case of the Shroud. The image, when examined closely, is simply too anatomically accurate and too detailed to be “explained away” in this manner. It would thus appear that the exist-

tence of the image on the Shroud of Turin is an objective fact which, like any other physical phenomenon which cannot be regarded as due simply to chance, must have an explanation.

We must now ask whether Mueller's trichotomy exhausts all possibilities of explanation. Given the common understanding of the term "supernatural", it is clear that all possible explanations must be either supernatural or naturalistic.¹⁰ Ignoring the possibility of a supernatural explanation for the moment, it would seem that any naturalistic explanation must explain the nature and origin of the image completely in terms of such things as the substance(s) of which it is now composed and the various purely physical events involving the Shroud which have occurred throughout its natural history. Assuming, as we surely must, that the cloth itself antedates the image, there are only two possibilities concerning the composition of the image itself. One possibility is that it consists of a colored substance which has adhered to the cloth in just those places necessary to account for the image which we see. The other possibility is that some physical process has transformed certain fibers of the cloth itself in such a way as to discolor them, thus producing the image. To explain the image is thus, in the former case, to explain how the colored substance got onto the Shroud, and in the latter case, to explain how the fibers were transformed. If a human artist initiated either of these processes in order to produce the image, the Shroud is a work of art, and otherwise not. But since we are justified in assuming that the image is an objective and non-accidental feature of the Shroud, the only conceivable hypothesis concerning image-formation in the absence of human artifice would surely be one involving interaction between the Shroud and a human body. Thus all naturalistic explanations are either explanations in terms of human artifice or explanations involving such interaction, and Mueller's trichotomy is established.

Initially, it seems overwhelmingly probable that the Shroud is a work of art. After all, there is a clear sense in which the image on the Shroud is a two-dimensional image of a three-dimensional entity, and there are extraordinarily few examples of such things which are not due to artistic endeavor of some sort.¹¹ Jesus has probably been artistically depicted more often and in a greater variety of ways than any other figure in Western civilization, and the fact that various bodily features, such as wounds, correspond to the events described in the Biblical narrative can readily be explained in terms of the intentions of an informed artist. Besides, no other naturalistic explanation for something like the image springs readily to mind.

This helps to explain why most people, like Mueller, are so quick to assume that the Shroud is a work of art. It also explains why the STURP team began by attempting to confirm or disconfirm this hypothesis, rather than the naturalistic hypothesis rejected by Mueller. In particular, they initially assumed that the image on the Shroud was a painting and attempted, by means of various tests and measurements, to determine how it was painted and with what. As previously mentioned, this hypothesis initially seemed by far the most probable, but the epistemic probability of a given hypothesis being true depends on what else we

know or have good reason to believe. As it turns out in the case of the Shroud, most of the available scientific data concerning the image on the Shroud of Turin tend to disconfirm the hypothesis that it is a work of art, and nearly all of the STURP scientists have essentially ruled out this hypothesis. They do not claim to have *proven* that the Shroud is not a work of art. Their claim is rather that this hypothesis has been shown to be highly improbable.¹²

How can an hypothesis which is *prima facie* the most probable become highly improbable? It would be beyond the scope of this paper to attempt to cover all of the details of the scientific investigation which leads to this conclusion, but some of the more accessible details can be readily given. In the first place, the clearly visible details of the image itself raise suspicions as to why an artist would have created it with the features that it has. It consists, for example, of both a dorsal and a ventral image arranged longwise on the cloth and placed head to head, a most peculiar artistic rendering of a human figure. In the second place, the image has all the shading and contrast of a "negative" image, as if the Shroud were a photographic negative waiting to be developed, and we know that the image was in existence many centuries before the invention of photography. Why would a medieval or classical artist create a "photographically negative" image?

The results of the scientific tests, however, are by far the most telling evidence against the hypothesis that the Shroud is a work of art. Various tests, for example, indicate the presence of blood, probably human, on the Shroud. More precisely, although there is no single scientific test which is definitive for the presence of blood, what appears to be blood on the Shroud gives a positive reading on twelve different standard tests for blood. This implies that the substance on the Shroud which appears to be blood is either blood or a mixture of twelve other substances, each of which gives a positive reading for one of the twelve different tests.¹³ The likelihood that these twelve substances would be mixed together deliberately by an artist or occur together naturally in some sort of artistic medium is vanishingly small, so if what appear to be blood stains on the Shroud were put there by an artist, the artist must have used real blood. Moreover, tests have shown that some of the blood found on the Shroud is pre-mortem blood, and some, especially that found on the area of the cloth corresponding to the side wound on the image (supposedly from the spear wound inflicted by one of the executioners), is post-mortem blood.¹⁴ In addition, x-ray fluoroscopy indicates the presence of serum albumin on the Shroud in those areas of the image where one would expect to find it if the ostensible blood stains on the Shroud were in fact due to wounds on a human body.¹⁵ If the Shroud is simply a work of art, the artist must have applied not only both pre-mortem and post-mortem blood, but also serum albumin in the appropriate places on the Shroud. The application of serum albumin by an artist would be especially remarkable, in view of the fact that it is a colorless liquid which remains invisible and leaves physical effects visible only under ultraviolet light. Finally, it has been determined that the blood on the Shroud was there before the image was.¹⁶ If both the apparent bloodstains and the image on

the Shroud were put there by an artist, he or she must have begun by putting blood and serum on the Shroud in various locations with the idea of subsequently creating the image — a very unlikely scenario.

With regard to the image itself, as opposed to the apparent blood-stains, there are even greater difficulties for the hypothesis that it was created by an artist. Microscopic examination reveals that there are no brushstrokes, and no capillary action within the fibrils of the cloth (which would necessarily have occurred if any liquid medium had been used to create the image). Moreover, no pigment or other substance of an appropriate kind and of sufficient amount to account for the image was detected. This implies not only that the image is not a painting or drawing of any kind, but also that it is not a rubbing, since this would also require that some sort of colored particles adhere to the cloth. The scientific investigation of the image shows that it is extraordinarily superficial and consists of nothing but submicroscopic oxidized cellulose fibrils. In other words, the image was produced when some physical process slightly oxidized certain fibrils. The problem is that there is no known physical process sufficiently subject to human control to enable an artist to create such an image. The application of a liquid oxidizing agent would show the effects of capillary action, even more than most liquid artistic media, and the use of a solid would have left some residue and could not have been controlled well enough to produce such a precise image. Finally, although various forms of radiant energy are capable of oxidizing cloth, none of them can be controlled well enough by human beings to produce a precise image like that on the Shroud.¹⁷ This seems to exhaust the possibilities of artistic creation, but there is still at least one more bit of scientific data indicating that the image cannot be a work of art.

The most intriguing scientific data pertaining to the image on the Shroud is that obtained by means of the VP-8 image analyzer. The VP-8 was developed by NASA to obtain "photographs" of celestial objects in outer space. Unlike ordinary cameras, which rely on the diffused light available within the earth's atmosphere to create an albedo image, the VP-8 must rely entirely on light which emanates or is reflected directly in straight lines from the object being photographed. Since the intensity of light decreases as it travels through space, the VP-8 is programmed to create realistic images of objects by treating their distances from the lens of the VP-8 as a function of the intensity of the light reaching it from those objects. In other words, if the intensity of the light reaching the VP-8 from object A is less than that reaching it from object B, the VP-8 will create a picture which makes it look like object A is further away from the camera than object B. The same principle applies to a single three-dimensional object in that the part of that object that seems the farthest away in the picture created by the VP-8 will be that part from which light of the lowest intensity is detected by the VP-8.

The VP-8 is fairly effective at producing realistic images of three-dimensional objects in outer space, but because of the effects of diffusion, it produces remarkably distorted images when its lenses are trained on ordinary two-dimensional representations of three-dimen-

sional objects. In other words, a photograph of a realistic painting taken by the VP-8 will not normally look realistic, nor will VP-8 photographs of ordinary photographs. Photographs taken by the VP-8 of the image on the Shroud, however, while they lack the resolution of ordinary photographs, do look realistic, at least in the sense that there is no spatial distortion of the sort to be expected. This may not seem important to a typical layperson, but to the physicists investigating the Shroud, it was an important fact which needed to be explained. The most intriguing fact is that the VP-8 takes into account differences in light intensity that are far too small to be detected by human beings with the naked eye. Artists who were commissioned to attempt to duplicate the physical appearance of the image on the Shroud were unable to produce images which did not produce distortion when photographed by the VP-8 even though these images were, to the naked eye, almost indistinguishable from the Shroud image.¹⁸ Given the range and accuracy of the VP-8 in detecting different light intensities, the likelihood that a human artist would accidentally create an image which does not produce distortion is extremely small.

These considerations and many others like them have convinced nearly all of the STURP scientists that the image on the Shroud cannot be a work of art. As previously mentioned, they do not claim to have *proven* that it is not a work of art, but scientists seldom if ever claim to have proven anything absolutely. What they do say in this case is that it is *highly improbable* that the Shroud is a work of art, which is to say that they regard the hypothesis that it is *not as highly confirmed*.

The STURP scientists, of course, as scientists, are still committed to the view that there must be a naturalistic explanation for the image, so they have turned to the other naturalistic leg of Mueller's trichotomy and are attempting to explain the image in terms of some sort of physical interaction between the cloth and the body of a recently crucified man. This sort of explanation, however, is precisely the sort that Mueller claims can be "ruled out *definitively*".¹⁹ The problem is that there are strong theoretical considerations which seem to count against any image-formation hypothesis consistent with both the known facts and with currently accepted scientific theory. Explanations in terms of funereal oils and bodily secretions can be ruled out due to the previously mentioned lack of capillarity displayed by the image, and lack of residues rules out powdered oxidizing agents. The clarity of the image rules out oxidizing vapors as a source of the image. Given the results of the VP-8 investigation, the best naturalistic hypothesis is that the image was created by some form of radiation emanating from a human body, but there is no explanation of how this radiation could have been produced, nor is there any known form of radiation which would have all the requisite image-producing characteristics. One of the STURP scientists sums up the status of the scientific attempt to explain the image in the following way:

"Briefly stated, we seem to know what the image is chemically, but how it got there remains a mystery. The dilemma is not one

of choosing from among a variety of likely transfer mechanisms, but rather that no technologically credible process has been postulated that satisfies all the characteristics of the existing image."²⁰

It might be appropriate at this point to reconsider the results of the carbon dating tests. If these tests had shown conclusively that the Shroud came into existence only six or seven centuries ago, then we certainly would have been justified in concluding that it could not have been the burial shroud of Jesus. This would also have lent significant support to the skeptical view that the Shroud was, after all, nothing but a medieval work of art. There are several problems with this view. In the first place, the carbon-14 dating results are by no means conclusive. The methods used are very controversial in archaeological circles, especially when applied to cloth, since the method has often produced results which are many centuries off when applied to samples of known age. In addition, there are special problems in this particular case. The sample used was apparently taken from a narrow strip along one side of the cloth which might well have been added in the fourteenth century to center the image for its first public display. Extreme heat from a fire which almost destroyed the Shroud in 1532 could have resulted in ion exchange which would have invalidated the results of the carbon dating tests, as would various forms of radiation, which is significant if the image was produced by a form of radiation. Finally, it has recently been reported that the laboratories which conducted the tests may have failed to cleanse the Shroud fragments of invisible, submicroscopic fungi, the presence of which would also invalidate the results of a carbon-dating test. More importantly for our present purposes, however, the results of the carbon-dating tests, *even if completely accurate*, do *nothing* to explain how the image was formed! If the Shroud itself came into existence in the fourteenth century, then the image was produced no earlier than that, but how? Every bit of data which indicates that the Shroud is not a work of art is completely unaffected by the carbon-14 data, and the hypothesis that the image was produced by contact with a crucified body becomes less likely than it would otherwise be, since it is less likely that anyone was crucified in the fourteenth century. We still have no naturalistic explanation of how the image was formed, and the "contact" hypotheses currently favored by the STURP scientists are now even less plausible than they would otherwise be. This explains why the results of the carbon dating tests, far from resolving anything, actually make the situation more confusing than ever to knowledgeable sindonologists.

Let us now summarize our discussion so far. It would seem that if we assume that the image on the Shroud of Turin is neither subjective nor an accidental phenomenon, then the only naturalistic explanations of its nature and existence are that it is a work of art or that it is the natural effect of a natural interaction between the cloth and a human body. There is a strong body of scientific evidence which counts against the hypothesis that it is a work of art, and there are strong theoretical considerations which count against its being the result of a natural interac-

tion. No one has claimed that either of these hypotheses has been conclusively disproven, but it could be argued that they have both been scientifically disconfirmed to such an extent that they have become unreasonable to believe. But what then *is* reasonable to believe about the image? If it really is "scientifically inexplicable", are we to believe simply that it has no explanation, or should we believe that the correct explanation, if we are willing to call it an "explanation", is that a supernatural event has occurred? Within the context of the theistic framework sketched earlier in this paper, why not simply conclude that God changed the inherent properties of some of the theons composing the Shroud in order to produce the image? If we decide to reject the results of the carbon dating tests, why not simply conclude that the image was produced when God changed the causal powers of the theons composing the body of Jesus at the moment of the Resurrection?

As of this writing, it is tempting to regard the image on the Shroud of Turin as scientifically inexplicable in the stronger of the two senses described above. In the first place, far from not having enough data, we seem to have enough to know exactly what the image consists in, even though we have no idea what produced it. In the second place, far from having too many possible explanations to choose from, we currently have none consistent both with what we know about the image and with currently accepted scientific theory.²¹ Finally, although we have not mentioned this previously, the Shroud image appears to be unique. If the Shroud is a burial garment, it is the only one among thousands of extant specimens which bears a recognizable image (although there are many with decomposition stains and bloodstains on them), and if it is a work of art, it is the only one which has many of the physical features previously described. It thus appears that it might satisfy all of the conditions mentioned for something's being scientifically inexplicable in the strong sense mentioned above.

The fact that no satisfactory scientific explanation of the Shroud image has been given does not imply that none can be, and no scientists, including the members of STURP, have concluded that the Shroud image is scientifically inexplicable. For one thing, despite everything that has been said above, it is nevertheless true that the facts about the Shroud of Turin are not all in, and never will be. Besides, it is always possible that some of the data referred to earlier will prove to be faulty, or that someone will discover a fairly simple naturalistic hypothesis that has been overlooked, in which case the Shroud of Turin may lose its air of mystery. It is also possible, however, that the data will *not* prove to be faulty, and that the origin of the image will never be naturalistically explained. In any case, it would appear, as of this writing at least, that science has given us good reason to believe that the image on the Shroud of Turin is scientifically inexplicable in a fairly strong sense of the term. A fairly intensive scientific investigation has given us no good scientific reason to believe that the image is a work of art, and many scientific reasons to believe that it is not. Moreover, despite extensive knowledge of the physical nature of this particular image and of the various processes which are capable of producing images on cloth, this same scientific

investigation has produced *no* credible hypothesis concerning the formation of the image. Moreover, scientists have more or less ruled out entire classes of potential explanations, and it is difficult to see how more data would help. In recent years, each new batch of data has simply deepened the mystery. As the scientific grounds for rejecting both of the first two legs of Mueller's trichotomy continue to accumulate, must there not be some point at which it is simply unreasonable to believe that the image on the Shroud has a completely naturalistic explanation? And would it not then become reasonable to infer that it must have a supernatural explanation?

The answer to this question at present is at best a "qualified maybe". To see why, we must re-examine the argument derived from Mueller's trichotomy. Simply put, the argument has the following logical form:

- (1) The Shroud image is either a work of art, a result of a natural interaction between a human body and the cloth, or a supernatural phenomenon.
 - (2) The Shroud image is not a work of art.
 - (3) The Shroud image is not a result of a natural interaction between a human body and the cloth.
- Therefore,
- (4) The Shroud image is a supernatural phenomenon.

This is a valid form of argument, and we have already established that (1) is true. If we could establish the truth of (2) and (3) to the same degree of credibility as (1), we could then be confident of the truth of (4). Assuming that supernatural phenomena are almost always scientifically inexplicable, we could then regard the Shroud image as scientifically inexplicable in an "absolute" sense of the term. As it turns out, of course, we never can establish the truth of (2) and (3) to the same degree of credibility as (1), but it would at least appear that (2) and (3) might be rendered increasingly probable by further scientific research, in which case the probability of (4) would presumably be increased as well. Thus it would seem that science itself might indeed present us with good grounds for believing that a scientifically inexplicable event has occurred. To put it another way, the scientific evidence which we have concerning the image on the Shroud of Turin is of considerable weight, and gives us much more reason to believe that the image is scientifically inexplicable than we would otherwise have. Moreover, it might even turn out that when all is said and done, the most reasonable explanation, all things considered, for the image on the Shroud of Turin is that a miraculous event has occurred, or perhaps even that the image was produced by the resurrection of Jesus from the dead.

Even if, however, science can provide us with good grounds for believing that a scientifically inexplicable event has occurred, it does not follow that science can *prove* that this has happened, nor does it follow that science in itself can show that such an event must be miraculous. In the first place, just as there can be violations of scientific law which are not miraculous, there can be scientifically inexplicable events which are

not miraculous. Although we might have good grounds for regarding a scientifically inexplicable spontaneous remission of an ordinarily fatal disease as miraculous, we would presumably not so regard a scientifically inexplicable recurrence (or first occurrence) of such a disease. The point here is that even in those cases where an event's being scientifically inexplicable is an important reason for its being regarded as miraculous, it is never a sufficient condition for so regarding it. The concept of a miracle must obviously be defined at least partly in terms of divine agency and purpose, but the nature of God precludes a direct empirical discovery of either of these things. Thus, even in those cases where a theistic explanation seems to be the most reasonable, science itself cannot provide direct evidence of divine involvement, and any inferences to such involvement, even if justified in some sense, is not *scientifically* justified.²²

More importantly, all claims concerning scientific inexplicability are necessarily defeasible, so that what is scientifically inexplicable today might not be scientifically inexplicable tomorrow. This is *not* to say that we are never justified in believing that something is scientifically inexplicable, nor is it to say that nothing can be permanently or absolutely scientifically inexplicable. It is simply to say that even in those cases in which the most reasonable thing to say is that something is scientifically inexplicable, it is nevertheless possible that this might not always be the case. Everything science tells us is provisional. This is inherent in the nature of science. With regard to the Shroud of Turin, for example, no matter how probable (2) and (3) become relative to available evidence and then-current scientific theory, it will always be at least possible that either (2) or (3) is false, so that (4) can never be conclusively established by means of this argument. We will always be free to withhold judgment while we continue to attempt to discredit either (2) or (3), and this is precisely what the STURP scientists have done and will probably continue to do.

Any attempt to enlist science as the handmaiden of theology in this case thus runs into two difficulties. In the first place, it must acknowledge that science can at best provide indirect, circumstantial support for the claim that a miracle has occurred. Even if science could somehow conclusively demonstrate the truth of both (2) and (3), non-scientific considerations would also have to be introduced to justify the conclusion that a miracle had occurred. In the second place, it must acknowledge that, to the extent that science can at best show (2) and (3) to be highly probable, any conclusion based on them will also be only probable, and these probabilities can change dramatically with the accumulation of new data and the evolution of scientific theory. Finally, it would seem that the conclusions reached here in the case of the Shroud of Turin can easily be generalized. Science deals only with the physical world; divinity is inaccessible to it. It can therefore neither confirm nor disconfirm claims involving the existence, nature, or agency of God. Moreover, even in those cases where physical evidence (or the lack thereof) seems to suggest divine agency or presence, this evidence, to the extent that it is provided by science, must be probabilistic at best.

David Hume, in his famous chapter on miracles, says the following:

...we may establish it as a maxim, that no human testimony can have such force as to prove a miracle, and make it a just foundation for any such system of religion. I beg the limitations here made may be remarked, when I say, that a miracle can never be proved, so as to be the foundation of a system of religion. For I own, that otherwise, there may possibly be miracles, or violations of the usual course of nature, of such a kind as to admit of proof from human testimony; ...²³

It is not entirely clear what Hume means by this, nor are his motives for saying it as clear as we might hope. What is clear is that he would countenance a belief that "a violation of the usual course of nature" had occurred more readily if it were not used as a "foundation" for religious belief. In other words, we may need better reasons to base a religion on presumed empirical facts than we need simply to believe those facts in themselves. Hume may have been somewhat confused and misguided concerning both the nature and the possibility of miracles, but, ironically enough, he may have been on the right track in this instance at least.²⁴

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NOTES

1. This supposition was inspired by remarks made by Peter Van Inwagen in "The Place of Chance in a World Sustained by God", in *Divine and Human Action*, ed. Thomas V. Morris (Ithaca: Cornell UP, 1988).

2. Cf. Nancy Cartwright, *How the Laws of Physics Lie*, (New York: Oxford UP, 1983), and Bas Van Fraassen, *Laws and Symmetry*, (New York: Oxford UP, 1989)

3. For an elaboration and examples of this point, see Edward L. Schoen, "David Hume and the Mysterious Shroud of Turin", *Religious Studies*, 27, 2, (1991): 209-222.

4. A miracle, as here defined, might accidentally be thus subsumable, if we could imagine some reason for God's bringing it about that His extraordinary actions cancel each other out, thereby producing observable events indistinguishable from events that would or could have happened anyway, but it is difficult to imagine why God would do this.

5. For an interesting and enlightening discussion of this and related points, see Nicholas Rescher, "Baffling Phenomena", in *Baffling Phenomena* (Savage: Rowman and Littlefield, 1991) Ch.1.

6. Marvin Mueller, "The Shroud of Turin: A Critical Appraisal," *The Skeptical Inquirer* VI, 3, (Spring 1982): 27.

7. Mueller 27.

8. Mueller 27.

9. The team of scientists I am referring to here is a loosely organized group of forty scientists who eventually began referring to themselves as the Shroud of Turin Research Project, or STURP for short. I shall henceforth refer to them collectively as the "STURP scientists."

10. Although Mueller does not explain what he means by the term "supernatural", it is clear from the context that he would regard a "supernatural explanation" of a physical event as an explanation in terms of agents

or entities which are not part of the physical universe but which nevertheless have physical effects within the physical universe. An explanation in terms of the activities of "extraterrestrials", i.e., physical beings from some distant part of the physical universe, would thus not be considered supernatural, whereas an explanation in terms of the activities of such beings as God or angels (fallen or otherwise) would be.

11. The only example that comes readily to mind is the "permanent shadows" of physical objects which appeared on walls as a result of the atomic bombs dropped on Hiroshima and Nagasaki at the end of World War II. Even in this case, the "shadows" were the result of deliberate human action, but at least they were not one of the intended results.

12. I once asked one of the STURP physicists what he would conclude if the carbon dating (which had not yet been done at that time) indicated a fourteenth century origin for the Shroud, and he said that he would conclude that someone had been crucified and wrapped in the Shroud in the fourteenth century. I took this to be a measure of his confidence that the image had a naturalistic but non-artistic origin.

13. John H. Heller and Alan D. Adler, "Blood on the Shroud of Turin," *Applied Optics* 19, 16, (14 August 1980): 2742-2744.

14. Heller and Adler, "Blood".

15. Heller and Adler, "Blood".

16. John H. Heller, *Report on the Shroud of Turin* (Boston: Houghton Mifflin, 1983) 203.

17. It seems possible that laser technology might soon be able to produce such images, but it goes without saying that this was not the case with the Shroud.

18. Heller, *Report* 207.

19. He is by no means alone in this assessment. Steven Schafersman is another scientist who is not a member of STURP and believes that the Shroud must be a work of art simply because "the perfection of the image rules out [...] the possibility of its being formed by *any conceivable* [his italics] natural process..." "Science, The Public, and the Shroud of Turin," *The Skeptical Inquirer* VI, 3, (Spring 1982): 41.

20. Eric J. Jumper, et al, "A Comprehensive Examination of Various Stains and Images on the Shroud of Turin," *ACS Advances in Chemistry, No. 205, Archaeological Chemistry III*, ed. Joseph B. Lambert (1984):456.

21. cf. quotation from Jumper on page 25.

22. It should also be noted that we have said nothing about the possibility of non-theistic supernatural explanations. It would be beyond the scope of this paper to attempt to describe and assess either the possibility or the relative merits of such explanations, but it seems clear that science would be of no help in this regard in any case.

23. *An Inquiry Concerning Human Understanding*, chapter X, ed. Charles Hendel (New York: Liberal Arts Press, 1955) 137.

24. I am indebted to Peter Van Inwagen for his many helpful comments on an earlier version of this paper.