

Science, the Public, and the Shroud of Turin

Steven D. Schafersman

The Shroud of Turin. By Ian Wilson. Image Books/Doubleday, New York, 1979, 320 pp., \$3.95.

"Shreds of Evidence." By Cullen Murphy. *Harper's*, November 1981. pp. 42-65.

Verdict on the Shroud. By Kenneth E. Stevenson and Gary R. Habermas. Servant Books, Ann Arbor, Mich., 1981, 224 pp., \$12.95.

Readers of the SKEPTICAL INQUIRER are no doubt unhappily aware that the media rarely present a critical or opposing viewpoint when confronting their audience with claims of the paranormal and the supernatural. The public's seemingly insatiable appetite for the miraculous and the supernatural, the naturally unexplainable phenomenon, and the marvel of modern science's hopeless confusion and impotence before wonders of ancient origin has been amply fulfilled in recent years by such authors as von Däniken and Velikovsky.

The latest example in this deplorable series of media events is the "Shroud of Turin," the supposed linen burial-shroud of Jesus Christ. All the necessary elements of awe, mystery, and melodrama are present: the existence of an actual physical object, a long history of religious veneration and immense religious implications, painstaking scientific examination by a team of forty scientists (the Shroud of Turin Research Project, or STURP) using the latest space-age gadgetry, and, of course, the "unexpected" outcome—startling scientific revelations that the investigators cannot explain by natural processes. The Shroud of Turin example surpasses UFOs, the Bermuda Triangle, and ancient astronauts in a number of interesting ways. First, the shroud really does exist; it was displayed to millions of pilgrims in 1978. Second, we were recently treated to the unprecedented spectacle

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of a team of serious United States scientists who traveled to Italy to deliberately examine this notorious religious relic. Third, many of their findings were published in legitimate scientific journals. Fourth, and very important, a large number of popular and professional scientific magazines, in addition to newspapers, presented lengthy and detailed descriptions of the scientific team's results with an appalling lack of skepticism. Finally, the inevitable publications appeared that presumed to make sense out of this nonsense by implicitly and explicitly invoking supernatural intervention. I review three of these publications in this essay, but I cannot ignore the scientific work that accompanies the Shroud of Turin story, since it is this very "scientific evidence" that the authors of the three publications call upon to demonstrate the "truth" of their implicit and explicit suggestions of authenticity.

History

The Shroud of Turin is an ancient piece of linen measuring approximately 4.4×1.1 meters. The cloth has on it the faint front and back images of a man who was apparently dead. Because the man on the shroud bears precisely the exact markings of a scourging and crucifixion, many believe it to be the actual burial cloth of Jesus of Nazareth. It is thus a religious relic and an object of faith and veneration for millions of persons. It was first exhibited in about 1357 in Lirey, France, but was immediately denounced as a hoax by Bishop Henri de Poitiers. We know this because of a letter written in 1389 to the Avignon Pope Clement VII by Pierre d'Arcis, Bishop of Troyes, in northern France. D'Arcis claimed that when the shroud was first exhibited by Jeanne de Vergy, the widow of Geoffrey de Charny, who was killed in the Battle of Poitiers in 1356,

many theologians and other wise persons [were skeptical] that this could be the real shroud of our Lord, having the Saviour's likeness thus imprinted upon it, since the holy Gospel made no mention of any such imprint, while, if it had been true, it was quite unlikely that the holy Evangelists would have omitted to record it, or that the fact should have remained hidden until the present time. Eventually, after diligent inquiry and examination, he [Bishop Henri de Poitiers] discovered the fraud and how the said cloth had been cunningly painted, the truth being attested by the artist who had painted it, to wit, that it was a work of human skill and not miraculously wrought or bestowed. [Quoted in Wilson, 1979, p. 267.]

The fourteenth century was renowned for its abundance of religious relics, as Ian Wilson's book *The Shroud of Turin* makes clear. The purpose of relics was to attract pilgrims who would pay for the privilege of observing and venerating some object associated with their Lord and Savior. Wilson, in fact, presents the history of the shroud in remarkable detail, and this book must be read in its entirety to really appreciate the subsequent profusion of articles. One of Wilson's major goals in his book is to provide a speculative, some might say fanciful, history of the shroud before 1357, its first documented appearance. Wilson believes that the shroud was in fact venerated for centuries as the Mandylin of Edessa, the cloth bearing the face of Jesus that was allegedly "not made by the hands of man." This cloth was discovered in A.D. 525, hidden in a part of the old city gate of Edessa, a city in Turkey now named Urfa. It was taken to Constantinople in 944, where it joined, in a magnificent shrine described by Wilson as "a veritable Byzantine Fort Knox," the following items:

... two pieces of the True Cross as large as the leg of a man . . . , the iron of the lance with which Our Lord had his side pierced, two of the nails which were driven through his hands and his feet, the tunic which he wore and which was taken from him when they led him to the Mount of Calvary, and . . . the blessed crown with which he was crowned, which was made of reeds with thorns as sharp as the points of daggers. [De Clari, 1936, quoted by Wilson, 1979, p. 156.]

Try to refrain from smiling in smug self-satisfaction at the superstitious credulity of the Byzantines, at least until you have finished this review, at which time you may not feel like smiling at all.

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Wilson's hypothesis is that the Mandylion was simply the Shroud of Turin folded in such a way that only the face was visible. This is so highly unlikely that few of the subsequent investigators and writers, including the STURP scientists, have taken this hypothesis seriously. However, one of the notoriously biased pro-authenticity authors (Johnson 1979) subtly presented Wilson's hypothesis as historical fact in a legitimate scientific journal, and Stevenson and Habermas (1981) endorse it. But Cullen Murphy, in his pro-STURP article in *Harper's* (p. 57), labels Wilson's hypothesis "a trail of circumstantial evidence," and he makes clear (p. 47) that "STURP, however, scorns circumstantial evidence." We will remember STURP's scorn of circumstantial evidence later, but for now another bit of circumstantial evidence must be examined closely.

Max Frei is the Swiss criminologist who in 1973 was permitted to press sticky tape to the shroud to remove dust and other particles for laboratory analysis. Having been trained in botany, Frei noticed that a substantial number of pollen grains from the shroud had been collected by the tape. Some of this pollen was from European plants, consistent with the shroud's exposure in France. Frei also identified the pollen of halophyte desert plants that are common to the Palestine area around the Dead Sea. This suggested to many that the shroud had indeed been in Jerusalem early in its history; but, as most of the authors we are examining here point out, this circumstantial evidence is not reliable because winds can transport pollen for great distances (Murphy 1981, p. 57; Weaver 1980, p. 747; Burden 1981, p. 79). However, the situation is much more complex than this. As described in great detail in Wilson (1979, pp. 77-81, 293-98), Frei actually claims to have discovered pollen on the shroud from four (and only four) distinct areas: (1) Europe (i.e., France and Italy), (2) Palestine (i.e., Jerusalem), (3) the Anatolian steppes (a region including Urfa), and (4) the "environs of Istanbul." We must remember that Wilson's hypothetical early history of the Shroud of Turin includes a beginning in Jerusalem (obviously!); an unknown journey to Edessa (Urfa, Turkey), where the Mandylion is first discovered; a journey to Constantinople

(Istanbul) to join the other Byzantine relics; and then the hypothetical journey to Lirey, France, by Crusaders and Knights Templar. Wilson (1977, p. 81) concludes that the “significance of [Frei’s list of four distinct pollen provenances] is very substantial, and it is ironic that Max Frei should have been able to deduce so much from material literally as humble as dust.” Ironic indeed! Frei published his list of plant species identifications at the International Congress of the Turin Shroud in 1978, at which time “he publically affirmed his support for [Wilson’s] theory that the Shroud is one and the same as the former Mandylion of Edessa/Urfa” (Wilson 1979, p. 293). Both Johnson (1979, p. 78) and Stevenson and Habermas (1981, p. 26) conclude that Frei’s work makes “inescapable the conclusion” and “strongly indicates” that the shroud has been in Palestine and Turkey. As a professional micropaleontologist, and being somewhat familiar with palynology (the study of spores and pollen), I find Max Frei’s conclusions incredible. A professional palynologist should examine Frei’s original tape samples containing his pollen grains, examine all of STURP’s sticky tape samples for pollen, and request that duplicate and independent sticky tape samples of pollen and dust be allowed by the Turin authorities. Most STURP scientists doubt Frei’s work and discount his results.

Skepticism and the Shroud

The article “Shreds of Evidence” by Cullen Murphy (1981) is respectful of the intentions and integrity of the members of the Shroud of Turin Research Project. The article portrays the scientists as real people, which is certainly legitimate, since scientists are people and science is a human enterprise. Murphy is careful to emphasize that STURP members “tend to divide their personas into ‘scientist’ and ‘layman’ as a prelude to giving two different answers.” This clarification is, as we shall see, one of the keys to the whole shroud controversy. In Murphy’s article, each STURP member expresses initial skepticism regarding authenticity of the shroud. Furthermore, they all claim that science can never prove the shroud’s authenticity. “The facts, as team members never tire of repeating, will just have to speak for themselves” (Murphy 1981, p. 47). This statement is the other key. By empathizing so completely with the STURP scientists, and by having a writer’s skill to express the significant opinions and attitudes that so frequently go unspoken, Murphy has performed a great service.

The STURP scientists have publicly adopted the mantle of arch-positivists, who contend that all knowledge regarding matters of fact is based only upon the “positive” data of experience, i.e., empirical data. One STURP scientist told me, in all sincerity, that only “producing observations and numbers is important.” Arch-positivists believe that, when sufficient empirical data is lacking to verify a specific hypothesis, one must refrain from drawing conclusions. For example, Pellicori (1980) appealed to “the reader’s sense of scientific trial, where judgment is reserved until all the facts are collected.” But at what point are “all the facts” collected? STURP says they will never have sufficient evidence to prove or verify the authenticity of the Shroud of Turin. This sounds like good, hard-headed science. But it isn’t, because this conclusion leaves unspoken two positivistic corollaries that STURP ignores: STURP will also never have sufficient evidence to prove or verify that the shroud is a *forgery*; and, since matters of fact are based only on objective,

empirical evidence, STURP members implicitly believe their personal or subjective beliefs do not and will not affect their scientific data or conclusions. Not only is such assumed positivism philosophically untenable; it is poor science. STURP's adoption of these views, including the implicit corollaries, contributes to individual members' frustrations, inadequacies, or ludicrousities, as the case may be.

Facts never speak for themselves; they can be understood only within a theory or hypothesis. It is impossible to prove or verify something in science. Subjective beliefs *do* affect results and interpretations. These are only three of the modern understandings of science of which STURP members are seemingly ignorant. In real science hypotheses fight for acceptance. They are tested and either refuted or corroborated.

What are the two hypotheses in the present case? The shroud is authentic or it is a forgery. Is there a possible third hypothesis? No, and here's why. Both Wilson (1979, pp. 51-53) and Stevenson and Habermas (1981, pp. 121-29) go to great lengths to demonstrate that the man imaged on the shroud must be Jesus Christ and not someone else. After all, the man on *this* shroud was flogged, crucified, wore a crown of thorns, did not have his legs broken, was nailed to the cross, had his side pierced, and so on. Stevenson and Habermas (p. 128) even calculate the odds as 1 in 83 million that the man on the shroud is not Jesus Christ (and they consider this a very conservative estimate). I agree with them on all of this. If the shroud is authentic, the image is that of Jesus. Otherwise, it's an artist's representation, i.e., a fraud. Note that we are not yet discussing miracles; the image could still have been naturally formed.

The Image on the Shroud

The image of the man on the shroud is unusual to say the least. It is a very faint, sepia-colored image that can barely be distinguished from the linen cloth. It can only be seen from a distance. As Joan Janney says, "The closer you get, the less you see. How could you paint it in such a way that while you're painting it you can't see it?" (Murphy 1981, p. 56) Most photographs of it are filtered to increase the contrast. The body image is a negative; the skin and hair, body parts of two different compositions and textures, produce an identical image quality. On the other hand, the "blood" is positive. Unfortunately, it doesn't look like old, dried blood; it is "exceptionally reddish" (Pellicori and Evans 1981, p. 41) or "a deep burgundy" (Murphy 1981, p. 44). Photographs of the image show the entire body, front and back, with *no distortion*: no folds, creases, spaces, or bends, things one would expect if a piece of cloth was draped over and under a supine body that transferred its image to the cloth (for example, if the body was covered by paint that then transferred to the cloth). In fact, the perfection of the image rules out, to my mind, the possibility of its being formed by *any conceivable* natural process, assuming, of course, that the shroud is authentic. It is this fact that has so greatly troubled STURP. They at first proposed various radiation hypotheses to explain the image, but these have now been retracted upon the realization that they were proposing supernormal or supernatural phenomena. As Murphy's article makes clear, STURP "cannot, for the life of them, say how it was made" (Murphy 1981, p. 47). This, of course, is pure positivism in action: since the evidence is lacking, we cannot come to a conclusion. The question is: Is the evidence lacking?

Murphy's article (p. 47) contains another interesting statement: "It is STURP's

conclusion that none of the forgery theories is tenable. Neither are any of the 'natural phenomenon' hypotheses." Obviously, this leaves only a supernatural authentic hypothesis. Now we're getting somewhere. Although STURP scientists don't want to explicitly endorse an obviously supernatural mechanism of image formation, they nevertheless *suggest* such a process by eliminating both a natural explanation and a forgery. Pellicori and Evans (1981, p. 43) say that "the Shroud is not the product of a clever Mediaeval artist. . . . To us, the idea that the image was transferred directly onto the cloth by skin contact remains the most plausible theory." They don't come right out and admit that they are invoking the supernatural, but that's what Pellicori and Evans are doing: the perfection of the image must mean that, somehow, all the wrinkles and distortions of the image transferred to the cloth were miraculously removed. They hypothesize that skin secretions or burial ointments caused the structural degeneration of the linen fibres as a result of "natural, chemically induced molecular changes in the material." These later evaporated over the centuries. This is fine, but still there is no distortion. Nothing authentic *and* natural caused this, and Pellicori and Evans ignore this fact. The others in STURP do not ignore this fact and disagree with Pellicori and Evans.

Weaver (1980, p. 751) quotes STURP-member Ray Rogers: "Nearly all of us now believe that the shroud is not a painting." STURP-member John Jackson says that "when you add up everything we know, the argument against a forgery acquires a certain force" (Murphy 1981, p. 61). STURP member Pellicori (1980) says flatly: "We do rule out a man-made origin for the body image on the basis of our microscopic visual observational, x-ray fluorescence, and contour-decoding image processing results." STURP-member Joan Janney (1981): "We can conclude that the shroud image is that of a real human form, of a scourged, crucified man. It is not the product of an artist." If we accept the idea that either the shroud is authentic or it was created by an artist, STURP scientists are saying, since the shroud is not the product of human hands it is, in effect, authentic. This is the message of Cullen Murphy's entire article. By frequent subtle suggestion, by planting doubts about possible human artifice, by ignoring conflicting evidence (as we shall see later), and by claiming outright that "forgery theories are untenable," Murphy is concluding that the shroud is authentic. If it is authentic, and since no one can think of a natural explanation for it (Murphy even claims STURP holds all natural explanations untenable), Murphy and STURP are concluding it was formed supernaturally. I find this message, from legitimate scientists, to be appalling.

The STURP Scientists

It is difficult to come to grips with the paradoxes presented by the Shroud of Turin, especially the paradoxes in the minds of the STURP scientists. In print, they have all clearly stated that they have eliminated the artist, or forgery, hypothesis. Also, they clearly state that they either do not have a natural explanation or have only flawed natural explanations. For example, Pellicori's natural explanation of direct shroud contact to a human body is not accepted by the other STURP scientists because the image that would be formed could not show the perfect detail found on the shroud. Also, in the minds of some, this contact mechanism would not produce the "three-dimensional" information found on the shroud (more on this later). The vapor and radiation hypotheses are not acceptable, since vapor diffuses (i.e., it does

not travel in a straight line and so could not produce a distinct image) and no known source of body radiation could have produced an image on a flat shroud (thus imparting the "3-D" information of cloth-to-body distance that some STURP scientists claim is found on the shroud). The point is that there are really only two possibilities for the origin of the shroud: either it was made by an artist or it is a miraculous reproduction of the image of Jesus Christ. To contemplate a third possibility for *this* shroud (e.g., a natural image transfer of a crucified man who was not Jesus of Nazareth) is absurd. Therefore, by concluding that the shroud is not the work of an artist, the STURP members are concluding that it is authentic (i.e., Jesus and supernatural). At the same time, they constantly claim that science can never reach this conclusion. Of course science can't, but scientists can suggest it, as Cullen Murphy's article reveals so clearly.

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What is the source of the curious duplicity among STURP scientists by which they have "two different answers" to the shroud problem: on the one hand, their initial claim of skepticism and current claim of scientific inability to prove that the shroud is authentic and, on the other hand, their pervasive explicit repudiation of fraud and implicit suggestion of authenticity. I have already answered the first question by the clues in Cullen Murphy's article: the STURP scientists' adopted anachronistic stance of arch-positivism keeps them *both* from claiming verification of authenticity *and* from believing that their subjective prejudices or biases in any way interfere with their scientific work. As another witness to this, Johnson (1980, p. 145) characterizes the STURP scientists by stating: "They realize that they must not become emotionally involved or introduce any personal bias, and that the information generated while attempting to elucidate the truth must be distributed through the usual, accepted scientific channels." Arch-positivists believe that such emotional noninvolvement is really possible, but today informed scientists and philosophers are not so sanguine. Such objectivity is a chimera, as the slightest familiarity with the published literature in the philosophy and history of science for the past fifty years would make abundantly clear. Scientific objectivity results from independent testing and admission of possible subjective bias, something STURP scientists have not taken to heart.

But what about the repeated public denials by STURP scientists of the

possibility of an artist's forgery with the concomitant implicit assertion of authenticity? Here Murphy's article gives us another clue. He states (Murphy 1981, p. 43): "With respect to the hereafter the group [STURP] is an ecumenical one—among its members are Baptists, Lutherans, Mormons, Episcopalians, Jews, Roman Catholics, and agnostics." Astounded by this revelation, I called a leading STURP member who assured me that "yes, STURP did have one agnostic." One agnostic among forty scientists! What are the chances of randomly choosing forty scientists among the thousands in the United States and coming up with a group containing thirty-nine religious believers? At least one in 83 million (and I consider this a very conservative estimate!). In fact STURP is an entirely volunteer organization, and it attracted a particular type of individual: one who wanted to scientifically examine a notorious religious relic. As I wrote in a letter (which may or may not be published) to *Harper's* replying to Cullen Murphy's article: "I find it humorous that Cullen Murphy took seriously the STURP members' claims of initial skepticism regarding the authenticity of the Shroud of Turin. The fact that STURP is composed almost entirely of religious believers makes it an extremely odd group of scientists indeed, and not one you would credibly consider predisposed to skeptical behavior." I suppose some STURP members really believe that, as presumed arch-positivists, they initially approached the shroud with skepticism. But if they did, it didn't last long.

The Shroud and Biblical Criticism

The perfection, realism, and accuracy of the image of the man on the shroud has frequently drawn comments to the effect that no artist could have produced the image. Wilson (1979, p. 37) quotes Paul Vignon, a turn-of-the-century biologist who later became a professor at the Institut Catholique, Paris: "No painter, in his most elaborate work, has ever risen to such exactitude." The fact that the image is a negative and has an alleged "three-dimensional" quality led Pellicori and Evans (1981, p. 38) to claim that this puts "proponents of the deliberate forgery theory over an impossible barrel: to suggest that a Medieval artist would have the foresight to conceive of a rendition having the qualities of a photographic negative encoded with three-dimensional information is preposterous." I term statements like this *von Däniken statements*, such as "The ancient Egyptians could not possibly have built the pyramids without the aid of an advanced technology—to think otherwise is preposterous" and "The ancient Peruvian indians of the Nazca plain could not possibly construct on the desert floor perfectly straight lines that run for miles and huge animals that are visible only from high above—to think otherwise is preposterous." Perhaps Pellicori and Evans are unaware that the fourteenth-century French were building cathedrals and creating stained glass, illuminated manuscripts, sculpture, and paintings of extraordinary detail and beauty. Furthermore, the common subject matter of Gothic sculpture and painting was "determined . . . by the mysticism of the period; in both arts, themes from the infancy and Passion of Christ, with emphasis on suffering and emotion, were favoured and in many cases introduced for the first time" (*Encyclopaedia Britannica, Micropaedia IV*, p. 645, Gothic art).

The striking resemblance of the image of the man on the shroud to French Gothic art has not gone unnoticed by previous commentators. But none of all the shroud articles or books appearing in recent months has pointed out that the

image's right forearm is distinctly longer than his left, or that the fingers on the right hand are unnaturally extended. Was Jesus deformed? I suppose STURP would say that "we'll never know for sure." I suppose we'll also never know for sure that Jesus was a hemophiliac, since the blood of the man on the shroud has a curious resistance to coagulation: the blood flows down his arms, down the back of his ankles, and across his back in perfectly formed rivulets without clotting. Most remarkable of all is that the blood on his head, produced by the crown of thorns, flows down his hair without the slightest tendency to mat or coagulate in the hair.

John Jackson, more than anyone else the leader of STURP, "is a believer" (Murphy 1981, p. 61). But he insists that "my responsibility is to scientific rigor." He says (Murphy 1981, p. 61):

Somewhere along the way, you'd think a forger would have made some mistake, but there aren't any. And some of the little touches are very nice. . . . When you add up everything we know, the argument against a forgery acquires a certain force. . . . As for whether the image is Christ's, all I can say is that the wounds are consistent with the gospel accounts.

That the wounds of the man on the shroud are indeed remarkably consistent with the Gospel accounts is a frequent claim. Every article emphasizes this, especially the books by Wilson (1979) and Stevenson and Habermas (1981). Three of the most important criteria for identifying the man on the shroud as Jesus are that the legs or ankles are *not* broken (it was common practice to break the legs or ankles of crucified victims to speed asphyxiation), that the man was *nailed* to the cross (most crucified victims were simply tied to the cross), and, most important, that the image of the man on the shroud shows a lance wound in his right side that appears to have bled forth both blood and water after death, that is, the amount of blood emitted is small compared with such a wound suffered by a living person whose body would pump out sheets of blood. Indeed, the stigmata of the man on the shroud are so accurate that this is the primary evidence every author uses to claim its unimpeachable authenticity.

Before we examine these claims, it might be useful to point out that there are serious doubts that, if he existed, he was crucified; that there are serious doubts that, if he was crucified, he died; and that there are serious doubts (to say the least) that, if he died, he was resurrected. Just the beginning of the literature that supports these doubts should be read by every skeptical, if not literate, person: Blanshard (1974), Angeles (1976), Smith (1979), and Stein (1980). For my own part, let me state that I think it probable that Jesus was an authentic person. I do not base this conclusion on the so-called non-Christian sources, such as Josephus, Tacitus, Suetonius, and Pliny, which as everyone knows are spurious and interpolated (in the case of Josephus) or equivocal and ambiguous (in the case of the Roman authors). To me, the sheer idiosyncratic originality of the Gospel parables and passion story make it likely that a historical Jesus existed, or, if not him, someone else equally as original and idiosyncratic who could just as well be equated with the traditional Jesus. Whether Jesus must have been, in the inimitable logic of C. S. Lewis, either madman or Messiah, I leave for the reader to judge. My intention here is only to admit that there is *some* truth in the Gospels.

Let us examine the Gospel accounts of the crucifixion of Jesus of Nazareth. It will come as a shock to most readers that not one of the four Gospels says that Jesus

was nailed to the cross. All four say only that he was “fastened” to the cross or that he was “crucified.” (These quotes and all subsequent ones are from *The New English Bible*, which is by far the most accurate translation.) The sole source for the traditional belief that Jesus was nailed to the cross is John 20:24-25, which is as follows:

One of the twelve, Thomas, that is “the Twin,” was not with the rest when Jesus came. So the disciples told him, “We have seen the Lord.” He said, “Unless I see the mark of the nails on his hands, unless I put my finger into the place where the nails were, and my hand into his side, I will not believe it.”

Of course, John 20:26-27 relates that a week later the doubts of Thomas were removed. Most of the articles and especially the books by Wilson and Stevenson and Habermas go to great pains to point out that the man on the shroud had his *wrists* pierced, not his hands, but the Greek word for hand can include the wrist, so the Gospel account is unimpeached. But what about the unbroken legs and the lance wound in the side. Again, these vital characteristics are found *only* in John:

Because it was the eve of Passover, the Jews were anxious that the bodies should not remain on the cross for the coming Sabbath, since that Sabbath was a day of great solemnity; so they requested Pilate to have the legs broken and the bodies taken down. The soldiers accordingly came to the first of his fellow-victims and to the second, and broke their legs; but when they came to Jesus, they found that he was already dead, so they did not break his legs. But one of the soldiers stabbed his side with a lance, and at once there was a flow of blood and water. This is vouched for by an eyewitness, whose evidence is to be trusted. He knows that he speaks the truth, so that you too may believe; for this happened in fulfillment of the text of Scripture: “No bone of his shall be broken.” And another text says, “They shall look on him whom they pierced.” [John 19:31-37]

If you get the impression that John is trying awfully hard to fulfill the Scriptures, you’re right. The bones being left unbroken fulfills Psalm 34:20 and Exodus 12:46. The lance wound fulfills Zechariah 12:10. Even the passage about Thomas and the nail holes in the hands and feet is intended to fulfill Psalm 22:16 (the early English translations refer to “pierced hands and feet,” but the *New English Bible* gives “they have hacked off my hands and my feet” as the probable reading). The point of all this is that three of the most important or crucial characteristics of the crucifixion of Jesus are found only in John, and they appear to fulfill specific Old Testament Scripture. Was this done deliberately as a known interpolation, or was John aware of the true facts of that eventful day?

In an excellent recent article, “Resurrection Fictions,” Randel Helms (1981) introduces his readers to just a sample of the way the four evangelists thought nothing of borrowing, repeating, changing, and adding to earlier sources and Gospels. In particular, after Mark wrote his Gospel, Matthew and Luke attempted to improve theirs by adding many other significant traditions and legends, especially those that tended to fulfill Old Testament Scripture better than Mark’s did. They also curiously felt no inhibitions about making changes, which is why the Gospels contain so many contradictions. John’s Gospel, the last, written about A.D. 100, followed the pattern set by the Synoptic Gospels of Mark, Matthew, and Luke. But John’s Gospel is unique in a special sense: higher biblical criticism has found it to be so different in style, tradition, and theology from the Synoptic

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Gospels that it cannot be accepted as a valid historical source. Consider the following statements from possibly the two foremost scholars of the life of Jesus, Bornkamm and Conzelmann:

Because a theological conception has been incorporated in the account to such an extent, this Gospel [of John] cannot be directly used as a historical source. [Bornkamm 1974]

Conzelmann not only accepts, he applies the results of the critical-historical approach to the life of Jesus which developed over [the twentieth century]. Assumed [is] the general nonhistoricity of the fourth Gospel [of John]. [Reumann 1973]

In short, it is abundantly obvious that St. John the Divine interpolated the three Christian *traditions* of unbroken legs, lance wound, and nailing to the cross into his Gospel—traditions which had developed among Christians during the seventy years between the death of Jesus and the writing of the Fourth Gospel. The traditions had developed, of course, because they provided additional examples of fulfilled Old Testament Scripture to those of the Synoptic Gospel accounts. This is the type of evidence that writers like Wilson, Stevenson and Habermas, and all the others use in their defense of the authenticity of the Shroud of Turin. This is the same evidence that the artist who created the shroud used to make it look as realistic as possible. All parties concerned believe implicitly in the literal truth of all Gospels, and so the shroud is of use only to those who believe implicitly in the literal truth of all the Gospels. Presumably, none of these parties has any use for modern biblical criticism, but at least the shroud artist had a valid excuse for his lack of knowledge. I would be interested in learning the excuses of the others.

STURP and the Media

The lack of skepticism about the Shroud of Turin in the print media must be the most depressing aspect of the entire controversy. For a period in early October 1981, the local newspapers carried daily stories about the shroud, STURP, and the publication of Stevenson and Habermas's *Verdict on the Shroud*. Predictably, all statements about STURP and the book, and all quotations from STURP members, were pro-authenticity. In AP and UPI wire-service articles, we are told:

The shroud is not the product of an artist. The bloodstains are composed of hemoglobin.

Human craft did not create the image on the shroud.

No pigment or substance of any kind which could account for the image on the shroud was detected by the shroud team.

Scientists are convinced that the cloth once held a dead body, which left an image of itself. It is most likely that the image was caused by some sort of scorch process. The bloodstains on the cloth are real blood.

The shroud provides at least four strong indications that Jesus probably did rise from the dead.

The facts indicate that the body was not removed from the cloth by human means because the bloodstains are intact and anatomically precise, but would have been smeared or broken if the cloth was removed by normal means.

The most probable cause found for the shroud's image was a heat or light scorch from some extraordinary occurrence not explained by natural means.

These probabilities strongly favor the authenticity of the Shroud as evidence for Jesus' death and resurrection.

In all fairness to STURP scientists, most of these quotes, especially all concerning the "resurrection" of Jesus, were from Stevenson and Habermas. Also, I was told by one STURP scientist that she was "misquoted," and two others have assured me that they still consider the idea that an artist produced the shroud to be a possibility; but these private communications are so spectacularly different from their public pronouncements and printed quotations that I refuse to participate in such a private deception. The STURP scientists should publicly admit, *at least*, that an artist could have produced the shroud and that for all their years of work they have not found one bit of reliable evidence that the shroud is authentic. Apparently, their last chance to do so is in a final summary paper by Lawrence Schwalbe and Raymond Rogers to be published in *Analytica Chimica Acta* in February 1982. Since both historically and philosophically arch-skepticism has always accompanied arch-positivism, the STURP scientists are a unique and fascinating group of individuals. This is why this book review has concentrated mainly on them and not on the books: I consider the story of the motivations and activities of the STURP scientists much more interesting than the story of the Shroud of Turin. I attribute the STURP members' credulity and lack of skepticism to their religious inclinations, and I attribute their assumed posture of scientific arch-positivism to their archaic belief of how real scientists are supposed to act. STURP needs to be studied in more detail than does the Shroud of Turin, and they deserve a book of their own (*about* them, not *by* them).

The article by Cullen Murphy for *Harper's* is not unusual for this magazine. I have fond memories of two similar articles by Tom Bethell published in *Harper's* that portrayed an equally pervasive bias and artful exclusion of damaging evidence: "Darwin's Mistake" (February 1976) and "Burning Darwin to Save Marx" (December 1978). To Murphy's credit, however, he avoids Bethell's monumental illogic and distortion of fact, and Murphy's use of scientific-equipment names and technical lingo as stylistic devices to impress his readers is far more graceful than Bethell's ponderous but unsuccessful attempt to master scientific concepts to

convince *his* readers that he knew what he was talking about. As I said earlier, Cullen Murphy empathized completely with the STURP scientists, and his long article wonderfully mirrors all the characteristics of STURP's members that I have identified. Since *Harper's* is not a scientific journal and doesn't pretend to be, I must conclude that Cullen Murphy's article is a success in presenting a sympathetic portrayal of a group of curiously misguided scientists.

I cannot be as kind to four other scientific or professional journals. *National Geographic* (Weaver 1980), *Archaeology* (Pellicori and Evans 1981), *Industrial Research and Development* (Johnson 1979, 1980), and, the most amazing of all, *Science 81* (Burden 1981) all published unskeptical pro-authenticity articles that either ignored or gave short shrift to the damaging negative evidence. These five articles are pervasively credulous and biased. Although none of them concludes outright that Jesus is the man on the shroud (to its credit, STURP has never stated this), all of them by emphasizing only the purported evidence of authenticity and by minimizing or ignoring the evidence that negates authenticity, fall into the trap of the STURP argument: since it isn't an artist's forgery, it must somehow be authentic, although we can't explain how, and if it's authentic, it must be the actual shroud of Jesus Christ, although we can never be sure. Since *Science 81* is published by the American Association for the Advancement of Science, the nation's scientific community deserves an explanation. This is particularly true because its article (Burden 1981) contains a refutation of Walter McCrone's evidence of iron earth pigment on the shroud's image, by Alan Adler and John Heller, that directly disagrees with McCrone's results. Since Adler and Heller's work is not published and McCrone's is, and since I consider McCrone's techniques and conclusions to be 100 percent reliable, I must charge *Science 81* with complicity in continuing a deception. The article (Burden 1981, p. 80) states that Adler and Heller "used fibril microchemistry and microscope magnification up to several hundred times and found no greater amounts of trace iron in the image than in the background." McCrone used these identical techniques and found a significant difference. I must admit, however, that the words "trace iron" may be a STURP equivocation, since McCrone, as we shall momentarily see, found a significant difference in amount of "iron oxide particles." Adler and Heller are simply going to have to publish their results.

Ian Wilson's book *The Shroud of Turin* is typical of a long line of pro-authenticity shroud books. He reviews all the historical, medical, and scientific evidence and concludes that, "All these conclusions . . . seem sufficient to rule out the old claim that the Shroud is merely a painting by a fourteenth-century artist" (p. 245). Wilson explicitly discusses and accepts the early STURP hypothesis of "flash photolysis" in his final chapter, "The Last Miracle." As he describes it:

In the darkness of the Jerusalem tomb the dead body of Jesus lay, unwashed, covered in blood, on a stone slab. Suddenly, there is a burst of mysterious power from it. In that instance the body dematerializes, dissolved perhaps by the flash, while its image and that of the body become indelibly fused onto the cloth, preserving for posterity a literal "snapshot" of the Resurrection. (Wilson 1979, p. 251)

Or, as one wag put it, the "first Polaroid in Palestine." The subtitle of Wilson's book is "The Burial Cloth of Jesus Christ?" but from the book's contents I am certain that we can dispense with the question mark without Wilson's disapproval.

Walter McCrone and Joe Nickell

We must be grateful that there exist two individuals, at least, who don't believe that "miracles are natural phenomena which we just don't understand" (which I swear a STURP scientist told me recently on the telephone) and that these two individuals, with the selfless dedication and self-sacrifice typical of STURP members, began their own investigations of the Shroud of Turin. Walter McCrone was in fact initially a member of STURP, but he has since resigned. While a member, he examined the sticky tape samples of shroud debris that STURP had collected during its investigation in 1978. In two papers (McCrone and Skirius 1980; McCrone 1980), McCrone demonstrated that the image and "blood" areas on the shroud contained significant amounts of iron oxide pigment particles. This iron earth pigment is a hydrous ferric oxide that varies in color from yellow or orange to red. The mineral name is hematite. It has been used as a red pigment by artists for millennia. The clear or nonimage areas of the shroud revealed no iron oxide particles at all. McCrone also found trace amounts of orpiment, ultramarine, azurite, wood charcoal, madder rose, and vermilion that had contaminated the iron oxide pigment of the image and "blood," indicating that the shroud had been produced in an artist's studio. McCrone also showed that the yellow fibers of the "blood" areas were covered by an animal protein that was used as a tempera binder for the application of the iron oxide pigment of the "blood." Unfortunately, McCrone didn't test yellow fibers of the image areas (the clear or nonimage area fibers are white) for protein, and STURP insists that their "very sensitive" protein tests on image fibers were negative. McCrone explains his actions by saying that the image and "blood" yellow fibers looked identical. However, the point is really irrelevant, as Marvin Mueller explains in his article in this issue of the *SKEPTICAL INQUIRER*. Whatever gelatin binder was used to transfer the iron oxide pigment to form the original image on the linen surface could have evaporated over the centuries. STURP's claim that the image is latent due to cellulose degradation and that there isn't enough iron oxide to produce an image today is probably true, but there *are* significant amounts of iron earth pigment particles all over the image and the blood, and they didn't get there by a miracle. STURP's attempts to explain away McCrone's results are so ridiculous that I won't waste space to answer them. For example, one serious STURP suggestion is that the iron is from the blood and was distributed over the shroud by handling over the centuries. McCrone answers this by pointing out that the "amount of iron in blood is about a tenth of one percent. A lot of the particles are pure hematite crystals. . . . You'd have to bleed iron oxide" (Rhein 1980).

One of the most significant McCrone discoveries is that the "blood" on the shroud contains vermilion pigment as well as iron earth pigment (McCrone 1981). Vermilion is composed of the mineral cinnabar, mercuric sulfide. Vermilion and red iron earth were the two most popular red pigments of the fourteenth century, and the shroud's artist apparently used these two to create the "blood," which today looks unnaturally red. McCrone's identification of mercuric sulfide in the pigment particles was done by analytical chemical techniques that are unimpeachable. Although STURP "scorns circumstantial evidence," as Thoreau said, "Some circumstantial evidence is very strong, as when you find a trout in the milk." I agree, some circumstantial evidence is very strong, as when you find cinnabar in the blood.

Joe Nickell (1978, 1979, 1981) has produced negative images identical, for all practical purposes, to those on the shroud. His technique is embarrassingly simple: wet linen cloth is molded to a bas relief and iron-oxide pigment is applied by rubbing when the cloth is dry. All the fourteenth-century artist had to do was carve a bas relief figure of the dead Jesus on a plank of wood, mold the wet linen on, let it dry, prepare a mixture of powdered iron earth pigment and some gelatine binder and rub this on the linen to create the faint negative image. Subsequently, the "blood" was painted on with a brush, using the vermilion and iron earth pigment mixture. Of course the artist was "cunning," but cunning individuals have lived in every age, including the fourteenth century.

A Few Loose Ends

The "three-dimensional" information that Jackson and Jumper found in the shroud is largely a creation of their own efforts, as Marvin Mueller explains in his article. I will only quote Jumper (Murphy 1981, p. 62):

As for the image, my own opinion is that because there is such a regular mathematical relationship between image intensity and cloth-body distance, some very simple phenomenon is at work. I think we're going to kick ourselves when we get the answer and find out how simple it is.

I also find amusing Johnson's (1980, p. 148) comment: "To a great extent, the [electronic image] analyzer was able to remove the major distortions caused by the unevenness of the cloth." To a very great extent.

Father Francis L. Filas of Loyola University claims to see a coin in the image over the right eye of the man on the shroud. While others see this coin too, Father Filas also claims that he can read the inscription on the coin, and he states that it is of a type issued only during the procuratorship of Pontius Pilate. Filas has been getting a lot of newspaper publicity with his claim lately, but unfortunately no one else in the world, including all the STURP scientists, agrees with him. The weave of the cloth is too coarse for the degree of precision necessary to make out any inscription. Father Filas's imagination has been working overtime.

It is essential that carbon-14 dating of shroud material be done as soon as possible. True to the assumed positivistic character of STURP, Cullen Murphy claims only that "if carbon-14 tests showed that the shroud was manufactured during the first century A.D., it would still be just another inconclusive piece of evidence." The whole point is that a fourteenth-century date would be very conclusive.

Contrary to numerous claims in most of the recently published articles and books on the Shroud of Turin, no unequivocal evidence for real human blood has been found on the shroud's "bloodstains." Of course, even if this evidence was obtained, such a discovery would be irrelevant to any verification of authenticity.

Professor Allan Whanger's recently announced "discoveries" of the likeness of the shroud image's face to a sixth-century Byzantine icon and a seventh-century Byzantine coin (*New York Times*, January 28, 1982) are nothing new. In his book, Ian Wilson discusses in great detail the similarities of the shroud image's face to many Byzantine icons and mosaics of the face of Jesus. Whanger, like Wilson, believes that the Mandylion, from which the faces of Jesus were presumably copied,

was simply the Shroud of Turin folded so that only the face was visible. The error in reasoning that both of these men make is that the resemblance of the face of the shroud image to the typical Byzantine portrait of Jesus allows one to conclude that the Byzantine artists copied the face from the shroud. Rather, it is much more likely that the fourteenth-century shroud artist copied the well-known Byzantine representation of the face of Jesus.

“Verdict on the Shroud”

I have purposely saved the best for last. *Verdict on the Shroud*, by Ken Stevenson and Gary Habermas (1981), will go down in history as a classic twentieth-century example of pseudoscience, equal in every way to scientific creationism, Velikovskyism, dianetics, and ancient astronauts. The subtitle of this book says it all: “Evidence for the Death and Resurrection of Jesus Christ.” But something else is written on the front cover of the dust-jacket: “The definitive book, based on new evidence from three years of intensive investigation by the Shroud of Turin Research Project.” Inside, all the top STURP scientists are gratefully acknowledged, and Larry Schwalbe wrote the Foreword. Among other things, Schwalbe (p. xii) says:

Stevenson and Habermas have [examined all the] historical, philosophical, as well as scientific arguments and have proposed an explanation that involves an intervention of the supernatural. To some people this may be shocking; yet if the authors’ hypothesis is consistent with the available evidence, it remains a plausible explanation.

Plausible to whom—theists and supernaturalists? Certainly not to scientists. But Schwalbe and all the other STURP members are scientists, aren’t they? Certainly Schwalbe was not including himself among those individuals who he thought might be shocked, but is he including himself among these who believe the book’s proposed supernatural explanation is “plausible”?

These questions are difficult to answer, and the plot thickens quickly if you were lucky enough to find the following “clarification” in your copy of the book:

CLARIFICATION:

Verdict on the Shroud is NOT an official publication of The Shroud of Turin Research Project. While the book is based in part on scientific work done by The Project, the book was not authorized, sponsored or approved in any way by The Project and the conclusions reached by the authors are their own. They do not necessarily represent those of members of the scientific team. All of the names of members of the scientific team should be deleted from the Acknowledgements page.

For some reason, the STURP scientists are angry with Stevenson and Habermas. On the dust-jacket, Stevenson is described as “team spokesman and editor for the Shroud of Turin Research Project,” which is true; however, the dust-jacket doesn’t mention the fact that Stevenson has been asked to resign from STURP. Habermas is

described as a "research consultant to the Shroud of Turin Research Project." He has not been asked to resign because, unlike Stevenson, he is not an official member of STURP. He consulted only with Stevenson, but apparently STURP's loose organization allows him to claim an affiliation. From what I have been able to

*"The lack of skepticism
about the Shroud of Turin in
the print media must be the
most depressing aspect of
the entire controversy."*

learn, Stevenson has so far refused to resign (can STURP fire him?). Then there is the litigation. Originally, legal proceedings were initiated by STURP to force Servant Books, the publisher of *Verdict on the Shroud*, to include the "clarification" above with each book sold and to remove the offending acknowledgments and front dust-cover statement from the second edition. But the litigation is still in progress, and nobody from STURP can (or will) tell me why or what for. Frankly, I don't really care, but it may involve money (the book is selling well, probably because of the great amount of free STURP publicity in recent magazines). STURP itself must take major responsibility for the current untenable situation the group's members find themselves in now that *Verdict on the Shroud* has been published. Stevenson was, in espionage terminology, a mole who joined the project early and always intended to write this sort of book. STURP should have anticipated this possibility and dealt with it years ago.

The book itself is hopelessly biased, although the authors try desperately to appear rational and logical throughout. Neither author is a scientist, but almost every page invokes scientific justification of one kind or another to support the authors' claims about the shroud. They assert (p. 5) that "the disbelieving view—the assumption that the Shroud *cannot possibly* be genuine—has its source in something other than scientific reasoning." I agree: this view has its source in common sense. The authors' knowledge of epistemology is flawed. They make the following remarkable statement (p. 10):

We—and the reader—cannot prejudice our study by rejecting the miraculous *a priori*, assuming that supernatural events cannot occur. In other words, our treatment of this subject will be balanced. We will avoid both a pious approach, which interprets every fact as proof of the validity of the Shroud, and a skeptical approach, which refuses to view the evidence objectively.

Such an understanding of the "skeptical approach" may surprise some readers, but we can easily understand Stevenson and Habermas's purpose (p. 8):

In an age when science is making faith in the gospel difficult, science may be going as far as it possibly could to provide evidence for the gospel's validity.

Gary Habermas is a minister in the United Brethren Church and a professor of

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apologetics and philosophy at Jerry Falwell's Liberty Baptist College in Lynchburg, Virginia. In a recent New York Times News Service article, Edward Fiske wrote the following:

In his freshman introduction to philosophy course, for example, Gary Habermas uses a textbook whose authors declare that it is important not only to "present every position as fairly as possible" but also to refute "views that are anti-Christian!" On a recent afternoon, Habermas took attendance and then opened his class with a prayer that God would "give us insight into agnosticism." He then lectured his 32 students on various forms of modern agnosticism, with hints on how to deal with such attitudes. "A good way to answer a skeptic is not to find fault with this or that point but to say, 'Here is my basis for what I know is right,'" he suggested.

Stevenson and Habermas do not follow this approach in their book; contrary to their earlier quoted goal, they treat every fact as proof of the shroud's authenticity and go to great lengths to find fault with all conflicting evidence. For example, the Gospel of John says that Jesus was wrapped in burial linens, not simply covered by a shroud, as other Gospels state. The authors explain this and everything else away.

I particularly noticed one amusing item among many in the book. On page 157, Dr. Robert Bucklin, a medical examiner and one of the STURP members who sued to have his name removed from the acknowledgments, is quoted as claiming: "The medical data from the Shroud supports the resurrection. When this medical information is combined with the physical, chemical and historical facts, there is strong evidence for Jesus' resurrection." In Burden (1981, p. 80) Bucklin states that "the shroud's markings depict an expanded rib cage and drawn-in hollow below it, which would be the case if the man died while hanging by the arms." Stevenson and Habermas, however, prefer the view of Dr. Pierre Barbet (1953) and refer to him when they state (pp. 39, 45):

[Jesus] was already dead, as his swollen abdomen clearly indicates. Again, it is interesting to note that most paintings or sculptures of the crucifixion show Jesus with a sunken belly. Artists did not know the medical significance of a swollen abdomen. . . .

His swollen abdomen indicates that he died by asphyxiation, the way crucified victims died.

Were Drs. Bucklin and Barbet looking at different shrouds, or did each see just what he wanted to see? Or were Stevenson and Habermas just being perverse in using Barbet's "swollen abdomen" opinion rather than Bucklin's "drawn-in hollow below the rib cage" opinion, especially since Dr. Bucklin was generous enough to state that in his view the medical evidence supported the factuality of the resurrection. Or perhaps the abdomen isn't below the rib cage?

To their credit, Stevenson and Habermas have included a chapter entitled "The Naturalism-Supernaturalism Debate: Do Miracles Occur?" Unfortunately, they decide for the affirmative and claim that STURP's scientific evidence is justification for believing in the supernatural. This explicit endorsement of pseudoscience should be enough for one to form a reasonable opinion about the book. Marvin Mueller, in his article, speculates on the motivations of the STURP scientists. I shall do the same for Stevenson and Habermas. The local Catholic bookstore sold out quickly of *Verdict on the Shroud*, but they assure me that a new stock will arrive soon. The second printing is already in press. In the fourteenth century, Jeanne de Vergy and the Lirey clergy made money by exploiting a religious relic venerated by credulous pilgrims. Even through six centuries, some things never change.

References

- Angeles, Peter. 1976. *Critiques of God*. Buffalo, N.Y.: Prometheus Books.
- Barbet, Pierre. 1953. *A Doctor at Calvary*. New York: Doubleday.
- Blanshard, Brand. 1974. *Reason and Belief*. London: Allen & Unwin.
- Bornkamm, G. 1974. "Jesus Christ." *Encyclopaedia Britannica, Macropaedia* 10:145-55.
- Burden, Annette. 1981. "Shroud of Mystery." *Science* 81 2(9): 76-83, November.
- De Clari, Robert. 1936. *The Conquest of Constantinople*. Translated by E. H. McNeal. New York: Columbia University Press.
- Helms, Randel. 1981. "Resurrection Fictions." *Free Inquiry* 1(4): 34-41.
- Janney, Joan. 1981. "Shroud of Turin Study. Scientists say image is that of 'crucified man.'" *Houston Post*, 10 October, p. 12A. AP wire service.
- Johnson, R. I. 1979. "The Shroud of Turin." *Industrial Research & Development* 21 (12):74-78, December.
- . 1980. "Scientists Examine the Shroud of Turin." *Industrial Research & Development* 22(2):145-50, February.
- McCrone, Walter C. 1980. "Light Microscopical Study of the Turin 'Shroud' II." *The Microscope* 28:115-28.
- . 1981. "Microscopical Study of the Turin 'Shroud' III." *The Microscope* 29(1):19-39.
- McCrone, W. C., and C. Skirius. 1980. "Light Microscopical Study of the Turin 'Shroud' I." *The Microscope* 28:105-13.
- Murphy, Cullen. 1981. "Shreds of Evidence." *Harper's* 263:42-65, November.
- Nickell, Joe. 1978. "The Shroud of Turin—Solved!" *The Humanist* 38(6):30-32, November/December.

- _____. 1979. "The Turin Shroud: Fake? Fact? Photograph?" *Popular Photography* 85(5):97-99, pp. 146-47, November.
- _____. 1981. "New Evidence: The Shroud of Turin Is a Forgery," *Free Inquiry* 1(3):28-30.
- Pellicori, Samuel F. 1980. "Don't Rush into Shroud Judgment." *Industrial Research & Development* 22(7):165, July.
- Pellicori, S. F., and M. S. Evans. 1981. "The Shroud of Turin Through the Microscope." *Archaeology* 34(1):34-43, January/February.
- Reumann, J. 1973. Editor's Introduction, in Hans Conzelmann, *Jesus*. Philadelphia: Fortress Press, pp. iv-xi.
- Rhein, R. W., Jr. 1980. "The Shroud of Turin," *Medical World News*, December 22, pp. 40-50.
- Smith, George. 1979. *Atheism: The Case Against God*. Buffalo, N.Y.: Prometheus Books.
- Stein Gordon, ed. 1980. *An Anthology of Atheism and Rationalism*. Buffalo, N.Y.: Prometheus Books.
- Stevenson, Kenneth E., and Gary R. Habermas. 1981. *Verdict on the Shroud: Evidence for the Death and Resurrection of Jesus Christ*. Ann Arbor, Mich.: Servant Books.
- Weaver, Kenneth F. 1980. "The Mystery of the Shroud." *National Geographic* 157(6):730-53, June.
- Wilson, Ian. 1979. *The Shroud of Turin: The Burial Cloth of Jesus Christ?* New York: Image Books, Doubleday. ●

Scientific Cranks

... No crank wants, or will accept, an honest criticism of anything. He has solved the "problem," whatever it is, and is looking for an endorsement. . . . Whatever else cranks may be up to, after one deals with several it becomes clear that they are not really interested in doing science. They are not prepared to accept the rough-and-tumble of scientific criticism; any criticism is regarded as a provocation and a threat.

—Jeremy Bernstein, "Scientific Cranks: How to Recognize One and What to Do Until the Doctor Arrives," *American Scholar*, vol. 48, Winter 1977-78. (Also to appear in Bernstein's new book, *Science Observed*, Basic Books.