

The Einstein Mystique

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Abstract—Albert Einstein’s scientific career is studied, with the purpose of trying to explain why he became such a universally famous and revered person. Various events of the past century are considered, and their effects on his scientific and personal reputation. Some of the events studied are: the publication of the special and general theories of relativity, the 1919 solar eclipse and the famous meeting at which the results of the eclipse observations were announced, and Einstein’s visit to the United States in 1921. After his death, many biographies of Einstein were written, both before and after the availability of further information that became available about his personal life after the deaths of Helen Dukas and Otto Nathan; some of these are discussed, including the strange story of what happened to Einstein’s brain after his death. Celebrations of the centenary of his birth, the centenary of the theory of special relativity, and the centenary of the solar eclipse are also discussed. In spite of all the information that is available, the reasons for Einstein’s great and enduring fame remain mysterious.

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Introduction

Why is Albert Einstein so famous? Many writers have wondered why he is one of the most celebrated people who ever lived, and the answer is certainly not obvious. For example, Finch (1970) expressed the following opinion about the problems that future historians may have in trying to explain the Einstein phenomenon:

They may find themselves wondering how it happened that an abstract scientist, whose work could be understood only by a handful of people, should nevertheless have become an idol of millions so that his name and face were known all over the globe.

The history of twentieth-century physics was dominated by Albert Einstein. In the more than thirty years since Finch wrote the above words, Einstein’s prestige has increased and is still increasing, especially as we approach the hundredth anniversary of his “miraculous year” 1905, in which he published five important papers. The activities for the celebration of the anniversary have already begun, starting with a major Einstein Exhibition that opened in The American Museum of Natural History in New York in November 2002, and which is to move to the Hebrew University of Jerusalem in time for the hundredth anniversary in 2005.

The Special Theory of Relativity

One of the papers that Einstein published in 1905 presented what is now known as the Special Theory of Relativity. The immediate impact of this theory, at the time it was published, is difficult to judge from the viewpoint of the present time, but the theory certainly became more prominent as a result of the subsequent rise of the General Theory. As pointed out by Fölsing (1997, pp. 201–203), the eminent scientist Max Planck was largely responsible for the acceptance for publication of Einstein's first paper on special relativity, and he was also "the most important figure in establishing relativity theory after 1905." Even so, the theory seems to have been less renowned outside Europe, judging by the following assessment that appeared in an editorial article in *Scientific American* (Anonymous, 1921):

The Special Theory, promulgated fifteen years ago, received its fair share of attention from mathematicians all over the world, and is doubtless as well known and as fully appreciated here as elsewhere. But it has never been elevated to a position of any great importance in mathematical theory, simply because of itself, in the absence of its extension to the general case, it deserves little importance. It is merely an interesting bit of abstract speculation.

The General Theory of Relativity

Despite the fact that Einstein published five papers in 1905, the growth of his reputation was slow at first, and even after the publication of the General Theory of Relativity in 1916, that theory did not immediately become widely known. What caused the spectacularly rapid growth of his fame was the announcement, at a famous Joint Meeting of the Royal Society and the Royal Astronomical Society held in London on November 6, 1919, that the observations of an eclipse of the sun in May 1919 decisively supported his General Theory. The announcement was made by two very eminent astronomers: Sir F.W. Dyson, the Astronomer Royal, and Professor A.S. Eddington, Plumian Professor of Astronomy at the University of Cambridge, and resulted in such a spectacular rise in his scientific reputation that it was described by Pais (1982) as the canonization of Albert Einstein.

As I have described in detail in an earlier paper (McCausland, 1999), the accuracy of the 1919 eclipse observations was in fact not sufficient for a conclusive verification of the General Theory. Although that fact is now fairly widely known, scientists still appear to be very reluctant to admit it. As an example of the confusion that this reluctance causes, consider the following two quotations from the same scientist. In *A Brief History of Time* Hawking (1988, p. 32) wrote:

This proof of a German theory by British scientists was hailed as a great act of reconciliation between the two countries after the war. It is ironic, therefore, that later examination of the photographs taken on that expedition showed the errors were as great as the effect they were trying to measure. Their measurement had been sheer luck, or a case of knowing the result they wanted to get, not an uncommon occurrence in science.

The light deflection has, however, been accurately confirmed by a number of later observations.

Several years later, in the “Person of the Century” issue of *Time* magazine, Hawking (1999, p. 41) wrote, referring to General Relativity:

It was confirmed in spectacular fashion in 1919, when a British expedition to West Africa observed a slight shift in the position of stars near the sun during an eclipse. Their light, as Einstein had predicted, was bent as it passed the sun. Here was direct evidence that space and time are warped, the greatest change in our perception of the arena in which we live since Euclid wrote his *Elements* about 300 B.C.

Hawking’s words, in the first of the above two quotations, illustrate some of the important features of the rise of the Einstein mystique. One of the reasons for Einstein’s rapid rise to enormous fame was the supposed confirmation of a German scientist’s theory by British scientists. The timing is especially important: World War I, one of the bloodiest events of the 20th Century, had ended in November 1918. The Paris Peace Conference, which lasted for six months, was the major historical event of 1919 and culminated in the signing of the Treaty of Versailles, over German objections, in June. The eclipse of the sun took place on May 29, 1919, and the announcement of the results took place on November 6, 1919, almost exactly a year after the armistice of November 11, 1918.

Various writers have described how the timing of the events affected the way in which the announcement of the results was received by the public. One very interesting account was given by Chandrasekhar (1987), who was present at an informal after-dinner discussion in Cambridge at which both Eddington and Ernest Rutherford were present.

Someone said to Rutherford “I do not see why Einstein is accorded a greater public acclaim than you. After all, you invented the nuclear model of the atom; and that model provides the basis for all of physical science today and it is even more universal in its applications than Newton’s laws of gravitation. Also, Einstein’s predictions refer to such minute departures from the Newtonian theory that I do not see what all the fuss is about.”

Rutherford turned to Eddington and said, “You are responsible for Einstein’s fame.” He went on to mention the war and the confirmation of a German scientist’s predictions by British astronomers, and continued:

Astronomy had always appealed to public imagination; and an astronomical discovery, transcending worldly strife, struck a responsive chord. The meeting of the Royal Society, at which the results of the British expeditions were reported, was headlined in all the British papers: and the typhoon of publicity crossed the Atlantic. From that point on, the American press played Einstein to the maximum.

The claim by Hawking (1988), that the light deflection has been accurately confirmed by later observations, has no relevance to the enormous impact that the announcement had on both the scientific community and the general public in 1919. The simple fact remains that Einstein was propelled to world-wide fame by an announcement that the observations decisively supported Einstein’s

theory, when the measurements were in fact, in Hawking's own words "sheer luck, or a case of knowing the result they wanted to get."

Another reason for the enormous impact of the announcement was the apparent incomprehensibility of the theory, which made those who claimed to understand the theory appear to be extremely clever. Supposedly there were only twelve men in the world who could understand it. A similar phenomenon has been described somewhat satirically by Galbraith (1990) in the words of one of the characters in his novel *A Tenured Professor*:

Never forget, dear boy, that academic distinction in economics is not to be had from giving a clear account of how the world works. Keynes knew that; had he made his *General Theory* completely comprehensible, it would have been ignored. Economists value most the colleague whom they most struggle to understand. The pride they feel in eventually succeeding leads to admiration for the man who set them so difficult a task. And anyone who cannot be understood at all will be especially admired. All will want to give the impression that they have penetrated his mystification. This accords him a standing above all others.

With a few obvious minor substitutions, this quotation might be taken as an expression of the attitude of many physicists towards Einstein's General Theory.

After the enormous boost to Einstein's reputation that was caused by the joint meeting, the mystique surrounding the theory was maintained at its high level for some time by many further meetings devoted to the subject. The next strong boost to his fame appears to have occurred as a result of his visit to the United States in 1921. Goldberg (1984, p. 309) has described the reaction of the American public to that visit:

After the initial interest in late 1919 and early 1920, a brief period of calm ensued which lasted until just before his first visit to the United States in 1921. If the proportion of space in the public press allotted to Einstein's comings and goings can be used as a measure of American fascination with him, then Einstein's visit here (on a fund raising tour on behalf of Hebrew University) was followed by the public in the manner of the arrival of the Beatles in the mid-nineteen sixties.

Another account of that visit was given by Missner (1985):

When Einstein came to the United States in 1921 as part of a Zionist delegation, the warm welcome American Jews gave the delegation, and Chaim Weizmann in particular, was mistakenly described by the American press as a hero's welcome for Einstein. This led to a complex series of interactions between the Yiddish and English language press that resulted in Einstein being considered a hero and a secular saint.

Missner referred to the growth of Einstein's fame in the period from November 1919 to August 1921 as follows:

This was the crucial period for the development of Einstein's fame, as afterwards his reputation grew and fed on what had already been achieved. While there is no reason to believe that there was a single cause for Einstein's fame, the American press was *the* instrument that made Einstein into a celebrity. [Italics in the original.]

In 1922 Einstein was awarded a Nobel prize for 1921, but not for relativity; the prize was awarded for his contributions to theoretical physics, including

another of the papers that he had published in 1905, on the photoelectric effect. After a few more years there was little further contribution on Einstein's part, but his prestige remained extremely high. As Pais (1994, p. 43) wrote:

Einstein is the only scientist to be justly held equal to Newton. That comparison is based exclusively on what he did before 1925. In the remaining 30 years of his life he remained active in research but his fame would be undiminished, if not enhanced, had he gone fishing instead.

Publications About Einstein

During the period from 1919 to Einstein's death, many books and articles were published about him and about relativity. After his death, many more biographies were published; one of the best was by Ronald W. Clark (1971). In a review of Clark's book, McCrea (1973) wrote:

No one has yet explained the phenomenon that was Einstein, but if anyone ever does this it must surely be upon the basis of Clark's masterly account. The work has been done at just the right time. There can be few relevant documents that have not by now come to light and Clark seems to have digested all there are! The people who knew Einstein at all well have by now said all they will ever say about him.

Clark's book was an extremely thorough treatment of Einstein's life and work, based on the information available at the time he wrote. However, it subsequently turned out, as is described below, that there were indeed many documents that Clark either had not seen or was not allowed to use.

Most of the books and articles written about Einstein during the first twenty-five years after his death were highly laudatory, and in many cases Einstein was made to appear as saintly in his private life as he had been made a scientific saint at the joint meeting. Even his rather unpleasant divorce tended to be written off as an unfortunate minor irregularity, for example by Ziman (1981, p. 9):

We admire also the lifestyle, so simple and modest, so kind and friendly, so courteous and good humoured, so liberal, wise and humane. Newton, as we are now informed, was arrogant, vain, suspicious and quarrelsome. It is difficult to imagine the character defects that will be discerned in our Einstein, 300 years from now. The failure of his first marriage seems no more than a mild accident of fortune.

Jaki (1989) drew attention to the adulation of Einstein during that period, saying that most of his biographers "portray him as an exemplary character without guile and with no fault." Jaki continued by saying that only on occasion do there appear in Einstein biographies "lines revealing for their brevity," giving a more realistic picture, and mentioned as an example a reference by Pais (1982, p. 14) to a letter written by Einstein admitting that he had disgracefully failed twice in marriage. Pais's book can be taken to mark the transition between the two kinds of biography: the earlier ones that show Einstein in a very favorable light, and the later ones that describe him more objectively. The main events leading to the changes in the kind of biography were the deaths of the two people who had joint control of his literary estate: Helen Dukas, his longtime

secretary, and Otto Nathan. It is significant that Pais (1982) ends his Preface “To the Reader” in the following words: “I have left the text of this Preface as it was written before the death of Helen Dukas on February 10, 1982.”

After the deaths of Dukas and Nathan, more information about Einstein and his private life became available, and it was revealed how carefully they had guarded his reputation. For example, as described by Highfield and Carter (1993, p. 269), Dukas had even been able to prevent Einstein’s daughter-in-law Frieda from publishing a book based on his letters to his first wife, letters that were in Frieda’s own possession. Highfield and Carter also pointed out that it was a source of regret to Nathan that he had allowed to be published “the most illuminating letter of all, in which Einstein admitted that he had ‘failed rather disgracefully’ in his marriages.” They also pointed out that, although Clark had seen some of the revealing correspondence between Einstein and his friend Michele Besso before writing his biography of Einstein, he was not permitted to use the information. They mentioned some of Clark’s problems on page 275:

Clark had been warned by Hans Albert to expect trouble from Nathan and Dukas, and he got it. . . . He was threatened with legal action against both himself and his sources, and was refused key copyright permissions for the UK edition of his book. Although Clark fiercely resisted, Nathan forced him partially to rewrite the work before its publication in London in 1973.

(I assume that McCrea’s review (1973), mentioned above, was based on the edition of Clark’s book that was published in London in 1973.)

The biographical books that have appeared since Dukas’s death, such as those by Brian (1996), Fölsing (1997), and Overbye (2000), have taken into account the further information that then became available about Einstein and his private life. With the appearance of these biographies there seemed to be little more to write about, and one might have thought that the Einstein publishing industry would become less prolific. However, the eagerness of authors to write about Einstein and his theories remains undiminished. If they cannot write on Einstein’s life story as a whole, they write books about subjects such as *An Equation that Changed the World* (Fritzsche, 1994), *Einstein’s Miraculous Year* (Stachel, 1998), $E = mc^2$ (Bodanis, 2000), and *The Curvature of Spacetime* (Fritzsche, 2002). Alice Calaprice has published two books of quotations from Einstein, *The Quotable Einstein* (Calaprice, 1996), *The Expanded Quotable Einstein* (Calaprice, 2000), and a book of Einstein’s letters to and from children (Calaprice, 2002). Another book of quotations (Mayer & Holms, 1996) bears the modest title *Bite-Size Einstein: Quotations on Just About Everything from the Greatest Mind of the Twentieth Century*. Recently Jerome (2002) has written a book based on the FBI file on Einstein; the file itself, which is about 1500 pages, is available on the internet site of the FBI. Jerome’s book contains much interesting information on various unpopular causes that Einstein supported, and on the attempts of J. Edgar Hoover and Senator Joseph McCarthy to discredit him.

In view of the attention that is being paid in recent books to the equation $E = mc^2$, it should be pointed out that, although it is now a very famous equation, it

was not the reason for the spectacular rise in Einstein's fame in November 1919, since few people would have realized at that time that the announced bending of light that caused his instant fame had anything to do with nuclear energy.

Einstein's Brain

One of the strangest stories associated with Einstein is the account of the adventures of his brain after his death. Although Einstein had expressed a wish that his body be cremated and his ashes scattered at an undisclosed location, in order to avoid the creation of a shrine, his brain was removed and kept by the pathologist who performed the autopsy, and it has since been treated in a way that almost certainly would have horrified Einstein.

The facts of the treatment of the brain have been presented by Carolyn Abraham (2001). Although the book documents the facts very well, it is unfortunately written in a highly rhetorical style with an abundance of irrelevant detail. For example, Einstein is variously described as "the smartest man this planet has ever produced" (p. 199), and "the most ubiquitous personality on the planet" (pp. 245–246), whatever that means. Some of the profusion of detail is shown in the following reference to the brain: "It grew in the belly of a German woman in the summer of 1878. It was barely a speck beneath skirts and petticoats and flesh, drawing forest-scented air from the Swabian Alps northwest of the Danube." A few pages later we are told that "It looked like a lima bean by the fall of 1878, just over a centimetre long." After Einstein's birth in 1879, the brain "feasted on its first gulps of oxygen," as if it had not received any oxygen from the forest-scented air the previous summer. Presumably it was the author's sense of delicacy that restrained her from starting the story of the brain from the gleam that appeared in Hermann Einstein's eye on a certain momentous day in 1878.

According to Abraham, even Einstein's family members were unaware that the brain had not been cremated with the body until an item appeared in a newspaper saying that the brain had been removed for scientific study. Einstein's son Hans Albert telephoned the Princeton Hospital to complain. Dr. Harvey, the pathologist who removed the brain, said that Hans Albert had given permission for an autopsy and, in Harvey's mind, "standard autopsy procedure included removal of the brain and, in some cases, keeping it." He appears to have subsequently received permission to keep the brain after promising that "it would only be used for scientific study and that reports about it would appear only in scientific journals." That would have been a difficult promise to keep, and the subsequent story shows that it has not been kept. Soon after Einstein's death, there was some controversy between various scientists about who would be entitled to carry out research on the brain, and some of this was recorded in newspapers. As a sample of the reaction to conflicting reports of these controversies, the following is an extract from a letter from Otto Nathan to Dr. Harvey, dated April 26, 1955, just over a week after Einstein's death (Abraham, p. 85):

I am at a loss to understand the various discrepancies and feel completely insecure about the various undertakings and promises made, and all of us are in addition gravely disturbed at the utterly distasteful notoriety, which would have shocked the late Professor Einstein beyond words.

If Einstein would have been shocked beyond words at the events surrounding his brain during the week after his death, those events were as nothing compared with what has occurred since that time. For example, thirty years later, Gina Maranto (1985) ended an article on Einstein's Brain with the following paragraph:

Yet what lingers is a sense that the whole affair has become a tawdry botch. Especially considering neuroscientists' inability to discover from a brain the reason for genius, one wishes heartily that Einstein's brain had gone the way of his body, scattered to the winds of the universe, just another blip in the realm of space-time.

The tawdriness described by Maranto also seems a minor detail compared to the subsequent public coverage of the story of the brain. One of the oddest parts of the story, in my opinion, is the published account of the very strange car trip with the brain from Princeton to California in February 1997, as told by Michael Paterniti, first in an article in *Harper's Magazine* (Paterniti, 1997) and subsequently in the book *Driving Mr. Albert* (Paterniti, 2000). When I first read the magazine article, I thought that far too much print had been devoted to the story, and I was astonished that it later became a book. Now Abraham's book carries the even more astonishing story of a Paramount Pictures plan to make a movie of the Paterniti book.

One of the unfortunate features of Paterniti (2000) is a remarkable misunderstanding of what it was that Eddington supposedly observed at the solar eclipse in 1919. It appears on page 81, in the following words:

Thus comes one of the huge revelations: Matter and energy drive the bending of space-time. To verify it, and almost as a triumphant toss-off, he produces an equation predicting the exact shift of sunlight as it passes Mercury—approximately forty-three seconds of arc per century, says Einstein—the very equation that, to the astonishment of the world, Arthur Eddington confirms as correct after observing the 1919 eclipse in western Africa.

The quoted passage confuses two completely different phenomena associated with the General Theory: the anomalous advance of the perihelion of the planet Mercury is forty-three seconds of arc per century, and requires years of observations to measure; Eddington's observations were completed in about five minutes of total eclipse, and measured the shift of starlight as it passes the sun, not the shift of sunlight as it passes Mercury.

Eventually, Dr. Harvey returned Einstein's brain to the Princeton Medical Center in or about 1998, and it is interesting to read the descriptions of both Abraham and Paterniti of their subsequent visits to Dr. Elliot Krauss, pathologist at the Center and custodian of the brain. Both described how Krauss dismissed a paper that had been published about the brain, comparing it to phrenology. When Paterniti visited, Krauss had only had the brain for two days, and took it from under his desk to show it to him. When Abraham visited in February 2000,

Krauss asked her to step outside the office while he fetched the brain from a secret location (possibly under his desk) to show it to her.

It should also be mentioned that Einstein's eyes were removed by another doctor, and are kept in a safety-deposit box in a bank. In Paterniti's book they are in a bank in Philadelphia, in Abraham's they are in a bank in New Jersey; perhaps they may have been moved between the writing of the two books. It appears that Einstein's brain and eyes are being treated like relics of a saint instead of ordinary physical objects.

Personally, I am appalled at the indignity that has been done to the memory of Albert Einstein in the way that his brain has been treated, with so little contribution to knowledge as a result. I believe that Einstein would have felt that the treatment of his brain and his eyes, in the way described by Abraham in her book, was completely unacceptable, and I would urge those who have them in their possession to have them cremated and scattered as he wished to have done with his body.

Perhaps it might also be appropriate to express the hope that Stephen Hawking has stipulated very clearly what is to be done with *his* brain when he has no further use for it, since for obvious reasons it would be a very interesting brain to study.

One of the interesting features of Paterniti (2000, pp. 170–174) is the story of his visit to the Beverly Hills office of Roger Richman, “president of his own celebrity-licensing agency and the man who represents the beneficiaries of the estate of Albert Einstein, Hebrew University in Jerusalem.” Richman described Einstein as “the most widely recognized human being that ever lived,” and the scale of his Einstein operation may be judged from Paterniti's assessment:

Richman won't reveal how much money he and Hebrew University make annually from Einstein, but he admits it's more than from any other client, totaling somewhere in the seven figures.

Abraham (2001, pp. 278–279) also mentioned the Richman agency and described how Otto Nathan, three years before his death, had arranged with the agency to license Einstein's image for the benefit of the Hebrew University of Jerusalem:

The agent eventually told Nathan that Einstein was in such hot demand that the estate ought to have some control over the appropriate use of his image and receive some benefit for allowing it. For Nathan, as always, exercising some control was better than no control. He put Richman in touch with the Hebrew University. To this day, Einstein ranks as Richman's hottest property.

The Religious Significance of Relativity?

Another very interesting phenomenon that appears in connection with Einstein is the way in which scientists have tried to take over God from the religious communities, or to use God to sell their books about the scientific saint. An interesting example is Pais's description of the choice of the title of his first

biography of Einstein (Pais, 1982): ‘*Subtle is the Lord ...*’. Pais (1997) has described how his publisher was reluctant to use that title because the book would then end up on religion shelves in bookstores, to which Pais replied, “So what? That will mean selling even more books.” Subsequently there has appeared the book *God’s Equation*, by Amir D. Aczel (1999), in which there appears an equation (p. 218) described as “Einstein’s field equation with the cosmological constant, which is our best estimate of God’s Equation.” Aczel ends his book with the following paragraph:

Once each discipline is supported by developments in the others, we may begin to understand the ultimate laws of nature and to formulate our human estimate of God’s Equation. When the final equation is constructed, we should be able to use it to solve the wonderful riddle of creation. And perhaps that’s why God sent us here in the first place.

It seems very strange to me to suggest that God might have created us just so that we could spend our time trying to solve the problem of why he created us.

Another book that associates Einstein with religion is Corey S. Powell’s *God in the Equation* (2002). The link with Einstein appears in the subtitle: *How Einstein Became the Prophet of the New Religious Era*. The hyperbole seems even more intense than in most other books on Einstein, a typical sample of which appears in the first two sentences of the description on the book jacket:

We are living at a turning point in human spirituality—akin to when Jesus or Buddha or Mohammed was alive—and Einstein is its prophet. That is the audacious, provocative, and fascinating argument Corey Powell makes with dazzling eloquence in this extraordinary book.

The author makes somewhat extravagant claims about what he calls the Church of Einstein and the new faith of sci/religion that is associated with it. We are told (p. 246) that “The Church of Einstein is more authoritative and comprehensive than ever. Its spiritual power has eclipsed that of the old-time religions.” Many scientists apparently worship in the Church of Einstein; for example, we read on page 245: “At the American Astronomical Society, as well, there is more sci/religious zeal than the superficial sights and sounds indicate. Despite their reluctance to invoke overtly theological language, in their actions the current priests of sci/religion remain firmly committed to the Church of Einstein.”

The recent books about Einstein seem to be even more adulatory than the ones that appeared before his private life became public knowledge, and Einstein’s admirers still appear to be strongly motivated to enhance his eminence. Judging from many recently published books, several publishers have decided that a photograph of Einstein on the cover or Einstein’s name in the title or the subtitle is a sure way of selling a book; presumably it gives readers an impression that they must be very clever to be able to read a book that has some association with Einstein. Mentioning the deity in the title is an additional way of increasing sales.

Greatness and Celebrity

In any case, the big question is still: why is Einstein such a revered figure? Even if the astronomers had been justified in their claim at the famous Joint Meeting that the observations conclusively supported the general theory, it is still difficult to understand why the verification of such an abstruse scientific theory caught the imagination of the general public to such an enormous extent in 1919. A possible reason was given by Clive James (1993), who wrote that “Einstein achieved world fame, largely because of the popular though erroneous notion that his theories of relativity had some relevance to ordinary life.” Another interesting clue to his fame is a remark by Abraham Pais (1994, p. 139): “To Einstein applies *par excellence* the whimsical yet profound definition of a celebrity: a person who is famous for being well-known.” That statement forms an excellent link to Daniel J. Boorstin’s discussion of the difference between greatness and celebrity that comprises Chapter 22 (From Hero to Celebrity) of his book *Hidden History* (Boorstin, 1987). Boorstin uses a very similar phrase to the one used by Pais: “*The celebrity is a person who is known for his well-knownness.*” [Italics in the original.] Fame or celebrity can be manufactured; greatness can not, and one mark of the difference between a hero and a celebrity is given as follows:

The hero was distinguished by his achievement, the celebrity by his image or trademark. The hero created himself; the celebrity is created by the media. The hero was a big man; the celebrity is a big name.

It may be instructive to consider another famous person, whom Boorstin gives as a dramatic, tragic example of the distinction between greatness and celebrity: Charles A. Lindbergh. Like Einstein, Lindbergh became world-famous almost overnight, having performed one of the most spectacular feats of the Twentieth Century when he flew the Atlantic Ocean alone from New York to Paris. As Boorstin points out, “Except for the fact of his flight, Lindbergh was a commonplace person.” Boorstin records that, when Lindbergh returned to New York, “the *New York Times* gave its first sixteen pages the next morning almost exclusively to news about him” and goes on to say:

Lindbergh was by now the biggest human pseudo-event of modern times. His achievement, actually because it had been accomplished so neatly and with such spectacular simplicity, offered little spontaneous news. The biggest news about Lindbergh was that he was such big news. Pseudo-events multiplied in more than the usual geometric progression, for Lindbergh’s well-knownness was so sudden and so overwhelming. It was easy to make stories about what a big celebrity he was, how this youth, unknown a few days before, was now a household word, how he was received by Presidents and Kings. There was little else one could say about him.

Boorstin goes on to point out how Lindbergh remained a celebrity mainly because of two subsequent events: his marriage to Anne Morrow, daughter of the American Ambassador to Mexico, and the kidnapping and murder of his infant son. However, his celebrity eventually diminished rapidly, as explained by Boorstin:

Democratic faith was not satisfied that its hero be only a dauntless flier. He had to become a scientist, an outspoken citizen, and a leader of men. His celebrity status unfortunately had persuaded him to become a public spokesman. When Lindbergh gave in to these temptations, he offended. . . . His pronouncements were dull, petulant, and vicious. He acquired a reputation as a pro-Nazi and a crude racist; he accepted a decoration from Hitler. Very soon the celebrity was being uncelebrated.

Galbraith (1990) had a satirical explanation for this phenomenon also: "In all these cases there was a lesson: find out who in any euphoric episode is the greatest hero, who is the most celebrated, and invest in his eventual fall."

Like Lindbergh, Einstein's celebrity status was maintained by subsequent events, the main ones being his flight from the Nazis and his immigration to America, his letter to President Roosevelt about the nuclear bomb, and the development and use of the bomb. As in Lindbergh's case, society was not satisfied that its hero be only a clever scientist; Einstein was for the rest of his life taken to be a kind of oracle whose opinion was valuable in all fields of life, not just in physics. That may have been an undesirable result of his fame also, because the opinions of scientists outside their specialties are not necessarily any better than those of ordinary people. A rather strong statement to that effect was made by Jacques Ellul (1964, p. 435):

We are forced to conclude that our scientists are incapable of any but the emptiest platitudes when they stray from their specialties. It makes one think back on the collection of mediocrities accumulated by Einstein when he spoke of God, the state, peace, and the meaning of life. It is clear that Einstein, extraordinary mathematical genius that he was, was no Pascal; he knew nothing of political or human reality, or, in fact, anything at all outside his mathematical reach. The banality of Einstein's remarks in matters outside his specialty is as astonishing as his genius within it. It seems as though the specialized application of all one's faculties in a particular area inhibits the consideration of things in general.

Hook (1987) also criticized Einstein's opinions in fields other than science. In his chapter "My Running Debate with Albert Einstein" he said "there is a tendency, especially in modern times, to give undue weight to the political judgments of great figures in art, literature, and science." He felt that the tendency was greater in the case of scientists, "primarily because their vocation seems to express the quintessential practice of rationality."

Why is Einstein so Famous?

It still seems difficult to understand why Einstein has held the attention of the world for so long. Was he just a celebrity, or was he really a great man? McCrea (1973), who was an admirer of Einstein and a strong defender of relativity against its critics, wrote: "I think he was certainly not in the class of Newton, and personally I question whether he was as great a scientist as Faraday or Maxwell or Rutherford or Bohr." Yet those scientists did not become especially famous for their accomplishments. As Missner (1985) pointed out:

Einstein's achievements, as great as they were, cannot be used to explain why other scientists whose achievements were of at least similar magnitude, such as Niels Bohr and Werner Heisenberg, did not gain any public recognition at all.

It is interesting to compare McCrea's opinion with the following assessment by Cornelius Lanczos (1965):

He discovered a host of other basic results in theoretical physics and it has been pointed out more than once that if somebody asked: "Who is the greatest modern physicist after Einstein?" the answer would be: Einstein again. And why? Because, although the theory of relativity in itself would have established his fame forever, had somebody else discovered relativity, his other discoveries would still make him the second greatest physicist of his time.

That is a remarkable statement; it immediately makes every other modern scientist, no matter how eminent, drop to third place or lower, behind Einstein and "Zweistein."

A reviewer (Anonymous, 1974) of another adulatory book by Lanczos made the following comment:

No doubt we can easily forgive the author's over-anxiety about the status of his hero, but the constant jumping-up-and-down exhibited by recent writers on Einstein is too desperate by far and too noisy. They protest too much. Surely Einstein himself, it is safe to assume, is waiting serenely and quietly for everything to take its proper place.

What *is* the proper place for everything to take? Even Einstein did not expect his theory of relativity to last for ever; his own opinion was stated in *The Evolution of Physics* (Einstein and Infeld, 1938) as:

There are no eternal theories in science. It always happens that some of the facts predicted by a theory are disproved by experiment. Every theory has its period of gradual development and triumph, after which it may experience a rapid decline.

In a review of another book on Einstein, McCrea (1982) wrote: "Actually, two chapters seem still to be missing from all the books about Einstein. One of these would tell of his fantastic *luck* in his scientific work—using the word as in ordinary parlance." [Italics in the original.] He went on to say: "Einstein was one of the greatest physicists who ever lived, but even Einstein's scientific career depended for much of its success upon countless circumstances beyond his control."

Einstein was indeed lucky in at least two instances: first, it was the prestige of Max Planck that helped to establish his Special Theory, and second, it was the prestige of Dyson and Eddington that caused the eclipse measurements (which were themselves "sheer luck") to be accepted so readily at the joint meeting in 1919.

One of the main reasons for Einstein's continuing to be such a celebrity, nearly a century after the publication of his first paper on special relativity, is that the news media have kept his fame alive. For example, *Time* magazine awarded him the status of Person of the Century in December 1999. An amusing token of the incomprehensibility of his work may be noted in a photograph

accompanying the article by Hawking (1999) in the "Person of the Century" issue. The photograph, which shows Einstein lecturing in Paris in 1922, is printed the wrong way round so that the equations on the blackboard run from right to left! Correctly printed copies of the same photograph can be found in Pais (1982, after p. 272) and Fölsing (1997, after p. 242).

Einstein has even been voted Person of the Millennium. A Canadian newspaper, *The Globe and Mail*, published the results of a readership survey on January 2, 1999, with Einstein as the readers' choice as the person who had "the most impact in the past 1,000 years." The same newspaper published on January 1, 2000, the results of another survey in which readers voted for their person of the millennium; in this case, Johann Gutenberg (who had been eighth in the earlier survey) was first and Einstein second.

It is reasonable to suggest that, of all the people who voted for Einstein as Person of the Century or the person who had "the most impact in the past 1,000 years," very few really understood what Einstein really accomplished and exactly what impact his accomplishments have on their daily lives. Public perception of the various choices for the person of the period in question is strongly based on what the media say about the candidates and on the persuasive powers of those who solicit support for them in the voting. As an example of what can happen when greatness is measured by voting, and an illustration of the difference between greatness and celebrity, consider a nationwide poll held by the British Broadcasting Corporation in 2002 to find the greatest Briton, the results of which were given in *The Times* of London (on-line edition, November 25, 2002). Winston Churchill came first. Isambard Kingdom Brunel came second, his candidacy having been helped by an organized campaign by students at Brunel University. Diana, Princess of Wales, came third, followed by Charles Darwin, William Shakespeare, Isaac Newton, Queen Elizabeth I, John Lennon, Horatio Nelson, and Oliver Cromwell, in that order.

Einstein's fame has also been kept alive by elaborate and widespread celebrations in 1979 of the hundredth anniversary of his birth. Several books were published in honor of the occasion, but they were not all of uniformly high quality. One frustrated reviewer (Hendry, 1982) made the following comment in a review of three commemorative books about Einstein that were published at about that time:

Question: How do you induce a perfectly sane and intelligent person to talk absolute rubbish?

Answer: Ask him or her to talk about Einstein.

No doubt there will be many more books and articles published in connection with the centennial of Einstein's Miraculous Year, and it will be interesting to see how the quality and quantity compare with those published for the centennial of his birth. Although it appears from the publicity for the current Einstein Exhibition that the darker side of Einstein's personal life is being portrayed, it still seems doubtful whether there is to be an objective appraisal of the

observations at the 1919 solar eclipse. If there is to be a celebration of the hundredth anniversary of the 1919 eclipse and the Joint Meeting, as presumably there will be, it is to be hoped that an honest assessment of the eclipse observations will be clearly made known in whatever celebrations take place at that time.

Why is Albert Einstein so famous? A typical attitude of perplexity was well expressed by Rowe (1973) in the last paragraph of his interesting review of Clark's biography:

I must confess I have not reached a wholly satisfactory answer to the problem of why Einstein was, is, and is likely to be for centuries to come, one of the immortals. If the reader tries to find a solution he will find the task more absorbing than any detective story.

I share Rowe's perplexity, but not his opinion of the longevity of Einstein's towering reputation. Although there are many features of Einstein's story that can be adduced to try to explain his enormous and continuing fame, that fame is so overwhelming that no explanation seems completely satisfactory. It is indeed an absorbing and fascinating story and, like Rowe, I commend the problem to the reader for further study.

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Editorial Comment

Reviewers of this manuscript were unanimous in judging its content likely to interest readers of this journal. There was disagreement, however, as to whether Einstein's fame or mystique is anomalous and, therefore, requiring special explanation. The disagreement runs more or less along disciplinary lines. It may be natural for engineers and scientists to presume that fame and public image should be approximately commensurate with some objective assessment of an individual's achievements; social scientists, on the other hand, find reasons for fame in other directions as well. McCausland argues that the Einstein mystique exceeds Einstein's substantive accomplishments and is therefore anomalous; this is what one might call a logical-positivist perspective. By contrast, some reviewers pointed out that sociologists, and particularly students of popular culture, would find nothing remarkable about mystique exceeding objective measures.

One salient point is that the media delight in—they cannot do without—celebrities. Seeking celebrities among scientists, almost automatically the media have looked to physics. A physicist whose theory superseded that of Newton—universally acknowledged one of the very greatest scientists of all time—would therefore seem a most natural candidate for unlimited adulation. Since Einstein was also photogenic and apparently willing to be an amiable guru, why look any further? Detailed and subtle arguments as to originality, significance, etc., are of little or no interest to the media (unless, of course, something scandalous or controversial can be made out of them).

The eclipse observation of 1919 was announced as a proof of general relativity. That it may not have been in fact conclusive, that hindsight is less impressed, is beside the point: leading scientists announced it as definitive proof of a new understanding of the universe. Add the romanticism of an obscure patent clerk outdoing established professors with a theory described as understandable to only a dozen people in the world. What more could the media want?

During the 1920s, the award of a Nobel Prize will have reinforced Einstein's place on the pedestal. That the Prize was not for relativity could be seen, not as any discounting of relativity theory, but as an additional proof that Einstein was a genius, able on a variety of topics to accomplish things that others could not.

In the 1930s, mix in the escape of a prominent Jew from Nazi persecution. In the mid-1940s, add the revelation that Einstein helped to win WWII, first by having conceived " $E = mc^2$ " and then by persuading President Roosevelt to build a bomb.

Thus, social circumstances make it appear anything but anomalous that Einstein was widely viewed as the leading scientist in the world for most of the first half of the 20th century. A discrepancy similar to that alleged by McCausland in the case of Einstein, between objective scientific accomplishments and fame, is also evident in the cases of various other popularly celebrated scientists, for example: Stephen Jay Gould, Stephen Hawking, Carl Sagan.

It is perhaps easier to discern outside science, just how disconnected can be social prominence and objective achievement: among business CEOs, personalities of stage and screen, managers of mutual funds. . . . Few computer scientists believe that Bill Gates contributed much, if anything, to the theory or practice of computing, for instance.

It is a social fact that fame and accomplishment, even in science, are at best only loosely correlated.