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The Story of O from Giotto to Einstein (Excerpt*)

Vasari, Life of Giotto:

„... the work brought Giotto such fame in that city and elsewhere, that Pope Benedict IX [*recte*: Boniface VIII], who was proposing to decorate St. Peter's with some paintings, sent a courtier from Trevisi to Tuscany, to see what manner of man Giotto was, and the nature of his work. On the way the courtier learned that there were other excellent masters in painting and mosaic in Florence, and he interviewed a number of artists at Siena. When he had received designs from these, he proceeded to Florence. Entering Giotto's shop one morning, as he was at work, the envoy explained to him the Pope's intention, and the manner in which he wished to make use of his work, and finally asked Giotto for some small drawing to send to His Holiness. Giotto, who was always courteous, took a sheet of paper and a red pencil [*recte*: brush dipped in red, *un pennello tinto di rosso*], pressed his arm to his side to make a compass of it, and then, with a turn of his hand, produced a circle so perfect in every particular that it was a marvel to see. This done, he turned smiling to the courtier and said: "Here is the drawing." The latter, who thought he was being mocked, said: "Am I to have no other design but this?" "It is enough and more than enough", replied Giotto; "send it in with the others and you will see if it obtains recognition." The messenger perceived that he would get nothing else, and left in a state of considerable dissatisfaction, imagining that he had been laughed at. However, when he sent in the other designs with the names of their authors, he included that of Giotto, and related how the artist had executed it without moving his arm and without compasses. From this the Pope and many of the well-informed courtiers recognised to what an extent Giotto surpassed all the other painters of the time in excellence. ... Accordingly the Pope sent for Giotto to Rome, where he received him with great honour, and recognised his worth. He caused him to paint for the choir of St. Peter's five subjects from the life of Christ, and the principal picture for the sacristy, all of which were executed with great care,

* Excerpted from an essay that will form part of my Mellon Lecture series at the National Gallery of Art, Washington, in April 2004. First presented at a symposium honoring Christoph Frommel at the Bibliotheca Hertziana, Rome, October 2001.

1 „quell'opera gl'acquistò in quella città e fuori tanta fama, che Papa Benedetto IX da Trevisi mandasse in Toscana un suo cortigiano a vedere che uomo fusse Giotto e quali fossero l'opere sue, avendo disegnato far in S. Piero alcune pitture. Il quale cortigiano, venendo per veder Giotto et intendere che altri maestri fussero in Firenze eccellenti nella pittura e nel musaico, parlò in Siena a molti maestri. Poi, avuto disegni da loro, venne a Firenze et andato una mattina in bottega di Giotto che lavorava, gl'espose la mente del Papa et in che modo si voleva vale-



Fig. 1: Ferdinand Schmutzer: Portrait of Einstein, etching, sixth state (after Weixlgärtner).

and no more finished work in tempera ever left his hands; thus he richly deserved the reward of 600 gold ducats which the delighted Pope gave to him, bestowing many other favours upon him, so that it became the talk of all Italy.⁴¹

I want now to perform what the Italians call a *salto mortale* from early fourteenth century Florence to twentieth century Vienna, where the O that Giotto drew to represent the all-encompassing capacity of his art, reappeared, at least so I believe, in a radically new and different context. The leap is not quite so risky as it might seem because if the connection I want to make succeeds,

Rembrandt will provide the safety net (Plate 2). In January 1921 there took place in Vienna an amazing and famous event. Albert Einstein, who was by then probably the most glamorous man on earth – more so, I bet, than Rudolf Valentino himself –, visited Vienna to give two lectures on his theory of relativity. Part of the glamour of Einstein, like that of Valentino, was the romantic air of mystery that surrounded him; in Einstein's case for two main reasons: One was that he had propounded a revolutionary theory about the universe, which, it was said, only a bare handful of people in the world could understand. The second was that not long before observable, objective evidence had been found that demonstrated that his theory was actually true! The visit itself became

re dell'opera sua et in ultimo gli chiese un poco di disegno per mandarlo a Sua Santità. Giotto, che garbatissimo era, prese un foglio et in quello con un pennello tinto di rosso, fermato il braccio al fianco per farne compasso e girato la / mano, fece un tondo sì pari di sesto e di profilo che fu a vederlo una maraviglia. Ciò fatto, ghignando disse al cortigiano: « Eccovi il disegno ». Colui, come beffato, disse: « Ho io a avere altro disegno che questo ? ». « Assai e pur troppo è questo, – rispose Giotto – mandatelo insieme con gl'altri e vedrete se sarà conosciuto ». Il mandato, vedendo non potere altro avere, si partì da lui assai male sodisfatto, dubitando non essere uc[c]ellato. Tuttavia, mandando al Papa gl'altri disegni et i nomi di chi gli aveva fatti, mandò anco quel di Giotto, raccontando il modo che aveva tenuto nel fare il suo tondo senza muovere il braccio e senza seste. Onde il Papa e molti cortigiani intendenti conobbero per ciò quanto Giotto avanzasse d'eccellenza tutti gl'altri pittori del suo tempo.”

Giorgio Vasari: *Le vite*, A cura di R. Bettarini, P. Barocchi, Florenz 1966, Bd. 1, S. 103f.

famous because the wife of the distinguished physicist in whose house Einstein stayed, recalled that he had forgotten his bedroom slippers and only brought one white collar, both of which she went to the store and bought for him. He had brought a change of trousers, both of which were wrinkled so she pressed one pair for him to wear at the great occasion.

The first lecture, on January 9, was very technical and took place at the university at the invitation of Einstein's good friend and colleague Felix Ehrenhaft. The second lecture, the one that concerns us, was at the invitation of the prestigious association of

science lovers, the Urania, and took place on January 13 in an auditorium ordinarily reserved for public performances. The auditorium, with 3000 seats was filled to more than capacity. When he came to the lecture Einstein was wearing the dirty collar and the wrinkled pair of trousers, and he was too frightened to go to lectern unless his friend accompanied him. The lecture itself became famous for two reasons reported those who heard it. No one in the room understood anything of what he was saying; and he delivered the lecture in such a monotone, without emphasis or modulation of any kind and finally simply walked away from the lectern without a word of conclusion. Only after the speaker failed to reappear did the audience realize that the lecture was over, whereupon they applauded politely and went home.

I have so far been unable to learn the actual content of this "popular" presentation, except that unlike the specialized paper at the university, the Urania lecture was about the general theory of relativity. This is confirmed also by a visual record of the occasion, in the form of an etched portrait of Einstein executed in 1921 by the Viennese portraitist Ferdinand Schmutzer (fig. 1, 2). Largely forgotten today, Schmutzer was one of the most successful portraitists of the day, recording many of the important figures of the city, especially intellectuals, and many Germans, including the Emperor himself. Einstein is shown as if he were giving a lecture, with lightly sketched drawings on the blackboard behind

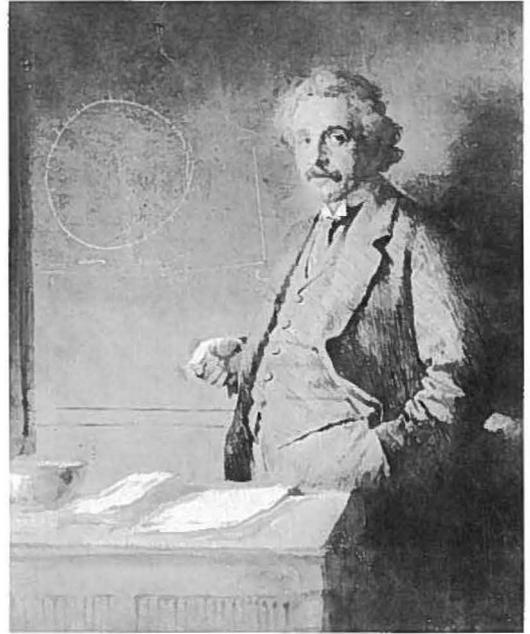


Fig. 2: Ferdinand Schmutzer: Portrait of Einstein, etching, artist's proof (after Martin).



Fig. 3: Ferdinand Schmutzer: Self-portrait, etching, 1909 (after Weixlgärtner).



Fig. 4: Ferdinand Schmutzer: Photograph of Einstein.

him, including mainly a large circle and an ellipse. Let me say at once that this striking recollection of Rembrandt and the graphic tradition stemming from Giotto's O that lay behind him, was by no means fortuitous. It is evident from every other aspect of the portrait of Einstein itself, and from every aspect of Schmutzer's work generally, that he was a profound, like-long student of Rembrandt, especially his portraiture. Without the example of Rembrandt's *Self-portrait at Kenwood*, the portrait Schmutzer made of himself in 1907, at work in his studio with a large circle drawn on the back wall, is inconceivable (fig. 3).

All this seems obvious, at least to me. What I want to consider, however, is the nature and content of Schmutzer's image, which I seriously doubt is a record of what took place at Einstein's lecture. In the admittedly scant reports no mention is made of a blackboard or of Einstein illustrating his talk in any way. And from what we are told of his lecture style on that occasion, at least, it seems very unlikely that he made any rhetorical gesture at all, visual or verbal. The most important evidence I have found for Schmutzer's creative process in this case suggests to me, at least, that he was one of those few who did understand the three basic principles on which the proof of Einstein's reformulation of the universe rested. During Einstein's visit Schmutzer took the three photographs

of him, two of which are rather formal: Einstein standing, rather dapper in his overcoat and hat, and what looks to be a clean collar, looking at the camera; Einstein seated, coatless and hatless, gazing wistfully into the distance (fig. 4, 5). The third photograph, certainly made on the same occasion and no less obviously staged than the others, was clearly made in preparation for the etching (fig. 6). Einstein, evidently rather amused by the situation, stands with one hand resting on the table before him, the other holding a stick of chalk. On the slate behind him are boldly and distinctly drawn two of the features that reappear more sketchily in the etching, the circle and the Kt coordinates. I have so far found no record of their meeting or of what must have been an interesting photography séance in Schmutzer's studio. We shall never know for sure who drew those marks, Einstein or Schmutzer, but in addition to reversing them Schmutzer changed them significantly in the etching (fig. 7, 8). A diagonal ellipse with a longitudinal axis was added above and a smaller coordinate scale was added beside the first. And the circle has now acquired a series of radiant marks along the left rim; these make it quite clear that the reference is to the stupendous observations made by Arthur Eddington on an expedition to West Africa in 1919 to test the theory by studying an eclipse of the sun, which showed that, as Einstein predicted, rays of light were indeed bent by the force of gravity – reported immediately around the world, proof number one that the theory was right. But rather than go on myself about things I do not really understand, I will read to you from a note I received from a physicist colleague of mine, one of the successors

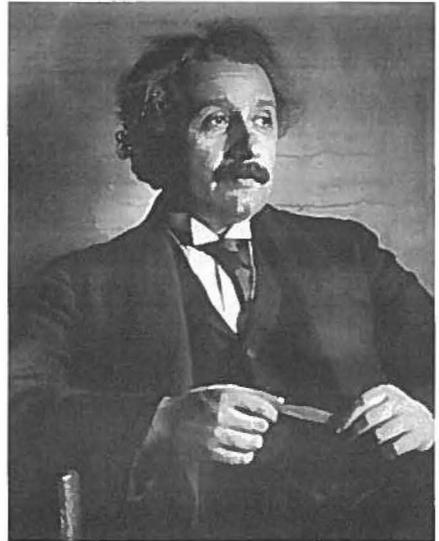


Fig. 5: Ferdinand Schmutzer: Photograph of Einstein.

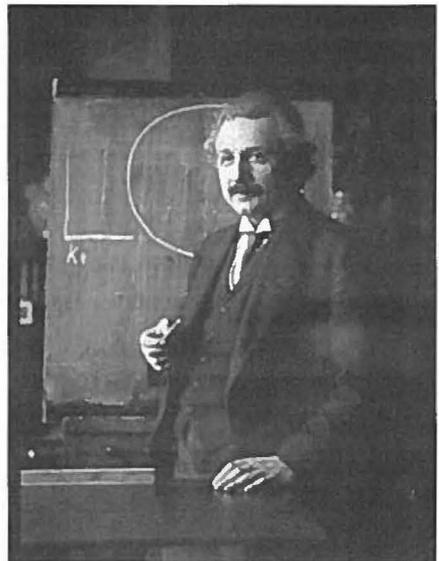


Fig. 6: Ferdinand Schmutzer: Photograph of Einstein.

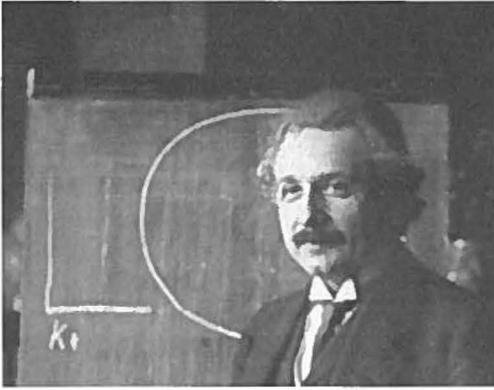


Fig. 7: Ferdinand Schmutzer: Photograph of Einstein, detail.



Fig. 8: Ferdinand Schmutzer: Portrait of Einstein, etching, artist's proof, detail (after Martin).

to Einstein at the Institute, after I showed him a rather poor photocopy of the etching and convinced him to take the sketches seriously.

E-Mail from Steve Adler, Monday 13 August 2001:

Dear Irving,

Just to recapitulate some of what we talked about.

1. Two elements of the picture – the ellipse, and the circle, seem to refer to general relativity. The perihelion precession of Mercury is discussed on page 253, 255 of Pais's book "Subtle is the Lord". In November 1915 Einstein wrote a paper showing that his new theory of general relativity explained the precession of the elliptical orbit of Mercury, which had been a mystery for more than sixty years. (Precession means that the major axis of the ellipse rotates very slowly in direction, rather than being fixed as would be predicted by Newtonian theory.) In the same paper, he predicted the bending of starlight near the limb of the sun, getting a value twice what he had obtained earlier. On pages 303–306 Pais describes how Einstein became a world celebrity after the eclipse experiment in the fall of 1919 confirmed the starlight bending prediction. Thus, by the time of your print in 1921, Einstein's successes in general relativity were well-known to the world at large. (Einstein received the 1921 Nobel Prize, but this was announced only on Nov. 9, 1922, presumably after the date of your print.)

2. The two sets of axes may well refer to special relativity. Einstein's famous June 1905 paper is reprinted in English translation in a little Dover Press Book entitled "the Principle of Relativity". The paper, entitled "On the Electrodynamics of Moving Bodies", is his first exposition of special relativity. In the paper (see page 43 of the reprint) he talks about transformations between a moving system (k) and a stationary system of axes (K). (He uses x, y, z, t to label the three spatial coordinates and time, as usual. In the German version

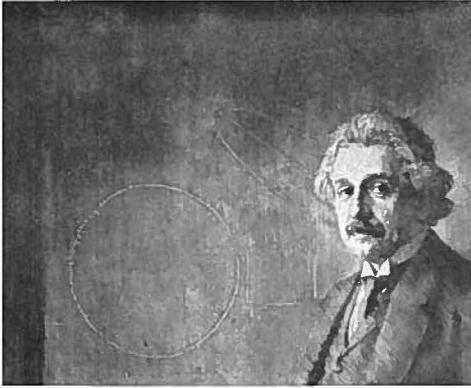


Fig. 9: Ferdinand Schmutzer: Portrait of Einstein, etching, sixth state, detail (after Weixlgärtner).

coordinate system is Koordinatensystem – hence the K.) So that would suggest that the right angled axis set, with the k (or K) near it, is a reference to his special relativity theory. (I'm amazed – I didn't expect to find the k/K !)

I'll send you Xerox copies of the things I've quoted. If you want to see the books, Layla Wieczorek in Bldg. D can get them for you from my office; I'll leave them on the table in front of the couch in my office. The original German is in an issue of *Annalen der Physik* which Momota Ganguli keeps in her office. Best Steve

In the revisions he made to the simple diagrams on the back wall, Schmutzer succeeded in combining in one image references to General and Special Relativity, and the peculiar orbit of Mercury, i.e., the two main points of Relativity and the two proofs: the bending of light and the precession of Mercury. It is interesting to note, finally, that the etched portrait of Einstein went through no less than six states, of which I have obtained reproductions of the first (fig. 2, 8) and the last (fig. 1, 9). The designs on the back wall remain throughout, but one of the main changes in the sequence of etchings is that the drawings, now scientifically more meaningful, become more regular and distinct, more geometrically "correct" as in the less comprehensive figures in the photograph that evidently preceded the lectures (fig. 7, 8, 9). One might say that here, almost exactly six centuries later, the perfect, all encompassing universe Giotto envisaged with his O, met its match.



Tafel 2: Rembrandt: Self-Portrait, ca. 1660, Kenwood House, London.



Tafel 3: Thomas Gainsborough: Selbstporträt, ca. 1787, Öl auf Leinwand, 74,9 x 61,0 cm, Royal Academy of Arts, London.