

How Leonardo did *not* fake the *Shroud of Turin*

Nicholas Peter Legh Allen (1995)

In this paper, I repudiate the recently popularised conjecture that the High Renaissance artist and scientist, Leonardo da Vinci conceived and manufactured the *Shroud of Turin* in Milan in 1492.

On the dust jacket of a recently published book, entitled *Turin Shroud: In whose image? The shocking truth unveiled*, is the sensational declaration:

This book answers three questions which have confounded experts through the ages:

HOW was the Turin Shroud created?

WHO created the Shroud?

WHOSE face appears on the Shroud?

Through the vehicle of this publication, the co-authors, Lynn Picknett and Clive Prince, strive to demonstrate, that the present day *Shroud of Turin* (that well known relic which contains both the frontal and dorsal photo-negative 'imprints' of a tortured man and which is still believed by many to be the

burial cloth of Jesus Christ), was in fact forged by none other than Leonardo da Vinci in 1492!

Within this context alone, these two co-authors, have the insurmountable task of convincing their readers that the *Shroud* at Lirey (c 1357-1418) and the *Shroud* at Turin (1578-1994) are not the same artifact.

Moreover, in the light of my own research (Allen, 1993a; 1993b; 1994a and 1994b), which has already postulated the theory that the *Shroud of Lirey-Chambery-Turin* was produced by means of a primitive form of photographic technology well before 1350, I was astounded to discover that these authors also specify photography as the very means by which Leonardo manufactured this relic. The book's blurb claims that

Perhaps most remarkably of all, they [Picknett and Prince] have replicated the technique by which the Shroud was created. This book explains this.

This declaration could of course, be considered somewhat malapropos, since it is a field of inquiry that has already been well covered in my many public lectures and publications over the past two years (as of 1995), all of which have elucidated the more plausible methods and techniques that were employed by medieval 'photographers' some five centuries before the time of Thomas Wedgwood.

However, in all fairness, the co-authors do not profess to be the originators of the afore mentioned conjectures, rather, they valiantly attempt to interpellate the sensational claims made by the particularly loquacious representative of an ancient secret society called the Prieur de Sion, which incidently, (according to Baigent, Leigh and Lincoln, 1991), was responsible for (amongst other things), the creation of the Knights Templar movement in the early twelfth century.

For those readers who are not familiar with the terrain, it should perhaps be pointed out that the pedigree of the *Shroud of Lirey-Chambery-Turin*, or if you prefer, the *Sudaria Christi* is relatively well documented back to the year 1389, when the then Archbishop of Troyes, Pierre d' Arcis wrote his famous *Memorandum* to the anti-pope Clement VII, in which he requested that the *Shroud's* owners (at that time being Jeanne de Vergy and her son Geoffroi II de Charny), be forbidden to hold religious expositions at the Collegiate Church in Lirey.

One of the main reasons for d' Arcis's letter is perfectly clear, viz: the *Shroud of Lirey* was luring pilgrims and their much sought after money away from the coffers of the Cathedral at Troyes situated some 20 kilometres to the north-west. Notwithstanding, d' Arcis, irrespective of his real motives, employs good old fashioned rhetoric to convince the anti-pope of the *Shroud's* unworthiness as an object of devotion and informs his sacerdotal reader that the self-same *Shroud* had been previously condemned as undesirable some 'thirty-four years or thereabouts' (Wilson, 1991:15) before his own time (*ie* 1389) by his predecessor, Archbishop Henri de Poitiers.

Picknett and Prince, in their attempt to give credence to their theory (*ie* the *Shroud* was exchanged in 1492), set out to prove that the known pre-1492 descriptions of the *Shroud* (both textual and visual) do not concur with the appearance of this relic as viewed today. In this regard their 'argument' revolves largely around two main pieces of 'evidence', viz: The above cited *Memorandum* of Pierre d' Arcis to Clement VII and a lead pilgrim badge, commemorating an exposition of the *Shroud* at Lirey in the fourteenth century and which was discovered in the Seine as recently as 1855.

In his *Memorandum*, Pierre d' Arcis mentions that his predecessor, Henri de Poitiers, discovered that the *Shroud* (at Lirey), was a forgery and

how the said cloth had been cunningly painted, the truth being attested by an artist who had painted it, to wit, that it was a work of human skill, and not miraculously wrought or bestowed (Wilson, 1991:15).

From this translated statement, Picknett and Prince infer that the *Shroud* (while at Lirey), originally contained a painted two-fold image of Christ, which somehow proves that the present photographic image on the *Shroud of Turin* must be a later product.

I cannot, in any way, accept this line of reasoning. For one, this sole statement by a man (d' Arcis) who might well have never seen the *Shroud* himself, is not valid evidence that the *Shroud of Lirey* was a painted cloth in opposition to the negative, pigmentless image we associate with the Shroud of Turin today. After all, if the *Shroud* was (as I suspect), produced by means of either Byzantine, Venetian or Islamic photographic technology, prior to 1350 (Allen, 1993a and 1993b), then who (living in France in the late fourteenth century), would have had the necessary words to describe what they saw? Should we not, rather, be asking why d' Arcis goes to some trouble to explain why the image is not really as 'miraculous' as people at that time supposed it to be? Why employ such terminology if the image was so obviously painted?

In addition, the authors themselves make mention of the important fact that when the *Shroud* was briefly exhibited at Liege in Belgium in 1449 (Wilson, 1978:241), a commission instituted by the local Bishop examined the cloth and determined that it was painted. What painted cloth needs a commission to decide whether it is painted, unless the image is so atypical as to demand closer examination?

The other piece of evidence that Picknett and Prince subpoena, concerns the well known lead pilgrim medal, which

is a crude visual souvenir of one of the numerous *Shroud* expositions held at Lirey (presumably no earlier than 1355 and certainly no later than 1418). In support of this interpretation, this medal clearly shows both the coat of arms of the man who is believed to be the first owner of the *Shroud*, viz: Geoffroi I de Charny (died 1356) as well as his wife Jeanne de Vergy (Wilson, 1991:21-6, 78-9).

Picknett and Prince contend, that the image depicted therein is not identical to the image which we have now come to associate with the *Shroud of Turin*. Again this opinion is highly questionable.

By their own acknowledgment, it is hardly fair to expect a medieval craftsman to accurately recreate on a diminutive piece of lead, the image we see today (Picknett and Prince, 1994:108-9).

Even so, despite these restrictions, this anonymous craftsman has still managed to portray (albeit stylistically) a rectangular support containing a two-fold depiction of a man with his arms crossed over his pelvic region, such that it corresponds to the present day image. In addition, the artist has carefully described the herringbone weave which is characteristic of the present day *Shroud of Turin*. Nonetheless, despite these striking correspondences, Picknett and Prince (1994:109) make the following statement,

There is one feature, however, that is clearly visible on the medal that is *not present* on the Turin Shroud - a curious thick twisted band, like a rope, across the width of the cloth at the small of the figure's back. What this is is anybody's guess.

What these authors fail to tell their readers, however, is that on the medal, a 'thick twisted rope' not only traverses the small of the dorsal figure's back, but may also be observed as an ambiguous relief pattern to either side of the feet in both

the dorsal and the frontal impressions. All of these patterns, including the 'twisted rope' run at right angles to the direction of the body image.

Is it not interesting that on the *Shroud of Turin* may be found a line of trickled blood running across the small of the back of the dorsal image and that the scorch marks which now appear on the cloth (as a result of fire damage in 1532), may very well conceal the continuation of this pattern beyond the boundaries of the figure itself? Blood is trickled quite freely at the site of the feet, more so on the dorsal image than the frontal depiction. This latter feature is reflected quite accurately on the lead pilgrim medal from Lirey. As an aside it is also worth mentioning here, that when the Clarisses repaired the *Shroud* after the fire of 1532, they remarked at the time about what they perceived to be 'chain marks' running across the small of the back of the image! If, as these authors assert, the *Shroud* had been switched by 1492, then what were the Clarisses referring to, between the years 1532-4? After all, no 'chain marks' appear on the *Shroud of Turin* today, so quite obviously the Clarisses misinterpreted the line of trickled blood as did the anonymous artist who produced the pilgrim medal before 1418.

Why do these authors attempt to mislead their reader on this issue if not to gain credibility for the highly speculative theory that Leonardo forged the image on the *Shroud* a full 135 years after it first came to light? Couple to this, the fact that the recent 1988 carbon dating strongly supports a date for this piece of cloth (*ie* 1260-1390), which pre-dates (at the very worst) Leonardo's birth by 62 years and we are left in no doubt that the Prieur de Sion 'theory' has little or no foundation.

It is important to note, that the authors do not overtly take issue with the validity of the carbon dating (1994:21-2), instead, they subtly emphasize that the dating indicated (with

a 99.9 per cent certainty) a date between the period 1000-1500. However, this five hundred year range encapsulates a far narrower and more likely 130 year period for the *Shroud's* production, viz: 1260-1390. Indeed, based on this statistical principle, the most probable date would have to be somewhere between about 1250-1325, whereas dates approaching the years 1000 or 1500 respectively, would have to be (statistically) the least likely candidates. The co-authors conveniently gloss over this point in order to favour a year (1492), which in fact falls within eight years of the least possible date. In this context, Picknett and Prince's (1994:79) loaded statement should be ignored, viz:

The carbon dating results told us the period of history we should be concentrating on, and immediately we realised that not only did this timespan include the heyday of faked relics, but it also included the lifespan of Leonardo da Vinci.

Firstly, Leonardo da Vinci died in 1519 (nineteen years beyond the timespan indicated *ie* 1000-1500) and secondly, if the carbon dating 'told' them the period of history with which they should focus on, then why do they employ the same carbon dating data to cast dispersions on the assumptions of those persons (such as Currier-Briggs) who believe the *Shroud* to date from before or around 1204?

In truth, the only way that one could accommodate Picknett and Prince's notions, would be to assume that Leonardo da Vinci, in the year 1492, somehow removed the original painting on an antique piece of linen of middle eastern origin (Allen, 1993b:250-52) and then, in a single attempt, making no mistake, produced his own photographic image, all the while risking the loss of a sacred relic that only 21 years previously had been heralded by Sixtus IV as the true shroud of Christ.

If we accept this absurdity, we must also accept that the Savoy family, who had already spent fifty gold franks in 1464 to ratify their ownership of the *Shroud* and who were busy enlarging and upgrading their Church at Chambery between 1471-1502 for the express purpose of housing their prize possession, willingly sent it out of their jurisdiction to be tampered with by an artist living in Milan.

Nonetheless, by far the most disappointing aspect of this book concerned the rather dubious 'experiments' that the co-authors undertook in their endeavours to give credibility to the Prieur de Sion photographic hypothesis. Having been most careful myself not to release anything on my own original work in this field until I was absolutely sure of my facts, I was perturbed by the *laisser faire* manner Picknett and Prince went about procuring their 'Shroud' image on linen. The following statement (1994:163), sums up their attitude

We must say straightaway that there is no evidence that this particular solution was used in Leonardo's day, still less by the maestro himself. It is, however, not impossible that it was. We were more concerned to find a method that worked, chiefly because there are so many possible substances that might fit the bill, that finding and testing them all would take far more time than we had available.

This statement, of course, contradicts the very claims made on the dust cover of their book. Furthermore, as a direct result of my own investigations, I know that only two light sensitive 'substances' could have been employed by these hypothetical 'photographers' (medieval or renaissance for that matter), viz: silver nitrate and silver sulphate. Only by employing either of these substances, which may both be safely traced back to the end of the thirteenth century and perhaps even before (Mellor, 1922:459), is it possible to produce a photo-chemically induced scorch (oxidisation) on a piece of organic material by the action of sunlight. In addition, once the requisite image

quality has been obtained, all silver salts may be removed by simply soaking the cloth in dilute ammonia. This action effectively strips away all of the light sensitive reagent leaving behind nothing except oxidised cellulose. Other substances such as silver chloride, which were also available by the end of the thirteenth century are not suitable for this technique as they do not produce an image which conforms to the image formation characteristics as found on the *Shroud of Turin* and which were documented by the STURP committee in 1978.

I have found that it is possible to duplicate the enigmatic photo-negative images as found on the *Shroud of Turin* by employing a corpse or life-cast (painted white) which is placed vertically in the sunlight such that it receives an equal amount of morning and afternoon light. This 'corpse' must be placed opposite the aperture of a large *camera obscura*, inside of which is placed a vertical screen which supports the linen cloth. This cloth (which may be made of any organic material) is prepared beforehand by being soaked in either diluted silver nitrate or diluted silver sulphate and then air-dried in a light-proof environment. I now find that silver sulphate produces the best results because (unlike silver nitrate) it only oxidises organic material in the presence of UV radiation.

The aperture of the *camera obscura* must contain a lens made from optical quality quartz (to allow for the transmission of UV radiation), which has a focal length of at least 2.2 meters. This means that the distance from the 'corpse' to the lens is 4.4 meters and the distance from the lens to the screen is also 4.4 meters. If one requires an exposure within a week (an important consideration if a real cadaver is the subject), then it is imperative that the diameter of the lens is quite large.

In this way, a negative image is formed. For this image to be made stable, I simply dip the cloth into ammonium hydroxide (5%). This action strips away all silver and leaves a stable negative image of the original subject. This resultant image

contains no dye, pigment or powder, and is formed from the oxidation of the cellulose which makes up the structure of the linen fibre itself. In this sense, the image produced is a chemically induced 'scorch', but one which only forms in those areas which were previously in contact with the reduced silver sulphate or silver nitrate.

By employing this tried and tested technique, I can now produce a fairly acceptable negative image on linen or cotton material in three to four days (*cf* plate 1), employing a lens of 180 mm diameter. However, a lens of between 100 - 140 mm diameter would suffice if the image was only required in seven days or so.

Picknett and Prince (who do not appear to have done much testing in this area) simply employ a technique based heavily on a standard nineteenth century recipe -- one which employs an albumen (or gum arabic) and ammonium bichromate solution (1994:161-5). It should also be borne in mind (despite the co-authors claims to the contrary), that chromium salts are relatively difficult substances to produce and even state themselves (Picknett and Prince, 1994:163) that

[a]s far as science acknowledges, the production of chromium from ore did not happen until 1798, when it was discovered by the French chemist Vauqueline in red lead ore from Siberia

By stark contrast, light sensitive substances such as silver sulphate and silver nitrate are simple to produce, deriving as they do from sulphuric acid (which also occurs naturally) and nitric acid respectively.

The authors compound their mismanaged 'experiment' by employing a 'fish-eye' lens of unspecified dimensions, placed at (what I can only assume to be) an object conjugate distance of some 30 cm and produced a number of negative images of two objects, viz: a gargoyle and a plaster bust of a round-faced

girl. These objects were illuminated by the use of two Osram Ultra-Vitalux ultraviolet lamps because Picknett and Prince did not have suitable weather in the United Kingdom in 1993. As a direct result of having obtained (again by their own admission), an unsuitable 'fish-eye' lens - one which produced a grossly distorted image, complete with a lens flare (the latter being caused by the proximity of the two UV lamps), they then immediately assume that the 'missing ears' phenomenon (as viewed on the *Shroud* image) is evidence of 'fish-eye' lens distortion! Unbelievably, they argue that the 'broken nose' feature (as found on the *Shroud of Turin's* frontal image, is in fact a lens flare!

I should point out here that lens flares (which appear as bright patches, rings and even irregular patterns), are formed as a result of strong light reflections inside the lens itself. These in turn are caused by light sources which are either within or to the side of the area being photographed. Considering the fact that the hypothetical photographers (who produced the original *Shroud*), most definitely did not make use of two static UV lamps placed 30 cm to either side of their corpse, it is highly unlikely that they would have had quite the same lens flare problem experienced by Picknett and Prince.

The authors do not explain what material their particular lens was made from and I can only surmise the dimensions of their 'fish-eye' lens by looking at their photographs. For the purposes of demonstration, let us assume that their lens had a diameter of 30 mm and was made of quartz. If this lens was to be re-ground and polished such that it adequately focussed the image of a life-sized figure with as little curvature of field as possible, then it would have to have (as previously pointed out) a focal length of about 2.2 meters. This means that the combined object conjugate distance and image conjugate distance (ie the distance from the corpse to the lens and from the lens to the screen inside the camera obscura) would be about 8.8 meters. Applying the principle of the inverse square

law to results based on my own experiments and subject to fluctuating weather conditions, it would take about a year (give or take a month) to produce the original *Shroud* with the revamped Picknett and Prince lens.

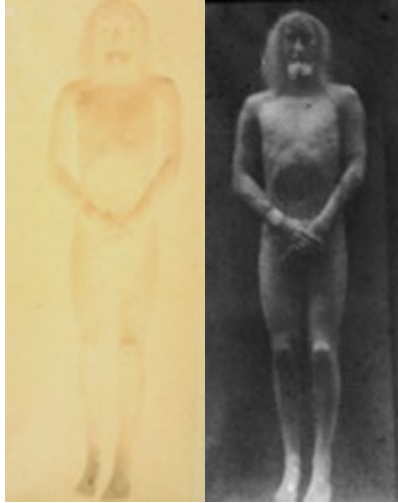


Plate 1 and Plate 2

Photographs of one of the authors' full scale shroud tests produced at his home in Port Elizabeth, employing silver sulphate, ammonia, a quartz bi-convex lens and a large camera obscura. Note that plate 1 is the cloth as it appears to the naked eye. Plate 2 is a negative photograph of plate 1 and clearly shows the positive image of a 'crucified' man. Readers should compare these photographs to the frontal images as found on the *Shroud of Turin* (plates 3 and 4).

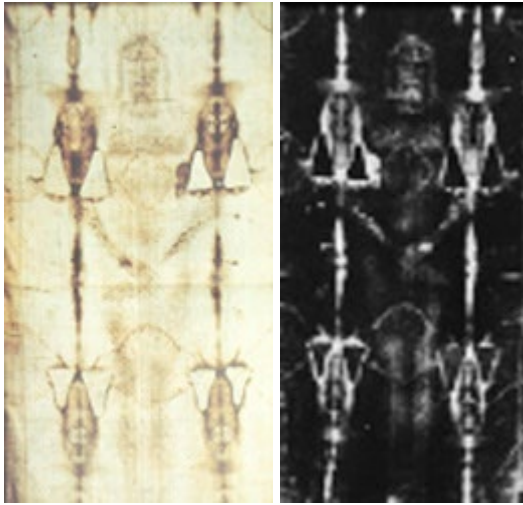


Plate 3 and Plate 4

Photographs of the frontal image as found on the *Shroud of Turin*. Plate 3 is an enhanced positive photograph of the cloth. Plate 4 is a negative photograph of plate 3, showing the positive image of a 'crucified' man.

The co-authors also claim that the *Shroud* is in effect a composite image, in that the likeness of the head was made separately from the body. There is no reason for this to have taken place, unless (as the authors claim) Leonardo specifically required his own portrait to grace the frontal image as found on the *Shroud of Turin* today. If we concede (for the sake of argument), that Leonardo did produce the *Shroud* in 1492, then we must also accept that Leonardo was of semitic origin. This latter distinctive feature of the man in the *Shroud* has been commented on by most medical authorities (*eg* Pierre Barbet, Robert Bucklin and David Willis), who have examined the photographic record of this relic. In addition, it would have been necessary for Leonardo to have had his nose broken and his face beaten until it was swollen and bruised.

There are good reasons for not suspecting the head to be a separate exposure, (*ie* distinct from the body, as Picknett and Prince claim). The reason for the apparent smallness for both the head and the feet (in relation to the centre of the body) is caused by a spherical aberration of the lens originally employed c 1260 - 1350. It is possible to roughly calculate the overall distortion of this lens by measuring such features as the width of the hand and comparing this to the spacing of the eyes. By this method, Derek Griffith of the Council for Scientific and Industrial Research in Pretoria has pointed out to me that the head and feet are approximately 10% smaller in proportion to the hands (centre of the body). This accounts for the lozenge shaped proportions of the figure in both the dorsal and frontal images (cf plates 3 and 4).

The co-authors cite the 'missing ears' feature and/or the missing strips on either side of the head in the frontal image as evidence of a wide angle lens distortion. Again they are incorrect on this point. In fact, the 'missing ears' are caused by two factors:

Firstly, if one observes the complete length of the *Shroud of Turin* it will be noticed that the direction of the warp threads is quite pronounced. It will also be noticed that associated with these regions are areas of either non image or diminished image. The most noticeable being to either side of the head, causing as it does a clear distinction between the edge of the face and the hair. However, this phenomenon may also be observed running almost the entire length of the frontal and dorsal images. During the weaving process the warp threads are often sized (sometimes with substances such as starch), in order to strengthen them before affixing them to the loom. I have found that both woven linen and cotton material which contains size, repels both silver nitrate and silver sulphate, and results in the formation of areas that either do not hold an image or hold an image of less intensity.

Secondly, in every reproduction of the *Shroud* I have ever produced, little to no image forms in the areas to either side of the head! The reason for this is that these areas are normally in shadow more often than the other parts of the body. When these two factors are combined, ie shadow and reduced light sensitive material, the result is as observed in the *Shroud*, viz: rigid, geometric, blank or diminished image areas corresponding to the warp direction of the linen.

The co-authors also claim that the low hairline feature (as viewed on the frontal image of the man in the *Shroud*, is an aberration caused by a wide angle lens. This deduction is only partially correct. In fact, the low hairline (on the frontal image) is caused by two factors, viz:

Firstly, it must be understood that the corpse or life-cast employed as the subject for the exposure was more than likely painted white in order to increase its reflectivity (Allen, 1993a:31 and 1993b:225-35). If the top of the subject's head was originally bound (or masked off) by dark material, it would not reflect the top section of the head and would cause the image of the face (in the frontal image) to appear shorter. In fact, this action (on the part of the `photographers' who originally produced the *Shroud*) is necessary in view of the fact that the sides of the head (as explained above) were not visible. In short, if the top of the head were not masked off, and the sides of the face were `missing' or in shadow, then the final negative image of the head would have appeared far too long for the body. For this reason, it is more than possible that the persons who produced the Shroud were merely correcting (what was for them) a visual eccentricity. It was not necessary for this procedure to be repeated on the dorsal image -- a fact borne out by the visual information contained on the *Shroud* itself. As should be realised, this action, on behalf of the hypothetical medieval `photographers' has produced an effect which has confounded sindonologists for many years now, producing as it does, a dorsal image which is longer than the

frontal image. Plate 2 clearly demonstrates the result of masking the top of the corpse's head in my own Shroud-images.

Secondly, the top of the head may be slightly foreshortened as a result of the spherical aberration of the lens -- an effect which may also be observed on the toes of the feet. It must be stressed, however, that this latter factor contributes only slightly to the 'low hairline' feature.

For Picknett and Prince to assume that they should publish their incomplete testing as 'proof' of the kind of technique employed in the manufacture of the Shroud of Turin is highly questionable. I, for one, made it a point of principle four years ago, that I would never employ a substance, a piece of apparatus or a technique that I could not prove was available before 1350. My repeated attempts to recreate the exact conditions for producing a Shroud - image were all conducted employing the sun, known medieval chemicals which required no elaborate means of production and a large *camera obscura*.

In the light of the preceding evidence, it is safe to assume that the *Shroud of Lirey-Chambéry-Turin* could not have been produced by means of albumen and ammonium bichromate solution before 1798, was not made as a result of a glass lens placed only 30 cm from the subject, was not made by Leonardo da Vinci (photographically or otherwise for that matter) and is certainly not his self-portrait.

Thanks go to Mr Glenn Meyer and Mr Jonathan Hansford for photographic work and advice, Prof Dr Peter Loyson, Prof Dr Ben Zealie, Mr Francois Olivier and Mrs Ronell Claassens for chemical advice and testing, Mr Derek Griffith and Mr Dan van Staaden for lens polishing and optical advice and Prof Dr Estelle Maré for her much-appreciated editing skills.

Source List

Allen, N.P.L. 1993a. Is the Shroud of Turin the first recorded photograph? *The South African Journal of Art History*, November 11:23-32.

Allen, N.P.L. 1993b. The methods and techniques employed in the manufacture of the Shroud of Turin. Unpublished D.Phil thesis, University of Durban-Westville.

Allen, N.P.L. 1994a. A reappraisal of late thirteenth century responses to the so-called Shroud of Lirey-Chambéry-Turin: encolpia of the Eucharist, vera eikon or supreme relic? *The South African Journal of Medieval and Renaissance Studies*, 4 (1):62-94.

Allen, N.P.L. 1994b. 'A reappraisal of late thirteenth century responses to the so-called Shroud of Lirey-Chambéry-Turin: encolpia of the Eucharist, vera eikon or supreme relic?' *Change and Medieval and Renaissance Studies*, Edd R. Gray and E Maré. Pretoria: UNISA Press.

Arcis, Pierre d', 1389. Memorandum of Pierre d' Arcis to anti-pope Clement VII. *Collection de Champagne*, v. 154, fol. 138. Paris: *Bibliothèque Nationale*. [Manuscript c. 1389 AD.]

Baigent, M. and Leigh, R. 1990. *The temple and the lodge*. London: Corgi.

Baigent, M., Leigh R. and Lincoln H. 1991. *The Holy Blood and the Holy Grail*. Aylesbury: Corgi.

Currier-Briggs, N. 1987. *The Shroud and the Grail*. London: Weldenfield and Nicolson.

Mellor, J.W. 1922. *Inorganic and theoretical chemistry: volume 3*. London: Longmans.

Picknett, L. and Prince, C. 1994. Turin Shroud: in whose image? London: Bloomsbury.

Wilson, I. 1978. The Turin Shroud. London: Victor Gollancz.

Wilson, I. 1991. Holy faces, secret places: the quest for Jesus' true likeness. London: Doubleday.