

NEW PROBLEMS AND ARGUMENTS
ABOUT THE POLLEN GRAINS

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One of the most surprising and important discoveries made on the Turin Shroud was the finding of pollen grains by the Swiss criminologist Dr. Max Frei.¹ This discovery was at first ignored by many scientists, but is now generally accepted. The interpretation, however, and the judging of the significance of the pollen have proved to be a complicated undertaking. During my long friendly communications with Frei, my part was to investigate the historical implications. Some difficult problems concerning the early history of the Shroud still have not been addressed.

Palynology is a young science. Moreover, the Near East is still new territory for European and American palynologists. The European geobotanists and palynologists whom I consulted after Frei's death (†1983) admired his painstaking work but most of the pollens, except for the European and Mediterranean, were unknown to them.²

The importance of the pollen findings were perceived by Paul Maloney, vice president of ASSIST.³ I personally thank him for putting me in contact with the one expert qualified to judge Frei's work: the geobotanist Professor Avinoam Danin (Hebrew University of Jerusalem), who is collaborating with the top palynologist of Israel, Professor Aaron Horowitz (Tel Aviv University). In the course of twenty years, Danin has explored the desert vegetation of Israel and Sinai, always in small areas of 5 x 5 kms. He dedicated to me his pioneering work on his discoveries.⁴

It is interesting to note that Frei too began his scientific career in this field of science. His dissertation on the geobotany of Sicily is still esteemed by the experts.⁵

Both Danin and Horowitz approved Frei's work: the excellent microphotos (which render the pollens visible to everyone) and the laborious definition of the pollens (for previously an evaluation was not possible). Furthermore, they confirmed that the exceptional spectrum of the pollens coincides with the exceptional flora of the region around Jerusalem.

The Pollen Enigma

The fact that there are pollens on the Shroud can no longer be denied. Nevertheless, a problem of great scientific and historical importance still has not been resolved: When and by what means did so many pollens of so many different plants, most of them

characteristic of a specific region, come onto the Shroud? Frei rightly emphasized that pollens could have come onto the cloth only when it was exposed to the open air. But here lies hidden an intricate problem. The Shroud must have been almost a "pollen catcher",⁶ and it must have been so for a long time, because pollens ripen in different seasons. Frei had to make seven expeditions to the Near East to identify all the pollens found on the Shroud.

The enigma of the Near East pollens becomes even more evident when we consider the European pollens found on the Shroud. We know with certainty that the Shroud has been exposed at least 27 times since the XIVth century, most often in churches but also in the open: usually from a tower or balcony of a castle, but also in meadows in France, Belgium and Italy.⁷ And yet the number of species of European plants is astonishingly small: only seventeen,* including some which grow also in the Mediterranean regions and some also in Jerusalem.⁸ The enigma therefore becomes more complex: How could such an abundance of Jerusalem pollens have come onto the Shroud?

Unrealistic Attempts to Explain the Jerusalem Pollens

1. The first hypothesis proposed that the pollens could have been transported by winds from Palestine to Western Europe, where the Shroud is documented since the XIVth century. Such winds, however, do not exist in the Mediterranean area. Especially in the summer months, the time of ripening, in the eastern part of the Mediterranean Sea the etesian winds blow from northeast to southwest, and so consistently that they were the condition of antique navigation. Furthermore, these hypothetical winds must have been blowing when all the different plants were ripening, and to cap it all, the Shroud must have been exposed in the open air at the very same times. Besides that, pollens from the European environment must have been prevented from getting onto the Shroud. Indeed, this is an extremely unrealistic assumption.

2. Some scientists claimed that a determination about pollens from the Near East would be impossible since that region had not yet been explored. This is true for European and American scientists. It was for this reason that Frei had to undertake so many expeditions.⁹ Only in Israel are there independent experts competent to judge Frei's work.

3. Other scientists objected that the vegetation of North Africa is generally so similar to the Palestinian flora that it would not be possible, on this basis, to determine the geographical provenance of the Shroud. Horowitz, who has explored the geobotany of North Africa, stated that this assumption is erroneous. The vegetation of

* In contrast to 45 plants from Jerusalem and environs. See Pollen Table in *Spectrum* #10. ED.

Jerusalem and its near environment is distinctly exceptional on account of its unique geographic situation: precisely between the Mediterranean area and the lowest zone on the earth. Elsewhere, the various vegetation regions are separated by great distances; but here they are adjacent in narrow strips of three to five kilometers; cultivated land, steppes, deserts and salty soils, offering the most diverse types of terrain.¹⁰ It is true that all the plants whose pollens are found on the Shroud grow in other regions too, but regions widely dispersed with regard to the different soils and climatic conditions.

4. Another hypothesis declared that it would be totally impossible to identify the pollens on the Shroud because they are dirty and often encrusted, and cleaning would destroy them. This betrays the author's lack of information. True, the cleaning of ancient pollens is a difficult and time-consuming task, and some pollens are damaged by it.¹¹ But pollens are protected by tough skins which are impervious to most damaging factors, and in the last decades the scientific methods of cleaning and preserving pollens have been so highly developed that it has been possible to study the vegetation history of many regions by pollens from old sediments.

5. It has been said that such an abundance of pollens could only have come onto the Shroud by human actions. Flowers, for instance, could have been laid upon the Shroud either during the burial or in later times in a liturgical ceremony. However, it is unrealistic to assume that so many different plants, a great part of them desert plants and halophytes, could have been laid upon the Shroud. One would also have to admit that these flowers were no longer in bloom, but already wilted, since pollens suppose the state of ripeness ... an unthinkable suggestion.

6. As absurd as it is shameful is the objection that Frei himself "intentionally put the pollens in a fraudulent manner onto the Shroud." Frei, who was one of the world's most esteemed criminologists (he was president of a United Nations commission on criminology), certainly did not work nine years for such trickery. And in recent years many more pollens have been found on tapes taken by American scientists, which Frei never could have seen.

This survey of the hypotheses so far proposed reveals the intrinsic enigma of the pollen data. There is no point in giving the names of the authors of these hypotheses, since all of them are completely irrelevant. It is remarkable that Frei himself stated, and rightly, that pollens could only come onto the Shroud when it was exposed in the open. But he said nothing about the conditions of such expositions.

The Simple Answer to the Pollen Enigma

The way to a realistic explanation of the pollen data was indicated by Danin and Horowitz. They suggested that the Shroud was

not only for some time in Jerusalem, but that the cloth was fabricated there. This clue led me to consult experts in the history of linen manufacture in the pre-industrial age. And instantly the obvious answer was found. Only a small percentage of pollens come to their proper destination, which is pollination. Most of them fall upon horizontal surfaces, such as water or fields. Protected by two stout skins, pollens remain intact for long periods of time. Therefore, in water and on fields, there will be an accumulation of pollens from plants that ripen at very different times.

Water and fields were of the greatest importance in making linen. In the first stage, the flax is laid in water for the retting process. Even more significant in pollen deposit is the bleaching process. The linen was laid out upon the grass for a long time. Again and again it was sprinkled with water. Bleaching is effected by moisture and sun (O₂). This situation certainly explains how so many and so different pollens from the same region could come onto the Shroud.¹²

In Jerusalem, there was a "Fuller's Field" near the Upper Pool (Isa. 7:3). Also from Mark 9:3 we learn that the bleaching of textiles was a fuller's job: "The garments (of Jesus) became shining, exceedingly white, as no fuller on earth could bleach them." Since pollens are provided with features such as small hooks or sticky surfaces, they adhere very firmly when they land on materials like textiles. The whiteness and at the same time the quality of linen depended on the duration of the bleaching process. The longer the bleaching process, the greater would be the number and variety of pollens which could adhere to the cloth. And the Turin Shroud is a cloth of the highest quality.

Of course, in later times pollens could come onto the Shroud whenever it was exposed in the open. It could happen also by pure chance, like the pollen from an American plant which came on the Shroud during the 1978 examination.¹³ However, the number of pollens from plants which do *not* grow in the region of Jerusalem is so small that the remarkable prominence of Jerusalem in the history of the Shroud is thereby confirmed.¹⁴

The history of the Shroud can likewise be illustrated and confirmed by some other pollens. For instance, there are pollens of *Epimedium pubigerum*, a forest plant of the Barberry family, which grows neither in the Near East nor in Western or Middle Europe, but in Turkey, and from there toward Bulgaria. That accords with the probable route of the Shroud, by way of Anatolia and Constantinople. Rice pollens are an interesting example, since in this case we have accurate dates: in 1494 and 1560, the Shroud was exposed from a balcony of the castle of Vercelli, Europe's principal area of rice cultivation.¹⁵ Additional pollens, only recently identified by Danin, offer far-reaching prospects for the research into the VIth century history of the Shroud.

NOTES

1. MAX FREI: *La Sindone e la Scienza*, II International Congress of Sindonology, Turin 1978, pp. 191-200; *La Sindone e la Fede*, III National Congress, Bologna 1981, pp. 277-284. *Shroud Spectrum International* #3, 1982, pp. 3-7. BULST: *Shroud Spectrum International* #10, 1984, pp. 20-28.
2. However, since I am not a botanist, their counsel was indispensable for me. I am indebted to my colleague in the Technical University of Darmstadt, the geobotanist Dr. G. Groze-Brauckmann; to Dr. W. Van Zeist, Biological-Archeological Institute, Rijksuniversiteit of Groningen, Netherlands; and especially to the geobotanist Prof. A. Bogenreider, University of Freiburg, with whom we and Mrs. Frei deliberated on the edition of Dr. Frei's work.
3. Correspondence with Dr. Frei.
4. AVINOAM DANIN: *Desert vegetation of Israel and Sinai*, Jerusalem, 1983.
5. M. FREI: *Die Gliederung der sizilianischen Flora und Vegetation und ihre Stellung im Mittelmeergebiet*, Zurich 1938.
6. This formulation is by Paul C. Maloney.
7. I. WILSON: *The Turin Shroud*, London 1978, p. 221ff, gives a chronological table.
8. See the pollen table in BULST, *Spectrum* #10, 1984, p. 22ff. Only six of the plants whose pollen is on the Shroud grow exclusively in Western or Middle Europe.
9. From 1974 to 1978, Dr. Frei traveled through the Near East and Turkey during different floral seasons. See *Spectrum* #3, 1982, p. 3ff.
10. BULST: *Shroud Spectrum International* #10, 1985, p. 25.
11. FREI: *Shroud Spectrum International* #3, 1982, p. 22ff.
12. I am indebted to Prof. Dr. G. Egbers, director of the Institut für Textil-und Verfahrenstechnik, Stuttgart.
13. BULST: *Spectrum* #10, 1985, p. 22ff.
14. See the pollen table in *Spectrum* #10, p. 21 foldout.
15. I. WILSON: *The Turin Shroud*, London 1978, pp. 224, 226.



Epimedium pubigerum