

## An Unusual Case of Stigmatization

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**Abstract** — The case presented is a several-month study of the stigmatization of a 70-year old woman, Anna Maria T. Stigmatization, the spontaneous appearance on a person's body of Christ's wounds on the Cross, is a well-known phenomenon among Catholics, while in this century it has also appeared in Protestants. The phenomenon has long been considered mysterious and miraculous. After first excluding the possibility of fraud, several elements of Anna Maria's stigmata were verified in an effort to sustain the hypothesis of a psychogenic genesis. The author made a study of the form, dimensions, localization and anatomic-pathological features of the stigma, and tests were carried out on the autonomic nervous activity of Anna Maria's hands. The results indicated a very circumscribed vasomotor increased activity in the area where the stigmata lay. Anna Maria T. also underwent a psychodiagnostic evaluation to assess her mental state and from the results of the basic tests (*i.e.*, MMPI and Rorschach) no elements were found that could indicate any psycho-pathological problem. Combining these elements with the circumstances in which the stigmatic marks manifested themselves the first time and reappear each month, no elements were found that could indicate with which mechanisms a mental image (*i.e.*, the figure of Christ on the Cross) could be transferred to Anna Maria's body, *i.e.*, no elements able to demonstrate the psychosomatic hypothesis of stigmata.

**Keywords:** religious stigmatization — autonomic nervous activity — auto suggestion — psychosomatic hypothesis.

### Introduction

Stigmatization is a phenomenon that consists of the appearance on the human body of stigmata, the wounds that were produced on the body of Christ during his Passion. Almost all stigmatized people have been Roman Catholics but in this century there have been newspaper reports of several cases among Protestants and Dumas (1907) reported Muslims with stigmata reproducing the wounds of Mahomet; however no firsthand reports are available.

In most cases the stigmata are wounds to the hands and feet corresponding to those made by the nails with which Christ was crucified; however there can also be a chest wound that reproduces the stab-wound of the spear with which a Roman soldier put an end to the agony. Less frequently other marks, like those of the crown of thorns, the flagellation and the knee abrasion caused by the fall during the ascent of Calvary, are also present, varying greatly in detail from one stigmatized person to another.

After the first case of St. Francis of Assisi in 1224, there were about 321 cases until the end of the last century (Imbert-Gourbeyre, 1894). This number is controversial because Imbert-Gourbeyre listed several uncertain and uncontrolled cases and others escaped his enquires, but until now the list has not been corrected. According to it there have been, on average, 30 cases per century, except for the 16th and 17th centuries when 80 and 114 cases were recorded, respectively.

On studying, century by century, the geographical distribution of the cases in Italy and in Europe, it can be seen that the dynamics of the phenomenon are similar to those of an epidemic: from a starting focus (13th C, Umbria, where three stigmatizations were verified) there is a “centrifugal” multiplication of cases progressively invading the whole of Italy and Europe until they almost disappeared in the 19th century (Margnelli, 1979, 1988a). In this, the 20th century, there have been from 80 (Margnelli, 1988b) to 137 cases (Bouflet 1996) and, whereas in the past the phenomenon was observed only in Europe, in this century there have also been cases in the United States, Canada, Latin America, Africa and India. It is interesting to note that the stigmata are most often seen in females.

The morphology of the stigmata varies greatly: the wounds to the hands and feet can be round, square, oval or just dots. In general they are found in the center of the palm or sole, but there have been cases where the localization is off-center. They can occur only on the back of the hands (missing from the palms), be superficial or deep, even to the point of running completely through the hands and feet, be raised, and covered by a material that simulates the head of a nail (probably a hematic crust). They can remain open, fresh and bleeding, for a period of months or years, or they can appear only once a year, during Holy Week, being completely absent during the other months of the year. They can change form, size and depth from one time to another, or else reappear always the same as the first time.

In most cases the stigmata appear suddenly, during an ecstatic trance, and can disappear quickly without leaving any scars.

Stigmata cannot be defined as wounds — lesions that just after production appear as cuts, incisions, and so on — as they are not produced by injurious instruments; they tend not to heal so are not sores — a local defect of the surface of the skin produced by the sloughing of necrotic inflammatory tissue generally surrounded by newly formed vascular tissue, called granulation tissue, that indicates the vivacious activity put on by the organism to healing the lesions; nor are they ulcers that are generally an excavation of the surface tissues of an organ or the skin possibly lasting for years with signs of scarring, as they produce no granulation tissue (Marianeschi, 1987). In any case they are commonly called wounds and, because they are generally characterized by tissue alteration, this is the name nearest to their anatomic-pathological nature. A more medical term would be lesion but this is too generic.

As Benedict XIV (1675–1758, Pope 1740–1758) established, stigmata can

be distinguished as natural, supernatural and preternatural (or else human, divine or diabolical) and have six anatomic-pathological characteristics differentiating them from other lesion types: (i) sudden in appearance, (ii) major tissue modifications, (iii) persistence and inalterability despite all therapy, (iv) hemorrhage, (v) absence of infection or suppuration, (vi) sudden and perfect disappearance (Benedicti XIV, 1841).

None of these characteristics (particularly the sudden appearance/disappearance and absence of suppurative phenomena) can be explained by the usual laws of general pathology and pathological anatomy and the Catholic Church has long considered true stigmata to be miraculous phenomena (*i.e.*, they cannot happen without the direct intervention of God). Even so, the behavior of the religious authorities with regard to stigmata has not always been favorable and, especially in the last two centuries, those bearing stigmata have been hidden, discouraged and even persecuted (Boufflet, 1996).

Certainly the development of medical-biological knowledge, especially in the last century, has contributed to caution in judging stigmatic wounds miraculous or supernatural, such knowledge having also led to numerous hypotheses on the causes of stigmata.

First there was an attempt to consider them part of the overall symptomatology of already known organic diseases, *e.g.*, the great German pathologist, Virchow, considered the stigmata of Louise Lateau (a case at that time), although he had not seen them personally, to be a pemphigus (Virchow, 1874). However several doctors had examined the "patient" Lateau and declared the inexplicability of the "lesions" appearance, so the Belgian Royal Academy of Medicine (Louise Lateau was Belgian) instituted a study commission that came to the conclusion that her stigmatization was not fraudulent, that the lady herself was of sane mind, that the stigmata were authentic and that often the bleeding from the marks of the crown of thorns occurred through unbroken skin (Warlomont, 1875). It was this last detail that led to another scientific controversy, Virchow sustaining that it was impossible for red blood cells to pass through the walls of unbroken capillaries (Virchow, 1874). But this phenomenon was also later observed on Therese Neumann (Ewald, 1927), Elena Ajello, an Italian with stigmata who died in 1961 (Bianchi, 1926) and, more recently, on Cloretta Roberstson (Early & Lifschutz, 1974).

Others attributed the phenomena to herpes simplex (Whitlock & Hynes, 1978), to malaria (purpura malarica) (Hartung, 1935), to fasting and even to hemophilia.

In 1936 Tinel, in the light of the neuro-physiological knowledge of his time, affirmed that the physio-pathological mechanism that could induce lesions with characteristics comparable to stigmata could be an antidromic (*i.e.*, an anomalous activation of nerve fibers from the center towards the periphery, not from the periphery to the central nervous system) of the sensory nerve fibers of the arms and legs, inducing the liberation of histamine in points where the lesions then formed. Processes of this type may be seen in herpes

zoster and the peptic ulcer (Tinel, 1936). Present day knowledge of the pathogenesis of such diseases is a long way from Tinel's conclusions.

Tinel himself admits that even if this is the mechanism that produces the stigmata, it is difficult to explain what antidromically activates the nerve trunks, the contained area of the lesions, the wounds' topographical precision and their long duration. To explain these characteristics mental factors need to be considered, *i.e.*, the imagination, emotions and psychology of the stigmatized person.

If stigmata are due to natural causes then various psychological factors undoubtedly play a strong determining role; in fact many have thought this for a long time. Thus, various psychogenic theories were put forward and these began to achieve credibility towards the end of last century, especially in Salpêtrière, the famous French school of psychology. For Charcot and his students stigmata were a definite and unequivocal symptom of hysteria (Bourneville, 1875), an explanation that many today still consider valid. However, the concept of hysteria was not fully clear even at the time of its formulation; thus, it is worth retracing its history to understand that it is not possible to explain a very complex phenomenon through a cause that is even less clear (Simpson, 1986).

For Charcot hysteria was a true and proper neurological disease determined by two concurring factors: a constitutional predisposition (hereditary) and a provoking agent (triggering trauma) (Charcot, 1889). Not having managed to find an anatomical lesion that demonstrated this hypothesis, Charcot amended the concept of hysteria from organic disease to functional lesion, taking it from neurological sphere and putting it into psychiatry. On this basis Babinski re-described the syndrome as being characterized by two elements: (i) a total lack of damage to the central and peripheral nervous systems and (ii) pitiatism (or suggestibility) that consists of the possibility of reproducing, by suggestion, all the symptoms of the syndrome and of abolishing them with counter-suggestions (Babinski, 1924).

In this way stigmatized people could be considered model hysterics in whom suggestibility/auto-suggestibility would reach the maximum visibility (Cousy, 1908). For example it is known that Martini used the diagnosis of state of severe hysterical illness to classify the disturbances of Therese Neumann, who was granted an invalid pension (Lhermitte, 1952). However, various authors have made numerous attempts to induce stigmata with hypnosis but met with no success (Thurston, 1952); only Lechler, in 1932, succeeded in inducing a complete and classical stigma picture working with a highly impressionable girl. On Good Friday in 1932 the young woman, Elizabeth K., formerly a patient in Lechler's Hospital, had attended a lecture (illustrated with lantern slides) on Christ's Passion. On returning home she told the doctor of her profound compassion for Jesus. Lechler suggested that quite possibly she would, during sleep, feel pain like that Christ had suffered on the Cross. This happened and from then on, Lechler, by inducing hypnotic trances, was able to

provoke in Elizabeth wounds, bleeding and tears of blood (Lechler, 1933). The contribution of auto-suggestion and the conscious desire to share in the suffering of Jesus on the Cross could be reverified by hypnotizing a stigmatized person in the free, no-stigma period, when the stigmata are quiescent, but not by trying to make stigmata appear on someone who has never desired them and knows nothing of mystical sores (Margnelli, 1988a).

What would permit the formation of skin lesions in a hysteric would be a sequence of neuro-physiological, neuro-psychological and neuro-chemical events that mediate, in the soma, the passage of a highly emotional psychic content. Hence the problem is not to establish whether stigmatized people have hysterical disturbances of the personality (that is always possible, but must be ascertained by the usual psycho-diagnostic methods; Mejia & Rodriguez Amenabar, 1986), but to understand how and why this mechanism, which should be physiological, is able to induce, in the stigmatized, true and proper lesions with characteristics different from all known dermatological lesions.

Already at the time of Babinski it was controversial whether or not hysteria could cause anatomical damage, and today most of those who still believe in hysteria classify it among the neuroses, *i.e.*, among psychogenic disturbances of function.

The possibility that psychic conflict can cause organic damage is currently widely accepted. The central neuro-physiological, neuro-psychological and neuro-chemical mechanisms that realize the bodily expression of an unconscious content are still to be discovered, but certainly much more is known today than one hundred years ago. Regardless of the working of such a mechanism, that could be defined as a central analog/digital converter, conflicts and emotions can influence the immune system and, also directly, the somatic periphery through the autonomic and endocrine systems. For example, of great importance is adrenergic vasoconstriction (autonomous nerve fibers induce arteriolar contractions liberating norepinephrine at their synaptic endings) that, under psychogenic stimulation, becomes a persistent condition in various pathological disturbances (*i.e.*, Raynaud's phenomenon and hypertension). Thus, if stigmata have a natural cause, their formation must occur through these routes. One attempt to combine all these factors into a single theory was made by Ratnoff. He described a syndrome, called psychogenic purpura, to which he also traced the etiology of stigmata. According to this theory, stigmatics (especially women) were individuals who, at some moment during their lifetime, had been subjected to physical trauma from a male figure with strong affective-emotional links (father, husband, *etc.*), such trauma (like being beaten) often resulting in internal hemorrhaging (subcutaneous and intramuscular hematomas). The emotional circumstances in which the traumatic events took place would favor the manifestation of an auto-immune reaction against the person's own red blood cells (auto-erythrocytic sensitization), but such auto-immunization would occur only in subjects psychically predisposed

to conversion (*i.e.*, hysterics). Later on in life the recurrence (even in the imagination) of the emotional-affective situations in which the original lesions were produced would trigger the formation of the stigmata (Agle *et al.*, 1969; Ratnoff, 1969). If psychogenic purpura is an actual clinical entity then an accurate study of well-documented contemporary stigmatization cases will demonstrate that the hypothesis, *i.e.*, that psychogenic purpura can be the cause of stigmata, is untenable. The anatomic-pathological characteristics of the lesions that Ratnoff and his colleagues observed in their cases are quite different from those that the Catholic Church considers stigmata. It is also worthwhile noting that Ratnoff considered the stigmatized as ill people, and the appearance of stigmata a pathological event of which they were the victims.

Nevertheless as the mechanism of psychosomatic expression is not a prerogative of hysterics, nor of the stigmatized, and is considered a physiological process that can produce damage only under particular conditions (rather than a pathological mechanism) there should be a reappraisal of several points of view that suggest a productive mechanism of stigmata exceptional but not pathological. For example, already in the 1930s, Wunderle thought that stigmatized people were endowed with a particularly willful personality and were animated by an out-of-the-ordinary psychic and spiritual force, so much as to mould the body with the force of ideas (*die plastische Kraft*) (Wunderle, 1936). A similar idea had already been expressed a good century earlier by the great mystic scholar Goerres (*die ideoplastik der Geistes* — Goerres, 1836). The point is that whereas in hysterical conversion and psychosomatic pathology the mechanism of conversion would be activated by the subconscious, in the hypothesis of the moulding force of ideas the mechanism would be activated to realize a conscious desire.

In actual fact, an accurate study of the psychological history of many of those stigmatized demonstrates that they (the majority being females) often desired to have stigmata with such intensity as to induce Thurston to speak of the crucifixion complex (Thurston, 1952). This would mean that the conscious desire to share the sufferings of Christ on the Cross could create the psychological ground to semi-voluntarily activate the mechanism of conversion. Although from the medical and psychological point of view this is all still to be demonstrated, from the religious point of view it would mean the exclusion of miracles.

This was the opinion of Father Gemelli, who stated that the only true stigmatized person was St. Francis and all the others were imitators (Gemelli, 1924). Also the psychoanalyst Lord expressed the opinion that even in the case of a conscious desire realization can occur through the subconscious, and then only in exceptional conditions (Lord, 1957).

Such an exceptional condition could be ecstasy (a modified state of consciousness that is little known but closely connected to stigmatization) if what Imbert-Gourbeyre affirmed is true, *i.e.*, that most, if not all, stigmatizations took place in ecstasy (Imbert-Gourbeyre, 1894). In fact Christian-Catholic ec-

stasy seems to be triggered by an orthosympathetic arousal (a strong central and peripheral autonomic activation) comparable to a state of shock (Margnelli, 1984) and it is not to be excluded that such arousal could be sufficient to produce, in a few seconds, stigmatic lesions.

The possibility of a psychosomatic origin of stigmata is indicated by several experiments demonstrating important influences on skin obtainable with hypnotic suggestions. Classic and well controlled is the possibility of inducing blisters in specified areas of the body (Pattie, 1941; Johnson & Barber, 1976; Gauld, 1990). Localization, shape and dimensions of blisters as well as the intensity of skin reactions around it could be more or less predetermined with direct suggestions. Although blisters are lesions that are far from being true stigmata, local autonomic activity giving rise to erythemas, edemas, ecchymosis, weals or blisters in hypnotic experiments could be similar to that inducing stigmatic lesions during ecstasy or whatever the state of consciousness could be during which stigmata appear.

Other indications of a possible psychosomatic origin of stigmata derive from cases of recurrence of bodily changes during recalled memory of physical injury (Stevenson, 1997) or from experiments on hypnotic and conditioned modulation of allergic skin response (Mason, 1960; Black *et al.*, 1963; Smith & McDaniel, 1983).

The validity of the miracle theory depends mainly on one's personal convictions. Simpson, however, writes that believers must keep several questions in mind. Why was it only from the 13th century onwards that God began causing stigmata to appear?. Why over the centuries (this must be added on the basis of epidemiological studies) did the appearance and distribution of stigmata follow the course of an epidemic (Margnelli, 1979)? Why is ecstasy needed to produce them? Why from case to case do the stigmata appear in different points of the hands, feet and chest? Why must their morphology and behavior be different in each of the stigmatized people (Stevenson, 1997) and, lastly, why are they more common in the female sex (Simpson, 1986)?

Thus, today, when it is possible to study a case of stigmatization there are many questions to be answered, but they are well defined.

The case of Anna Maria T. has been used to try to find answers to these questions. This woman who bears stigmata was closely studied over a five-month period in 1995 and is still, today, under observation.

### **Personal History**

Anna Maria T. was born in Milan, Italy, on October 1, 1925, the eldest of six children (thus in 1995, the time of the first visit, she was a 70-year-old woman). She had no formal schooling due to the poverty of the family and at 20 years of age she got married; she had three sons from the marriage. She worked all her life with her husband in their general food store and after his death in 1987 she continued to run the shop, working alone. Of her three sons, one still lives with her, one is married and the third is dead.

### Medical History

Anna Maria has always enjoyed excellent health and has never suffered any blood or skin disease. She was admitted to hospital only once, in 1994, when her gallbladder was removed because of gallstones. Each year, in accordance with the law, she has the compulsory hygiene-sanitary check-up for workers in the food industry and has always been given a clean bill of health. She is normotensive (P.A. 150/90), and uses no medicines, nor does she take sedatives or tranquilizers.

### History of Stigmatization

On the first Friday in the month of May 1990, towards 11.00 p.m., Anna Maria was sitting up in bed saying her evening prayers. She was sad and anxious and was crying, feeling sorry for herself. While she was thus absorbed, she began to be aware of strong sharp pains on her forehead, like thorns piercing her skin. Distracted by this pain from the state of concentration in which she was praying, she looked around and in a corner of the room she saw Jesus: she recognized him as he was like the images she had always seen, but his face was old, suffering and wrinkled and his hair very long.

In a few moments the vision grew dim, as if disappearing into a black cloud but, after some moments, he reappeared, looking young, as in the iconography that usually portrays him, and on his head was the crown of thorns. As soon as she noted this detail, the pains disappeared from Anna Maria's forehead, as if Jesus had relieved her of the pain. Then the vision approached her, and asked her to put out her hands; she held them out and Jesus took them and smiled at her. She felt the contact with the hands of Jesus very well, aware that they were normally warm, but she does not remember seeing any stigmata on them. The voice of the apparition seemed to her quite normal. She was not at all frightened and afterwards she fell asleep immediately. Anna Maria had no religious symbols (icons, statuettes, *etc.*) in her bedroom.

The following morning very painful round red marks appeared on her hands. Not knowing what they were (Jesus had given her no warning) after a few days, Anna Maria went to the doctor who ordered an X-ray to be taken of her hands and prescribed an ointment. The marks disappeared and Anna Maria thought the ointment had healed them, but on the night between the Thursday and the first Friday of the following month the marks reappeared. As the first time they remained visible and painful for two–three days and then disappeared, leaving the skin of the palms of her hands quite normal.

Since then on the first Friday of each month, the marks have regularly returned and Anna Maria, not being able to explain them to herself, finally asked a priest who told her: “You have suffered so much in your lifetime that now Jesus has given you the gift of helping others.”

### Psycho-Spiritual History

Throughout her lifetime Anna Maria attended Mass from time to time and took the sacraments, but she was not particularly religious. She married in church and had her children baptized, but she never practiced deep devotion. After the death of her husband, who was less religious than her, she prayed more and saw more of priests, but she still did not go to mass more than once a week or to confession more than once a month. She had always had a particular devotion to the Sacred Heart of Jesus and the Virgin Mary, and up until the appearance of the stigmatic marks she liked St. Francis of Assisi because he talked to the animals. She knew of, and was devoted to, Padre Pio of Pietrelcina (a very famous Italian stigmatic of this century), not because he bore stigmata but because he did good to others. In her store she had many religious images on the wall. One of them represented Padre Pio of Pietrelcina, showing his stigmata. At home, she had no statues or images of Jesus showing the nails or wounds of the Crucifixion. She still has no religious images in her bedroom. She prays once a day, before going to sleep, sitting up in bed with her eyes closed.

Anna Maria had never wished to bear stigmata but now that she has them she feels it is her duty to devote herself to people, and thinks that the marks give her the power to help people physically, psychologically and spiritually; to fulfill better this mission she entered the tertiary order of SS. Trinity.

The people who turn to her for help and advice are those from the district where she lives (a poor area on the outskirts of Milan) and she meets them during the lunch- and dinner-time breaks and after dinner. She practices the "therapeutic touch," *i.e.*, believing to cure transmitting "energy" through her hands. Several people are convinced they have been cured by her touch.

Anna Maria insists that the first time Jesus appeared to her she was in a normal state of consciousness and that it was the first time in her life she had had a "vision". Nowadays, she sees Jesus or the Virgin Mary from time to time, particularly when she has the stigmatic marks. Instead, quite often, especially in the evening while she is saying her prayers, she sees three unidentified people, two men and a woman who, since the stigmatic marks appeared, have come to visit her like old friends, smiling at her and touching her affectionately but never saying a single word. Only after she was invited to ask them some questions did she learn that they are called Anna, Francesco and Carlo. The two males wear habits, like monks, and their heads are circumfused by golden light. The woman is fair, dressed in white and on her brow bears a little red cross that does not bleed. Anna Maria does not go into ecstasy and claims to have the visions in a state of normal consciousness; since having stigmatic phenomena she has been quite serene and happy.

### **Morphology, Characteristics and Behavior of the Stigmatic Marks**

The stigmatic marks affected only the palms of her hands and since May 1990 have appeared every first Friday of the month thus, at the time of writing this article, they have been manifested 96 times.

Their morphology changes from one month to another. Sometimes they consist of only two bright red rounded blotches, about 15 mm in diameter, sometimes there is an oval blister containing hematic-serum liquid (a phlyctena) that breaks and dries up, producing a normal crust. The stigmatic marks have never bled and although they are very painful they have never stopped Anna Maria from working. Occasionally the marks appear on the back of the hands, always as painful round reddening and nothing more.

The phenomena are more evident and conspicuous on the right hand. This, explains Anna Maria, is because Jesus blessed, and therefore “cures”, with the right hand, and “consoles” from the heart with the left hand.

Her feet have always been completely free of any phenomenon, however she sometimes feels pain in the left side of her chest similar to pangs or pricks.

Under ordinary circumstances the marks have always remained visible for up to three days, never longer. Instead, during Lent they last for 40 consecutive days.

### **Studies and Observations**

From March 1995 until July 1995 Anna Maria was examined eight times: every first Friday of the five months (March 3, April 7, May 5, June 2, July 7), Good Friday (April 14) and twice in free periods when no stigmatic marks were visible (May 27 and June 16). Further observations were made on July 2 and 3, and on August 6 and 7, 1998.

On each of these occasions :

- (1) Color photographs of the stigmatic marks, normal close-ups and also highly magnified close-ups were taken.
- (2) Infrared photographs of the palms and the backs of the hands were made.
- (3) Prints of the entire hands and detailed sets of fingerprints using triketo-hydrinden hydrate were taken.
- (4) The electrodermal activity of all the fingers of both hands was studied.
- (5) A plethysmographic study of all the fingers of both hands was made.

In addition Anna Maria underwent a psycho-spiritual interview and the tests of Rorschach and the Minnesota Multiphasic Personality Inventory. These examinations were recorded on video.

## Results

### *Morphology of the Stigmatic Marks*

As Anna Maria had stated, the shape, size, color and entity of the stigmatic marks varied from one month to another.

At the first examination on March 3 there appeared, exactly at the center of the palm of the right hand, a rounded, *ca.* 15×10 mm, reddened blotch (brightly colored), with irregular and fading edges. Within this region of increased blood circulation a small area of pale skin could be seen: it was translucent white, almond-shaped, *ca.* 3×7 mm in size and, compared with the surrounding skin, not raised. On the left hand the mark was a reddened blotch the same color as on the right hand, rounded, *ca.* 12×15 mm with no peculiarities.

At the next examination on April 7 the general aspect of the marks was the same, except that the mark on the right hand was more pronounced (a brick-red color) while that on the left was more extended. Also the small area of pale, translucent skin within the red belt of increased blood circulation was clearly more visible and delineated than on March 3.

On April 14, Good Friday, examination of the right hand revealed a small (4×2 mm) brownish crust that seemed to be a dry residue of a blister that had broken and then dried up; there was no redness in the surrounding skin and it was only on close examination that a slightly discolored halo equal in size to the red mark observed the previous time (April 7) was detectable. On the left hand there was nothing to be seen.

On May 5 the area of redness on the right hand was much reduced in size and less bright compared to March 3 and April 7, but the small, pale and translucent skin formation usually found within the reddened area was very evident and developed. Instead, on the left hand the area of redness was less extended and less brightly colored than usual but, contrary to what had been observed in the preceding visits, there was an oval-shaped bulla within this area similar to the one usually visible on the right hand. It appeared slightly raised compared to the surrounding skin and appeared full of haematic liquid (Figure 1).

On June 2 the rounded red area of the right hand was very clearly seen; it measured 10×15 mm with edges fading away and at its center there was the small translucent-white "almond", evident and raised, and from which, as already observed, a blister seemed to be developing. On the left hand the stigmatic mark consisted only of the area of redness due to congestion of the capillaries that, as had already been noted, is the most constant formation of the stigmatic marks seen on Anna Maria. On this occasion two ecchymoses (bruises) on the upper side of the right forearm just above the wrist were visible. According to Anna Maria they had formed spontaneously without, as far as she could remember, trauma or contusion. These small lesions were not painful and were a distinctly different color from the stigmatic marks.

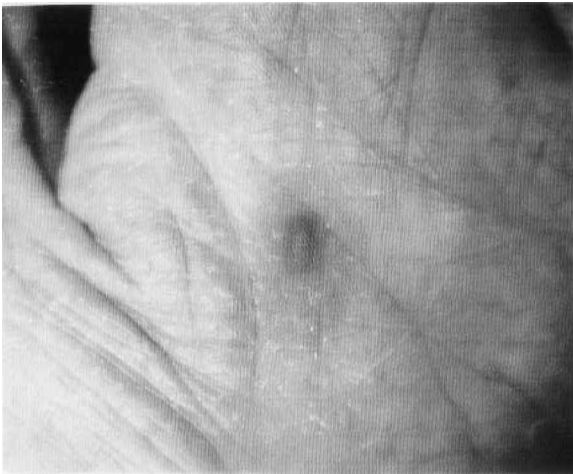


Fig. 1. Appearance of Anna Maria's left hand stigmatic marks on August 7, 1998.

On July 7 the appearance of the right hand stigmatic mark resembled that of March 3, *i.e.*, a rounded, reddened blotch with irregular and fading edges with a small area of whitish skin inside (Figure 2). On the contrary, on the left hand the mark was similar to that of May 5: Within the red hyperemic area, where there had been four times the only stigmatic sign, a blister had developed. It measured *ca.* 7×3 mm and contained haematic fluid.

The skin of the stigmatic sites in the free period (March 27 and June 16) appeared perfectly normal, especially on the right hand. However, on very close

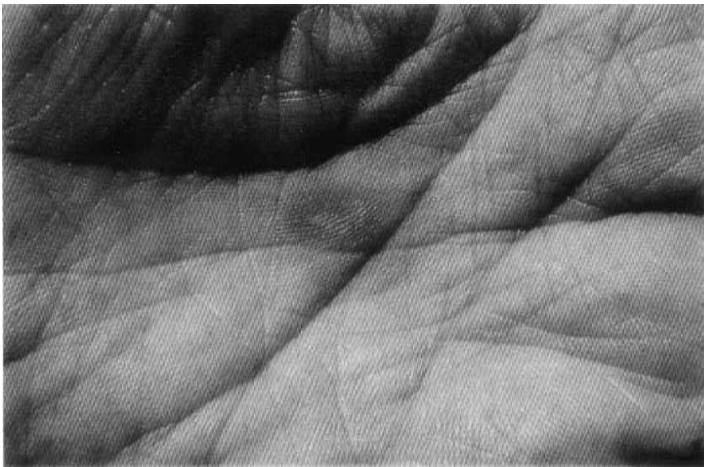


Fig. 2. High magnification close up of the most constant picture of the stigmatic phenomena of Anna Maria's right hand, as they appeared on July 7, 1995. Note the full preservation of epidermal glyphs from the blistered surface to the erythematic surrounding area and onto normal skin.

examination and under particularly favorable lighting conditions, the stigmatic sites could be seen within the surrounding normal colored skin as light coffee-colored halos.

On July 3, 1998 (three years later), the stigmatic mark on the left hand was more pronounced than in the contralateral and appeared as on May 5 and July 7, 1995, as an oval bulla arising from an intense reddish area measuring about 15×12 mm. On the right hand the mark consisted of a small white spot lying on a red blotch approximately matching as that of the left hand but less intense.

Finally, on August 7, 1998, the right hand showed a “quiescent” picture in which the small almond-shaped swollen area of whitish skin usually observed on the palm in this occasion rose from a bed of lightly hyperemic and almost normal skin. Also the appearance of the stigmatic mark on the left hand looked “quiescent.” The red area of increased blood circulation was a darker shade than a brilliant inflamed area and occupied a smaller surface than usual.

The seriate examinations of the marks that appeared on the palms of Anna Maria’s hands on the Friday of March, April, May, June and July 1995 and July and August 1998 have led to the following conclusions:

- 1) Despite the fact that the general aspect and the intensity extension, dimensions and coloring of the marks actually varied from one month to another, three absolutely constant elements were identified: (i) the phenomena were generally more evident and conspicuous on the right hand; (ii) the small white-translucent “almond” was never missing from the right hand, it was always found in the identical point of the palm area — at the intersection of two skin furrows; (iii) the greatly enlarged photographs always documented the perfect preservation of the epidermal glyphs.
- 2) The dermatological lesion most similar to that observed on Anna Maria’s palms is a burn, the right hand reaching the second degree (formation of phlyctena) while the left remained at the first degree (hyperemic reaction). Nevertheless the walls of the phlyctena appeared thicker than those observed in burns, and as has been stated, grazing light allowed to see the well-preserved epidermal glyphs, whereas in blisters due to burns these are often damaged (Figure 2).  
Marks of this type could be obtained artificially by bringing a red-hot object close to the skin or else by chemical means. Both methods call for considerable skill in controlling the damaging action, in producing constant elements and in avoiding damage to the finer constituents of the skin. Conditions that oppose the hypothesis of the fraudulent production of Anna Maria’s marks are the rapidity with which the lesions disappeared, the lack of scarring and the absence of permanent damage to the tissues, something that would be very difficult to falsify after 96 times.
- 3) Redness and blister-like lesions can be the initial or intermediate stage of various dermatological diseases but in this case it is difficult to identify a pathological form that (i) is regularly manifested about every 30

days, (ii) is found in a very limited and absolutely constant topographical site and (iii) disappears in the course of three days.

### **Infrared Photographs**

This method of observation demonstrates that the stigmatic zones had a higher temperature than the surrounding skin; thus, they were sites of dilation of local capillaries.

These hyperemic/hyperthermal areas reproduced exactly the form and extension of the areas of redness visible to the naked eye, the boundaries between the hyperemic/hyperthermal areas and the normal skin being clear and precise (Figure 3).

The small off-white “almond” constantly observed on the palm of the right hand was “colder” than the hyperemic bed on which it lay.

In the stigma-free periods the hyperemia/hypertermia disappeared.

These data would indicate that the regulation mechanisms of microcirculation play an important role in the origin of Anna Maria’s marks. Such mechanisms would be responsible not only for the topographical precision with which the hyperemic areas divide so abruptly from the rest of the skin but also for the restricted topographical localization (on the palms of the hands) of the vasodilator commands.

### **Triketohydrinden Hydrate Test**

As stated in the introduction, regardless of the type of mechanism by which a mental conscious or unconscious content could cause the formation of stigmata, such a mechanism could act through the autonomic nervous system. In



Fig. 3. Infrared photograph of Anna Maria’s hands on July 3, 1998.

fact several skin disturbances due to the interruption or abnormal activity of autonomic nerve fibers are known (Richards, 1967).

The antidromic activation hypothesis made by Tinel (1936) did not take into consideration the fact that sensory nerve trunks, that innervate the limbs, also contain sympathetic nerve fibers. Therefore, in order to explain stigmata formation it is not necessary to think of anomalous activation. To produce tissue damage it is enough to have a circumscribed strong, and persistent autonomous hyperstimulation.

As sympathetic fibers control pilomotor, sweating and vasomotor functions such activity could be revealed by suitable examination methods.

Sympathetic fibers in the hands reach their target anatomical structures through the cutaneous sensory nerves, so that the skin of the fingertips is supplied by three different nerve trunks. This has led to the hypothesis that if anomalous sympathetic activity is responsible for stigmata formation, it would be revealed only in the territory where the stigmata lie. For example: excessive sweating in the fingertips innervated by the same nerve trunk that could possibly convey anomalous commands to the stigmatic zone.

An imbalance in sweating secretion can be demonstrated by suitable staining techniques such as Moberg's (1958, 1964) ninhydrin test, also known as the triketohydrinden test. This colorimetric agent is colorless but becomes purple when exposed to very low concentrations of the organic components of sweat. The test is done by "taking" the fingerprints on a strip of absorbent paper: the pulp of the digits is pressed one by one against the paper and the outline of each digit is traced on the paper with a pencil that contains no soluble dye.

The prints are then developed in a solution of 50 ml acetone, 0.5 g. triketohydrinden and drops of glacial acetic acid.

Anna Maria took this fingerprint test eight times (six with stigmata, two in stigmata-free periods). On two occasions (July 2 and 3 and August 6 and 7, 1998) the test was also done on the entire surface of both palms (Figure 4).

Each test was immediately followed by a control test of the fingerprints or hand prints of the experimenter (Figure 5).

The tests demonstrate the almost total absence of sweating in the fingertips of Anna Maria's two hands, both when the marks were manifesting and in the free periods.

Slight sweating was observed in the fourth finger of the right hand on April 14 (Good Friday) and March 3, 1995; in the third and fourth fingertip on August 7, 1998 (Figure 6); in the second finger of the left hand June 2, 1995, and in the fourth finger of the left hand on August 7, 1998 (Figure 6). Although weak, this sign of increased sweating activity in only one or two fingertips could be of particular interest because the fourth finger's palmar surface is innervated by two nerve trunks, the median and the ulnar and the Anna Maria's stigmatic marks lay near the border between the two innervation territories. However, there was no correlation between the increased sweating activity and

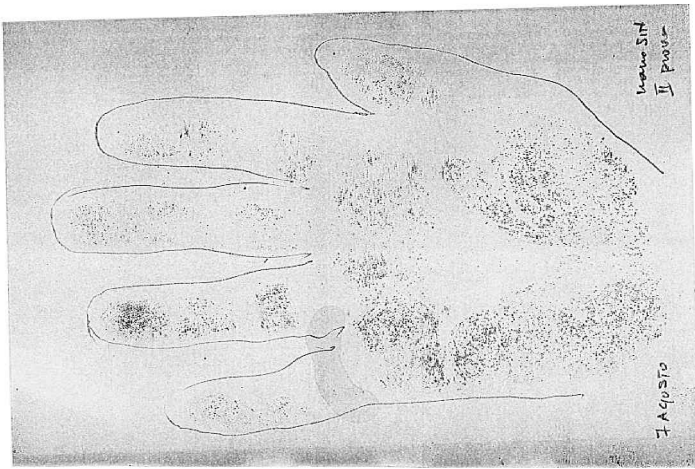


Fig 4. Triketohydrinden test of the Anna Maria's left hand on August 7, 1998. Note the greater sweating activity on the fourth fingertip.

the intensity of stigmatic marks (as, for instance, the presence of the “blister” or the extension of the hyperemic areas) nor to their morphology.

These results led to the conclusions that:

- 1) The sympathetic innervation of both of Anna Maria's hands is normally distributed, in that there were no signs of functional asymmetry. The increased sweating observed on the right hand's fourth fingertip is too oc-

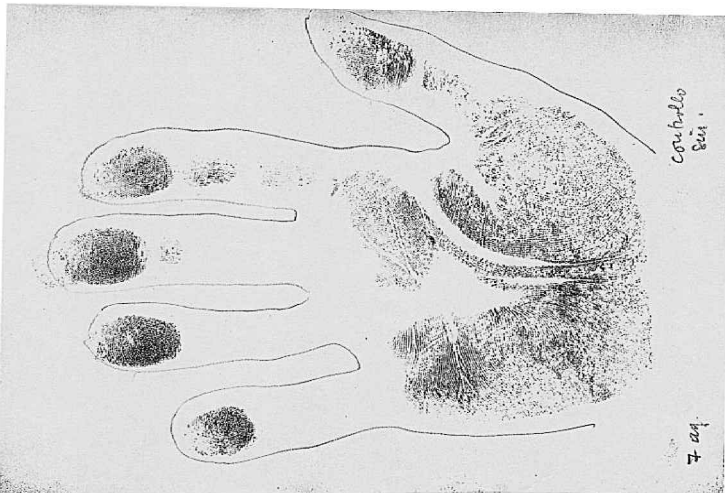


Fig. 5. Triketohydrinden control test of the left hand of the experimenter on August 7, 1998.

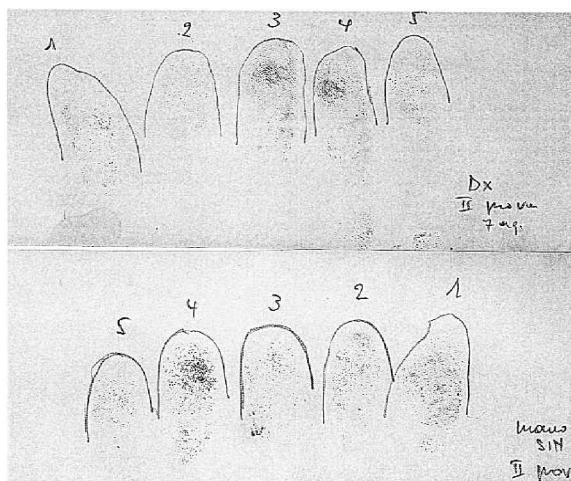


Fig. 6. Triketohydrinden test on Anna Maria's fingerprints of both hands on August 7, 1998. The test reveals a slight sweating on the third and fourth right and on the fourth left fingertips.

casional to reveal the autonomous activity that could generate the stigmata.

- 2) In the days when the stigma marks were visible there was no increase in the sympathetic tone, compared with the free periods.
- 3) There being no sweating asymmetry, the trunks and autonomous nervous centers (responsible for sweating activity in the hands) were intact and functioning harmoniously.

### Electrodermal Reactivity

It is known that skin is the site of marked electrical activity that can be measured in terms of variation of potential, resistance and conductance. Such activity is correlated to the conditions of skin dampness and is thus, in practice, proportional to the degree of sweating. Because sweat is a saline solution and conducts electricity, the more sweat there is, the lower the resistance to the current as it passes from one point of the skin to another. To promote a significant variation in the electrical parameters of the skin there is no need for a great quantity of sweat, an infinitesimal amount is enough (the so-called *perspiratio insensibilis*), hence the electrical activity of the skin is, in general, naturally very marked. Furthermore as sweating is strongly correlated to psychological and sensory events it is easily induced with a wide variety of stimuli; just as strong emotions can bring about copious, directly visible sweating, so even moderate entity stimuli activate imperceptible transpiration and give rise to ready and clearly recognizable modifications of the electrocutaneous activity. For such reasons the Triketohydrinden Test observations were

supplemented with a study of electrodermal responses, finger by finger, to painful stimuli.

In fact the Triketohydrinden Test, in addition to indicating a possible conduction deficit in the nerve trunks, can reveal excessive sweating (*i.e.*, cholinergic hypertonicity) and, in any case, reveals only the amount of sweat present at the moment of carrying out the test. Instead sweating responses to known stimuli reveal the excitability of the whole system (sweat glands, nerve trunks and neuroaxial sympathetic centers). In current practice electrodermal activity is studied in terms of conductance, and in the case of Anna Maria the variations of this parameter were recorded with a Lafayette Ambassador module.

Anna Maria was asked to keep her eyes closed (and she did so) and sweating responses were induced by a pinprick on the forearm, ipsilateral to the hand on which the electrodermal activity was being recorded. A study was made of the responses of the first finger coupled to the second, of the second with the third, of the third with the fourth and so on for both hands. The recordings obtained on the days when the stigmatic marks were visible were compared with those of the free periods.

Thus it has been demonstrated that:

- 1) On the days when the stigmata were visible the electrodermal responses were wider compared to those of free periods, demonstrating that Anna Maria's sympathetic system was more excitable on those days.
- 2) The responses for the various finger couplings were equal in latency and amplitude, indicating that there was no functional asymmetry among the nerve trunks that transmit the sweating impulses to the different fingers of the hands.
- 3) In particular, we observed no asymmetry at all in the responses of the third finger coupled to the fourth, or the fourth coupled to the fifth in the test on March 3, April 14, 1995, and August 7, 1998, when the Triketohydrinde Test revealed slight sweating in the fourth right finger. The same result was found on May 5, when slight sweating was observed in the second finger of the left hand: no asymmetry in the responses of the first and second fingers, or the second and third. This could mean that there is no contribution on the part of the autonomic fibers controlling sweating (or sweat function), neither to the genesis nor to the topographical precision of Anna Maria's stigmata.

### **Plethysmography**

The capillary pulsing of Anna Maria's fingertips was studied using an infrared plethysmograph that also equipped the Lafayette polygraph Ambassador module used in the electrodermal activity investigations.

The plethysmograph measures the changes in volume induced by blood content in an organ or part of it or a limb. As this content varies, following the heart pulsations, the plethysmograph records a wave-form activity, the apex of

each wave signaling the maximum blood content, the bottom the minimum. The amplitude of each wave (called dichrotic waves) is increased by a local or general relaxation of arterioles and decreased by their constriction. The observations were made twice, once on March 5 (marks visible) and again on May 27 (free period). On both occasions there was a preliminary recording, the plethysmogram of each finger of both hands being observed for three minutes while Anna Maria was relaxed in a sitting position; this was then followed by the recording of the arteriolar-capillary reactions to psychological stimuli (countdown, stating aloud her own name and surname) and sensory stimuli (painful prick to the forearms).

The test demonstrates that the arteriolar-capillary reactions to the stimuli on March 5 were more marked (considerable decrease in the amplitude of dichrotic waves, measured in millimeters and longer duration of the arteriolar-constriction) than on May 27. It was not possible to demonstrate asymmetry in the response of different fingers, although a certain degree of adaptation was noted, in the sense that the vasoconstrictor responses tended to be less lively in the last finger tested.

### Psychological Test

As was foreseeable, the elaboration of the Minnesota Multiphasic Personality Inventory (MMPI) of Anna Maria resulted in a high value scale 8 Sc (schizophrenia) that, in clinical practice, indicates schizophrenic type disturbances. Answering in an affirmative way to questions like type: -33 "I have had very strange and unusual experiences," -50 "My soul sometimes leaves my body," -66 "I see things, animals and people around me that others do not see," -184 "I usually hear voices without knowing where they come from," -350 "I smell strange things when I am alone," led to raised values in the scale, that would indicate problematic features. Nevertheless the case appears to come under exceptions by the Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association (DSMIII, 1983): religious and mystical "apparitions" and "visions" are not classified among the symptoms of mental disturbances.

On the other hand Anna Maria raised three children, had a stable and happy, marital relationship for more than 40 years, and worked all her life in daily contact with the public without manifesting disturbances of thought, affection or sociality.

If her manifestations are symptoms of mental illness one would expect that they would have broken out after the death of her husband (1987); however the fact is that the "marks" appeared for the first time three years later, in 1990. Furthermore, since the death of her husband (over 12 years ago) Anna Maria has continued to run the shop alone, a situation that puts her in continuous contact with people.

With regard to the MMPI results, it can be seen that the low scores on the HY (hysteria) and (HS) (hypochondria) scales were within normal limits.

The Rorschach test revealed no psycho-pathological symptoms.

### General Discussion

The studies carried out on Anna Maria include: (i) her state of mental health; (ii) the circumstances in which the stigmatic marks she bears were produced; (iii) the morphological characteristics, the anatomo-pathological aspect and the behavior of the lesions; (iv) the possible mechanisms producing the lesions.

Except for the “mystical visions,” that are in any case single and isolated symptoms in a panorama of normality, Anna Maria enjoys good mental health. The MMPI revealed no traces of hysteria in her personality, a condition that in the past was seen to be very closely associated with stigmatization. Also missing in Anna Maria as a visionary is the desire to share the suffering of Jesus and the desire to expiate the sacrifice of redemption — two psycho-religious attitudes indicated as the deep “motivation” of “unconscious” stigmatization and the “crucifixion complex” as written by Father Thurston (Thurston, 1952).

The circumstances in which the marks on the palms of Anna Maria’s hands were produced, and reproduced, resemble those described in many autobiographical accounts of stigmatized people: the marks seems to have started “by the direct intervention” of Jesus, even though there was not, in this case, the sudden bleeding that is generally a mandatory corollary of direct divine action. Nevertheless, in Christian hagiography there are various cases of stigmatization that took place slowly or that occurred “in stages.”

From 1990, Anna Maria’s marks reappeared regularly on the first Friday of every month, not only emphasizing the customary symbolism that characterizes stigmata but also highlighting the fact that the “cause” of the phenomenon was still active after five years (and at the time of writing several years later). In fact if the origins of the phenomenon were supernatural, then it would be reasonable to assume that Anna Maria should, each month, receive an encouragement or a booster to stay in the psycho-spiritual condition that the appearance of the marks triggered in her. If the causes were “human” then the regular recurrence of the events would indicate that the psycho-emotional pressure that first induced the appearance of the marks is still very active.

As has already been indicated, the only dermatological lesion that can be compared with Anna Maria’s marks is a burn. In the history of stigmatization a lesion that can bring to mind the action of heat is that described by Reverdit in the case of Thèrese Josephine Cartier. Better known as Madame Miollis (Marseille, 1806–1877), she presented, in the region of the heart, a bell-shaped pemphigal phlyctena, as if resulting from burning (Reverdit, cited by Imbert-Gourbeyre, 1894). However Reverdit excluded that such a lesion could be produced artificially with vesicants or rubefaciants because, despite being reproduced periodically for years, it never gave rise to the formation of scarring. In the case of Anna Maria such considerations are, for the moment, still hypothetical because a deep study of the evolution of the lesions has not been car-

ried out, they are of limited extent and that, in order to “heal”, do not require the slow plastic processes necessary to reconstruct tissue loss.

Anna Maria’s marks also resemble the stigmata of Thèrese Putigny, better known as Sister Marie Catherine of the convent of the Visitation in Metz (1803–1885) who for many years showed very painful reddish swellings, that never bled, on the palms of the hands and soles of the feet (Imbert-Gourbeyre, 1894).

Thus, if an evaluation of Anna Maria’s marks is made on the basis of Benedict XIV criteria for the recognition of true stigmata, it must be concluded that some characteristics are missing and others are rather vague.

With regard to the possible productive mechanisms, an effort has been made, as is usual in these cases, to gather together the elements that exclude fraud and disease, and any possible ones that could indicate a psychosomatic nature of the marks. As has already been stated, the preliminary data seem to make it improbable that Anna Maria could cause the lesions herself.

As far as the possibility of a psychosomatic genesis is concerned, the examinations carried out demonstrate sympathetic hyperactivity indexes only within the reddened areas themselves, while the sympathetic functions of the rest of the hands (sweating, symmetry of the electrodermal responses and vasoconstrictor reflexes) always appear within the norm. To complete the observations an hourly assessment of the microcirculatory activity needs to be made on the Thursday night preceding the first Friday of each month.

As far as the hypothesis of a miracle is concerned, it is not within my competence to make any judgement.

## References

- Agle, D. P., Ratnoff, O. D., and Warman, M. (1969). Conversion reactions in autoerythrocyte sensitization. *Archives of General Psychiatry*, 114, 438.
- Andreoli, V., Cassano, G. B., and Rossi, R., Eds. (1983). *Diagnostic and Statistical Manual of Mental Disorders*, DSMIII. Italian Edition, Milano: Masson, p. 209.
- Babinski, J. (1924). *Oeuvre Scientifique*. Paris: Masson.
- Benedicti XIV, Pontifex Maximus (1841). *Opera Omnia: De Servorum dei Beatificatione et Beatorum Canonisatione*. Prati: Typographia Aldina.
- Bianchi, V. (1926). Sudor Sanguigno e stigmatate religiose. *Rivista di Psicologia*, 22, 3.
- Black, S., Humphrey J. H., and Niven, J. S. F. (1963). Inhibition of Mantoux reaction by direct suggestion under hypnosis. *British Medical Journal*, 1, 1649.
- Boufflet, J. (1996). *Les stigmatisés*. Paris: Cerf/Fides.
- Bourneville, D. M. (1875). *Science et miracle: Louise Lateau ou la stigmatisée belge*. Paris: Delahaye.
- Charcot, J. M. (1889). *Leçons du Mardi*. Paris: Delahaye et Lecrosnier.
- Cousy, S. P. (1908): Manifestations cutanées de l’hysterie et stigmatisation des mystiques. Cited from Lhermitte, 1952.
- Dumas, G. (1907). La stigmatisation chez les mystiques chrétiens. *Revue de Deux Mondes*, Paris.
- Ewald, G. (1927). *Die Stigmatisierte von Konnersreuth*. Munich: Lehmanns.
- Early, L. F. & Lifschutz, J. E. (1974). A case of stigmata. *Archives of General Psychiatry*, 30, 197.
- Gauld, A. (1990). The early history of hypnotic skin marking and blistering. *British Journal of Experimental and Clinical Hypnosis*, 7, 139.
- Goerres, J. J. (1836). *Die christliche Mystik*. Regensburg (cit. From Wunderle).
- Gemelli, A. (1924). Le stimmate di S. Francesco nel giudizio della scienza. *Vita e Pensiero*, 3, 18.
- Hartung, E. F. (1935). St. Francis and mediaeval medicine. *Annals of Medical History*, 7, 85.

- Imbert-Gourbeyre, A. (1894): *La stigmatisation, l'extase divine et les miracles de Lourdes: réponse aux libres penseurs*. Librairie Catholique: Clermont-Ferrand.
- Johnson, R. F. Q. & Barber, T. X. (1976). Hypnotic suggestions for blister formation: Subjective and physiological effects. *American Journal of Clinical Hypnosis*, 18, 172.
- Lhermitte, J. (1952). *Mystiques et faux mystiques*. Paris: Bloud & Gay.
- Lechler, A. (1933). *Das Ratsel von Konnersreuth im Lichte eines neuen Falles von Stigmatisation*, Eberfeld: Licht Und Leben Verlag.
- Lord, R. A. (1957). A note on stigmata. *American Imago*, 14, 299.
- Margnelli, M. (1979). An "epidemiology" of stigmatization. *Proceedings of the Annual Meeting of the Society for the Scientific Study of Religion*, S. Antonio.
- Margnelli, M. (1984). La droga perfetta: Neurofisiologia dell'estasi. *Riza Scienze*, 4, 1.
- Margnelli, M. (1985). "Epidemiologia" della stigmatizzazione: La preghiera é una tecnica psicodinamica? In: *Misticismo e Psichiatria*, Rapisarda, V. & Virzi, A. (Eds.). *Formazione Psichiatrica*, 2, 115.
- Margnelli, M. (1988a). Isterismo e stimate. In: *Atti del Convegno di Studio sulle Stimate del Servo di Dio Padre Pio da Pietrelcina*, Di Flumeri, G. (Ed.), S. Giovanni Rotondo: Edizioni P. Pio da Pietrecina.
- Margnelli, M. (1988b). *Gente di Dio*. Milano: Sugar Co.
- Marianeschi, P. M. (1987). *Stimate e Medicina*. Tyrus: Terni.
- Mason, A. A. (1960). Hypnosis and suggestion in the treatment of allergic phenomena. *Acta Allergologica*, 7 (Supplement), 332.
- Meija, R. H. & Rodriguez Amenabar, S. M. (1986). Investigation diagnostica sobre la salud psíquica de una visionaria. *Proceedings of the X Congress of the Associazione Internazionale di Studi Medico-Psicologici e Religiosi (AIEMPR)*, Barcelona.
- Moberg, E. (1958). Objective methods for determining the functional value of sensibility in the hand. *Journal of Bone and Joints Surgery*, 40B, 454.
- Moberg, E. (1964). Aspects of sensation in reconstructive surgery of the upper extremity. *Journal of Bone and Joints Surgery*, 46A, 817.
- Pattie, F. A., Jr. (1941). The production of blisters by hypnotic suggestion: A review. *Journal of Abnormal and Social Psychology*, 36, 62.
- Ratnoff, O. D. (1969). Stigmata: where mind and body meet: A study of autoerythrocyte sensitization. *Medical Time*, 97, 150.
- Richards, R. L. (1967). Causalgia, a centennial review. *Archives of Neurology*, 16, 339.
- Simpson, C. J. (1986). Stigmata: pathology or miracle? *British Medical Journal (Italian Edition)*, 5, 404.
- Smith, G. R. & McDaniel, S. M. (1983). Psychologically mediated effect on the delayed hypersensitivity reaction to tuberculin in humans. *Psychosomatic Medicine*, 45, 65.
- Stevenson, I. (1997). *Reincarnation and Biology: A contribution to the etiology of birthmarks and birth defects*. London: Praeger.
- Tinel, J. (1936). Essai d'interpretation physiologique des Stigmates. In: *Douleur et Stigmatisation*, Paris: Etudes Carmelitaines, Desclée de Brouwer.
- Thurston, H. (1952). *The Physical Phenomena of Mysticism*. London: Burns & Oates, .
- Virchow, R. (1874). Über wunder. *Deutsche Zeitschrift für Praktik Medizin*.
- Warlomont, E. (1875). Louise Lateau: Rapport médicale sur la stigmatisée de Bois d'Haine. *Bulletin de la Société Royale de Médecine du Belgique*, XV, 144.
- Whitlock, F. A. & Hynes, J. V. (1978). Religious stigmatization: an historical and psychophysiological enquiry. *Psychological Medicine*, 8, 185.
- Wunderle, G. (1936). Essai sur la psychologie de la stigmatisation. In: *Doleur et Stigmatisation*, Paris: Etudes Carmelitaines, Desclée de Brouwer.