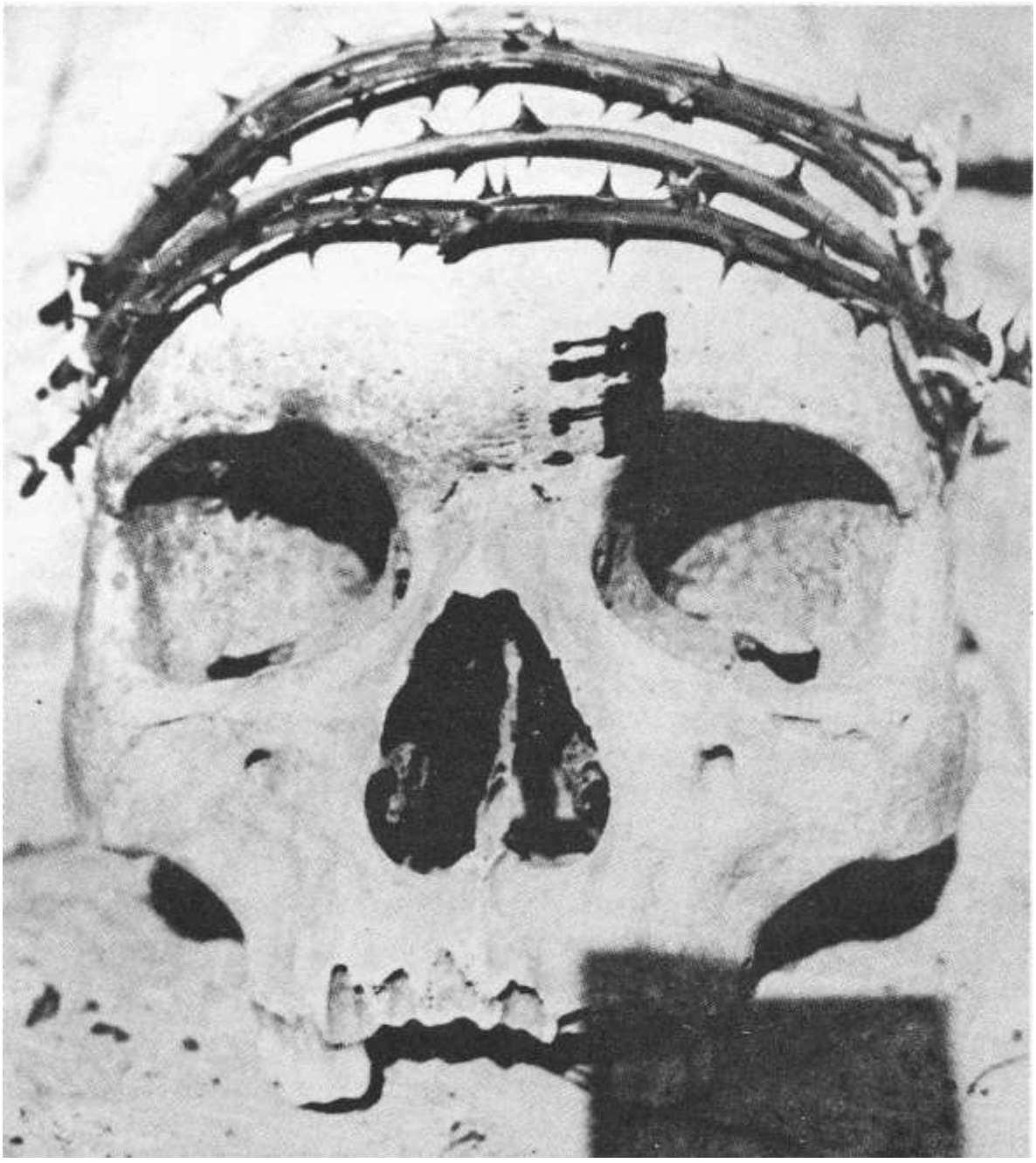

fig. 1) Crown molded onto the forehead. Larger number of thorns in contact with the bone.

THE CORONATION OF THORNS

IN THE LIGHT OF THE SHROUD*

SEBASTIANO RODANTE, M.D.

In this study we will objectively examine the blood clots on the forehead and the nape of the neck, caused by the crown of thorns, as they appear in the black and white photo of the Holy Shroud; dark blood on the white background (figs. 2 & 3).

In order to better understand the location of the clots and the direction of the blood flows toward right** or left** in respect to the observer, let us imagine the imprinted sheet unfolded (fig. 4). Putting oneself at A, looking toward the head, the blood from the wound in the R side is at C, i.e. at the R of the observer. Therefore on the frontal imprint, everything which we see on our R corresponds to the R of the Crucified, and the direction of the blood flows toward the R or toward the L of the observer corresponds, in effect, to the R or the L of the Crucified.

Putting ourselves at B however, looking toward the feet, the imprint of the R shoulder is at D; i.e. at the L of the observer. Thus the dorsal imprint is laterally reversed.

This being granted, we will study the puncture lesions caused on the head by the crown of thorns.

For many years I have observed the sindonic Face in the life-size photo made by Giuseppe Enrie in 1931. I chose this particular photo in order to have the "real" vision and the precise dimensions of the blood clots produced by a device which was meant to be an instrument of mockery but which, in effect, was one of torture.

It is necessary to differentiate between puncture wounds caused by a thorn which was implanted in a blood vessel of the head and afterwards removed; and a wound from a thorn injuring a vessel and remaining in situ for a certain period of time. In the first case, there is the issue of blood (arterial or venous, according to the type of vessel injured) until, by the coagulative process at the point of the injury (inside the vessel and in its walls, as well as in the injured cutaneous capillaries)—until a clot forms and therefore the bleeding toward the exterior ceases. In a healthy organism, in which the coagulative factors are normal, this process takes place in a few minutes.

*Translated and reprinted from SINDON 24, Oct. 1976 by kind permission of the International Center of Sindonology, Turin, Italy.

**Due to the very frequent use of the words "right" and "left," from here onwards "R" will indicate right, and "L" will indicate left. Ed.

Instead, in the Crucified of the Shroud, the crown of thorns must have remained implanted on the head for a certain period of time, either before the crucifixion or during the hours in which he remained on the cross right up until death. In this case, each thorn remaining *in situ* blocked the issue of blood onto the skin to some extent, depending on the calibre of the perforated vessel. But the spasms of the forehead muscle, contracting because of the pain provoked by the injury-stimulus on the sensitive nerve-endings and making the infixed thorn move, kept the thorn-wound open. If the injured vessel was a vein, there was a determination of blood in a slow and continuous flow, helped in its course by the movements of the wrinkling forehead. However, the perforation of an artery of a certain calibre (such as the frontal branch of the R superficial temple artery), by its own arterial pulsation caused movement at the point of perforation.

Therefore, while arterial pressure and the elasticity of the vessel walls, pulsing in systolic jets, aided the blood to issue around the implanted thorn, the thorn was moved externally by the pain-contractions of the forehead muscle.

Directing a glance at the total forehead, we notice that there are clots isolated or in groups, and clots which, following the movement of the head and starting from the point of the wound on the skin, take a downward course in rivulets—perpendicularly or almost so—or diverge toward the R or toward the L (fig. 5). The isolated clots numbered 3, 5, 6—by their slimness—show that they come from wounds in the cutaneous capillaries. Those in a group at numbers 8, 9, 10, 11, 12, 13, in the hair—being of larger dimensions—issued from larger vessels situated between the boney sheath (theca), the muscular tissue and the skin. Finally, the clots which run to R or to L —numbers 1, 4, 7—were produced by wounds in the walls of vessels of large enough calibre to allow the blood to issue in streams, running into an area free of hair (forehead).

I counted these clots, relating each one to a wound, either superficial or deep. Logically, each venous perforation was determined by at least one thorn; but it cannot be excluded that some clots could have been the result of two perforating thorns, contiguous on the thorny wreath. So that on the forehead and in the frontal-temple area, R and L, there are at least thirteen perforations. In fig. 5 one notices three isolated drops: G1, which separates from the epsilon and terminates on the L eyebrow; G2, coming from flow #7, falls toward the R, forming a certain angle (indicating the movement of the head in that direction); G3, at the outside limit of the L eyebrow.

In contrast to the forehead clots, those of the back of the head cannot all be discerned. In fact, it is not possible to detect the rivulets hidden in the thick hair. Mons. Ricci has studied the clots in relation to their directions: "Twelve bloodstreams with various directions start, in fact, from the eight wounds of the nape of the neck."

Completing the count of the clots (fig. 6), I have come to the conclusion that at least twenty thorns were implanted in the occipital

region. And since the injuries reach the parietal-occipital area, we can suppose that the crown of thorns was in the form of a cap. These numerical calculations give us the certainty that at least some thirty thorns (thirteen on forehead, twenty in the occipital region) perforated the head in front and back. Since we have no way to study injuries produced in the parietal-temple area (because the sides of the head did not register) we can deduce that at least some fifty thorns tortured the head of the Crucified.

In his study on the Passion and Death of Christ, La Cava writes: "After the scourging, Jesus was crowned with sharp thorns which, binding the head in a painful circle, was then beaten upon with canes ... To understand well the extent of this torture, it is enough to consider that the forehead, temples and, in general, all the scalp, are provided with a rich, sensitive nerve web derived in part from the trigeminal, in part from cervical nerves, whose nervous sensitivity are among the most painful in the human body. Think of the degree of painful sensations produced by dozens and dozens of extremely sharp, directly-stimulating points, lacerating the nerve-endings, not only of the skin, but also of all the layers of soft tissue of the scalp and even the cranial bones; and one will understand, with a certain approximation, the pain of the tragic coronation."

John the Evangelist (18:18) tells us indirectly how the thorny material was right at hand, being used as fuel in those chilly nights (Jerusalem is at 760-790 meters above sea level): "In the meantime, the servants and the guards, having made a bonfire of briars, because it was cold, stood around it to warm themselves." Thus it was easy for the soldiers of the praetorium to obtain the spiney branches and improvise a tangle of sharp thorns to place, as a cruel joke, on the head of the Condemned.

After this look at the overall picture of the wounds produced by the crown of thorns, we will now study the individual bloodclots on the forehead. Much light on their formation and characteristics has been shed by notable authorities (G. Judica-Cordiglia, Caselli, Masera, Barbet, Hynek ...).

Caselli in particular, during the 1939 National Convention of Holy Shroud Studies, was the first to distinguish arterial blood from venous blood. "Analyzing these injuries, we see on the right temple (at the right of the observer, since the image is reversed as in a mirror) at the roots of the hair, a small puncture wound (fig. 2, A1) from which two rivulets depart, one of which goes downward along the hair toward the shoulder, the other perpendicularly on the forehead toward the eyebrow. The thorn has injured the frontal branch of the superficial temple artery. The characteristic of the blood, in fact, is distinctly arterial."

To Caselli's truly important consideration, we add that the blood starting at the point of insertion of thorn A1, spurts out and arrives lower down, in a rivulet, along the frame of the hair, being impelled by the pulsation of this artery; the surge of blood in its progression

inside the vessel, having reached the point of the thorn's insertion, by the elasticity of the walls and by the arterial pressure, rhythmically opens the wound around the thorn, assisting the issue of blood. "Looking instead toward the middle of the forehead," Caselli continues, "a little to the left of the median line (fig. 5, clot 4) we see a brief hemorrhage in the form of a reversed 3; blood that is dense, of homogenous tint, uniform, opaque and very dark. It has distinct characteristics of venous blood, quite different from that of the right temple described above, which—we have seen—is arterial. Here the thorn certainly injured the forehead vein, called by anatomists the `prepared vein;' sometimes single, more often double, as in this case ... The curious aspect of a 3 is due perhaps to the furrowing of the forehead muscle in spasms of pain."

After this surprising anatomical correspondency, it seems to me closer to reality to differentiate the characteristics of venous blood, not so much by density or homogenous uniformity, as put forth by Caselli's serious study, but more by the modality of the coagulation of venous blood ascribed to it so magisterially by Barbet. In fact, in analyzing the epsilon blood clot, Barbet says that it is blood with venous characteristics because it has "a slow and continuous downward flow. And since a few minutes are required before coagulation occurs, only a small part of it clots near the wound. The farther it goes from the wound, the greater is the quantity of blood reaching the coagulation-point, and which, continuing to flow, coagulates in successive layers. Therefore the mass of the clot becomes increasingly thicker and wider as it descends; and that much more so since the blood encountered obstacles."

After this precise description by the French surgeon, as we observe that clot (fig. 5) we do indeed notice how, close to the wound, it is narrower and thinner; while farther from the skin-puncture the clot is thicker and wider (as at the middle, or the elbow of the epsilon) and even more so farther down in the terminal area (knee of the epsilon) to the extent that a drop of blood (G1) falls on the L eyebrow.

In various anatomy atlases, I have carefully observed the position of the frontal vein and the frontal branch of the superficial temple artery (figs. 7 & 9) in respect to the location of the two clots (A1) studied above (fig. 8). The perfect correspondency of the forehead clots imprinted on the sheet, overlaying as they do the vein and the artery in mirror image, gives us the certainty that that linen covered the corpse of a man who, while living, suffered the lesion of these blood vessels.

I said "while living," because it is not possible to demonstrate by crowning a cadaver with thorns. A crown of thorns placed on the head of a corpse would cause not a drop of blood to issue forth, for example, from the scalp; or even if some came, even if one succeeded in injuring the frontal vein above the bifurcation or to perforate the frontal branch of the superficial temple artery, one could not produce a blood clot in the form of an epsilon. We know, in fact, that the

epsilon was determined by the spastic contractions of the forehead muscle as a reaction to the pain provoked by the lesion of the extremely fine, sensitive nerve-endings with which the scalp is richly provided ... A dead man does not react to pain. Nor could one obtain a clot of arterial blood at the temple which would fall far down along the hair, impelled by the pulsation of this "living" artery.

At this point I would like to make a logical consideration; we know that in the course of the centuries, the Shroud disappears from one place to reappear later somewhere else. Periods of absence more or less long which—we must be honest—certainly do not bolster the continuity of historical documentation concerning the passage of ownership of the Shroud. And historians rightly give weight to these serious lacunae.

But of the Shroud which has come down to us and which we are now studying, one thing is certain and cannot be placed in doubt by anyone: that this Shroud is the same one that, in 1534, the Poor Clare nuns of Chambéry, for fifteen days, mended with triangular linen patches over the triangular burns (fig. 10) produced, two years earlier, during the fire in the sacristy of the Chambéry chapel.

Well, the fact that, for long periods in the peregrinations of the Shroud, there were serious historical gaps (begging the historians' pardon!) does not interest me. It does not even interest me to know what happened to the Shroud prior to 1534. I hold instead that it is of extreme importance to have the certainty that the sheet which interests me is that of 1534.

Studying this sheet, I limit myself to an objective examination only of the blood on the forehead, produced by a crown of thorns. And I come to the conclusion, as I said above, that "the perfect correspondence of the forehead bloodclots imprinted on the sheet in mirror image at the vein and the artery being studied, gives us the certainty that that sheet covered the corpse of a man who, while alive, endured the lesion of these blood vessels." So—since the circulation of blood (the difference, i.e., between arterial blood and venous blood) was discovered by Andrea Cesalpino in 1593-60 years after the fire—nobody of that era or anterior to the fire could possibly have had a precise notion of the different modalities of coagulation, on the skin, of arterial blood and venous blood.

This, for me, a medical doctor who seeks to study the bloodstains objectively, is the most important intrinsic detail which constrains me to testify in incontrovertible manner, over and above any existing historical gaps, to the authenticity of the Shroud, a medicolegal document.

Regarding the forehead clots, Mons. Ricci had the merit to establish the movements of the head of the Crucified during the whole torture. He followed the observation first made by Barbet who—attentively studying the flow on the L wrist (on the cross the flow had to be perpendicular to the ground, according to the laws of gravity)—said that "this flow divides into two diverging traces, forming an angle of

about 10 degrees" (fig. 11). On the basis of this important fact, Ricci reasoned that, to escape asphyxia on the cross, the Crucified must have assumed two positions: of slumping forward and straightening up. Measuring more exactly the angle of the two diverging rivulets of the wrist, he determined the kinetics of crucifixion and—for what applies to this study—the movements of the head, deduced from the angles of some rivulets on the forehead (fig. 12). In fact, the blood flows A1, A2, A3, each start from the points of penetration of a thorn and are compelled in two directions, denoting the movements of the head. "On the cross, the head of That Crucified had to undergo two extremely painful positions: that of slumping, and—to avoid asphyxia—that of straightening up. These positions obligated the head to bend to the right in the straightening up and to remain immobile and forward at the center when the body hung from the arms in the state of slump. Consequently the blood of the three wounds of the crown of thorns remaining open on the forehead when Jesus hung on the cross, signals the two positions of the head, in the vertical flow and the flow toward the right (as is clearly seen on the Shroud)."

In my opinion, it should be specified that flow A3 (fig. 12), diverging to the R in the L temple region, is not formed by a rivulet but by the droplet G2, which fell from the point of perforation, above it, at one of the times when the head leaned toward the R, its axis thereby marking the angle of opening in relation to the inclination of the head. Concerning what Mons. Ricci established, we can therefore be certain that the three rivulets were formed on the cross; produced therefore by the crown of thorns which the Condemned wore on the cross.

May Mons. Ricci amiably permit me to disagree with him when, admitting that the Crucified wore the crown along the Via Dolorosa, he thinks that Jesus did not have it on when he was crucified: "Because of the very few traces on the right of the face, I think that on the cross he must not have worn the crown of thorns."

At the beginning of this study we noted the difference between a puncture wound (thorn) which perforates a vessel and is then removed, and a puncture wound of the same agent remaining for a certain time in situ and which is moved in the place of fixation by the movement of the forehead muscle (and, for the arteries, moved also by pulsation). In the first case (hypothesis of Ricci), there is the issue of arterial or venous blood until, by the coagulative process, the blood ceases to issue through the open wound; a coagulative process which requires some minutes to occur, according to the diameter of the wounding agent which, whatever its size, is always a thorn.

However, if we consider the time spent: to remove the tunic from the Condemned (and immediately beforehand, he had to remove the crown of thorns, since the tunic was "without seams"); laid on the ground (to permit the nailing of the wrists to the patibulum); hoisted onto the stipes (so that the patibulum could be inserted); and the feet

nailed (so as to be definitely fixed, vertically, to the stipes); one would have to deduce that the hematic flux of the three wounds—already existing when he arrived to Golgotha—must have stopped. So much the more so because the blood inspissation, due to the loss of organic liquids (hematidrosis, flagellation, crown of thorns) as well as the lack of food and drink after the Last Supper, certainly would have accelerated the coagulative process. And the cry of the Crucified, "I thirst;" was it not the imperious need to restore the hydrate equilibrium in the dehydrated organism?

If the three wounds had been produced by the crown "before the crucifixion" (Ricci's hypothesis), as soon as the crown was taken off, the blood—initially fluent—would have determined rivulets confusedly to R and to L on the forehead precisely for those movements of the head which the Condemned would have made while the executioners pulled the tunic over his arms and head.

For the reasons above, it is more probable that the three wounds were produced when the crown of thorns was adjusted on the head of the Crucified, already nailed to the cross; adjusted, perhaps, by the same person who fixed the superscription atop the stipes, once the crucifixion was completed. From that moment, three of the thorns perforated that many vessels; remaining infixed and at the same time being moved inside the mass of the forehead muscle (which contracted as a result of the painful efforts of straightening up), they aided the issue of the bloodstreams on the forehead with the divergent angles to the R, first studied by Ricci.

Returning to the origin of these trickles; from the studies of Caselli, cited above, we know that the trickle of the R temple region derives from the forehead branch of the superficial temple artery (fig. 13, flow A1). I have observed at length and for a long time the other two flows, A2 and A3. Having had the Enrie photo printed in natural size in black and white and with a bit more contrast, I was able to better study the characteristics of coagulation (fig. 13).

Flow A2 is disturbed by a dark wrinkle of the sheet, which goes from L toward the R. Since the imprint of the two rivulets, one perpendicular, the other diverging to the R, is somewhat pale on the sheet despite the greater contrast achieved in this photo, one cannot establish (from the manner of efflux and coagulation of the trickle) whether it was an artery or a vein that was lesioned.

But one can study quite well the flow A3 (fig. 13) which, with the drop G2, forms the angle diverging to the R. At the origin of the skin injury, one notices a roundish formation C3, dark enough to denote a more homogenous clot around the thorn. The trickle descends perpendicularly downward, slowly and continuously, helped—so to say—by the movement of the thorn in the vessel walls as a result of contractions of the forehead muscle (fig. 14). This rivulet, formed in the slumping position, gradually thickens as it flows away from the wound, so that in the terminal part T (fig. 13) it forms a large roundish drop. The mass of the clot, therefore, is that much thicker and

wider the farther it is from the wound. Such behavior then—as also for the epsilon clot—is of venous blood.

I have observed with a certain interest the position of clot A3 and its opposite A1, which is arterial. Dividing the Face in two parts (fig. 14) with a line passing along the ridge of the nose, it is seen that the skin lesion, through which the blood issues from the forehead branch of the superficial temple artery A1, is—in the natural size photo—at 3.6 cm from the median line dividing the Face into two parts. Observing now the position of clot A3, one sees that the skin lesion around the infixed thorn is at 4.3 cm from the upper-external margin of the arch of the L eyebrow and at 4.8 cm from the same median line. This clot, with venous characteristics, is therefore 7 mm higher and 5 mm more inward than its opposite A1, coming from the frontal branch of the superficial temple artery.

Carefully observing fig. 16, we notice that the frontal branches of the artery and the superficial temple vein are close beside each other and, advancing upward, approach the median line. Well, in the L frontal temple area at A3, a thorn injured the frontal branch of the superficial temple vein a little higher—therefore a little closer to the median—than the thorn opposite it which injured the superficial temple artery at A1.

A last look at the forehead, and precisely at the venous clot in form of an epsilon (fig. 18). Here one sees quite well the circular clot C around the thorn which perforates the frontal vein. Since the rivulet has assumed this form not only by the furrowing of the forehead muscle (pain reaction), but especially for the movements of the head to R and to L, one can be certain that it would have been formed before the crucifixion. In fact (fig. 17), the line AB and CD denote a movement of the head toward the L; the line BC a movement toward the R; and even the terminal line DE follows the transverse flow, from L to R, of wrinkle R3.

Using a tube of narrow calibre, I let some citrated blood run for about 5 minutes onto the forehead of a colleague who, keeping his head immobile, wrinkled and relaxed his forehead muscle. The blood fell slowly and perpendicularly, surmounting the obstacles of the moving wrinkles but without forming any elbow or knee.

The epsilon form, then, was not produced solely by the wrinkling of the forehead but especially by movements of the head to R and to L. Thus we have reason to think that this clot was formed in the atrium of the praetorium during the mocking ceremony of coronation; i.e., before the crucifixion.

We read in Mt. 27:29-30; "And braiding a crown of thorns, they put it on his head ... took a cane and beat on the head." And in Mk 15:17, 19: "And braiding a crown of thorns they put it on him ... and beat on his head with a cane."

The cane-blows on the head were evidently dealt in every direction by soldiers who, excited by the cruel jest, took turns at hitting the king's head for fun; on the top, in front, at right, at left, on the nape of

the neck. Only a thorn infixed in the forehead vein—a thorn moving with the repeated blows and the painful furrowing of the forehead—could produce a clot so abundant and so accurate. And as the blows brandished to R and to L induced the "Crowned King" to bend his head to L and to R, the venous blood, running slowly from the open wound, formed the epsilon.

A detail: the drop of blood G1 (fig. 18) fell from the terminal part of the epsilon (the knee) upon the L eyebrow as if it had been jerked from such a distal place by an abrupt movement of the head (a slap or a push). In fact, the knee G of the epsilon lacks a part of its rotundity, as can be observed in fig. 18, greatly enlarged. "And the soldiers, braiding a crown of thorns, put it on his head ... and slapped him" (John 19:2, 3). Also the other lesions visible on the forehead which, in fig. 5, we have indicated with numbers 3, 5, 6, 8, 9, 10, 11, 12, 13, could have been determined by blows on the spiney wreath. Numbers 3, 5, and 6 show evidence of small clots, the small capillary vessels having been injured; while numbers 8, 9, 10, 11, 12 and 13 are larger clots (coming from wounds of arteries and veins of a certain calibre) detected amidst the hair. Because of the presence of the hair, the issue of blood from the respective vessels could not give the characteristic flows which, on the free zone of the forehead, permitted us to differentiate arterial blood from venous blood.

The paucity of clots on the forehead in respect to the abundant bloodflow on the nape induced me to study more attentively a head crowned with thorns. Using common briars which grow in the Mediterranean climate of Siracuse, I entwined at random five thorn branches, arranging a rudimental crown. I put it on a skull, trying to make it adhere as much as possible to the cranial bone (fig. 19). I was able to determine that, on the forehead, only seven thorns were in contact with the bone, while another seven remained raised above, although directed toward the bone. Calculating, then, the whole cranial circumference, there were about thirty thorns infixed while just as many—due to the flexibility of the wreath—did not touch the skull (fig. 20).

Then I tried to arrange four flexible branches on the forehead of the skull, each one parallel above the other and clinging well to the bone by being tied with rubber bands at each end. Stretched and settled against the bones of the cranial base, these bands held the branches firm (figs. 1 & 20). Only if a casque were made to measure and patiently modeled, could so many wounds have been produced, at least on the forehead.

But in the atrium of the Antonia fortress, the soldiers—finding themselves for the first time in their careers before a malefactor who dared to proclaim himself a king—impatient to give vent to their glee, must surely have improvised a crown by twining it at random and very hurriedly. The observation springs spontaneously that the blows of the cane must have injured also the blood vessels on the sides of the head; but since on the Shroud the sides are not printed, it is not

possible to take any of them into consideration. However, the clots of the nape (fig. 3) do fall under our observation; some of which were formed as a result of the blows in the praetorium but most of all, by the repeated falls on the way to Calvary.

Observing the L knee on the frontal imprint of the Shroud, one notices an excoriation surely due to falls on a stoney, uneven terrain. One may be permitted, then, to think that during the staggering and—above all—the falls, the patibulum struck against the occipital region, driving in the thorns even more deeply. And since the depth of the puncture wounds is related to the traumatic blow, vessels farther beneath the surface would also have been injured.

Thus, for these blows—*continuous* during the staggering course (between two wings of a ferocious crowd) and *specifically* at times of the falls, certainly there would have been an abundant issue of blood in the hair. But the atrocity of such traumatic blows was caused, we repeat, by the lacerations of the nerve-ends of the cervical region and even more by the thorns driven against the occipital bone.

The blood clots of the nape (fig. 3) have been studied quite well before now by G. Judica-Cordiglia and G. CaseIli, who differentiate their arterial or venous origin in relation to the density as imprinted on the Shroud. We will not linger upon these characteristics because the present study proposes to consider the difference between arterial blood and venous blood solely from the differing coagulation processes of the two types of bleeding on the skin. And this is only possible on the forehead, free of hair. By the abundance of clots on the nape, however, we are certain that the Crucified wore the crown of thorns along the way to the place of torture. Had the crown not been worn, the patibulum, striking forcibly on the occipital region during the falls, would have caused a dark formless impasto and an amorphous mass of clots. Instead, the crown, acting as insulation between the nape and the patibulum, allowed the clots to remain so clear and clean that they can be counted.

So we have to suppose that—because of the traumatic blow striking forcibly on the nape of the neck and the natural flexibility of the wreath—during the falls, all the thorns were pushed forward, moving away from the forehead teguments; while the thorns infixed in the temple regions, vigorously pushed forward, produced cutaneous lacerations, stimulating the relative nerve-endings. One more time, we repeat that the epsilon flow on the forehead was more likely formed in the praetorium when the crown was steady on the head rather than along the way to Calvary when, because of the falls, the thorns moved away from the frontal region. My supposition has been strengthened by a subsequent coronation of the skull. After having fixed a band of foam rubber 4 cm wide and 5 mm thick on the whole cranial circumference (to simulate the soft parts of the head), I set a crown of thorns upon it. As I exerted pressure on the occipital region, the frontal thorns moved away from the bone while those infixed laterally tended to lacerate the foam rubber.

We have reached therefore the end of this work; in the light of evidence which every observer can see on the Face and head of the Man of the Shroud. We have striven to present a study of the objective examination of the clots, differentiating, wherever possible, the arterial and venous characteristics solely by their modality of coagulation on the skin. This distinction, together with the position and direction of the flows and the number of the wounds, has brought us, indirectly, to relive the man's torment. May we submit ourselves, in love, to such atrocious outrage.

My own conclusions from the coronation of thorns on a skull may perhaps not be shared by other, more attentive, scholars; who might deduce different and more acceptable arguments. If nothing else, the present study will have served to bring into consideration this important aspect of the Passion of Christ; testimony of his grave sufferings during all that time from Pilate's praetorium to the Cross.

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FRANCESCO LA CAVA: "La Passione e la morte di N.S. Gesù Cristo illustrata dalla scienza medica," D'Auria, Naples, 1953

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FURTHER STUDIES ON THIS SUBJECT:

Dr. Rodante's Report to the Second International Congress of Sindonology, Turin, 1978: "The Shroud: Witness of the True Death of Christ." Published in LA SINDONE E LA SCIENZA, Turin, 1979.

PIERRE BARBET: "Proof of the Authenticity of the Shroud in the Bloodstains;" 1950. In SINDON 14-15, Dec, 1970, p. 31 ff. "A large skull-cap ...held on by a band of entwined rushes, circling the nape and the forehead. This bandeau is ... at Notre Dame of Paris; St. Louis had constructed the Sainte Chapelle for the relic ...The flow of blood from thorn punctures was arrested by this bandeau; then, passing over it, the blood ran down into the hair. For three hours, the head, leaning backwards, struck against the patibulum and the thorns were thus driven further into the scalp."

Also: PIERRE BARBET, "A Doctor At Calvary;" Doubleday Image Book, 1963, p. 93; or, "La Passion de Jesus-Christ selon le chirurgien;" Editions Paulines, Sherbrooke, Canada, 1965, pp. 126-130.

PAUL DE GAIL, S.J.: "Le Visage de Jesus-Christ et Son Linceul;" France-Empire, 1972, p. 212 ff., note B, Annex: "It is certain, particularly since He was dressed again in his own garments [in the praetorium that Jesus did not wear the crown of thorns on the way to Calvary, nor on the cross."

ANTOINE LEGRAND: "Le Linceul de Turin;" Desclée de Brouwer, 1980, pp. 118-126: Author observes that the soldiers would not have risked pricking their fingers by braiding the thorny branches, suggesting that the reeds served as a support for the thorns. He cites Josephus' account of the burial of Herod, whose corpse was crowned with a diadem, over which was placed his crown. A. believes that the abundance of sweat on Jesus' forehead caused the deviations in the epsilon bloodflow, and that the line of the reed diadem can be reconstructed, from left to right across the forehead, through the epsilon. He points out how one blood-drop shows a crater; at first a blood drop is convex, then forms a depression in the center, while the edges retain a certain relief. "A painter would never have dreamed of reproducing such minutiae." The flows at the nape originate high up on the head, where they cannot be seen because of the hair; while the reeds, binding the hair to the nape, arrested the flows at that level. Legrand also observes that the bloodflows at the back of the head reveal a detail which is not found on any other part of the body; i.e., the blood is speckled with tiny clear spots, as if the blood had slipped off these areas as it could have slipped off some oily substance. He supposes that the oily substance derives from the unguent with which Jesus was anointed at Bethany. (Mc 14:3)

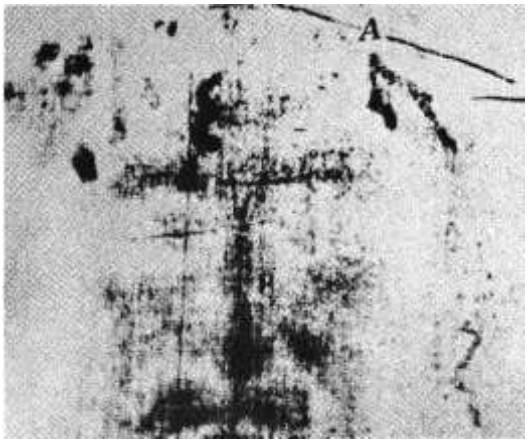

fig. 2) The face with bloodclots on forehead. The arterial flow A1 falls down along the hair.

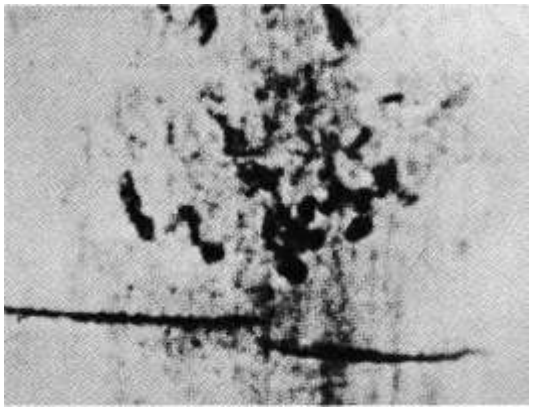

fig. 3) Clots on the back of the head.

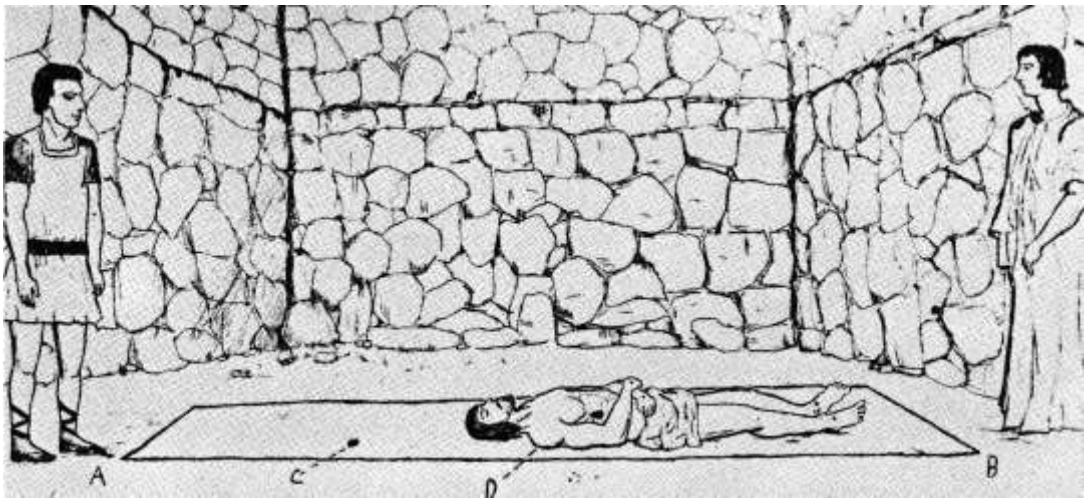

fig. 4) Positions of the imprint and blood spots on the sheet in relation to an observer and the position of the body.

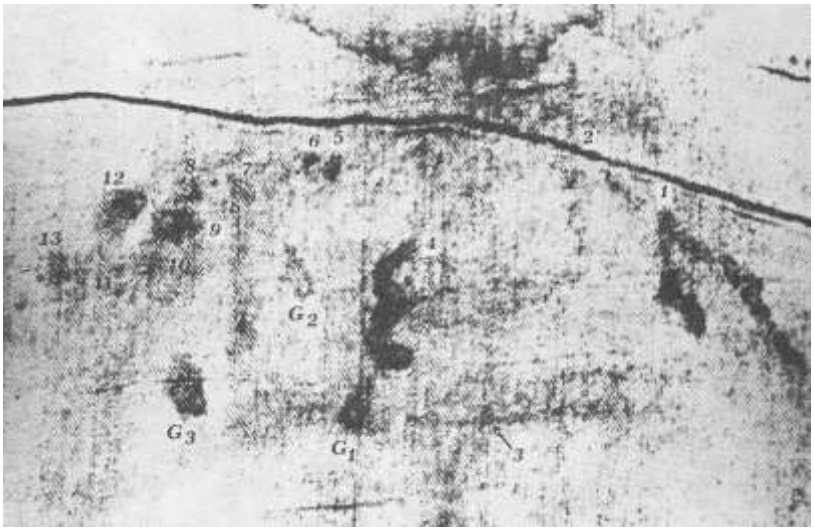

fig. 5) Number of forehead clots in reduced size.

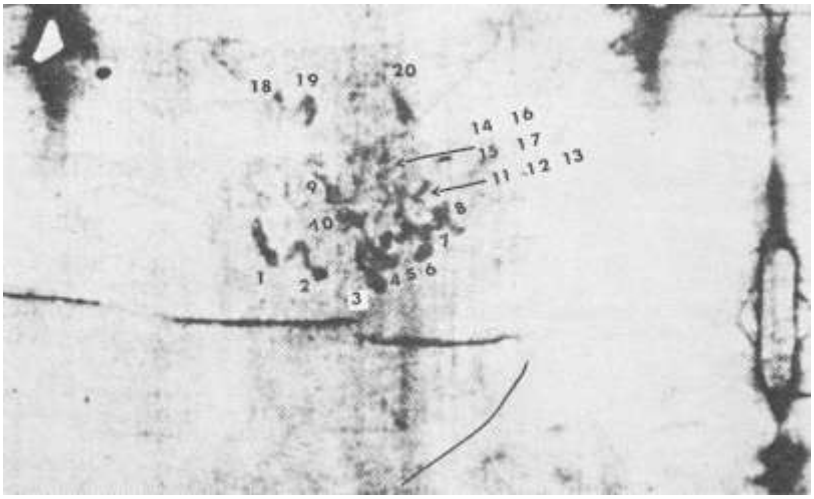

fig. 6) Number of clots observable on the back.

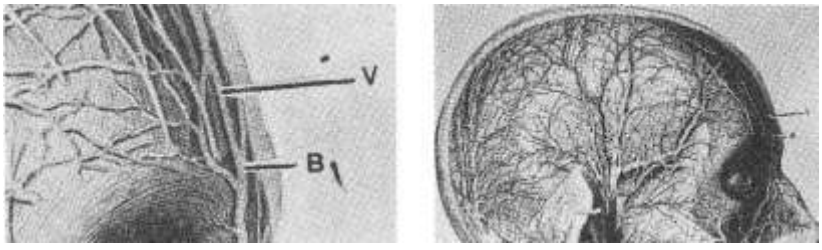

fig. 7) Position of the frontal vein which branches at B. A thorn has wounded the vein above the bifurcation at V.

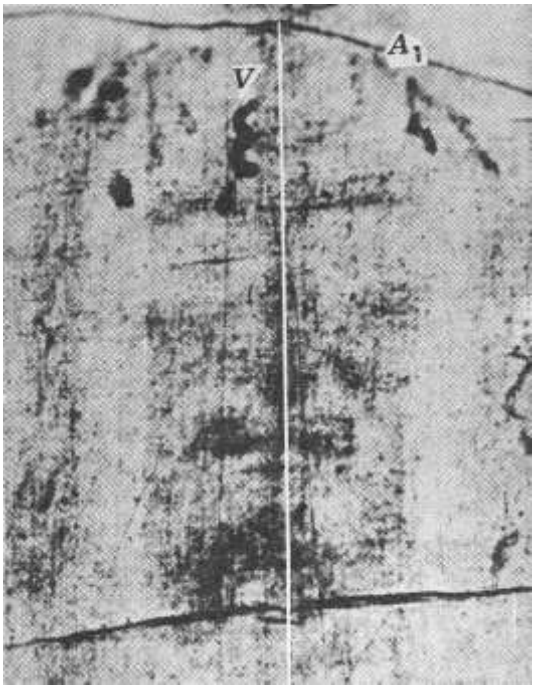

fig. 8) Position of the frontal vein V and the frontal branch of the superficial temple artery A1 on the forehead. The venous clot V in the form of an epsilon lies to the left of the median line. The frontal vein was perforated above the bifurcation.

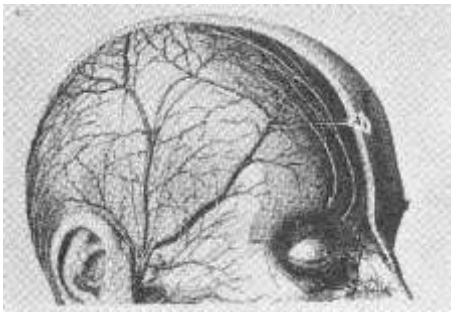

fig. 9) Position of the frontal branch of the superficial temple artery wounded by a thorn at A1.

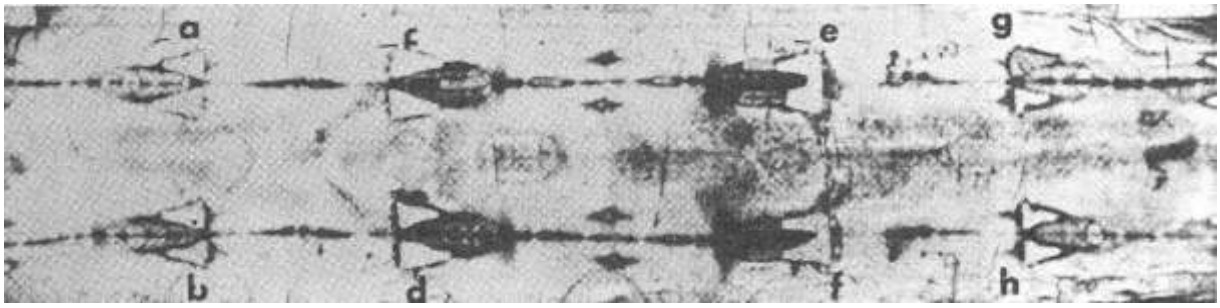

fig. 10)The Shroud with the triangular patches ab, cd, ef, gh, sewn on by the Poor Clare nuns.

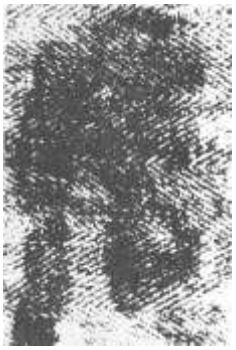

fig. 11)Clot on the wrist, formed on the cross. The two diverging flows denote the positions of slumping and straightening up.

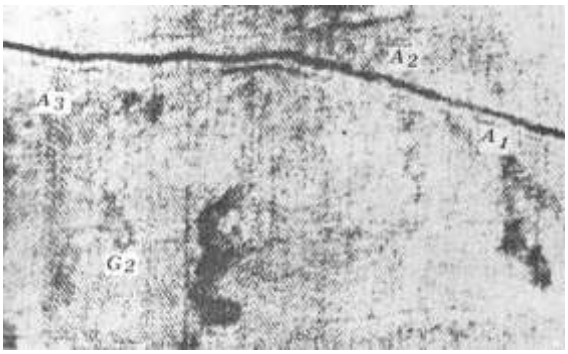

fig. 12)Three flows A1, A2, A3, indicate the movements of the head falling forward (slumping position) and toward the right (straightening up).

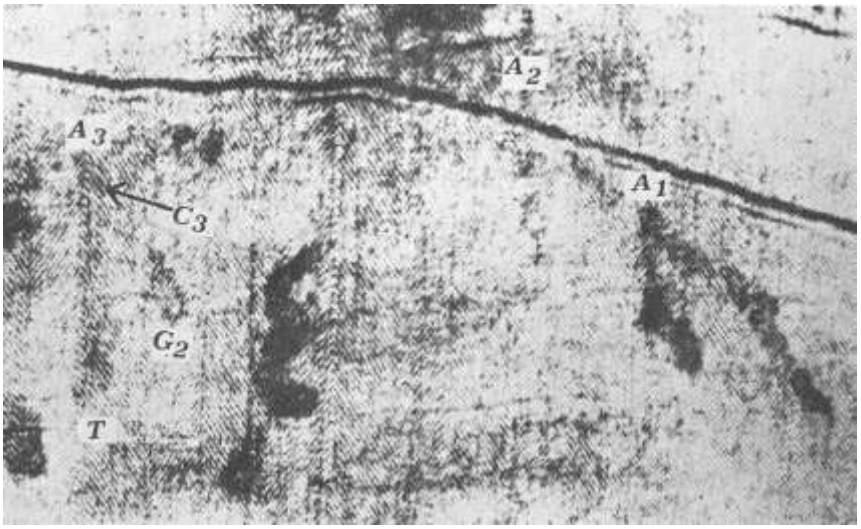

fig. 13)In A3 can be seen the circular zone of the clot around thorn C3 and the venous blood which, falling slowly, becomes larger, forming the roundish terminal drop T.

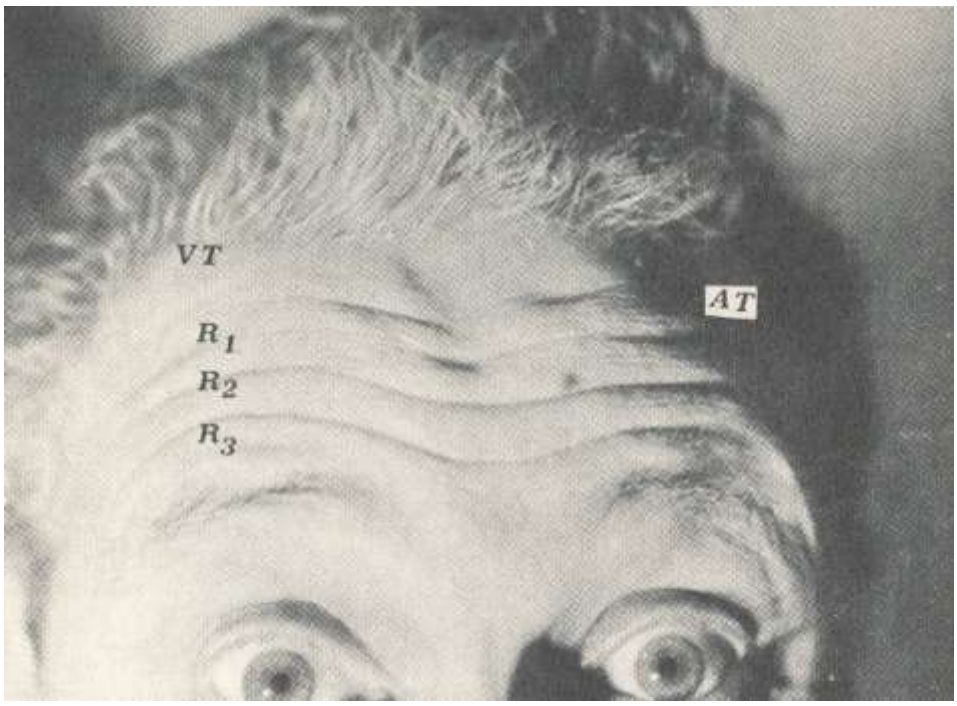

fig. 14)R1, R2, R3: wrinkles made by contraction of the forehead muscle. VT: frontal branch of the superficial temple vein. AT: frontal branch of the superficial temple artery.

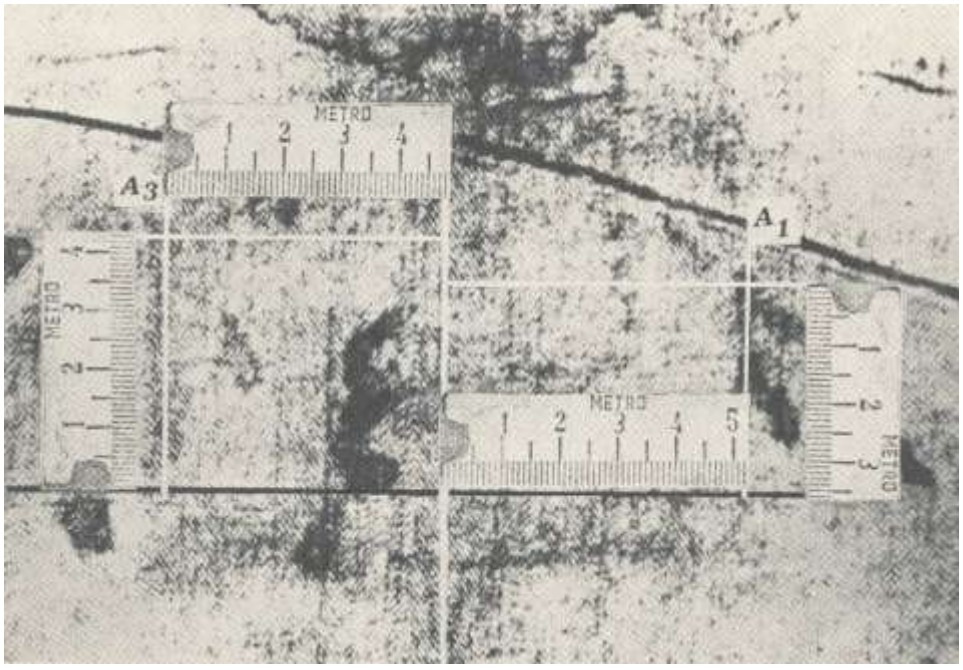

fig. 15)Photo in reduced size. Position of perforations in the frontal branch of the artery (A1) and the superficial temple vein (A3). The point of lesion A3 of the vein lies higher and closer to the median line than its opposite, A1, of the artery.

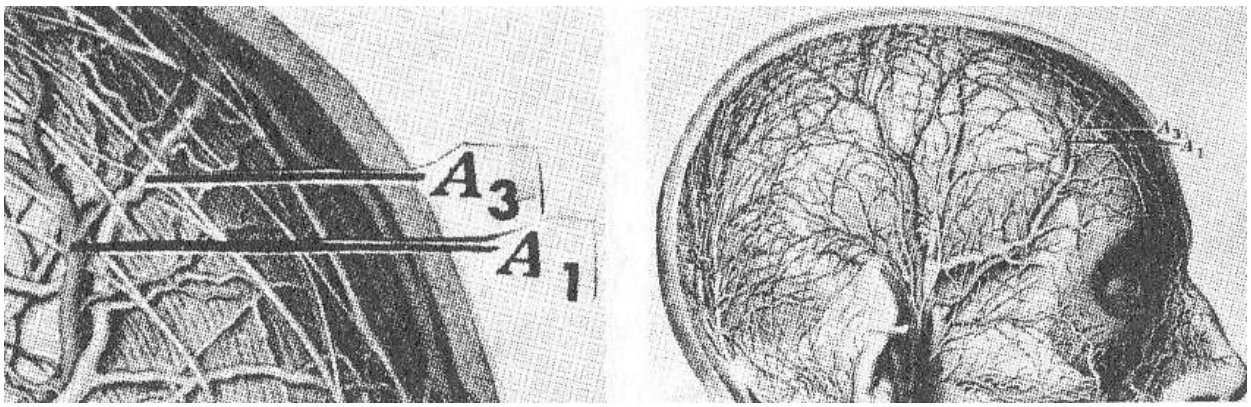

fig. 16)In the right hemisphere a thorn injured the frontal branch of the superficial temple artery at A1. In the left hemisphere a thorn injured the frontal branch of the superficial temple vein, which runs upwards and medially, at A3. This point (cfr. fig. 14) lies higher and closer to the median line than the arterial wound A1.

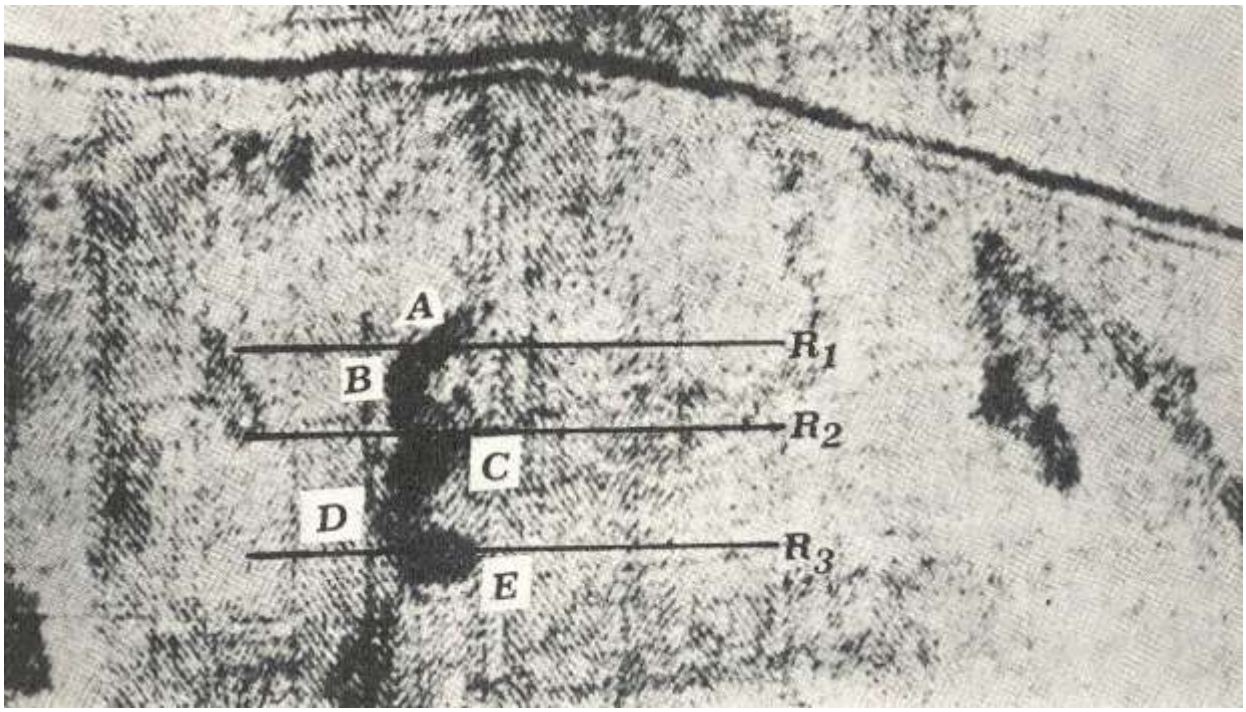

fig. 17)By the movements of the head toward the left (AB and CD) and toward the right (BC and DE), the three forehead wrinkles R1, R2, R3 aided in the formation of the epsilon flow.

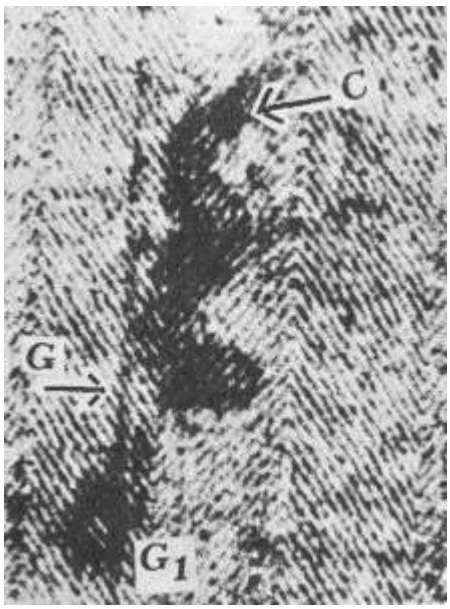

fig. 18) C: circular clot very precise around the infixed thorn. G: knee of the epsilon lacks its natural roundness. C1: drop of blood fallen from the knee because of a brusque movement of the head (slap or push). This drop seems to have been "torn" from the knee.

fig. 19)Crown of thorns on a human skull. Only seven thorns are in contact with the bone; seven others point toward it.

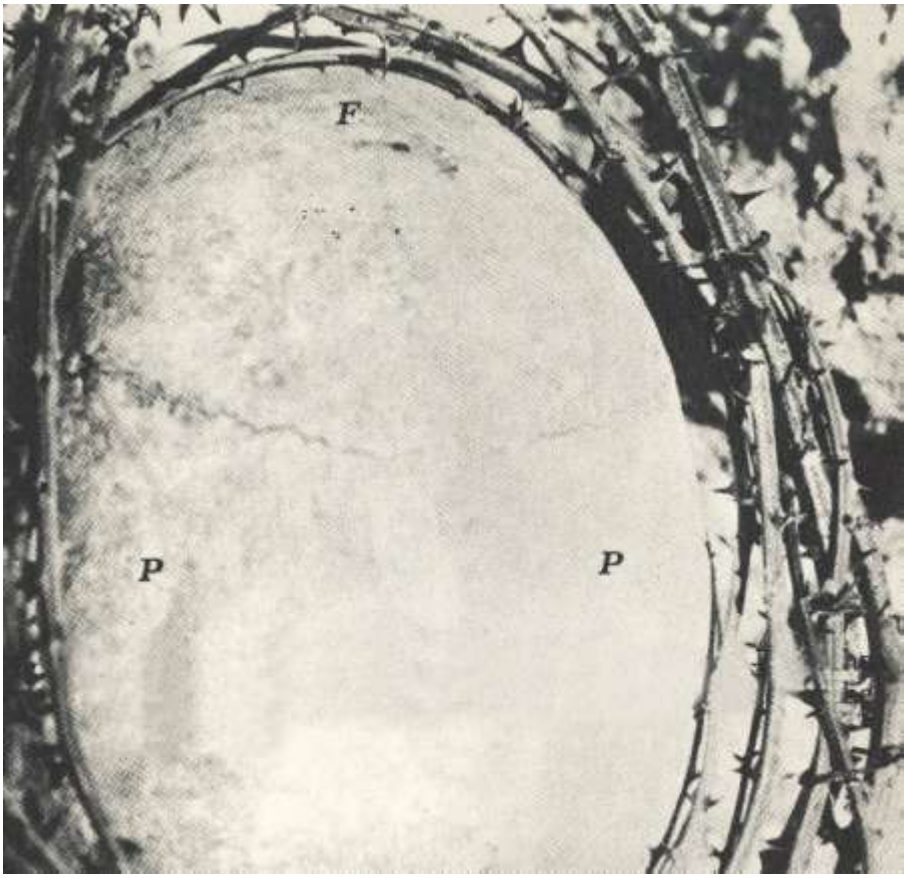

Fig. 20) Same experiment as in fig. 19, seen from above. P: parietal bone. Thorns in contact with the forehead bone are few.

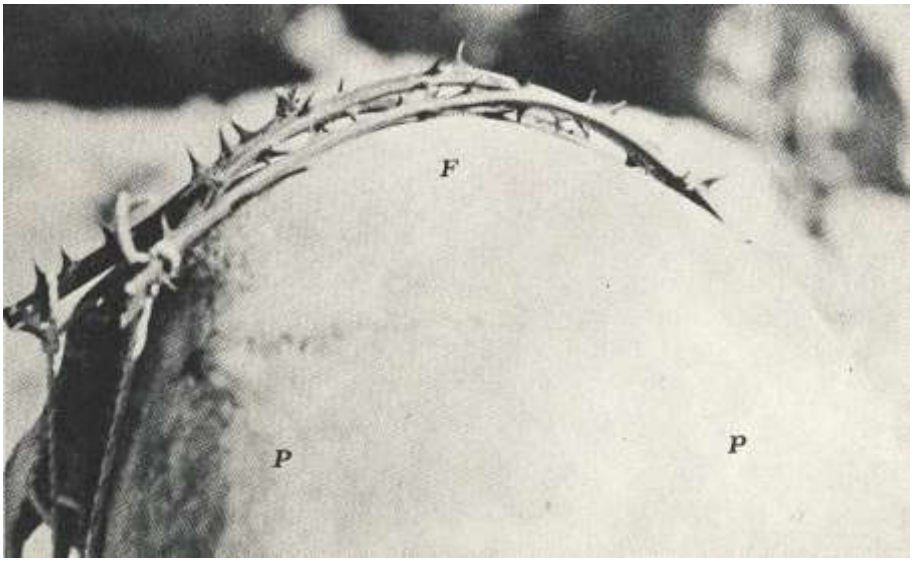

Fig. 21) Detail of fig. 1 on page four. F: forehead bone. P: parietal bone.