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## ARTICLE III.

FURTHER STUDIES ON THE BLOODY SWEAT  
OF OUR LORD.

BY W. W. KEEN, M.D., LL.D.

IN the *Baptist Teacher* for October, 1890, and in a fuller paper in the *Baptist Quarterly Review* for April, 1892, I published an article on "The Bloody Sweat of our Lord," as viewed from a medical standpoint. Since that time I have consulted a number of additional authorities and have gained from these a wider knowledge of the facts. It gives me, therefore, great pleasure, at the request of the Baptist Ministerial Conference of Philadelphia, to lay before you some of these additional facts.<sup>1</sup> I have selected only a very few, because it would be burdensome and also useless to attempt to quote, or even give a *résumé* of, the exceedingly extensive literature on the subject of bloody sweat, stigmatization, chromathidrosis, chromidrosis, chromocrinie, and other similar terms, which are used to indicate varieties of this curious condition.

Those who desire to pursue further studies in the matter are recommended, for a more exhaustive bibliography than in the present and my former papers, to consult the literature gathered together under these headings in the Index Catalogue of the Surgeon-General's Library, United States Army, not only in the published volumes, but in the supplementary volumes soon to appear.

Of the references obtained since my first paper, the most complete and satisfactory are the following:—

<sup>1</sup> Read March 1, 1897.—EDS.

Fox (T. C.). On two cases of chromidrosis in which a blue-black pigment exuded from the skin of the circum-orbital regions. *Trans. Clinical Society, London, 1881, xiv. 211-221, 1 pl.*

Leroy (de Méricourt). *Mémoire sur la Chromidrose ou Chromocrinie Cutanée. Suivi de l'étude microscopique et chimique de la substance colorante de la chromidrose, par le Dr. C. Robin, et d'une note sur le même sujet, par le Dr. Ordoñez. Ann. d'Oculist., Brux., 1863, Vol. 1. p. 5.*

Duffy (F.). A case of Chromidrosis. *North Carolina Med. Jl., Wilmington, 1883, xii. 260.*

Babesiu (V.). Ueber die Bakterien des roten Schweisses. *Centralbl. f. d. med. Wissensch., Berlin, 1882, xx. 146-148.*

Béhier. Rapport sur l'état d'une malade adressée à la Société comme atteinte de Chromidrose, au nom d'une commission speciale. *L'Union Méd., Paris, 1861, xi. 82.*

Koch. Die Bluterkrankheit in ihrer Varianten, *Deutsche Chirurgie, Lief. 12.*

Wilson. *Diseases of the Skin, Philadelphia, 1868, pp. 711-712.*

McCall Anderson. *Treatment of Diseases of the Skin: an analysis of eleven thousand consecutive cases, Philadelphia, 1873.*

It is owing chiefly to the courtesy of the gentlemen connected with the Surgeon-General's Library that I have been able to continue my studies in this direction.

There seem to be three kinds of discoloration of the skin which should be differentiated from each other as to their cause and character. While technically different, and some not at all consisting of "sweat," scientifically speaking, yet popularly they would be confounded with this secretion.

I. There is a discoloration, usually bluish to black in color, which is due to distinct granules of coloring matter

which exude from the skin. This has not the appearance of blood at all, but should be considered as one of the curious allied phenomena. The discoloration is seen especially on the eyelids, particularly the lower eyelids and the adjacent cheek. It can be wiped off, when it stains the handkerchief from a blue to a black, sometimes a clear indigo blue. After the coloring matter had been wiped off, it has reappeared under the very eyes of the doctor. In some instances the face has been sealed up with elastic collodion, and in other cases by dressings under seal, which have remained undisturbed.

Naturally the question of simulation or fraud would be the first thing that would suggest itself, and especially because there have been certain times and places (for example, about thirty years ago, and particularly in and near the town of Brest in France) when a considerable number of persons have been so affected. But the very careful investigations referred to, especially by Fox and Leroy (de Méricourt), with whom were associated six or seven very prominent physicians, and also the report of Béhier, put fraud out of the question.

Perhaps the best way to obtain an idea of the phenomenon is by narrating some of the recorded instances.

Fox<sup>1</sup> records the case of a girl, a deaf mute, aet. 19, who had two brothers and sisters, also deaf mutes. She suffered from irregular menstruation, great constipation and distention of the abdomen, but was not hysterical. The pigmentation appeared on the under lids, and disappeared *pari passu* with the constipation. It could be washed off, but would reappear. Later when the constipation was remedied, it seemed to be influenced more especially by the menstrual periods. When the color appeared on the face, there was always found in the urine a coloring matter known as indican, a natural glucoside which furnishes in-

<sup>1</sup> *Loc. cit.*

digo by its decomposition. The skin pigment appeared as granules, a picture of which in a similar case is given by Leroy (de Méricourt), while the illustrations in Fox's article will give a very good idea of the discoloration of the skin. The pigment, when examined by the microscope, looks like granules of a black to a blue-black or ochereous color. (FIG. 1.)

Dr. Fox also describes a second case, in a girl of fifteen, practically of the same character.

Féréol<sup>1</sup> narrates the case of a girl of twenty who was very nervous and hysterical, who presented a blue discoloration over the lower eyelids, the breast, and in the arm-pits. It appeared almost instantly, especially if conversation led up to the subject; it could be rubbed off by a handkerchief, which became colored indigo blue. The pigment, when examined, resembled scales of Canada-balsam, and was not moist, but dry. There was no blood in it, nor did it appear from the sweat glands.

Leroy (de Méricourt) in 1884<sup>2</sup> narrates the case of a student, twelve years of age, who, apparently, sweat blood from the right side of his neck. His shirt was deeply red colored, but the microscope showed that there was no blood in the apparent sweat, but only red granules.

Dr. H. S. Purden<sup>3</sup> records a case of light-blue and yellow-straw colored sweat in a woman of forty.

Mr. Teevan<sup>4</sup> reports the case of a girl of fifteen who suffered from a black secretion over the entire forehead and the eyelids of both eyes. The plate shows the color to be almost jet black. It could be removed with soap and water, but this caused much pain. The quantity removed at one time was sufficient to make four basins of water as

<sup>1</sup> Bull. Acad. de Méd., Paris, 1885, 2. s., xiv. 1071-1075.

<sup>2</sup> Bull. Acad. de Méd., Paris, 1884, 2. s., xiii. 425-428.

<sup>3</sup> Journal of Cutaneous Medicine, 1868, ii. 247.

<sup>4</sup> Medico-Chirurgical Trans., 1845, xxviii. 611 and Plate VI.

black as if it were India ink. When the secretion ceased from the forehead precisely similar black matter was vomited and passed by the bladder and bowels. There was no blood in it, but the chief constituent of the matter was carbon, so that it would almost deflagrate. There was no possible deceit, as she was watched most carefully. She finally recovered entirely.

Dr. J. C. White of Harvard<sup>1</sup> also reports a case of unilateral yellow sweat in a man of twenty years old in apparently perfectly good health. The left side of his shirt was constantly stained yellow.

The first case of chromatidrosis ever described was published by Dr. Younge in the Philosophical Transactions for 1709. In 1864, Leroy (de Méricourt), in the article alluded to, collected thirty cases, of which he had seen seven. In 1869, Dr. A. W. Foote collected thirty-nine cases, to which Fox (in 1881) added five. Of these forty-four cases, thirty-eight were in women and six in men. In all the health was disturbed, and in women the menstrual function especially. Sometimes the attacks may recur off and on for even ten years. While most frequently seen in the lower eyelids, the discoloration may appear on the upper eyelids, on other parts of the face, and, occasionally, on other parts of the body. It is generally symmetrical, is increased or produced by emotion. Sometimes it disappears from the skin only to reappear in the stomach, as is shown by bloody vomiting. In other cases it is seen as bloody discharges from the bowels or in the urine. The mucous (or lining) membrane of various parts of the digestive tract, which is only a modification of the skin, seems, therefore, to be attacked by a true hemorrhage (?) replacing the granular pigment from the skin. Whether the blood in the urine comes from the bladder or the kidneys has not, so far

<sup>1</sup>Journal of Cutaneous and Venereal Diseases, 1884, ii. 293.

as I know, been determined. The relation between the skin and the kidneys will be alluded to in a moment.

The color varies from black to blue, yellow, or violet. A most exhaustive examination of this coloring matter was made by Robin, as is shown in the reports of Leroy (de Méricourt) and Béhier. He found that it differed from any pigment which could be applied by any possible fraud. It consists of indigo, iron, carbon, and fatty matters. "From these considerations, it appears probable, that, under certain circumstances, the sweat glands of certain portions of the body assist the kidneys in eliminating this indican, which readily, by contact with the air, becomes oxidized into the different colored indigos" (Fox). It must be remembered that the relation between the skin and the kidneys is very intimate. In a number of cases of high fever with marked suppression of secretion by the kidneys, I have seen the skin assume the function of the kidneys to such an extent that the salts commonly excreted by the kidneys would be found upon the skin, and a distinct urinary odor would proceed from it. "I have not," says Dr. Fox, "a shadow of a doubt as to the genuine character of the chromidrosis"; his reasons being: (1) the identity of the chemical and physical character of the pigment in a large number of patients, who, if they had been practicing deceit, undoubtedly would never have all used the same pigment; (2) its appearance after cleansing of the skin under the very eyes of critical and often skeptical physicians; and (3) its reappearance on the cleansed skin after not only cleansing, but after being sealed up by various protective applications.

II. The second variety is a discoloration of varied hues,—red, blue, yellow, or green—and is due to the presence of microbes of different kinds. In this variety the discoloration is much more commonly red than the other tints mentioned. It appears not so commonly on the face or the eye-

lids as in the axillæ (armpits), and occasionally in other parts of the body. The bacteriological origin of this red sweat seems to have been pointed out, first, in 1873 by Hoffmann<sup>1</sup> and Pick<sup>2</sup>; and the bacteriological origin of the yellow sweat by Eberth.<sup>3</sup> Since that time a very considerable number of such cases have been reported. The only paper I have found published in this country is one on the bacterium of red sweat by Dr. Prince.<sup>4</sup>

Among these cases I may quote the following:—

Balzer et Barthelemy<sup>5</sup> narrate the case of a man of thirty-four who had free sweating on the forehead and other parts of the body, but in the armpit this free sweat was colored red, and stained his shirt red in spite of daily baths. This continued for four or five months. Several other similar cases also are narrated by them, all of which are due to various bacteria.

Babesiu<sup>6</sup> reports the case of a woman of twenty-six with marked nervous symptoms of uterine origin, and also the case of her sister, and of a third young woman, and a young man, who all suffered from red axillary colored sweat. The hair in the armpits was thin, pale, stiff, brittle, and covered with small reddish masses which were filled with ovoid or round bacteria. The discoloration was associated with very free sweating, and in all was found to be due to bacteria.

Temple<sup>7</sup> reports two cases of a father and son affected with pink sweat due to a pink torula, a variety of fungus resembling the yeast fungus.

Hartzell<sup>8</sup> gives a very excellent illustration of the masses

<sup>1</sup> Wiener med. Wochenschrift, 1873.

<sup>2</sup> Bericht d. naturforscher-Versamml., 1873.

<sup>3</sup> Centralblatt f. d. med. Wissensch., 1873, No. 20.

<sup>4</sup> Boston Med. and Surg. J., 1882, cvii. 586.

<sup>5</sup> Contrib. à l'étude des sueurs coloriés, Ann. de dermat. et syph., Paris, 1884, 2. s., v. 317-322.

<sup>6</sup> Centralbl. f. d. med. Wissensch., Berlin, 1882, xx. 146-148.

<sup>7</sup> Lancet, 1896, i. 513. <sup>8</sup> University Med. Mag., July, 1893, 771.



of microbes and fungi growing on the hair. (FIGS. 2, 3, 4.)

III. The third variety consists of a true escape of blood from the skin. Of this there are quite a number of illustrations. Some undoubtedly are true hemorrhages directly from the blood vessels of the skin; others are probably instances of blood escaping from the orifices of the sweat glands. By non-medical observers this fine scientific distinction would not be made, but to them all would be instances of "bloody sweat." In at least one instance what was apparently bloody sweat, when examined by the microscope, was found to contain no true blood corpuscles. This is narrated by Dyer.<sup>1</sup> The patient was a man of twenty-six, and the sweat appeared over the knees and between the shoulders. On one occasion two ounces of fluid were collected resembling carmine ink. The father of the man also suffered in the same way.

Among other cases the following may be narrated:—

"Hebra in his work on 'Diseases of the Skin' describes the case of a man coming under his personal observation who, although strong and well nourished, was attacked repeatedly with hemorrhage from the surface of the lower limbs. This generally occurred during the night; so that he first became aware that the bleeding had taken place by finding the sheet stained with blood when he awoke. On one occasion Hebra himself saw the blood flow from the uninjured back of the hand of this patient, while sitting near him at table. The blood formed a jet which would about correspond in size to the duct of a sweat gland. This jet had also a somewhat spiral form, and rose about one-twelfth of an inch above the surface of the skin."<sup>2</sup>

Hutchins<sup>3</sup> reports the case of a man, aet. 39, in whom the bloody sweat appeared after repeated nettle-rash. The

<sup>1</sup> Medical News, June 22, 1895, 702.

<sup>2</sup> Van Harlingen, Internat. Clinics, July, 1896, 333.

<sup>3</sup> Internat. Clinics, Phila., 1893, 3. s., 111, 346-351.

disease is described as "numerous, fresh, pale yellowish pin-point stains here and there, with a minute drop of blood." In other parts of the skin were points of purpura or true hemorrhage into the skin. In this case the points did not correspond either to the roots of the hairs or the mouths of the sweat glands, but the author concluded that the oozing was certainly due to blood.

Tittel<sup>1</sup> reports the case of a young man of twenty who had red sweat since he was twelve years of age, especially on the neck and the hand, the thighs and the feet, so that he was obliged to change his stockings three or four times a day. The attacks followed marked nervous symptoms. Chemically it was proved to be blood by the hæmin crystals.

Deryabin<sup>2</sup> describes a very remarkable case, sometimes assuming the form of a sort of sweat oozing from the skin, and at other times of a distinct hemorrhage. She was a healthy girl of eighteen who suffered from hemorrhages on the forearms, the fingers, and the tip of the nose. It lasted for four hours, and endangered life by reason of the amount of blood lost. From the tip of the nose, there was a single fairly thick stream, but from the extremities many fine jets like those from the perforated nozzle of a watering-pot. It varied greatly in force; sometimes the jet would be a foot high, and again only oozing.

The only case of a negro that I have found described as suffering from bloody sweat, is related by Duffy (F.).<sup>3</sup>

Hart<sup>4</sup> reports the case of a man of twenty-five who fell ill in November, 1894, with pains in his head, back, and body, and some stupor. Four days later in the vomitus, and also in the urine and the feces, blood was noticed. It

<sup>1</sup> Arch. der Heilkunde, 1876, xvii. 63.

<sup>2</sup> British Med. Jl., Epitome, 1892, ii. 53.

<sup>3</sup> North Car. Med. Jl., Wilmington, 1883, xii. 260.

<sup>4</sup> Richmond and Louisville Med. Jl., Jan. 1895.

also oozed from almost all the pores of the body. The sweating was more marked on the trunk than on the extremities or the face. The night-clothes and bed-clothes were stained. The man died at the end of ten days.

Huss<sup>1</sup> describes the case of a servant of apparently sound and blooming appearance who, however, had had convulsive attacks in her childhood. In other respects she had been and was perfectly well. On August 4, 1850, she stated, that, after she had been boxed on the ears and was struck with some hard substance on the head, she became unconscious and passed into convulsions. When she came to herself, she noticed a marked bleeding from the scalp, which, however, had not been cut. The bleeding continued for eleven days. For the next two months, on account of weakness in her legs, she was obliged to remain in bed, during which time the hemorrhages were repeated almost daily, especially from the crown of her head, without there being a trace of an injury. This was followed by repeated attacks, accompanied also with the vomiting of blood, and occasionally with stupor, during the fourteen months that she was in the hospital. After leaving the hospital she had other attacks also, when it was observed that the blood oozed from the roots of the hair, forming around each hair a red point, and then coalescing with neighboring drops. Distinct, firm blood clots were formed. Examination of the bleeding spots found no defect nor any alteration in the roots of the hair. The blood appeared normal by the microscope, but the blood corpuscles did not form in rouleaux, showing that the blood was somewhat abnormal. Six times she had severe attacks of vomiting of blood.

Wilson<sup>2</sup> refers to quite a number of cases (the original references are given); but most of them seem not to have been examined with that care which modern science would

<sup>1</sup> *Med. Central Zeitung*, 1856, 97.

<sup>2</sup> *Diseases of the Skin*, Phila., 1868, 711, 712.

exact, or else were such ancient cases as to suggest a probable doubt as to the character of the discharge. One case, which deserves to be quoted, is that of a young woman of eighteen who bled from her nose, a little later at the tips of her fingers, and then from her hands, her navel, and the corners of her eyes.

J. Mason Good, an eminent physician of the beginning of this century, remarks that bloody sweat "has taken place sometimes during vehement terror, and not infrequently during the agony of hanging or the torture." The reference which is given<sup>1</sup> is too ancient for us to place absolute faith in it.

McCall Anderson of Glasgow published a book on "The Treatment of Diseases of the Skin, based upon personal observations of eleven thousand successive cases."<sup>2</sup> In these eleven thousand cases, bloody sweat only occurred once. The outline of the case is as follows:—

"The patient, a young lady fourteen years of age, was seen by me at the request of Dr. Mason, of Ayr, in the summer of 1866. The parts implicated were the face, arms, front of the chest, and legs. The hemorrhage occurred from round erythematous patches of eruption, which were remarkable for their symmetry. One was on the brow, another on the chin, and one on each cheek. On the front of each arm also there were four in a row, two on each upper arm and two on each forearm. A similar arrangement was observed upon the sternum and upon the legs. One of the most marked peculiarities of the hemorrhage was the suddenness of its invasion. An oval or round red ring, varying from the size of a shilling to that of a crown, formed almost instantaneously, and the redness quickly spread inwards over the inclosed skin. As soon as seen the patches appeared as if the cuticle had melted away, and the surface was quite wet. Sometimes the exudation

<sup>1</sup> Bartholinus Epistola, i. 718.   <sup>2</sup> Phila., 1873.

was like water at first, and changed into blood; at other times, and especially on the face, the patches were at once covered with a complete dew of blood. The hemorrhage did not, however, consist merely of the dew of blood; that was only at the outset: it was actual bleeding, as from a cut, the blood sometimes streaming down the face or other part attacked. There was rarely more than one attack each day, although sometimes the bleeding occurred from two separate portions of the skin simultaneously. It is very curious to note that the outbreak generally occurred at the same hour each day—namely, at 11 A.M.; but it did not seem to be under the influence of mental or bodily excitement, or to be induced by taking food or stimulants. It was evident that the hemorrhage was dependent upon defective and irregular menstruation—that, in fact, it was a case of vicarious menstruation; and accordingly it yielded, in the space of three or four weeks, to remedies directed against the latter disorder.”

One curious phenomenon, allied probably to bloody sweat, which should not be passed over, is the appearance of the so-called “stigmata” on certain persons who are believed in the Catholic Church to have been especially pious saints. St. Francis of Assisi is one notable illustration. The most recent known case is that of Louise Lateau. A quite detailed account of her case, with others, will be found in an article by Wheatley<sup>1</sup> and in Warlomont’s essay “Louise Lateau.” She was a healthy girl, born in Belgium, January 30, 1850. Her stigmatization came after her paroxysms of religious zeal and on Fridays. The blood flowed from the left side of the chest, the insteps of both feet, both the backs and palms of both hands, and between the shoulders. She declared that she did not sleep, and had neither eaten nor drunk for four years. She was examined by M. Warlomont for the Royal Academy of

<sup>1</sup> Pop. Sci. Monthly, N. Y., 1888, xxxiii. 667-673.

Medicine in Belgium, who examined the alleged blood, and found that it was normal blood, except that it had an excess of white corpuscles. He concluded, however, that she had access to food and drink, and that she ate, drank, and slept like other people, though her ecstasies and stigmata were absolutely real.

It seems, therefore, that, under varying influences of ill health and of strong emotion, a real escape of blood from the skin may and does occasionally take place, and that the "sweating as it were great drops of blood" in our Lord's case was a real though unusual phenomenon due to intense emotion.

In my former paper I alluded especially to the cases brought on by profound emotion. To these may be added the three following cases:—

Van Harlingen<sup>1</sup> says, "Moral shock, as terror, may occasion hæmathidrosis. A young woman observing a mortal combat taking place unexpectedly under her eyes was seized with violent sweating of blood. Another subjected to violence during the sack of a city died with the symptoms of general hæmathidrosis. A woman subject to kidney colic suffered from hæmathidrosis, apparently the result of the severe pain during several successive attacks, and then, the habit being established, experienced other attacks of hæmathidrosis without obvious cause."

All these three cases are evidently the same as those quoted in the paper by Jules Parrot.<sup>2</sup> The case arising from pain in the kidney was reported by Caizergues in 1814, but was not studied with the care and exactness modern science would demand. The other two are cases from Leodanus and Severinus, and are so ancient as to throw great doubt upon their authenticity. Most of them, it will

<sup>1</sup> International Clinics, July, 1896, 338.

<sup>2</sup> Paris, 1859, reprinted from the *Gaz. Hæbdom. de Méd. et de Chirurgie*, entitled "Étude sur la Sueur de Sang."

be observed, are more or less remote in date, and occurred at a time when the exact requirements of modern science either were not possible or were not rigorously applied. For example, I would admit no case, medically speaking, in which there was no distinct examination of the fluid by the microscope to determine that it was really blood. If possible, also, there should be an examination of the skin in order to determine exactly the source of the blood. Of course all means to detect fraud should be employed.

Klemperer,<sup>1</sup> in an interesting paper on hemorrhage from sound kidneys, goes on to say, "Medical literature contains a great number of cases where even profuse hemorrhage in hysterical persons has followed from various organs without any anatomical change being perceptible in them." He also gives in detail two personal observations of hemorrhage from the lungs and from the stomach, in both of which cases a post-mortem examination showed the bleeding organs to be entirely sound.

It is not out of place, perhaps, to allude to Dr. Stroud's well-known book on "The Physical Cause of the Death of Christ," which he thinks was from rupture of the heart. Spontaneous rupture of the heart has been reported a great many times. I have personally never seen but one case.<sup>2</sup> The rupture was verified by a post-mortem examination. For an hour and a half after death, spontaneous flexion and extension of the toes occurred. The cause of such rupture is usually fatty degeneration of the muscular fiber of the heart. It occurs usually in later life, say from fifty years onwards, and results from the wearing out of the heart as a physical machine. I do not know whether there are any cases on record as early as thirty-three years of age. If there are, it would be an unusually early age for it to occur.

<sup>1</sup> *Deutsche Medicinische Wochenschrift*, 1897, 129.

<sup>2</sup> *Trans. Pathological Society of Philadelphia*, 1874-75, v. 94.

It is not, however, uncommon to see great emotion, even in relatively young persons, disturb the rhythmical action of the heart very profoundly and produce great irregularity of the heart-beat. This, of course, if often repeated would be followed by organic change, such as fatty degeneration and softening of the muscular wall of the heart.

Now we must remember that our Lord's life was one of peculiarly severe and excessive emotion. You gentlemen in the ministry well know how intense become your emotions during a period of particularly profound and intense religious interest, and you know how wearing that becomes both upon mind and body. Yet your emotion can be but slight when compared with that of him "upon whom was laid the iniquity of us all," and who presumably from adolescence till his death, and certainly during the three years of his active ministry, felt this burden most intensely. If bloody sweating occurs, as is certainly the case, as a result of the nervous phenomena of hysteria, how much more probable would it be from the intense nervous strain of a Gethsemane. Moreover, as, though "foxes had holes and the birds of the air had nests, the Son of man had not where to lay his head," he was undoubtedly often subject to physical hardships, spent the night on mountains in prayer, was exposed to mob violence, and finally, combining both the acme of emotion and the acme of physical suffering, passed through the awful night in Gethsemane and the physical and mental agonies of the crucifixion. Under such circumstances, with such intensified emotion beyond the limit of human endurance, and with such physical suffering as culminated on the cross, it cannot be a wonder either that his sweat became bloody, or that his heart, even at so early an age as thirty-three, should rupture.