Blood examinations in a case of dementia precox with periodical variations / by Dr. Gunnar Kahlmeter, Stockholm, Sweden ; translated by Dr. Chas. O. Carlstrom.

Dementia Precox Studies

BLOOD EXAMINATIONS IN A CASE OF DEMENTIA PRECOX WITH PERIODICAL VARIATIONS.

By DR. GUNNAR KAHLMETER, Stockholm, Sweden.
Translated by Dr. Chas. O. Carlstrom.*

Twenty years ago studies of the blood in the insane were made and published in foreign countries. English, French and Italian investigators especially had focused their attention on this question. As so often before has happened in the history of medicine, the Germans then took it up and carried it further. Here in Sweden these examinations have never aroused any great interest and, as far as I know, Lundvall is the only one who has published anything pertaining to them. He has reached conclusions that in important points differ from those reached by other students and therefore he has been exposed to rather harsh criticism from some sources. Especially the periodic changes that he found in the blood of dementia precox patients, the "blood-crises," have been looked upon with skepticism. My examinations were undertaken to disclose if such "blood-crises" really existed in a case which, on account of whose periodic course and short and rather regular periods, seemed eminently fitted for serial examinations of the blood.

N. E. W. was born in 1876. He is married and has four children. His parents were not related and neither of them has shown any peculiarities in temperament, deportment or habits. No case of nerve or brain trouble is known in the family, with the exception of W.'s grandmother, who at the age of eighty-one years suffered an apoplectic stroke which left her very paretic and "silly."

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Through the kind offices of Chas. O. Carlstrom, a graduate of the Royal Gymnastic State Institute of Stockholm, Sweden, this greatly abridged translation is presented among the Dementia Precox Studies. Considerable space was occupied with a review of the literature on the condition of the blood in this disease which does not seem necessary at this time for American readers. Other liberties in the way of abbreviation have been taken and in places Dr. Carlstrom's very accurate and close translation has been sacrificed to meet our idiom or custom of expression. A very long table, containing the details of the examinations on which the two curves are founded has been omitted. The more serious students of this subject will not be put out because, they would consult the original anyway, and the cursory reader will find enough in the two curves which we reproduce. The expenses incident to the circulation of this article have been provided by one of the friends of the insane.—Bayard Holmes.

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W. has been very gifted; has shown unusually good mathematical as well as practical tendencies, besides being very musical. His temperament has always been of the silent and self-critical kind. He is married and has four children, all well. Well fixed financially, he has been happy with his family and led a regular life, never misused alcoholic beverages, does not know of any luetic infection.

Having enjoyed the best of health, W. began in the fall of 1909 to become nervous, absent-minded and peculiar, but not sufficiently so to attract the notice of his wife until later on, when her attention was directed to it. W., who was president of a large business concern, was undoubtedly under unusual strain on account of "hard times." He saw himself forced to discharge a number of employes and this caused him no little concern. During the fall he occupied provisionally a professorial chair and worked at the same time upon a thesis which he thought would secure him the permanent professorship. Thus he spent every night in study until three or four o'clock. At the same time he was worrying a great deal lest, after all, he should lose the professorship.

After a period of sleeplessness, W. began, about the 9th of October, 1909, to make peculiar remarks to the effect that his friends did not want him to get the professorship. The following night he slept very badly, jumped out of bed in the middle of the night and ran downstairs to look for a friend whom he believed to be in the house. The next day (October 10th) he remained mostly quiet in bed, only repeating his friends' names. He recognized his relatives and was at times fully normal, but exclaimed a few times: "Now I understand how I became insane!" During the night (October 11th) he became more and more irrational and so violent that it took two men to restrain him. He urinated and defecated in bed.

On the 11th of October he was taken to a private sanitarium. Somatically nothing was noticeable. The Wasserman reaction was negative. He was perfectly irrational, very agitated, threw himself back and forth in bed or in the bathtub. He beat his hands and his head violently against the walls and made resistance to feeding. He passed urine and feces in bed. He acted rather gay most of the time, but at other times sullen and anxious. He seldom answered when spoken to, was rarely quiet, sang most of the time and talked to himself. An occasional sentence was perfect, but ordinarily his speech was irrational, meaningless and consisted of unrelated words or twisted new-formed words. He had a tendency to rhyme and often repeated questions or sayings by the surrounding people. He had hallucinations frequently and slept poorly in spite of sleeping powders.

During the following weeks W. became somewhat calmer and for short intervals even clear and rational. Toward the end of the year (1909)

his condition began to fluctuate between days when he was fully clear and rational and days when he presented about the same picture as during the acute initial onset. The different conditions varied considerably in duration and the changes were very rapid. During the good days he was perfectly clear, collected and calm, well oriented, spoke coherently and distinctly, behaved faultlessly in every way; but right in the middle of an otherwise correct and fluent sentence there would all of a sudden come a few words totally void of all meaning. Then he would begin to look absent-minded, start to strain his body and perform a number of tense movements and grimaces, to bend forward and to the sides, extend the arms, bend, stretch and spread apart the fingers, close the eyelids forcibly, wrinkle the forehead and pucker the mouth. During this period he would all of a sudden jump up, take hold of the bed clothing and throw it on the floor, crawl under the bed, move a chair and strike the wall with the fist. At the same time he incessantly repeated the same meaningless words, for example: "Sueba, sueba, sueba, sueba." At other times he would stand for long periods perfectly still on the same spot, while the saliva collected in his mouth in large quantities. A few times he unexpectedly jumped out of bed and smashed a window and then jumped back to bed again.

Just as suddenly, as a rule, the change to normal would occur. During the normal period W. could never give any explanation of his conduct during unruly periods. He said on one occasion that he was forced to perform the peculiar movements with arms and legs. Several times W. insisted he saw strange animals, colored spots on the bed sheets and other irrational things. He also suffered from auditory hallucinations. Hypochondriac thought-combinations came about often. He said he thought himself blind; that a serpent had stung both his eyes; that he had lost all his blood, and that his genitals were changed.

During the spring of 1910 W. gradually became so well that he could leave the sanitarium and he spent some time at his home. During this time, although he had several similar disturbed periods, they were not so severe, and in the lucid intervals he was even able to go back to his old occupations. At the beginning of February, 1910, he suffered a relapse that necessitated his return to a private institution for the insane. He was then aggressive and violent and showed the same symptoms and stereoptypes as before. During the month of July he was transferred to the Psychopathic Clinic at Munich, where he stayed only one week for observation and then returned to Sweden with the diagnosis of dementia precox.

He was removed to a Stockholm hospital, where during the whole of the following year he showed the same symptoms and irregular changes from calm to disturbed periods. The change from one over into the other

came remarkably suddenly. In the middle of playing a game of tennis and when he seemed perfectly normal he all of a sudden threw his racket away, began to stare blankly, grimace his face and twist his body into the usual strained positions and exclaim: "Now it is over me again! Now I am crazy again!" Then he could be gotten to bed only with the help of a couple of nurses, and just as suddenly he would return to normal again.

Toward the end of 1912 the course of W.'s disease began to assume the characteristics they kept up all through the first half of 1913 and which they consequently ran during the period that I made regular examinations of his blood. During this time W.'s intervals were very regular. The good days lasted seven to eight days; the disturbed periods about five days. The good days W. was fully clear and sensible. He busied himself with billiards, backgammon or lawn tennis and especially with piano playing, which always had been his hobby. He was well enough to pay visits to his home in the neighborhood of Stockholm or to his friends in the city, where he was even present at parties. During all this time he was perfectly normal and clear. The first signs of a change to a bad spell were always slight inhibition and depression, followed by stiffness and stereotypy of movements (catatonia) He would then hold the doctor's hand for long periods of time, murmuring an abrupt sentence, like "I don't know—" while his lips and face muscles moved grimacingly. After a few hours he would suddenly become noisy and boisterous and it was hard to keep him in his bed. He would throw himself about, jump up and down, run about the room, talk, sing, scream, joke or make puns showing quite decided quickness of thought. He recognized his surroundings, but spoke to everybody in affectionate, baby language. His attention could only be caught for a moment at a time, but he showed himself rather well posted regarding time and place.

After two or three days he became stiff and depressed, and then generally sat up in bed with the blanket over his head, crying and wailing aloud, with every muscle strained and hard as a board, his hands clenched and often twisted in funny ways and performing the previously described athetos-like movements with the fingers. The only thing W. would then say between his sobs was: "I have killed my wife. I have killed you," etc. He was quite untidy in bed.

When this depressed period had lasted about two days he became in the course of a few hours perfectly calm, collected and clear again, and thus a few hours after he had been spasmodically crouched in bed like a ball, he was up, dressed and playing Beethoven on the piano.

During the intermissions he felt fully as well as ever, except that he had a feeling of not being able to work as well as formerly and he did not experience the same interest in the matters that used to interest him

intensely. It was obvious that his interests were dulled and less acute than one would expect by a person with his intellect and education.

W.'s physical condition was as follows: Height 175 cm., weight 72 kg., no stigmata of degeneration; heart, lungs and kidneys without a blemish; thyroid not palpable; temperature during the free intervals normal, during the disturbed periods, especially the first days of them, mostly somewhat higher, although never above 30 C. Pupils round, equally large, mediumly wide, reaction normal for light and accommodation. Other cranial nerves free from remarks. Motility and sensibility normal. Skin and tendon reflexes normal.

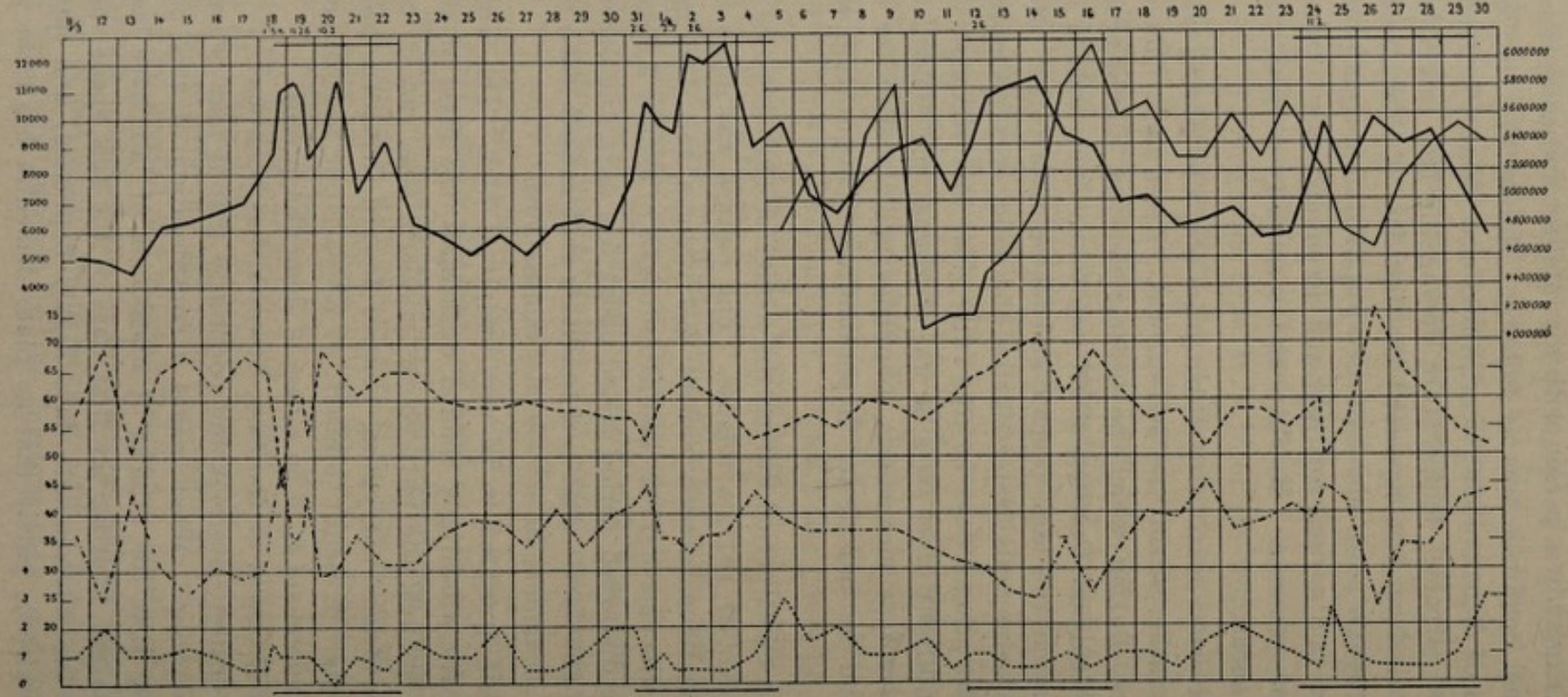
Our patient was a man thirty-three years old, who during adolescence showed himself rather silent and self-critical. After some time of severe intellectual work, during which he became nervous, absent-minded and peculiar, he suddenly in October, 1909, was taken down with a condition of mental aberration and high psychic and motor disturbance. But pretty soon he became calmer and later during the same year presented rather fluctuating states. Some days he was fully clear and rational, even conscious of his condition; other days he was irrational and violent, exhibited a number of stereotype movements, impulsive and uncalled for and purposeless acts, and he manifested hypochondriac thought complexes and hallucinations.

After a long quiet period during the winter of 1910-1911 he suffered, during the summer of 1911, a relapse. The picture was about the same with sudden variations between violent disturbances and seemingly good health. Toward the end of 1912 the disease began to assume a fixed periodicity, so that the disturbed period lasted about five days, the other periods about seven or eight days. And this condition still existed when in March and April, 1913, I undertook my blood examinations.

The diagnosis appeared to be very simple at first. The whole story of the violent, little affectingly colored uneasiness, the mass of stereotype movements and sayings, the purposeless impulsive acts, carried out without seeming affectation—everything pointed toward dementia precox and especially catatonia. Kraeplin himself, at whose clinic the patient stayed one week, also understood it to be a case of dementia precox.

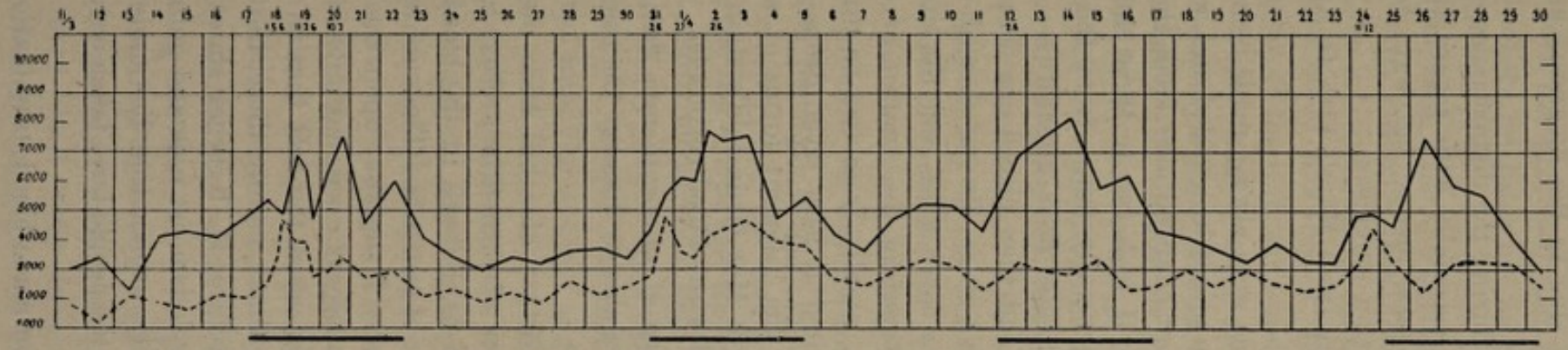
The further progress of the case, however, has been such as to make it impossible to entirely overlook the possibility that it may belong to the manic-depressive group. What makes a consideration of this possibility justified is partly that the attacks of uneasiness of late have been more colored by affectation (during the first days of the sick spells the humor is high, during the intermediate days highly depressed, and during the last days again raised), partly that no plain dementia has come about in

CURVE I



Total number of white blood corpuscles
Total number of red corpuscles
Percentage of neutrophile leucocytes
Percentage of lymphocytes
Percentage of eosinophile cells
Horizontal line above and below the curves shows the disturbed periods

CURVE II



Total number of neutrophile leucocytes
Total number of lymphocytes
Horizontal line below the curves shows the disturbed periods

spite of the several years' duration of the trouble. The periodical course of the case itself gives no clue to the diagnosis as it occurs within both groups of diseases.

W. presents, however, during the disturbances so many stereotypes and dividing-symptoms that I, especially with regard to previous history, still believe the case to be dementia precox, but want to reserve to myself the possibility of manic-depression psychosis.

In this patient I made, from March 11th to April 30th, examinations of the blood daily.

The blood examinations were always made before dinner in order that the leucocytosis of digestion might be avoided and, as a rule, once daily, but on the days when the patient changed over from the quiet to the turbulent state and the following day I took two to three samples at different times of day. The blood was generally taken from the finger tips with usual precautions. I used a Thomas-Zeiss apparatus. When counting I first blew out five or six drops and then placed one drop in the chamber, being careful that Newton's color rings always showed as a criterion of there being no fluid between the cover glass and the outer higher edge of the counting chamber. In estimating the number of erythrocytes, I counted at least 200 small squares, usually from two or three different drops. In counting the whites I counted at least seven drops—that is, 2,800 squares. For differential counts of the different forms of white blood-cells I used dried preparations dyed with May-Grünwald's stain, counted on a mechanical stage on a basis of 400 white blood corpuscles.

My case shows a trace of oligocythemia during the crisis. On the other hand, I have not been able to discover the eosinophilism, about which Lundvall writes.

Besides Lundvall, Pförtner also has been observing similar "blood-crises" in a couple of cases of dementia precox, and Lepine and Pogroff insist upon having noticed oscillations in the blood-picture as forerunners to changes in the condition of patients. That not more authors have found these "blood-crises" depends, I suppose, upon the fact that they are not to be found in all dementia precox cases, but only in those with a periodical course. It may also depend upon the fact that so few authors have made serial examinations, and without making those, the crisis, of course, cannot be discovered. When, therefore, H. Krueger states: "Der Theorie Lundvalls, das sei gleich hervorgehoben, ist niemand gefolgt, seine Angaben sind nirgends bestätigt," then the explanation lies undoubtedly hidden therein, that, like Krueger, most of the people have taken only a single specimen from each patient.

Most authors who have made blood examinations in precox cases have

tried to draw conclusions as to the etiology of the disease from the blood picture. Generally, the idea has prevailed that the blood picture indicated with rather strong probability an infection or toxic cause of the trouble, and this opinion is uniformly held by authors who have found blood pictures vastly different from each other. The latter condition is explained thus, that the blood picture, not only in different infections but also in different phases of the same infection, varies considerably. Recently similes have been drawn between blood pictures of dementia precox and those present in some disturbances of the internal secretions; for example, morbus Basedowi, myxedema, and also some morbid cases of hypophysis and the adrenals, and in status thymo-lymphaticus. In these conditions a relative lymphocytosis and sometimes eosinophilism are generally to be found; that is, a blood picture similar to the most common one in dementia precox, a fact that bolsters the belief that disturbances of internal secretions are present in dementia precox, but does not, however, give any information about the primary cause of the disease. Whether the disturbance of the internal secretions, the functioning of the brain or of the blood are the primary causes, or if all three of them are the result of one common cause which is as yet unknown, the blood picture does not help to decide. Very recently a solution of this problem has been attempted in a sereological way.

As to the blood-crises, the wave motion in the blood picture that my case shows can only be considered as the result of the patient's different moods of activity during the free times and the spells; that is, the increase in the total number of white blood cells that occurs during the spells should then depend upon the increased muscular activity, eventually also on changed concentration of the blood. Through investigations by Gravitz and others it is known that muscular activity is followed by a considerable increase in the number of white blood cells. Gravitz found that this increase was very large, generally the white cells were increased to three or four times as many as during rest. During the first and sometimes also during the second half hour a marked lymphocytosis existed, which later changed to polynuclear leucocytosis. That this increase in the number of white blood cells is not dependent on a changed distribution of the blood alone, Gravitz showed by taking blood both from the veins and capillaries and the blood showed identically the same composition.

Lundvall emphatically denies that muscular work could be responsible for the blood-crises, pointing out that, as the experience from the manias shows, we then ought to have an erythrocytosis simultaneously with the leucocytosis, both indicating an increased molecular concentration of the blood, while in reality during these blood-crises there exists an oligocythemia, besides the blood-crisis sometimes begin several days ahead of the psychic

and physical disturbance, yes, can even run an abortive course, so to speak, without any change in psychical status.

In my case the number of erythrocytes shows no constant behavior, and in looking at the lines and tables one must admit that nowhere are there plainly marked blood changes to be seen before the disturbance comes on. It is striking, however, that the leucocytosis neither sets in nor falls back as fast as the psychical or physical symptoms and certainly slower than one would expect (from Gravitz investigations) in a leucocytosis depending only upon muscular activity. Furthermore, it never reaches the height a work-leucocytosis usually shows, and is besides at its height in the middle of the spell, when the patient is always depressed and at least as far as can be seen, working less with his muscles than at the beginning or the end of the spell. It is, of course, possible that the terrible tension of the whole body during these depressed days means more muscular effort than the strong motoric agitation in the beginning and end of these attacks.

It seems to me most probable that the muscle contractions form an important and perhaps the most important of the causes of these blood-crises, but that they are not the only cause. The result of my investigations is in no way opposed to Lundvall's theory of the blood-crises being a sign of a collecting in the blood of toxins specific of dementia precox. To me it seems rather to support such a theory.

The slight raise in temperature in the beginning of the attacks ought to depend on the severe muscular activity, as that is known by experience to cause a raise in temperature of brief duration in healthy individuals. Through investigations by Rovighi, among others, it is well known that animals whose body temperature has been raised three degrees above normal in a thermostat did not experience an increase, but rather a decrease in the number of leucocytes, and Naegeli says in his book, "Blutkrankheiten und Blutdiagnostik" (Leipzig, 1912, Veit & Co.) that the leucocytosis in infectious diseases depends expressly upon the toxins, and adds: "Dass das Fieber selbst keine Leucocytose hervorruft, ist klar und bedarf keine weiteren Eröterung."

Finally, as regards the explanation of the plainly noticeable condition that the lymphocytes always show the greatest increase on the first day of the attack and then decrease, while the neutrophile leucocytes rise to the middle of the period, where they reach their largest figure, and then go down, may possibly depend upon the fact that the lymphocytes in lymph glands and spleen are more easily pumped into the circulation by violent muscular contractions than are the leucocytes. The return of the lymphocytes to normal while the leucocytes increase may be used to suppport the supposition held by many that the lymphocytes become leucocytes.