

OBSERVATIONS ON THE MATERNAL BLOOD AT TERM
AND DURING THE PUERPERIUM.

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John Henderson
M.B. Chib.
(Glasg.)

30th September 1901.

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OBSERVATIONS ON THE MATERNAL BLOOD AT TERM,
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The subject of this paper is one which attracted my attention while holding the appointment of Outdoor House Surgeon to the Glasgow Maternity Hospital. It is a subject which so far, and more especially of recent years, has had little attention paid to it, and any investigations, hitherto made, have been confined almost wholly to the blood of pregnancy, the changes during the puerperium being only casually alluded to. Literature on the subject is very scanty, and is chiefly continental, most of the observations being of rather a remote date. For this reason, apart from the more recent references, as in the work of Cabot, on the blood, and the paper by Drs. Elder and Hutchison this paper must almost perforce be presented on its own merits. The examinations, upon which it is based, were carried out during the period from December 12th 1900 to end of February 1901, upon the indoor patients of the Hospital. The cases were not selected in any way but were simply taken as the intervals in my work would allow, except towards the latter part of the series, when I selected, for reasons to be afterwards stated, more especially those cases which required the administration of chloroform.

A certain amount of consideration must be given to the class of patients dealt with. The institution is a charitable/

2.

charitable one, and therefore patients are received from all quarters of the town. The majority, however, are drawn from localities where overcrowding is the rule, cleanliness a thing unknown, and good feeding or even an approach to it, the exception. Generally speaking, the blood of such patients must be in a condition slightly altered, and affected by their environment. It necessarily follows, therefore, that such material is not the best upon which to base a series of calculations to arrive at a normal standard. Allowance must be made for this in reviewing the results, although in many cases it is surprising to find the blood well up to the normal standard, where one would not expect it.

The usual term of residence in the hospital is 10 days, unless the case has been abnormal, and the patient is not in a fit condition to leave at the expiry of that period. For this reason practically all the examinations of the series are confined to the first 10 days after delivery.. At first an attempt was made to get the patients to return at later periods for observation, but without success.

As /

3.

As regards the time of examination, it was attempted, so far as possible, to examine the blood at the same hour each day, to get the same conditions of nutrition, but owing to the irregular nature of the work in the outdoor department of a busy hospital this was obviously not always possible.

In the large majority of the cases, the patients were in labour when admitted, so that the initial examination was usually made during the first, or early in the second stage of labour. Sometimes it was not even possible to get an examination before delivery, but in such cases the first examination was made so soon after, that for all practical purposes, the result was the same.

With regard to the method of examination the routine was as follows:-

The blood was taken from the lobe of the ear, without pressure, the needle used being that supplied with /

with Gowers' Haemoglobinometer. A fresh specimen was taken for immediate microscopic examination, and films were prepared for staining purposes.

For the estimation of the corpuscles, the Thoma-Léitz Haemacytometer was used and was found to be very satisfactory. The diluting solution for the red corpuscles was the usual one of Gowers' viz:- sodium Sulphate, and acetic acid, while that for the whites was a solution of glacial acetic acid of a strength of $1/3$ of 1% coloured with a small quantity of Gentian Violet. In counting the red cells usually 120 squares were counted, but often this was done in two separate drops, to ensure more accuracy. For the white cells, two and often three drops, were counted for the same reason.

For the estimation of the Haemoglobin, Gowers' instrument was used. This instrument is so far unsatisfactory in that in a series of examinations like the present, one is alternately using it in day /

day and gaslight, and thus differences, though slight, may occur. For this reason, and as the results were very uniform up to that point, I latterly discontinued the estimation of Haemoglobin. Oliver's instrument, which is arranged and graduated for use with artificial light at all times, although much more expensive, would give more satisfactory and accurate results.

The films of blood were dried in air, fixed by heat, and stained with Ehrlich's triple stain. At first a few films were also stained with alcoholic Eosin, and methylene Blue, but this method was not so satisfactory for purposes of differentiation, and was therefore discontinued. In fixing with heat it is a great advantage to have a dry-heat steriliser so that the temperature can be accurately regulated, but in the present series the specimens were made simply by passing the cover glass rapidly through the flame of a spirit /

spirit lamp, the rate of speed, and the number of exposures to the flame, being learned by experience. With a little practice, useful specimens can be prepared in a short time, by this method. As regards the staining process itself it is comparatively simple. The stain is spread over the cover glass with a glass rod and is allowed to remain on for two or three minutes or longer. Cabot states that it is impossible to over-stain with this mixture. In my specimens usually two or three minutes was the time allowed, and this gave good results. The chief and in fact, the only difficulty in the process is the heating, as underheating and overheating alike spoil the specimen. After staining and washing in water, the cover slip is dried between layers of filter paper, and mounted in Canada Balsam.

In the process of differentiation of the leucocytes I always counted 4/500, and from that calculated the percentage of each variety present.

In such a paper it is necessary to give in detail /

detail the statistics of the examinations from which conclusions are drawn. These have been kept together the details of each case being given under a separate number, by means of which references are made.

Statistics are given of

303 examinations of white corpuscles

222 " " red "

115 " " haemoglobin

About 200 fresh specimens of blood were examined at various periods of the puerperium 125 blood films were stained, and 100 of these differentiated.

In the course of the paper, the condition of the maternal blood at term, and the changes it undergoes during the puerperium are first discussed. Thereafter a few points arising from the examinations are taken up in the following order.

(1) The effect of plural pregnancy on the maternal blood.

(2) /

(2) The influence of the sex of the child on the maternal blood.

(3) The effect of chloroform on the blood.

(4) Ebsinophilia

(5) The effect of Strychnine on the blood.

In addition a few special cases of the series are considered as it is of interest to compare the condition of the blood found in these cases with the most recent observations on the subject.

These are:-

(1) Puerperal Sepsis

(2) Syphilis

(3) Eclampsia

A series of numbered charts and tables illustrate the various results.

_____ // _____

Before considering the condition of the blood at term and during the puerperium it is necessary for purposes of connection to review shortly what is known regarding the blood in pregnancy. On this point Playfair is very concise, and I have quoted largely from his book.

It has long been known that the puerperal state is associated with well marked changes in the composition of the blood, although there has always been considerable difference of opinion as to the exact nature of these changes. It used to be believed, almost universally, that pregnancy was as a rule associated with a condition analagous^o to plethora, and that this explained many characteristic phenomena of common occurrence such as headache, palpitation, shortness of breath, ringing in the ears &c. It was habitual therefore to treat pregnant women on an antiphlogistic system, to place them on low diet, administer lowering remedies, and very often to practise venesection. Indeed the latter mode of treatment was at times resorted to/

to, to an alarming extent. About twenty years ago the opinion of the profession on this point underwent a remarkable change. It was then recognised from various careful analyses of the blood that the view of ~~the~~ plethora was not correct. It was found that the total amount of blood in the system is increased to meet the necessities of the largely increased vascular arrangement of the uterus. This was experimentally proved by Spiegelberg and Gscheidlin to be correct in the case of bitches. The blood was found to be more watery, its serum deficient in albumen, and the amount of coloured globules to be materially diminished. This was pointed out by Becquerel and Rodier who analysed the blood in a series of nine cases. They also found the fibrin and extractive matter to be increased in quantity. This is of peculiar importance, and goes far to explain the frequency of certain thrombotic affections observed in connection with pregnancy and delivery. This latter condition is also/

also considerably increased after delivery by the amount of effete matter thrown into the mother's system to be got rid of.

It was thus established that the blood of the pregnant woman is usually in a condition much more nearly approaching that of anaemia than of plethora and most of the phenomena formerly attributed to plethora were of course as easily, if not more easily, explained on this view. The changes too are much more marked towards the end of pregnancy, than at its commencement, and it is of interest to note that it is then that the concomitant phenomena alluded to are most frequently met with.

One of the chief advocates of this view was Cazeaux, who described the pregnant state as one essentially analogous to Chlorosis, and he contended that it should be treated as such. More recently Quinquad pointed out that a progressive fall in the amount of Haemoglobin takes place throughout pregnancy. He accordingly applied to pregnancy the /

the term "Chlorose puerperale". Still more recently the accurate observations of Willcocks of London have shown that the blood of pregnancy differs from that of chlorosis in the fact, that while in both, the amount of Haemoglobin is diminished, in pregnancy the individual corpuscles are not impoverished as they are in Chlorosis, but simply lessened in comparative number, owing to increase in the water of the plasma, due to the progressive enlargement of the vascular area during gestation. His assumption is that if the number and functional value of the red cells of the unimpregnated condition remain constant throughout pregnancy, a progressive dilution of the blood would necessarily ensue owing to the considerable and progressive enlargement of the vascular area in the puerperal state. Such an assumption at once explains both the diminution in number of the red cells and the diminution in their functional value. This may also explain the enormous loss of blood from /

from which some women suffer during parturition with comparative impunity, the greater serous dilution of the blood allowing the organism to lose a much larger quantity without injury than in the normal state. These observations of Willcocks appear to point rather to an excessive increase in the fluid of the liquor sanguinis in pregnancy, than to a condition of pure anaemia, which is usually considered to co-exist with it. In several cases detailed by him where continuous observations were made ⁱⁿ 2/3 months during the course of pregnancy, a slight progressive fall in the number of red corpuscles took place. In this connection Dr Maurel states that the increase in number of red globules, observed as the menstrual period recedes, continues, when under the influence of pregnancy, the haemorrhage is not reproduced. This increase may go on towards the 3rd month, when under the influence of causes as yet unknown the number diminishes again to increase once more towards /

towards the 7th month.

Gusserow, in 1871, called attention to the fact that the anaemia of pregnancy might progress to such a degree as to produce a fatal termination.

Lusk in his text book of Midwifery described the condition as one of serous plethora, the red cells, albumen, iron and salts of the blood being diminished while the white corpuscles, the fibrin, and above all the water of the blood are increased. He explains these changes partly at least by the demands made on the maternal system by the growing foetus. With increased waste in the organism as evidenced by an augmentation in the CO_2 and urea eliminated, there is usually diminished capacity to take and assimilate foods. How far these causes are operative in producing the above mentioned conditions is shown by the slight degree of hydraemia or the entire absence of blood impoverishment in women, who possess during pregnancy good appetites and excellent digestions, and who at the same time are able to procure an abundance of /

of nutritious food.

Objection has naturally been made to Cazeaux' theory on the ground that a healthy and normal physiological function should not be associated with a morbid condition. This naturally raises the question: How many women in the pregnant state can be considered to be perfectly healthy, especially among those in large towns, and from the lower quarters of these towns, from which class our investigations must almost of necessity be derived? Surroundings, civilization, climate, errors of diet, and indeed in many cases starvation or something approaching to it, occupation, exposure to contagion, uncleanliness and many other conditions all tend to render perfect health out of the question.

Playfair sums ^{up} the question thus:-

" Making every allowance therefore for the undoubted

" :ed fact that pregnancy ought to be a perfectly

" healthy condition, it must be conceded, I think

" that /

" that in the majority of cases coming under our
 " notice it is not entirely so, and the deductions
 " drawn by Cazeaux from the numerous analyses of
 " the blood of pregnant women seem to point
 " strongly to the conclusion that the general
 " blood state is tending to poverty and anaemia
 " and that a depressing and antiphlogistic treat-
 " ment is distinctly contra-indicated.

Newer text books of Midwifery practically repeat these ideas, but give no further information on the subject and in books on the blood there are only a few casual references to it. Cabot whose work on the examination of the blood is the most recent, treats specially of the leucocytosis of pregnancy, though not in great detail. His results will be referred to in the course of this paper.

The foregoing represents the state of our knowledge on the blood of pregnancy, and we are now in a position to take up the thread of our subject at this point viz:- the condition of the blood/

blood at term and during the puerperium. The sections will be treated as follows:-

- I The blood as seen in the fresh specimens
- II Red corpuscles
- III Haemoglobin
- IV White corpuscles.

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I Examination of Fresh specimens

From these of course only a general idea can be obtained, but an opinion can be given in each case as to the

- (1) Amount of rouleaux formation of the red cells
- (2) Deformity of the red cells, if any
- (3) Presence of anaemia, or leucocytosis
- (4) Amount of fibrin present

These points are noted in detail on the report sheets. As regards the red cells in normal cases, no abnormal feature was recognised in the blood at term, although at times there seemed to be a deficiency /

deficiency in the amount of rouleaux formation. During the first two or three days of the puerperium however in many cases slight changes in the shape and size of the red cells were noted, pointing to blood regeneration, which as will be seen later is taking place during that time. No nucleated red cell was observed during the puerperium in any normal case, but in several other cases such cells were observed. These will be referred to in detail at a later stage.

In the case of the white cells a leucocytosis was invariably found although varying considerably in degree in the different cases.

For actual results the only point upon which the fresh specimens are relied on to supply information is that of the quantity of fibrin present at term. On this point in the large majority of cases it is noted that the formation of fibrin was early or excessive, but a few cases showed no tendency towards this so far as could be seen.

No /

No decided statement on this point can therefore be made, although there is considerable evidence from the statistics to prove that in the blood at term there is usually an increased quantity of fibrin.

The researches of Becquerel and Rodier on this subject have been already alluded to. In the same article it is stated that in 34 cases examined Andral and Gavarret found increase of fibrin.

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II. Red Corpuscles.

(1) At term

In 45 cases examined just before, or immediately after delivery, the counts were found to vary from a minimum of 2.260.000 per cm. to a maximum of 5,000.000. giving as an average overall 3.906.666 per cm. This is of course considerably below the number given as the normal for the adult woman viz:- 4.⁵000.000. The minimum count occurred in case XLV where the patient was on admission in a condition resembling in many respects that of Pernicious Anaemia. Another very low count was in Case/

Case XXII where there had been considerable haemorrhage. These two observations are very much lower than the others, so that to get a more correct normal average they should be excluded. When this is done, the average for the remaining 43 cases works out at 3.975.348 per cm. which is still below the normal standard.

(2) During the puerperium.

In almost all the cases, as already stated, the patients were under observation for 10 days after delivery. The course of the red corpuscles after delivery is best shown by the following average table, compiled from the examinations made on each day of the puerperium.

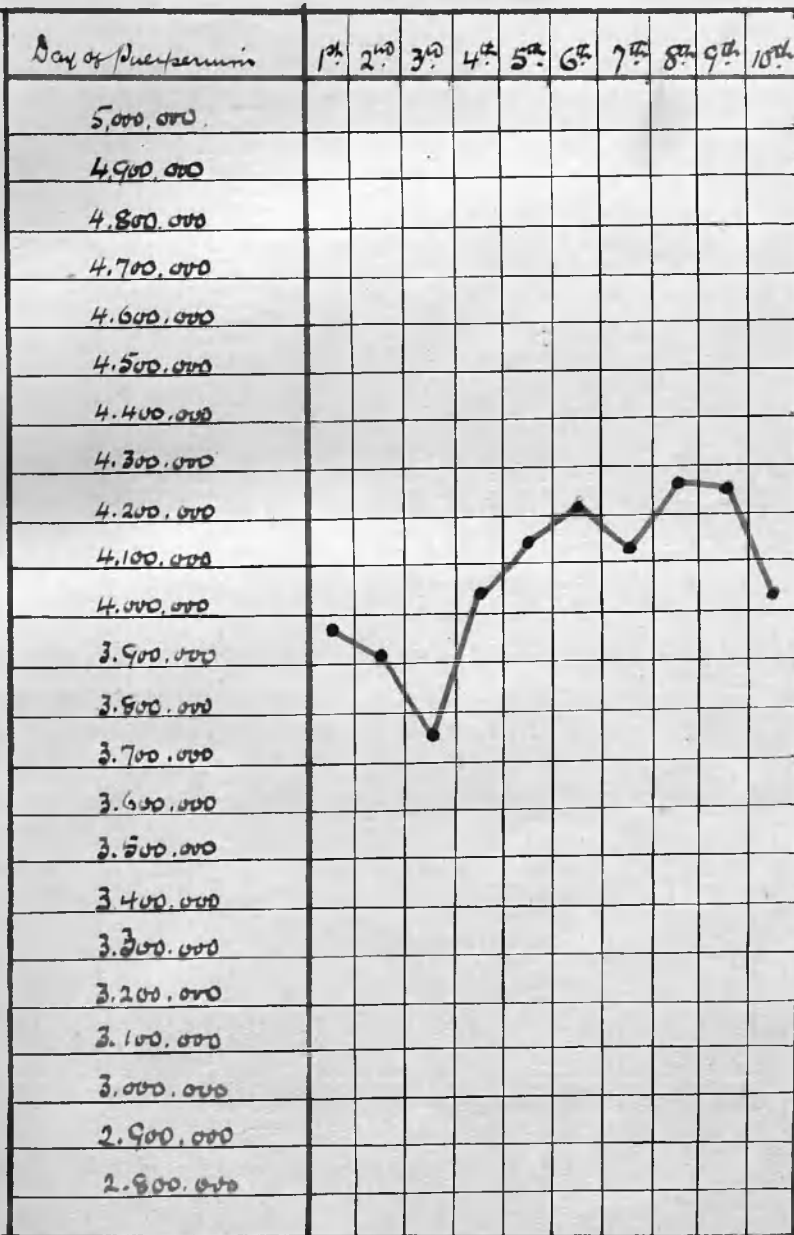
1st day	-	average of 43 counts	-	3.975.348 p.cm.
2nd	"	"	"	17 " 3.912.000 " "
3rd	"	"	"	19 " 3.757.000 " "
4th	"	"	"	17 " 4.047.000 " "
5th	"	"	"	19 " 4.148.000 " "
6th	"	"	"	15 " 4.208.000 " "
7th	"	"	"	22 " 4.128.000 " "
8th	"	"	"	14 " 4.273.000 " "
9th	"	"	"	21 " 4.270.000 " "
10th	"	"	"	13 " 4.021.000 " "
11th	"	"	"	4 " 4.020.000 " "

The first day represents the day of delivery.

It /

Chart I

Showing the course of the red corpuscles during the first 10 days after delivery.



This chart is constructed from the averages of 204 counts of red corpuscles (see page 20).

It will be observed that the average for each day does not represent an equal number of examinations but nearly all have a sufficient number to allow of a reliable average over all. In this table only those examinations which may be considered strictly normal have been included. This average table is represented diagrammatically in Chart I

At term.

With regard to the quantity of red corpuscles at term we must of course make a slight allowance for what may be called normal variations from the normal, as well as for the condition of the patients coming under observation. When this is done the average of 3.975.348 does not represent any marked degree of diminution, if indeed there is any. At this stage it is interesting to compare this average with that obtained by Drs Elder & Hutchison, in a paper I recently came across. In 16 cases in which they examined the blood at term they found the average number of reds to be 3.978.937 per cm. which is a strikingly similar result.

During /

During the Puerperium. It will be seen from the chart that there is a slight diminution in number of the red corpuscles during the first two days after delivery. Thereafter the course is a steady upward one until the 9th day when there is a second downward tendency, which continues as far as the examinations go. The temporary diminution after delivery is naturally explained by the loss of blood at childbirth, the amount depending not only on the amount of blood lost, but also on the capacity of the individual organism for blood re:generation. It should be observed here that during these days also in the specimens of fresh blood, changes in size and shape of the red cells were noted, pointing to new formation of red cells. This process is well seen in the chart, but the second downward tendency is more difficult to ex:plain. It is possible that a certain degree of diminution may be continued during lactation owing to the drain on the maternal system which this process /

process necessitates. Our examinations would point to such being the case, but how long it is continued, or whether it is present all through the period of lactation, we have no data on which to offer an opinion. All that can be said is that the slight diminution persists so far as the examinations show, as of 4 examinations made on the 11th day the average is 4.020.000 per cm.

These results though contrary to the older ideas already referred to are quite in accordance with the general statements of Cabot on the subject. He holds that normal pregnancy does not affect the count of red cells, but that childbirth and lactation cause a temporary diminution.

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III Haemoglobin.

(1) At term.

In 37 cases where the amount of Haemoglobin was recorded the average is 68.2% the lowest observation being 45% while the highest was 80%. The minimum occurred in Case XXII which cannot be considered ~~as~~ normal, and as this is the only record below/

below 60% it should be excluded to get a more correct average. The average for 36 cases is then 68.9%.

(2) During the puerperium.

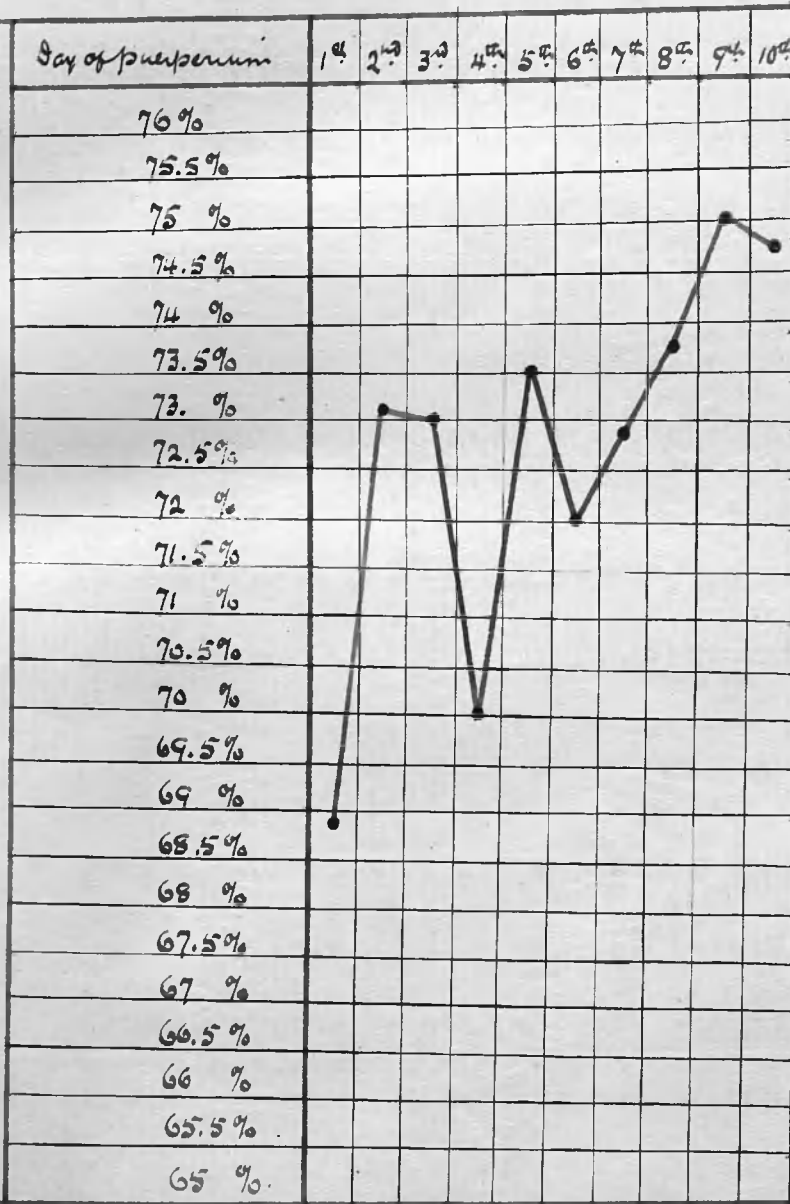
In almost all the cases a slight improvement is noticeable under observation, usually about 5% but in two cases the increase recorded was 15%. The following average compiled from the examinations will give an idea as to the course of affairs, although the records are not sufficiently numerous to give quite a satisfactory average:-

1st day average of 36 counts	68.9%
2nd " " " 8 "	73.1%
3rd " " " 7 "	73 %
4th " " " 6 "	70 %
5th " " " 7 "	73 5%
6th " " " 5 "	72 %
7th " " " 12 "	72 9%
8th " " " 4 "	73.75%
9th " " " 9 "	75 %
10th " " " 8 "	74.75%

This /

Chart II

Showing the course of the Haemoglobin during the first 10 days after delivery.



This chart is constructed from 102 counts of Haemoglobin. (See page 24).

This represents a steady average increase under observation of 5.85%.

This is illustrated by Chart II.

The normal standard of Haemoglobin is one which is very difficult to fix. Of course with Gowers' instrument 100 is fixed as the normal, but such a standard is rarely, if ever, reached in the adult blood, although in the blood of infants it is usually exceeded. Writers differ as to what may be considered the normal percentage of Haemoglobin. Cabot gives it as his opinion that for a woman, a haemoglobin percentage of 75 or more means practically normal blood. It is interesting, however, to give the results of A.K. Stone, and his assistants on this point. They estimated the haemoglobin of 189 female patients who looked anaemic and found over 75% in 89 or nearly one half of them. It is obvious therefore that when we use 75% as the normal, it must be looked upon as the very lowest limit. In any case, however, if we allow 20 or even 25% for what may be termed, for the present /

present, normal deterioration in the richness of the blood in haemoglobin, there still remains in the present series, a deficit to be accounted for as the average is only 68.9%. Our observations therefore point to a distinct but not marked reduction in the percentage of haemoglobin in the blood at term.

This is in accordance with the observations of Cazeaux, and the more recent ones of Quinquad and Willcocks which have already been referred to.

In 7 cases examined at term Messrs. Elder and Hutchison found the haemoglobin varying from 60 to 83% giving an average of 72%.

Cabot gives no direct opinion on this point although he includes pregnancy and lactation as causes of Secondary Anaemia. He states that in secondary Anaemia it is only comparatively rarely and in very marked cases, that the diminution in red corpuscles is considerable. The blood characteristic of most cases of Secondary Anaemia is one in which the number of red cells is approximately/

imately normal. The chief changes in such cases are (1) lack of colouring matter and (2) lowering of specific gravity. From this therefore we may conclude that he recognises a reduction in the amount of haemoglobin in pregnancy.

Colour index.

At term, therefore, it appears from our observations that the haemoglobin is diminished more than the red corpuscles, so that the color index, or valeur globulaire is less than 1 which represents the normal. The color index, at term, may be arrived at, by taking the average first day count of red cells viz:- 3,975,348 (which represents 88.3% of the normal 4,500,000), and dividing this into the average 1st day percentage of haemoglobin. Thus

$$\frac{68.9}{88.3} = .78$$

This shows an average deficiency in the color index at term, in the present series of '22.

IV. White corpuscles.(1) At term.

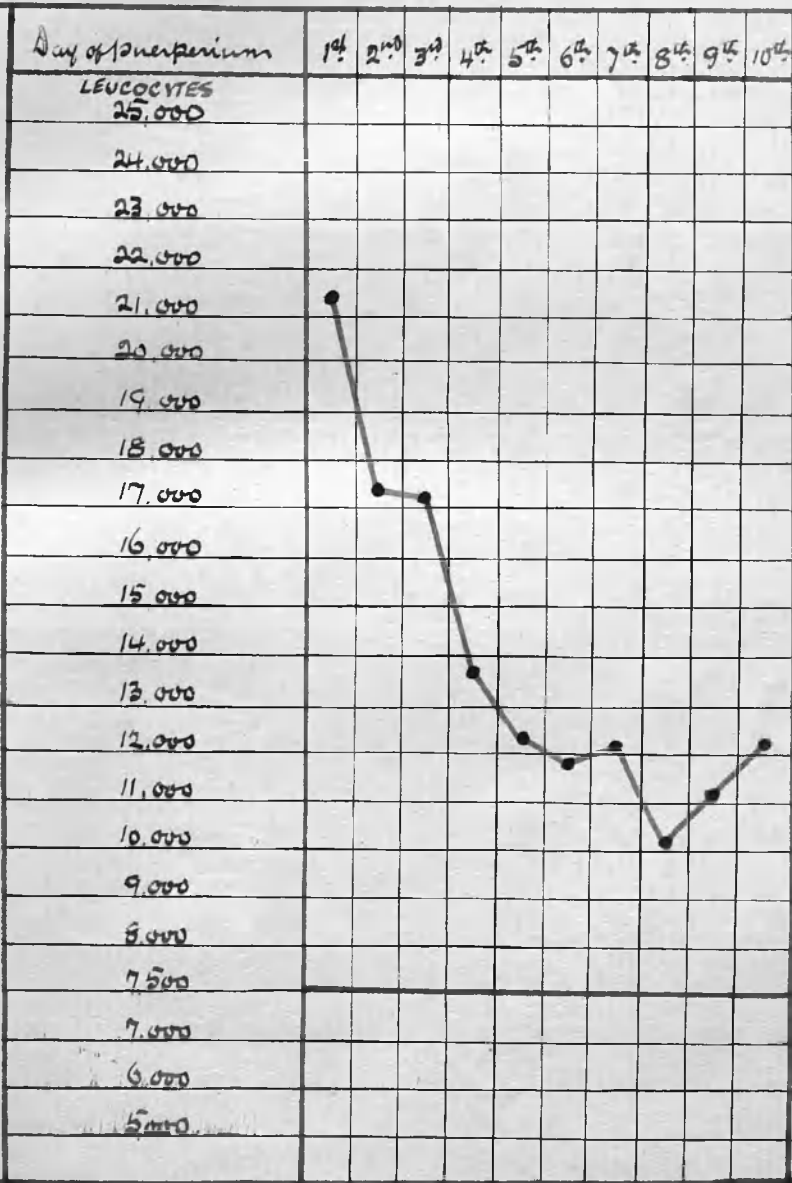
In 38 cases examined at this period the average is 21,365 per cm. the lowest count being 10600 in Case XIII while the highest was 36,600 in Case XLV. From this average those cases are excluded which for reasons to be dealt with hereafter, were obviously abnormal, but a few cases are included which may not have been strictly normal, but in which there could only be at most a slight variation.

This series includes both Primiparae and Multiparae and in all cases a leucocytosis of varying degree was found. So far as possible all were examined under the same conditions. Of the 38 cases 13 were primiparae the average count being 21,969 per cm. while 25 were Multiparae, the average being 21,052. For all practical purposes therefore they may be considered as showing an equal degree of leucocytosis although the average is slightly greater in Primiparae.

(2)/

Chart III

Showing the course of the leucocytes
during the first 10 days after delivery.



This chart is constructed from 188 counts of white corpuscles. (See page 29).

(2) During the puerperium

The course of the leucocytes during this period is shown by the following average table compiled only from observations which may be regarded as normal:-

1st day	average of 38 counts	21.365 per cm.
2nd "	" " 12 "	17.250 " "
3rd "	" " 13 "	17.015 " "
4th "	" " 21 "	13.752 " "
5th "	" " 21 "	12.276 " "
6th "	" " 16 "	11.975 " "
7 "	" " 21 "	12.190 " "
8th "	" " 18 "	10.147 " "
9th "	" " 18 "	11.061 " "
10th "	" " 11 "	12.327 " "

Chart III illustrates this table.

Here again it is necessary to establish a normal standard, and on this point also there is considerable difference of opinion. In persons not usually considered as sick, but simply ill-nourished /

inished the normal count of white cells may be as low as 3000 per cm., and for such persons a count of 10,000 would be decidedly pathological. On the other hand in vigorous and well nourished people the white cells may rarely fall below 10,000 per cm.. Of course to be strictly accurate one should know the normal count for each individual in health, but it is obvious that this is impossible in such a series of examinations as the present. It is necessary therefore to have some normal standard.

Löwitt considered that 5000-10000 might be called the normal limits, and showed how a slight shock is sufficient to materially affect the count of leucocytes.

Romberg in 55 healthy young women found the average to be 9.058 per cm..

In the present series the normal is put at 7.500 leucocytes per cm., which is the figure usually given for adults and is the normal used by Cabot. It is ofcourse liable to considerable variation/

variation according to the nutrition of the individual and also at different times of the day, apart from the influence of digestion, although such variation has not yet been explained.

It is evident from what literature there is on the subject, that this leucocytosis has been recognised for many years. For instance so far back as 1854 Moleschott stated that "the number" of colourless corpuscles is greatest in boys, and smallest in women except during menstruation and pregnancy when it is rather above the average" The references however in most cases are merely casual, and only a very few writers make any definite statement with regard to the matter. These I have picked out, and will give in detail.

In 1881 Willcocks of London gave statistics of 22 cases in which he had counted the white corpuscles. He found the average ratio to be 1 white to 595 red corpuscles, the highest being 1 to 184, and the lowest 1 to 1650 red cells. The counts /

counts however were not all made at term, some being considerably earlier. The average ratio in the present series on the 1st day of the puerperium (i. e. at term) works out at about 1 white to 183 red cells, which is almost equivalent to the highest count of Willcocks.

In 1893 Messrs Elder and Hutchison, in 11 cases examined at term, found the white corpuscles varying from 8000 to 25000 giving an average of 14,522 per cubic millimetre. Presumably as these writers make no statement to the contrary their examinations were made in Primiparae and Multiparae without selection.

On this subject Cabot remarks that most primiparae show during the latter months of pregnancy a moderate increase of all varieties of leucocytes, 13000 being about the average count, although in the last weeks of pregnancy it increases, until at the beginning of labour it is often 16000 to 18000 per cmm. He further states that /

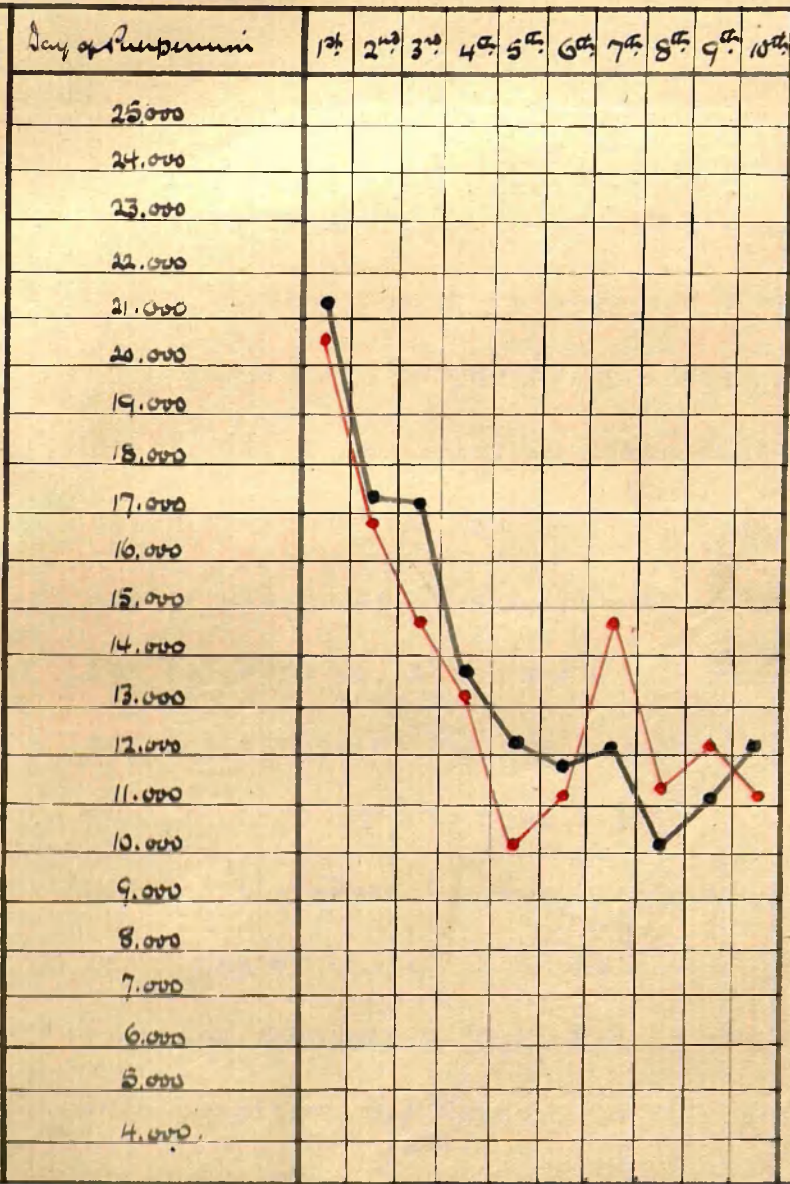
that this increase occurs in only about 50% of Multiparae. On this point my observations are very definite, as all cases showed a leucocytosis although in varying degree. The lowest counts certainly were all in Multiparae, 10600 being the minimum, but even this is still well above the normal standard of 7.500 per cm. . As already pointed out also, the average degree of leucocytosis in the present series is rather higher in primiparae although the difference is only very slight.

Cabot gives charts of 12 cases (9 Primiparae, and 3 Multiparae) examined on various days during the puerperium. For the sake of comparison, I have worked out his averages for the various days as under:-

1st day	average of 7 counts	20.642 per cm. .
2nd day	" " 6 "	16.833 " "
3rd day	" " 7 "	14.714 " "
4th day	" " 9 "	13.111 " "
5th day	" " 6 "	10.250 " "

Chart IV.

Showing the comparison between the average lensocyte curve of the present series, and that of Cabot. (See page 29, + (p. 33 + 34).



Curve of present series - black.
Curve of Cabot - red.

6th day average of 4 counts	11.250 per cm.
7th " " " 3 "	14.833 " "
8th " " " 5 "	11.500 " "
9th " " " 3 "	12.166 " "
10th " " " 4 "	11.250 " "

Chart IV is designed to show the marked resemblance between these averages and those of my series.

Further in comparing my series with that of Cabot, it is necessary to state that in the former seven of the women had dead children, while in the latter all nursed their children. Of the seven cases referred to, three were only examined twice, and one thrice during the puerperium, so that their inclusion could only have a trifling effect, if any, on the average curve. It is true that in at least one of these cases the number of leucocytes remained abnormally high, but in the others no such condition was found. On this point Messrs Elder and Hutchison remarked that in 6 cases examined after delivery, the white cells were found considerably decreased except in one case, where the /

the patient did not suckle her child. In this case they were increased. No definite opinion however can be based on an isolated case.

It is probable that the reduction of leucocytes during the first 3 of 4 days after delivery is to a certain extent compensated for, and obscured by a leucocytosis due to the regeneration of blood following on the haemorrhage during delivery. Such a leucocytosis usually persists for a day or two.

The reduction in the quantity of leucocytes after delivery is no doubt aided by a good lochial discharge. This point has been investigated by Ronne who states that the discharges after labour and leucorrhoeas cause diminution of the leucocytes. It therefore follows that in cases of Puerperal Sepsis, where such discharge is suppressed or at least much diminished the reduction should not be found. This statement is corroborated by the fact that in the only case of Sepsis in the present series, viz:-case XXXVI the leucocyte curve never fell/

fell below 18,000 per cm³. during the fortnight she was under observation and there was no sign of commencing involution of the uterus until the day of dismissal. This case will be afterwards referred to in greater detail.

With regard to the duration of the leucocytosis after delivery, it is evident, from the observations on the 10th day in my series, that it is prolonged beyond the puerperium into lactation, but how far it may go on I have no data to found an opinion upon. With a view to getting some information on this point, I endeavoured, as already indicated, to get some of the patients to return for observation during lactation, but without success. So far as I am aware Cabot is the only writer who makes any reference to this point, and he is of opinion that it may go on for several weeks, although he himself has not investigated the point.

Effect of digestion

Effect of digestion.

I cannot say much as to the effect of digestion on the leucocytosis of pregnancy as from the nature of the cases it was rarely possible to have them in hospital long enough before delivery to carry out the required experiment. In only one case was this done satisfactorily, viz:- Case XLI when^{as} the patient was brought in for Caesarean Section, and was under observation some days before operation. The blood in this case was examined just before breakfast, and the white corpuscles were found to number 10,200 per cm. 2 hours after breakfast i.e. when the digestion leucocytosis, if present, should have been well marked, a second examination was made and they were found to number 10,400 per cm.. There was therefore no appreciable alteration in this case. The examination was made before breakfast in order to obtain the blood count in that individual when fasting, as, during the day, the leucocytosis caused by one meal may not have disappeared before, the /

the influence of the next meal begins. In this connection it is necessary to keep in mind that occasionally sound persons are met with, who show little or no digestive leucocytosis. Von Limbeck has explained some of these cases by habitual constipation but in others the reason is more obscure. There is no doubt, however, that after meals of mixed or proteid diet such a leucocytosis is the rule. In herbivorous animals and presumably in vegetarians it is not found. Of course, no reliable conclusion can be drawn from an isolated case, but the result detailed above agrees with Cabot's statement that digestion leucocytosis on the top of the constant pregnancy leucocytosis does not occur. This fact is put forward by him as a suggestion as to the causation of the leucocytosis of pregnancy, viz:- that the whole thing may be a prolonged digestion leucocytosis, the mother having to eat and digest for two. This will/

will be referred to later in discussing the causation.

With regard to the question of the effect of digestion on the leucocytosis during the puerperium it would appear from many of my Charts that after the 4/5th day when in most cases the leucocytes have reached their minimum or very near it, the influence of digestion is seen. At this point a considerable daily variation in the leucocyte curve appears, apparently depending on the relation of the time of examination to the ingestion of food. It must be remembered, however, in this connection that the number of leucocytes is known to vary at different times of the day in the same individual without obvious cause. In view of this in Case XXXIII on the 9th day the leucocytes were counted one and a half hours after dinner when digestion leucocytosis should normally be present, and were found to be 14000 per cmm. Three and a half hours after dinner, a second observation revealed the /

the fact that they were reduced to 9.500 per cm. In Case XLIV also on 29th February when the blood was examined at 12.15 a.m. the leucocyte count was found to be abnormally low, viz:- 7400 per cm. In this case the patient had tea at 3.30 p.m., and gruel at 7 p.m., on 28th, but thereafter had no food before examination. The low count is therefore explained by the abstinence from food for at least 5 hours. The same may be observed in Case XLV on 28th Feby., when under similar conditions, the count was found to be 8.800 per cm. Other examinations could be cited to illustrate this point, but these will suffice. These illustrations all point pretty clearly in one direction and it is therefore probable that the influence of digestion on the leucocytes is evident at least towards the end of the puerperium. No reference is made to this point even in Cabot,. It may be noted, however, that after the 5th day, on which his lowest average count is made, there are considerable /

considerable daily variations in the leucocyte curve, but he states that all his cases were examined under the same conditions as regards nutrition, So that the variations in his series cannot be ascribed to any difference in relation to the ingestion of food.

With regard to the varieties of leucocytes taking part in this leucocytosis the results of my differentiations are pretty uniform. In the process of differentiation, I have followed the nomenclature of Cabot, and recognise four varieties

- (1) Poly-morphonuclear neutrophile
- (2) Large Lymphocyte
- (3) Small Lymphocyte
- (4) Eosinophile

but for all practical purposes, classes 2 and 3 may be combined (vide infra)

It is necessary before proceeding further to state shortly what is understood by these terms and in so doing I have followed largely the description /

tion given by Cabot:-

(1) Poly morphonuclear neutrophile

These cells constitute the vast majority of those found in ordinary pus. They have a very irregular nucleus which stains deep blue or greenish blue (usually the former in my experience) with Ehrlich's tri-acid stain, and more deeply in some parts than others. The shape of the nucleus is never exactly the same in any two cells hence the more correct name 'poly morphonuclear'. They possess granules which stain best with Ehrlich, although faintly also with Eosin, so that they are not strictly accurately named neutrophilic but are faintly oxyphilic in character. For this reason Kanthak^c and other English observers have named them 'fine granular oxyphiles' as opposed to the term 'coarse granular oxyphiles' usually applied to Eosinophiles. The granules stain usually violet or purple with Ehrlich, though in some cases they may be pink, and are small and irregular /

irregular in shape and size, and lie over and around the nucleus.

(2 and 3) Large & small Lymphocytes

No definite line of demarcation can be drawn between these, the distinction being pretty much an arbitrary one, so that in my results, I do not lay much stress on the percentage of the large as compared with that of the small variety, but rather on the total percentage of lymphocytes present.

The small lymphocyte consists of a round blue nucleus about the size of an ordinary red cell surrounded by a very small amount of protoplasm, which with Ehrlich's triple stain is almost invisible. In my slides the nucleus is usually very deeply stained although others have found it pale.

The large lymphocyte is larger and paler than the small variety, but its construction is similar.

In many cases the nucleus of the lymphocyte is found to have a deep cut in one side, or indeed it may be quite divided, more especially in the small forms /

forms . Another transitional variety, which I have commonly seen, is that where the cell is as big as the larger lymphocytes, and whose nucleus is so indented as to resemble a horse shoe, in extreme cases. It is pale all through, even the nucleus being faintly stained. It is evident therefore that a few varieties of lymphocyte cannot properly be termed mononuclear. The distinguishing feature is really the absence of granules, and not the presence of a single nucleus.

(4) Eosinophiles.

These have a polymorphous nucleus and granules. The nucleus is paler, than in the neutrophilic cell and has more of a greenish colour. The nucleus also is more loosely connected to the granules which cluster round it, and which are larger than in the poly morphonuclear variety. With Ehrlich's triacid stain the granules are stained a dark brown or copper colour.

These cells are very commonly seen in a broken up condition in cover glass preparations, owing probably/

probably to their having a looser structure than the other varieties.

The normal percentage of each variety of leucocyte in the blood of the adult is given by Cabot as:-

Polymorphonuclear neutrophils	62-70%
Large Lymphocytes	4- 8%
Small Lymphocytes	20-30%
Eosinophils	$\frac{1}{2}$ - 4%

It is frankly owned however, that these figures are only an approximation to the normal standard, which is necessarily vague and elastic. In reviewing and comparing results this must be allowed for as, to be thorough, the normal for each individual case should be established, but this in such a series of examinations as the present, is obviously impossible. The above standard however is useful in giving data for a reliable comparison.

In the differentiations at term of 32 cases which /

which may be considered to be strictly normal, I found the average to be:-

Polymorphonuclear neutrophils	78.7 %
Large Lymphocytes	8.8 %
Small Lymphocytes	10.8 %
Eosinophiles	1.7 %

These results when compared with the normal standard already given appear to show a relative increase of the polymorphonuclear variety at the expense of the lymphocytes.

So far as I have been able to find, Cabot is the only writer who makes any statement on this point, and his opinion is that there is a moderate increase of all varieties of leucocytes.

Causation.

Regarding the causation of the leucocytosis of pregnancy various suggestions have been made, but so far none of them completely explain the condition of affairs. The suggestion of Cabot, that the whole thing may be only a prolonged digestion /

digestion leucocytosis the mother having to eat and digest for two, has been already alluded to, but this though feasible does not appear to be thoroughly satisfactory. Normally there is a digestion leucocytosis of a periodic nature i.e. dependent on the ingestion of food. It is true that in many cases especially in persons whose digestion is slow or who have their meals at very short intervals from one another the effect of digestion on the leucocytes, after one meal, has hardly disappeared before the effect of the next meal is seen. In such cases, however, the ingestion of food increases the already existing leucocytosis. In pregnancy there should be practically the same condition. It must be remembered however, that during pregnancy, the maternal blood must be very much richer in nutritious matter than that of the normal adult, and that the foetus is feeding upon this continuously through the medium of the placenta. The pregnant woman does not as
a/

a rule eat more than the normal adult woman, indeed in many cases she eats less food, yet the leucocytosis is still present. Also even if digestion is constantly going on in the mother, the ingestion of food ought to increase the leucocytosis, although it may be only to a slight extent. It is noteworthy also that although the pregnant woman during the latter months and more especially the latter weeks of pregnancy, does not necessarily increase the amount of food ingested, the leucocytosis goes on steadily increasing. It would appear therefore that there must be some other cause for this leucocytosis.

In favour of this theory of digestion there is the fact brought out in the differentiations at term viz:- that the polymorphonuclear variety of white corpuscles is relatively increased. According to Burian and Schur in digestion leucocytosis this variety is relatively increased, but so far as can be seen this statement is not corroborated. Cabot merely quotes it but does not otherwise express an opinion.

The swelling of the breasts with the formation of milk is also mentioned by Cabot as taking part in the causation. This would naturally cause a gradually increasing, though slight, leucocytosis. In favour of this there is the fact brought out in the examinations, that after the puerperium there still remains a modified leucocytosis, which is continued into the period of lactation.

During pregnancy, however, there is increased metabolism in the maternal organism, and this becomes greater with the ever increasing demands of the growing foetus. As the foetus develops also there must be from it an increasing amount of waste material thrown off. All this necessitates the presence in the maternal circulation of an ever increasing amount of effete material which must be got rid of. This naturally of itself will cause an increase in the number of leucocytes, and it is at least feasible therefore that the leucocytosis of pregnancy is chiefly of a toxic nature, increasing /

increasing with the increased metabolism in mother and foetus as the pregnancy runs its course, reaching its height at term, then immediately after delivery rapidly diminishing when there is no longer any need for it.

It is unfortunate that the leucocytosis of pregnancy has little or no diagnostic value, as in the early months of pregnancy when diagnosis is difficult or even impossible, (it is not present, and in the later months, according to Cabot,) such conditions as hydatiform mole, and fibroid tumours may raise the count of white cells as much as pregnancy.

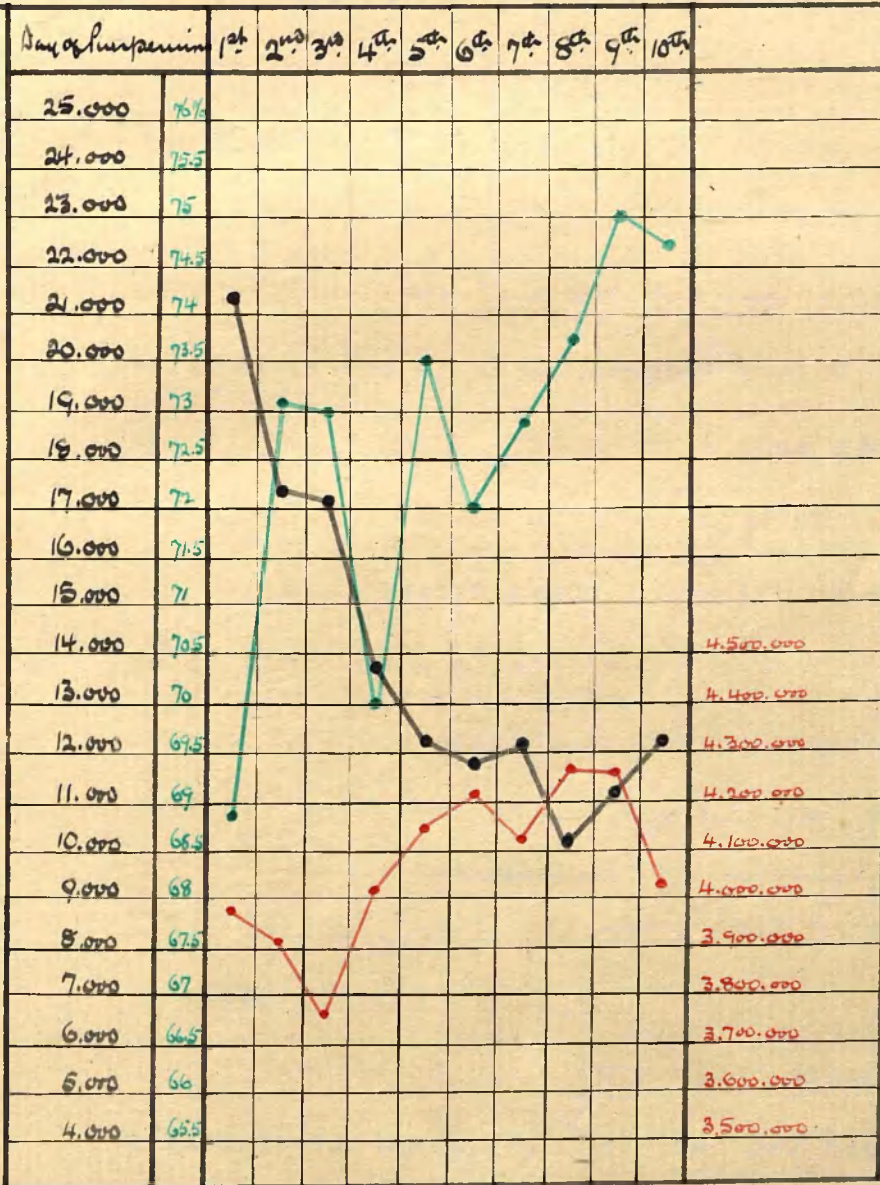
The leucocytosis during the puerperium is of importance from at least one point of view, that it might be confounded with a pathological leucocytosis in a case suspected of being Septic.

The maternal blood at term therefore shows changes which are characteristic of a mild case of Secondary anaemia, there being a considerable reduction in

Chart XVII.

(Composite). (See page 51).

Showing the course taken by the leucocytes, haemoglobin, and red corpuscles, during the first 10 days after delivery, based upon the averages given in the text.



Leucocytes - represented by black line.
Red corpuscles - " " red "
Haemoglobin - " " green "

in the amount of haemoglobin present, with but little change in number or appearance of the red corpuscles. This condition is naturally explained by the fact that during pregnancy there is a long continued drain on the albuminous constituents of the blood for the nourishment of the foetus. In addition there is a decided leucocytosis present. Before the end of the puerperal period, however, the blood in normal cases has almost returned to its condition in the unimpregnated state.

I have constructed a composite chart No. XVII which shows at a glance the course of the Red corpuscles, white corpuscles and haemoglobin from delivery until the end of the 10th day thereafter.

||

The effect of Plural Pregnancy on the maternal

blood

I find no record of the blood examination in a case where there was more than one foetus, but one case of twins - Case XXIV, which is included in my series, raises this question. It is natural to /

to suppose that if one foetus in utero causes a leucocytosis, two or more will cause a greater increase. In this case, however, it is found that the leucocytosis is considerably below the average at term being only 13000, per cubic millimetre. This may possibly be explained by the fact that, before admission to hospital, she had been drinking heavily for some weeks, and presumably therefore she had not had much in the way of ordinary diet, during that period. The influence of fasting, on the leucocyte count must therefore, be taken into consideration. Luciani gives particulars of the blood of Succi the professional faster during a 30 days abstinence. Von Limbäck also records 2.800 white cells in the blood of a patient who had fasted for a week. In both these cases the white corpuscles were found to be much diminished. It has also been established that fasting, by concentrating the blood, temporarily increases the red cells. In my case the red cells at term are recorded /

recorded as 4.800.000, which is quite above that of the normal adult blood. Unfortunately I have been unable to get another case of plural birth in which to investigate this point so that meantime this case must stand by itself.

//

The influence of the sex of the child on the maternal blood:-

It is only natural to suppose that some such influence should exist, although, probably, only in very slight degree. Hough in 1884 published a long article on the relative influence of the sex of the foetus in utero, on the mental, physical, pathological, and developmental condition of the mother during gestation, lactation, and subsequently. He states that, according to the sex of the foetus there is some diversity in the general mutations of the female body. Andral has stated that the blood in pregnancy shows a remarkable tendency to assume the character of the blood of inflammation, but /

but whether that change is greater in proportion, or different in nature, when a male foetus is carried we have no data for. It may however be inferred that as the proportion of various substances in the blood is different in adults in sex, it is therefore probable that the greater diversity or less watery condition of the blood in the male foetus, determines in the mother the production of more fibrin.

On this point my observations cannot go very far, as in almost all, or, at least, in the great majority of my cases, I observed early formation of fibrin, pointing to excess in the blood. The red corpuscles and haemoglobin do not show any such variation, but the behaviour of the white corpuscles is worthy of note. In investigating this point I have excluded all cases which were in any way abnormal, and I find that in 13 cases where there was a female foetus, the average count of leucocytes at term was 23,384, while in 18 cases where the foetus was a male, the average was 18,355. The latter /

latter average is perhaps even higher than it should be, as in 4 of the cases a certain amount of the leucocytosis might be caused by excitement which is specially noted as being excessive. The average for the remaining 14 cases works out at 16.685 per ccm. Of the female cases the lowest count was 14.800 (which is not much below the average male) and the highest 47.000, (while of the male cases the minimum was 10.600 and the maximum 31.400. It is noteworthy that this count is the only one of the male cases which exceeded 24,600 which is only slightly above the average female count. I do not hold for a moment that this should be used as a means of diagnosing the sex of the child before delivery because as seen, even in the limited number of cases in the series, there are exceptions on both sides. My attention, however, was drawn early in the series to the fact, that, with a male child, there appeared to be a smaller leucocytosis than with a female, and it certainly was /

was remarkable how often thereafter I was able to give a correct opinion before delivery as to the sex of the child. A very large number of cases would require to be examined before any definite statement could be made on this subject. I have no doubt that it would prove to be as correct a method as that of counting the foetal heart beats, but like it, it is a point which is more curious than practical, and is not worthy of further discussion.

————— " —————

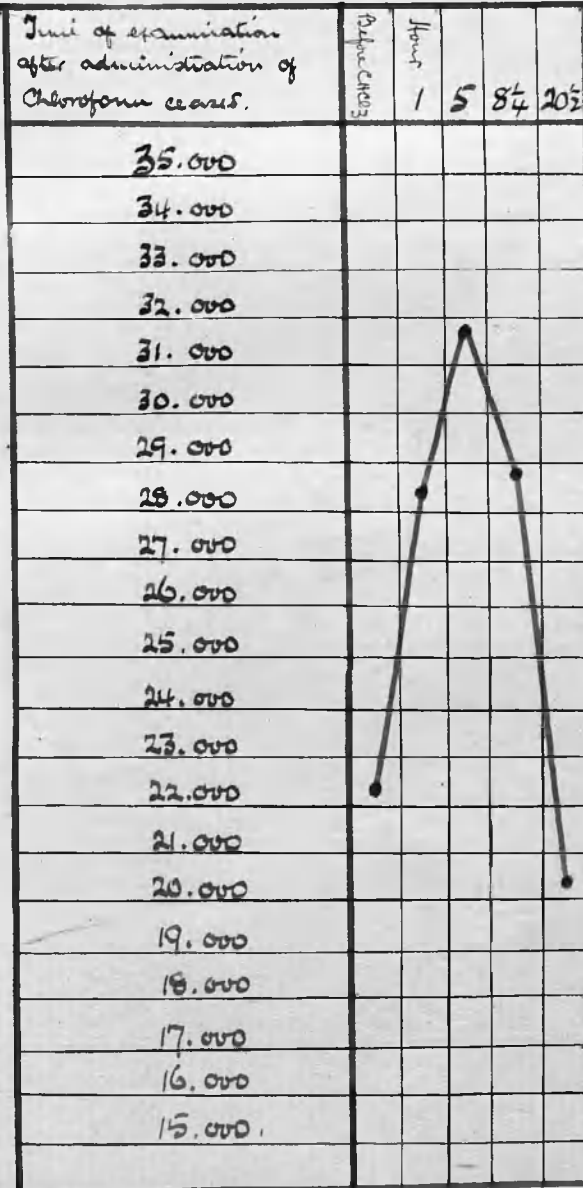
The Effects of Chloroform on the blood.

In making the foregoing examinations I was struck on several occasions by the very high count of leucocytes obtained, after the patient had been under chloroform, but I could find no trace or record of any observation in literature, as to chloroform causing a leucocytosis. Ether is known to have this effect, but there is no mention of Chloroform. I was thus led to investigate this point with the result that an almost constant leucocytosis /

leucocytosis was found which appeared very shortly after anaesthesia and was probably therefore due to the effect of Chloroform. My earliest observation is half an hour after the administration of Chloroform was discontinued. The leucocytosis is usually increased steadily for some hours, then gradually diminished again in much the same ratio as the increase, although the process of diminution was at times slower. The times of increase and decrease vary in the different cases no doubt due to difference in susceptibility. Unfortunately examinations with special reference to this point were not begun until well on in the series, but in the later cases the examinations were made before, and then every hour after, Chloroform, for a time, in order to arrive at some definite idea, as to its effect. Looking at some of the earlier cases in the light of the results of the later ones, it is interesting to see how the effect of chloroform can be traced, although such /

Chart V.

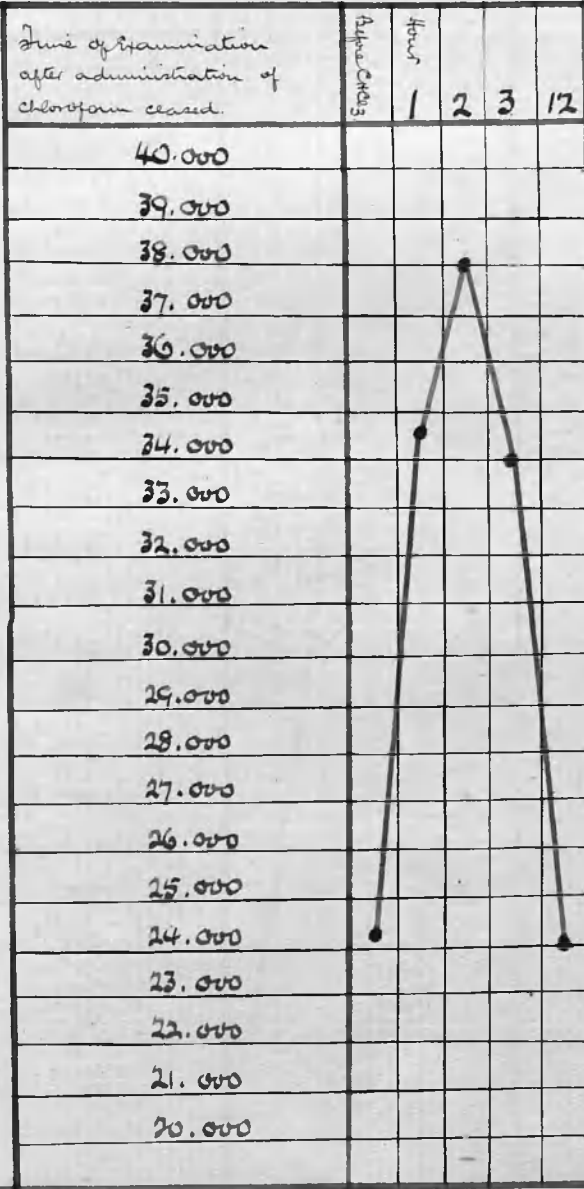
Showing the effect of the administration
of Chloroform on the leucocytes in
Case XXXXVII.



(See page 58).

Chart VI.

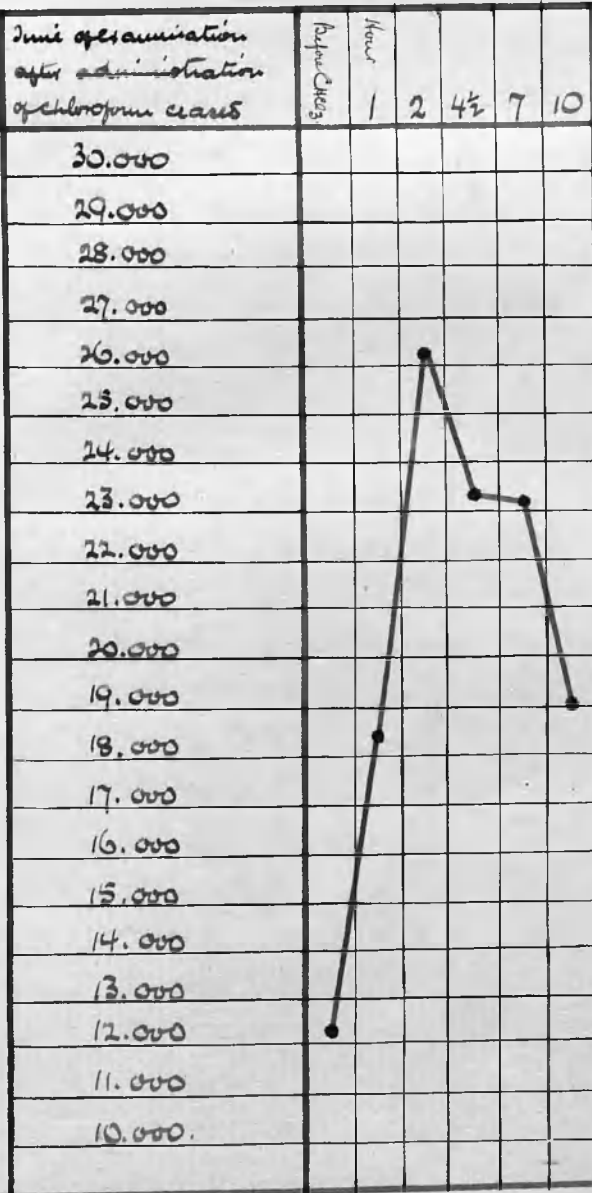
Showing the effect of chloroform
administration on the leucocytes in
Case XL.



(See page 58)

Chart VII

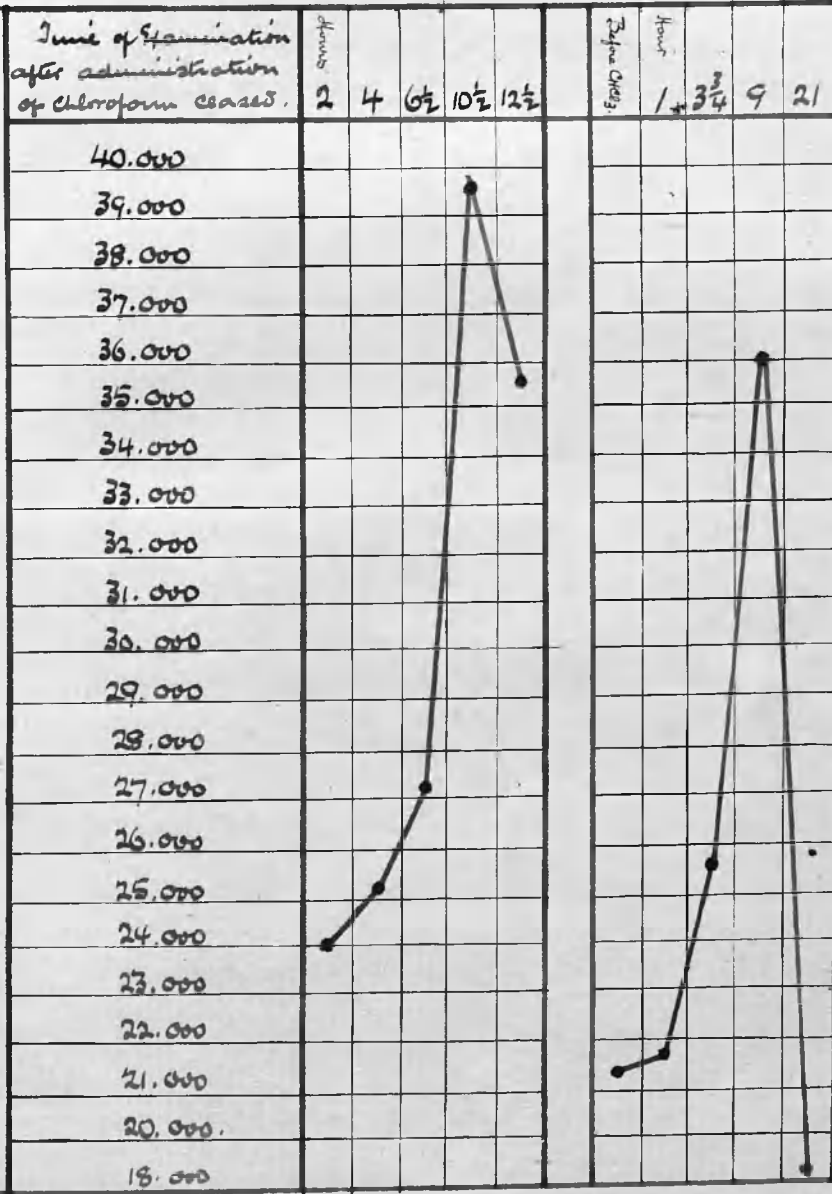
Showing the effect of the administration
of chloroform on the leucocytes in
Case XLI.



(See page 58).

Chart VIII.

Showing the effect of Chloroform on the leucocytes
on two occasions in the same case No. XXXVI.



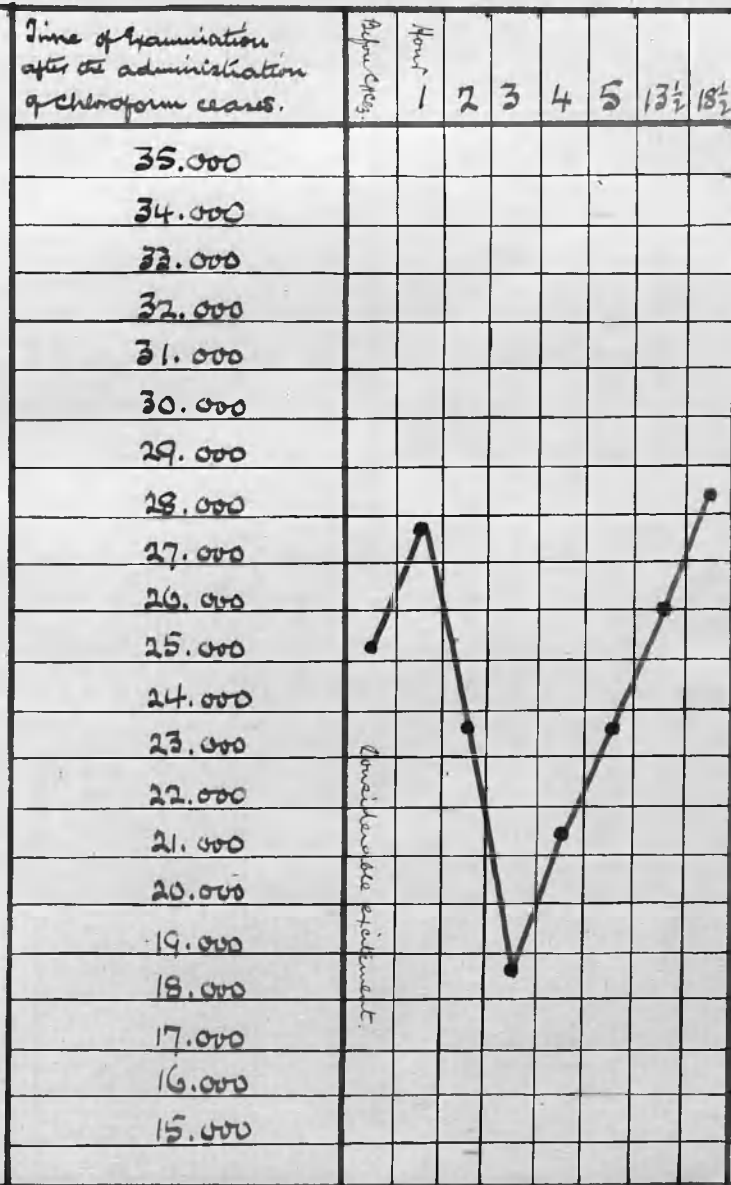
(See page 58).

such an effect was not at first suspected.

There are several special charts constructed to illustrate this point. The group of cases 37.40 and 41 (Charts V.VI,VII) show a striking resemblance to one another. In each of these the blood examined 1 hour after the administration of chloroform ceased, showed an increased count of leucocytes. The 1st showed an increase of 27% the next 41% and the last 50%. In two of them the highest observation was recorded 2 hours after chloroform ceased and while in Case XL a fall was found 1 hour later, in XLI a similar fall was recorded two and a half hours later. In case XXXVII the blood was not re-examined until 5 hours after Chloroform, and this was the highest observation in this case. All three cases show a return almost to normal limits within 8/12 hours. With regard to Case XXXVI (Chart VIII) Chloroform was administered twice during residence, and on each occasion several observations were made. The two/

Chart IX.

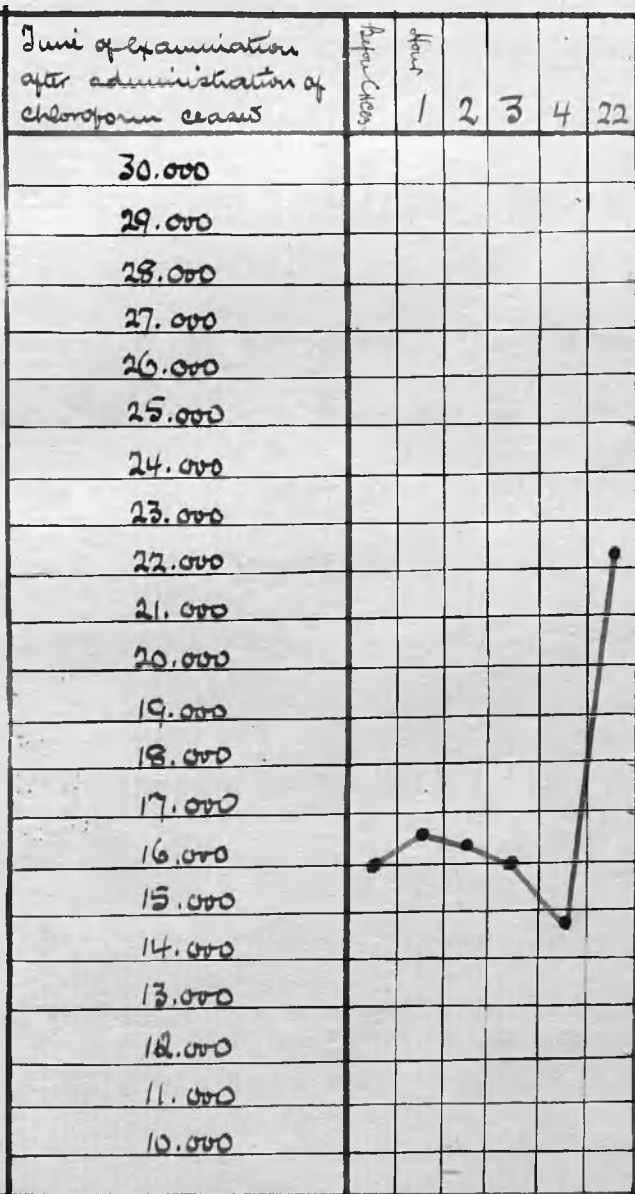
Showing the effect of the administration
of chloroform on the leucocytes in
Case XLII.



(See page 59).

Chart X.

Showing the effect of chloroform
administration on the leucocytes in
Case XLIII.



(See page 59)

two curves show a striking similarity, the highest observation in each case being recorded 9/10 hours after the anaesthetic was discontinued.

Two other cases are worthy of special record, as they point to a somewhat different primary effect viz:- a fall, followed in a few hours by the usual rise. In chart IX of Case XLII the curve shows practically no change after 1 hour or at least only a very slight rise. A distinct fall was found 2 hours after and continued at the next hour, but thereafter the count of leucocytes increased steadily the highest record being 18 hours after chloroform. In Case XLIII (Chart X) a very similar course is pursued, practically no change being observed at the first hour, then a steady fall until 4 hours after. Unfortunately no further records were made in this case until 22 hours after when a distinct rise was found.

Several other charts are included in the series but these speak for themselves.

The other records are more or less isolated ones but are of use in substantiating the results detailed /

Table III.

giving the results of differentiation of leucocytes
in 8 cases before and after Chloroform.

(See page 60)

Case	Polymuclear neutrophils		Large lymphocytes		Small lymphocytes		Eosinophiles.	
	Before CCl ₃	After CCl ₃	Before CCl ₃	After CCl ₃	Before CCl ₃	After CCl ₃	Before CCl ₃	After CCl ₃
21	84.1%	80%	10%	6.5%	4.5%	5%	1.4%	8.5%
28	84.6%	78.3%	6.4%	7.7%	6.4%	6.3%	2.6%	7.7%
30	82.6%	89.2%	8.7%	2%	6.7%	2.8%	2%	6%
34	70%	72%	9%	5.8%	20.4%	10.6%	0.6%	11.6%
40	71%	72%	7.8%	5.5%	5%	4%	16.2%	18.5%
41	83.2%	81%	9.2%	9%	6.1%	5%	1.5%	4%
42	85%	83%	8.3%	4.5%	6%	5%	0.7%	7.5%
43	86.6%	86%	6.7%	2%	2.7%	5%	4%	7%

Average of these cases :-

Polymorphonuclear neutrophils

Large lymphocytes

Small lymphocytes

Eosinophiles

Before CCl₃

After CCl₃

80.9%	80.2%
8.3%	5.4%
7.2%	5.5%
1.8% [#]	8.9%

[#] only 7 cases averaged for reason stated in the text.

detailed above.

With a view to determining the varieties of leucocytes concerned in this leucocytosis, films from the same patient before and after Chloroform were prepared and differentiated in 8 cases. The result is seen in Table No. III

In addition, there are notes of 10 cases, where films of blood, taken after the administration of chloroform, were differentiated. Thus we have 18 cases on which the following average is based:-

		normal at term
Polymorphonuclear	81.8%	78.7%
Large Lymphocytes	5.2%	8.8%
Small Lymphocytes	5.6%	10.8%
Eosinophiles	7.4%	1.7%

When this result is compared with the normal average at term already established, the most striking feature is the increase in the percentage of Eosinophiles after chloroform and it is noteworthy that this increase is altogether at the expense of the lymphocytes.

For /

Table I.

(See page 61)

Showing the relative times of increase and decrease of the leucocytes after Chloroform. The figures represent the time in hours after the administration of Chloroform ceased.

Case	1/2	1	2	3	4	5	6	7	8	9	10	12	13	14	16	18	20	21	22		
21	+																			+	
25			+																		
26			+																		
28					+																
29			+																		
30		+																			
32		+						+													
33		+	+																		
36			+		+			+				+	-								
		+			+						+									-	
37		+				+				-										-	
40		+	+	-									-								
41		+	+			-			-			-									
42		+	-	-	+	+								+						+	
43		+	-	-	-																+

Increase is represented by the sign +
 Decrease " " " " " -

For the sake of comparison I have averaged the varieties of leucocytes in the 8 cases above referred to before and after chloroform with this result:-

	Polymorphonuclear neutrophiles	Large Lymphocytes	Small Lymphocytes	Eosinophiles
<u>Before</u>	80.9%	8.3%	7.2%	3.6%
<u>After</u>	80.2%	5.4%	5.5%	8.9%

This is however, somewhat misleading as Case XL is included, which was a syphilitic case, and in which the percentage of Eosinophiles before Chloroform was 16.2. The other 7 cases only averaged 1'8%, which is just the normal term percentage.

When this case is excluded then, the change is more distinctly shown, there being a certain degree of Eosinophilia at the expense of the lymphocytes.

The results which are tabulated in Table I are not sufficiently uniform to allow of any definite rule being laid down as to the length of time taken for the effect to be shown, its duration and its time of disappearance. This may be /

be said however that there is apparently a difference in the time of appearance and degree of the effect, which may readily be explained by difference in susceptibility. This chloroform leucocytosis must be classed as a member of the group which for convenience sake is known as Toxic leucocytoses.

To get some explanation of the cause of the increase in the number of Eosinophiles after chloroform it is necessary to consider shortly what part these corpuscles play in normal circulating blood. They are found to such a small extent that they might almost be said to be there by accident. They cannot however, be classed as intruders, although they are not regular inhabitants like the neutrophile ^{and} Lymphocyte between which they seem to come as an intermediate variety. The percentage of Eosinophiles in normal blood often changes in a way very difficult to explain, as there is often a marked increase, although the cause may not be known. /

known. Normally these corpuscles are present in large numbers in various parts of the body outside the blood vessels, (bone marrow, gastro-intestinal tract, coelomic spaces, thymus gland &c.,) and in many ways they seem to live their life in comparative independence of the other members of the leucocyte group. They are always more numerous in the bone marrow, and in this situation mitoses are often seen in them, so that bone marrow seems to be a dividing place for Eosinophiles. Since they were found to be in no way peculiar to leukaemia, as was at one time supposed, their investigation was dropped, but Neusser and his pupils (Weiss, Schreiber, Klein, and others) have brought them more into prominence again. Cabot, however, remarks that Neusser's investigations are frequently incorrect and cannot be vouched for. Neusser gives disturbances of the sympathetic nervous system and hence of the bone marrow as one class of causes of Eosinophilia. It is possible that/

that chloroform Eosinophilia may be explained in this way.

Eosinophilia

In addition to those cases who had chloroform a few others of the series showed some increase in this variety of leucocyte and it is necessary to make some remark on them:-

1) Case XL showed 16.2% before Chloroform . This case as seen from the report sheet was one with well marked sores of an undoubtedly specific nature. Neusser in his classification of causes already alluded to includes many affections of the skin, among which he places Syphilis. This case therefore so far as it goes corroborates that statement.

(2) Case XXII showed 3.3% which is distinctly above the normal average of my series. This case was one where there had been considerable haemorrhage, and on this point Neusser remarks that increased Eosinophiles after haemorrhage show active /

active regeneration of blood and good prognosis. In this case also, there was a very high first count of leucocytes, which is no doubt partly explained by the haemorrhage, and it is interesting to observe that this leucocytosis followed the usual rule of post haemorrhagic leucocytoses in persisting for a day or two. There was, however, no lymphocytosis, as is sometimes found after haemorrhage

(3) Case XLV is worthy of reference in this connection, in as much as it showed no Eosinophile increase. Neusser has remarked that in the prognosis of Chlorosis and Pernicious Anaemia Eosinophilia is favourable.

Neusser has also included, as causes of Eosinophilia, troubles involving the female genitals, especially the ovaries, comprising among others Gonorrhoea, menstruation, and the psychoses of menstruation, the puerperium, and the climacteric period. Normally I have not found Eosinophilia present during the puerperium in any Case.

The /

The Effect of Strychnine on the Blood

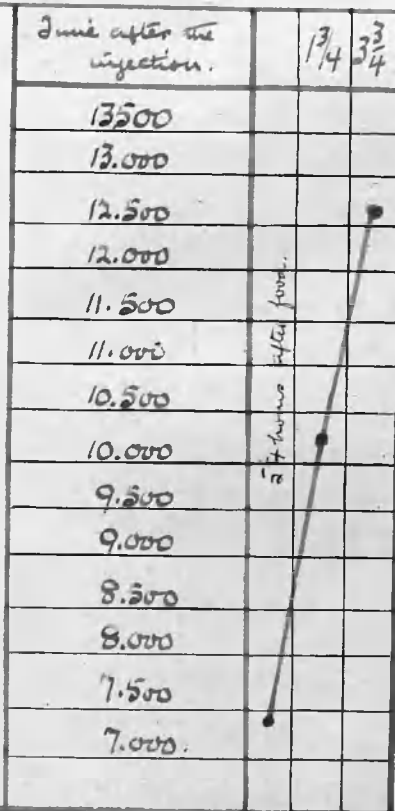
In case XXXVIII (Chart ²⁶ *(See p. 31 of Statistics)*), where the patient had Chloroform twice within ^a few hours a very high leucocytosis was recorded, four observations made within $3\frac{1}{4}$ hours averaging 60.850 per cm. As this count so much exceeded any of my previous observations in any case, and as such counts are rarely recorded without some pathological cause, it was necessary to find some explanation of it in this case. Fallacy was excluded as far as possible by the number of examinations. The condition of the patient was of course a very grave one for a time, as she was very collapsed, and this in itself might cause a leucocytosis. In addition she had chloroform twice, 31000 leucocytes being recorded after the first occasion, and no less than 61000 after the second. Besides chloroform a little Ether was given on the mask, and thereafter she had a sub-cutaneous saline infusion, both of which tend to cause a leucocytosis. However, as she had had fully $\frac{1}{4}$ gr. Strychnine hypodermically/

Charts XIII + XIV.

Showing the increase in number of leucocytes following on the injection hypodermically of $\frac{1}{30}$ gr. Strychnine in. (See page 67).

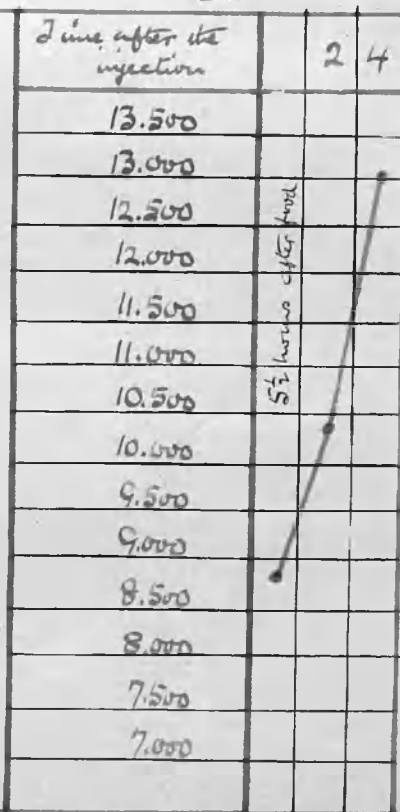
Case XLIV

XII.



Case XLV

XIII.



Increase of 38% in $\frac{3}{4}$ hours
+ of 70% in $3\frac{3}{4}$ hours.

Increase of 18% in 2 hours
+ 47% in 4 hours.

On this point reference is also made to Chart XIV. In this case patient had Strychnine in small doses at intervals with a resulting increase in leucocytes, as related on pp. 68 + 69.

hypodermically at short intervals, suspicion fast:
:ened on this. In two cases XLIV and XLV (charts
XII and XIII) I made experiments with a view to
confirming this point. In these cases the exper:
:iments were conducted at the end of the puerperium
when they were both practically well. At 3.30 p.m.
they had tea as usual, and at 7 p.m. they had gruel
but thereafter no food. The blood was examined at
12.15 and 12.30 a.m. respectively when in both
cases the leucocyte count was found to be very low
7,400 and 8,800 respectively. This of course was
over 5 hours after any food had been taken, so
that digestion leucocytosis, if any, would have
disappeared. In each case $1/30$ gr. Strychnine was
given hypodermically, and the blood was examined
twice thereafter, at practically similar intervals
2 and 4 hours after the injection. In the former
case there was an increase of 38% in 2 hours and
70% in 4 hours while in case XLV the increase was
18 and 47% respectively. As the patients were
comfortably /

comfortably sleeping between the examinations there was no excitement, nor, so far as I know, any other cause to account for the change. The fact of course remains that they did not increase in similar proportions, but here again difference of susceptibility will no doubt play a part. It must be remembered that there is an unexplained variation in the normal number of leucocytes at different times of the day. Here, however, there seems to be a constant change, varying in degree. Having found this change in these cases I looked all through my series for any sign of such a change in any previous case. In case XLI (Chart XIV)^(Sup. 34 of Statistics) a condition was found which might be classed under this head. This patient had, on the day after operation, repeated small doses of Strychnine as per report sheet, and as is shown on the chart a corresponding increase in the leucocyte count was recorded. At 11 p.m. on 19th the count was 19,000 at 12 p.m. she had 5m and at 1 a.m. 5m Liq. Strychninae. At 11.45 a.m. on 20th the leucocyte count had /

(1) Dr **Maurel**

Recherches Experimentales sur les leucocytes
Paris, 1892

had risen to 25,200 representing an increase of about 48%. Thereafter, with further doses, there was a continued increase, but on a smaller scale, the total increase shown being 62%. At the time of examination I ascribed this increase to the presence of a slight bronchial catarrh as such has been observed in a few cases. On this point V. Limbeck states that acute catarrhal and chronic purulent bronchitis have, in most cases, relatively little leucocytosis. Cabot as a result of 17 cases examined, is of opinion that, in the majority of acute cases, the blood shows no changes unless concentration due to Cyanosis be present. So that these opinions are decidedly against the idea that the slight bronchitis was the cause of the increase in Leucocytes in this case.

(1)

In 1897 Dr. E. Maurel maintained, as a result of his experiments with Strychnine, that the quantity of this drug required to kill an animal is equal to that required to kill the whole of the leucocytes /

(2) George Wilkinson M.D., Liverpool
British Medical Journal 1896
Effect of drugs on Leucocytes

leucocytes of the body, and that the sensibility of an animal to Strychnine corresponds exactly to the sensibility of its leucocytes to the same poison. He holds therefore that in poisoning by Strychnine the death of the leucocyte plays a most important part in the death of the animal.

Beyond this reference I have not been able to find any mention of the action of Strychnine on leucocytes, and in Cabot there is no reference to Strychnine as a cause of leucocytosis. In similar (2) experiments with other drugs, however it has been found that in animals, if the dose is not a fatal one there is a temporary decrease in the number of leucocytes, followed very soon by an increase of longer duration. The degree and duration of the change is found to vary with the drug employed.

My results are not numerous enough to found a decided opinion upon, but they certainly point strongly to this property of Strychnine. If this were firmly established, the importance of Strychnine as a therapeutic agent, great as it already is /

is would be considerably increased, especially in diseases where phagocytosis plays an important part.

#

Puerperal Sepsis.

Case XXXVI (Chart XV) is the only case of this kind in the series. It was not a very acute case, although as will be seen from the chart, a very high temperature was recorded on one or two occasions.

All observers agree that there is very marked anaemia in severe cases. Roschers's investigations tend to show that the diminution of the red corpuscles in septicaemia is greater than in any other infective disease, and appears more rapidly. Such a diminution he was able to recognise a few hours from the beginning of the illness. He has found the degree of anaemia to be proportional to the severity of the case, and concludes (reckoning by means of the estimated solid residue) that whenever a quarter or more of the substance of the blood is lost/

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afagad linoquoni

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1
Grawitz
"klinische Pathologie des Blutes"
Berlin 1895

2
Cabot. 1900

3
Hayem
La Med. Moderne 1897 Janr. 13th

lost, death follows. The serum of the blood also becomes very watery, thus taking part in the general atrophy of the blood. In an intensely acute case of Puerperal septicaemia, Grawitz records a reduction to 300,000 red cells, although the patient had been sick less than 24 hours. He accounts for this reduction by the combination of blood destruction and dilution. This is certainly a count which is very hard to believe, but he gives the case in detail in his recent text book. ⁽¹⁾

In the 9 cases of Puerperal sepsis ² seen at the Massachusetts General Hospital in recent years the red cells averaged 3,780,000 per cm³. which is comparatively low considering the shortness of the illness but allowing for the influence of haemorrhage during parturition is not far from normal.

³ Hayem reports a case of puerperal sepsis of only a few days standing, where in a case not previously anaemic, the red corpuscles numbered 1, /

4

Krebs:

Dissert. Berlin 1893

5

Rieder,

"Beiträge Z Kenntniss der Leucocytosis"
Leipsic 1892

1,450,000 per cm. Haemoglobin was 20 %, and white corpuscles 7,500 per cm .

With the exception of haemorrhage cases, such severe cases of puerperal sepsis are the best instances of an acute anaemia. The Haemoglobin is usually considerably diminished, but, unless in very severe cases, the red corpuscles are not altered either in shape or size.

As regards Leucocytosis it is usually found that this is almost or altogether absent in the mildest and severest cases, and is only present when there is a considerable struggle between the patient and her disease.

⁴
Von Limbeck and Krebs found in cases of puerperal septicaemia no leucocytosis, but these were all fatal cases, nor very mild ones. Rieder⁵ on the other hand, and the majority of other observers /

1 Sadler. Forsch.d.Med., Supplement - Heft.1892

2 Roscher Dissert. Berlin 1894

3 Kanthak Brit.Med.Journal. June 1892

4 Grawitz "Klinische Pathologie des Blutes" Berlin 1895

observers(¹Sadler, ²Roscher, ³Kanthak, ⁴Grawitz &c.) find leucocytosis. This means that most of these cases observed were of moderate severity.

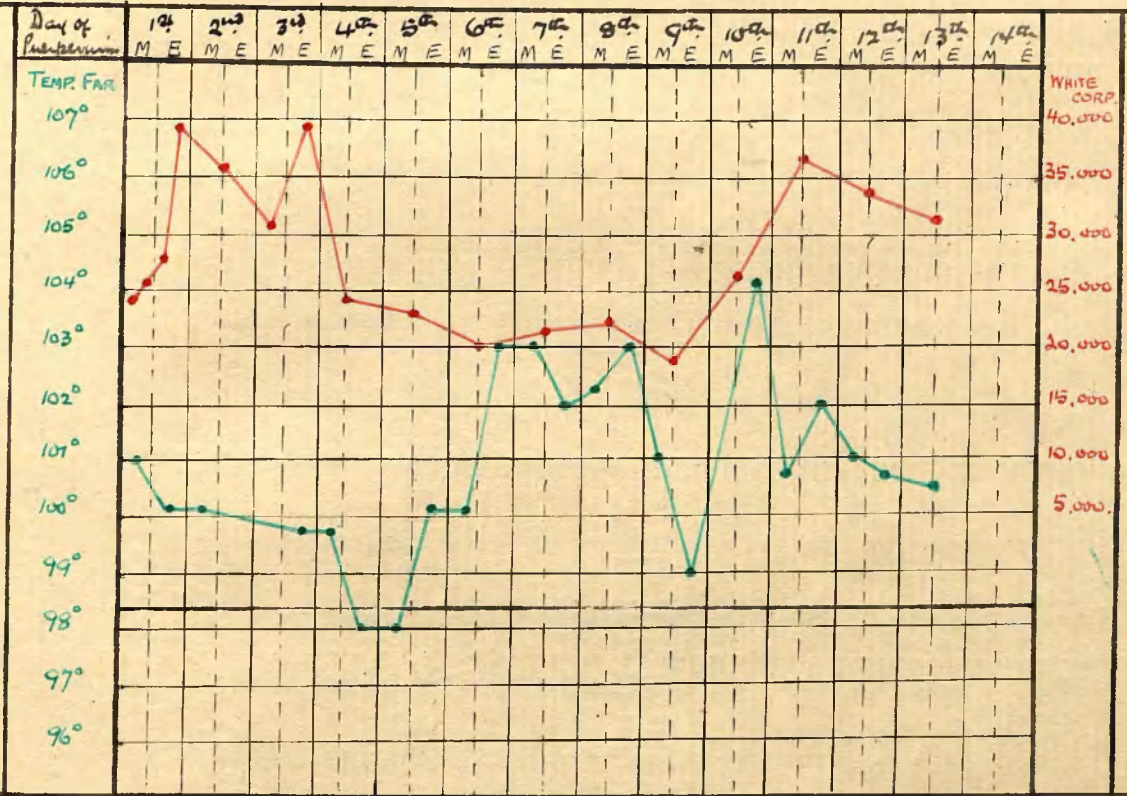
In the table of 11 cases given by Cabot, only one case shows no leucocytosis and in this case the patient died on the day of the examination. The other cases all show it in greater or less degree.

In comparison with the above results the particulars of Case XXXVI are interesting. There was a distinct diminution of the red cells from the count before delivery, a reduction of about 800,000 in a few days, the haemoglobin also was reduced to 70%. There was a very definite leucocytosis the course of which is clearly shown in Chart XVI. The exact degree of this leucocytosis was at first obscured by the ordinary term, and chloroform leucocytoses but, after the 4th day it is quite distinct, as here, according to the normal curve, there should have been a considerable approach to the normal. In this case 24,200 was registered /

Chart XVI.

Showing the similarity between the course of the renewals,
+ the temperature after repairs was established (5th day),
until the day of dismissal. (See also Chart XV. pp 29/30 of statistics).

Case No. XXXVI



Temperature represented in Green.

Renewals - " - red.

(See page 74).

registered on 4th day, dropping to 20,000 on the 6th, but again increasing steadily though slowly. The 2nd administration of Chloroform again obscures the leucocytosis. She was thoroughly examined and freely douched, with the result that next day 18000 leucocytes p.cmc. were found, the lowest count since admission. This drop corresponded with a fall of the evening temperature to 99° , the minimum since the 4th day. At noon next day, however the leucocytes numbered 26,200, the morning temperature unfortunately was not recorded, but the evening record was 104.2° Thereafter the leucocytes still increased in number and remained high, the temperature never falling below 100.8° At this point she was dismissed to her own home where she ultimately recovered.

An interesting point brought out by the chart is the marked similarity of the temperature and leucocyte curves once sepsis was thoroughly established viz: after the 5th day in this case.

Thus /

1

Reiss

Archiv. f. Dermatologie und Syphilis
1895, Heft 1.

Thus this case may be classed as one of moderate severity. There was a definite struggle for supremacy between the patient and her disease accompanied, as expected, by a decided leucocytosis.

The importance of a blood examination in puerperal cases, where sepsis is suspected, is somewhat discounted by the presence of the normal puerperal leucocytosis varying in degree. Blood cultures &c., if a positive result is obtained, are more important, but are not so easily carried out as a blood examination.

Blood in syphilis

Only one case in the series (No.XL) was Syphilitic but it is interesting to compare the observations on the blood in this case with what is generally accepted on the subject.

1
Reiss has come to the following conclusions after examination of 100 cases:-

(1) Red cells. These are slightly decreased between the time of the chancre, and the onset of the/
the/

2

Konried

International dermatological Congress 1892

3

Newmann & Konried

Wiener Klin. Woch., 1893 No. 19

4

Lezius

Inaug. Dissert. Dorpat. 1889

the secondary symptoms. This becomes more marked after the appearance of secondaries, and continues for a time even after treatment has begun.

(2) Haemoglobin sinks steadily from the time of the primary lesion onwards, but is not specially affected by the eruption.

²
Konried goes more into detail. According to him, in the first 4/7 weeks after infection, the red cells remain normal in number, but the haemoglobin begins to fall off, losing in that time 10/20%. Afterwards it sinks steadily until treatment is begun, the number of corpuscles also falling slightly.

³
Newmann and Konried in 200 cases, found that 25/30% of Haemoglobin is usually lost up to the time of Secondaries, without any change in the red cells but, after the outbreak of secondary lesions, the red cells diminish greatly in number.

⁴
Lezius agrees with this opinion as to the changes in the red cells, These changes become more marked in the tertiary stages.

(3)/

(3) White cells These show characteristic changes. In the first stage they are either normal or slightly increased, the percentage of the polymorphonuclear forms being almost always notably low, and that of the lymphocytes high. As the eruption breaks out, leucocytosis generally appears, lymphocytes and eosinophils being usually increased. Later, i.e., in the tertiary stages, along with the severe anaemia, leucocytosis occasionally occurs, not uncommonly with small percentages of myelocytes, and a marked lymphocytosis.

From these results then it is seen that the chief value of a blood examination in syphilis is not for diagnosis, but as a measure of the stage, and severity of the infection. Low haemoglobin, and a high percentage of lymphocytes point to severe types. Leucocytosis usually means that the case has got beyond the primary stage, while, in the tertiary stage, the presence of myelocytes with /

with a marked degree of anaemia is of serious import.

In Case XL there was a marked diminution in the red corpuscles, 3,830,000 being recorded on admission which is distinctly below the average. There was only 65% of haemoglobin present. A leucocytosis slightly above the average ^{at} term was also present. There was no lymphocytosis, but there was a considerable degree of Eosinophilia, 16.2% being found on admission. This agrees with Neusser's investigations, and is referred to in the remarks on Eosinophilia.

Looking at the blood in this case, in the light of the preceding remarks, one would remark that the condition points to the case being at an early stage. This indeed was the case, as a secondary rash began to appear immediately on admission.

As she was only resident in hospital for 3 days she had no antisyphilitic treatment, so that the /

Table II.

Showing the condition of the blood in two cases with edema + albuminuria, + in two cases of Eclampsia, both of a severe type.

(See page 80).

Case	Formation of Rouleaux	Leucocytosis	Red corpuscles	Fibrin	Hts.	Stage of case	Remarks
15	Abundant	Moderate 15,200	3,500,000 1 nucleated cell seen in counting 400 leucocytes	Early formation	80%	Slight edema + albuminuria of short duration	Only prodromata observed - normal delivery.
8	Scanty	Decided 20,500 many large cells observed	3,400,000 no nucleated cells seen while counting 400 leucocytes	Early formation	65%	Great edema with ascites. marked degree of albumin- -uria. no blood or casts	Improvement under treatment - normal delivery 3 weeks after admission.
16	Abundant	marked 34,400 many large cells observed	4,000,000 marked clumping 5 nucleated cells seen in counting 400 leucocytes	Early formation. Blood from the needle prick coagulated almost at once.	70%	Fits both before and after delivery. urine almost solid with albumin	Treatment by saline infusion - Recovery. Delivery before admission.
34	Scanty	Moderate 19,400. rapidly increasing.	4,800,000. marked clumping 28 nucleated cells seen in counting 500 leucocytes	no tendency towards early formation - Copious bleeding from the needle prick.	60%	Fits both before + after delivery. urine solid with albumin on boiling.	Improvement at first under treatment by saline infusion but relapse followed delivery Death.

the effects of mercurial administration on the blood which are very characteristic, could not be observed.

//

Blood in Eclampsia.

These remarks are based on a series of 4 cases. Of these only two had fits, but the others showed a varying degree of albuminuria and oedema and I have therefore included them as having some bearing on the subject. These cases 8.15, 18 and 34 are given in order of severity, the last alone being fatal, and for comparison, I have constructed table II to show at a glance the state of the blood in each case. As regards leucocytosis it is interesting to observe that the degree increased with the severity of the case, except in the last case, when on admission the count was only 19,400 per cm. The red corpuscles were distinctly below the average in the first two cases while in those having fits, they were not at all reduced. With the /

the exception of Case XXXIV all showed a tendency towards early formation of fibrin. The latter case indeed is noteworthy as in it there was copious haemorrhage from the lobe of the ear after the needle prick. This is contrary to the usual idea of the blood of Eclampsia, which is looked on as being more coagulable than normal. A striking feature in the series is the presence of nucleated red corpuscles in at least three of the cases. In these cases the number of nucleated red corpuscles is an index of the severity of the case, although in case VIII, where there was more marked oedema and albuminuria than in XV, no nucleated red cell was observed in counting 400 leucocytes. These cells are usually considered to be a younger stage in the life of the corpuscle than the non-nucleated or normal form, and they are usually to be found in the bone marrow, which may be called their "nursery". Their appearance in the peripheral circulation, therefore, means that a reproduction /

duction of red cells in the bone marrow is called for by a destruction elsewhere, and to supply this demand some of the immature cells also escape and circulate in this form for a time. The usual seat of destruction of red corpuscles is the liver, and it is of interest that quite recently attention was called to changes in the liver in cases of Eclampsia. My series of cases cannot be considered as showing any great degree of diminution in red corpuscles. Indeed the two cases who had fits did not show any diminution in the red corpuscles yet nucleated red cells were observed in them, so that some further explanation of their presence may be necessary.

It is generally recognised that oedema as such, has very little effect on the blood, but the loss of albumin by the urine tells both on the corpuscles and on the serum, thinning both and consequently lowering the specific gravity of the blood. In the first two cases of the series the /

the red corpuscles are distinctly under the average at term, although in the first case the symptoms had only been present for a few days before admission. On the other hand, in the two severe cases where there was a very marked degree of albuminuria, the red corpuscles were quite up to the normal standard.

Hayem found no considerable loss of red corpuscles in acute Nephritis unless the urine was haemorrhagic. Cabot states that the red cells are often much diminished in such cases but as to whether this is due to the loss of blood from the kidneys or to other causes no definite opinion is given. Grawitz records a slight reduction. Koblank, on the contrary, in a case of acute nephritis with oedema counted 5,168,700 red corpuscles per cm. Sadler also found the red cells practically normal in four cases out of six of acute nephritis; in the other two there was a slight diminution. In none of the few cases examined/

examined at the Massachusetts Hospital were the red cells much diminished, but in two cases the haemoglobin was very low. (Cabot).

In advanced cases of chronic nephritis the count of red corpuscles may run very low, but often it is chiefly the haemoglobin which suffers through the drain of albuminoids from the blood into the urine. The writers already referred to give instances of this, but the majority of cases examined in the Massachusetts hospital show very little reduction in red corpuscles or haemoglobin (Cabot)

As regards the white corpuscles, leucocytosis is usually stated to be the rule. Hayem gives several counts in support of this, but Koblank and Gravitz each in a single case found normal counts, while Sadler found an increase in only one of his six cases, and even then the highest count was only 13,312 per cm. Cabot believes that the leucocytosis of nephritis is due either to loss of /

of blood by the kidney or to unaemia, as when these conditions are absent he has not found the white corpuscles increased. He concludes that unaemia may cause leucocytosis or at any rate is not infrequently associated with it.

The series of cases given cannot be said to show an abnormally high degree of leucocytosis although in the severer cases it ran well above the average at term.

In connection with these cases of Eclampsia it must be remembered that subcutaneous saline infusions may cause a leucocytosis of their own, and in cases XVIII and XXXIV this must be taken into consideration. According to Winternitz who experimented with a large variety of subcutaneous injections the degree of leucocytosis is parallel to the degree of local reaction excited. He found that neutral salts and weak acids or alkalis produced only slight local inflammation and a leucocytosis of from 40/75 % of the original count.

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Statistics of Examinations

with various illustrative charts.

Case I. Kate Edgmes - aet 22 - Primipara - Del. 10-12-00.

Full time male child, weight 7½ lbs, length 20". Wt. of placenta 1½ lbs.

Fresh specimen shows abundant vascularity formation, evident leucocytosis, + tendency towards early fibrin formation.

Examinations (3) :-

Date	Time	Red cells	White cells	Hto.	Remarks
10-12-00	6.30 AM	4,900,000	13,000	65%	Just after delivery.
13-12-00	3.30 PM	4,420,000	11,800	65%	3 hours after food.
18-12-00	7.30 PM	4,900,000	11,200	70%	4 " " "

Differentiation of leucocytes - 10-12-00.

Polymorphonuclear neutrophils 74%
 Large Lymphocytes 8%
 Small Lymphocytes 16% } 24%
 Eosinophiles 2%

Temperature + Pulse remains normal throughout.

Uterine Involution satisfactory.

Case II. Elva Edgmond - aet 41 - Multipara - Del. 11-12-00.

Slight accidental haemorrhage - dead female child probably about 7½ months development, weight 5 lbs, length 18". weight of placenta 1 lb.

Fresh specimen shows normal appearances with evident leucocytosis, but no tendency towards early formation of fibrin.

Case II (contd).

Examinations (3) :-

Date	Time	Red cells	White cells	Hb.	Remarks.
11-12-00	12 noon	3,800,000	15,600	60%	Just after delivery.
14-12-00	12 noon	4,000,000	13,800	65%	
19-12-00	3.30 pm	3,600,000	11,800	65%	3 hours after food.

Differentiation of leucocytes :- 11-12-00.

Polymorphonuclear neutrophils 74%
 Large lymphocytes 10% }
 Small lymphocytes 15% } 25%
 Eosinophiles 1%

Temperature & Pulse remained normal throughout residence.
Uterine involution satisfactory.

Case III. Mary, of Andrew - act 22 - Primpara - Del. 12-12-00.

Full time female child, weight 8 lbs, length 22", wt of Placenta 1 1/2 lbs.

Fresh specimen shows abundant vascularity formation, marked leucocytosis, with tendency towards early fibrin formation.

Examinations (3) :-

Date	Time	Red cells	White cells	Hb.	Remarks.
12-12-00	12 MN	3,800,000	22,000	65%	Just before delivery
13-12-00	1 pm	4,500,000	8,400	70%	1/2 hour after food
20-12-00	5.30 pm	3,870,000	14,000	75%	2 hours " "

Differentiation of leucocytes :- 12-12-00.

Polymorphonuclear neutrophils 78%
 Large lymphocytes 8.5% }
 Small lymphocytes 13% } 21.5%
 Eosinophiles .5%

Case III (contd.)

Temperature from 13th to 18th Dec. inclusive was 100° or 100.2°.
 + Pulse correspondingly rapid.
uterus shows faulty involution, but was quite satisfactory before discharge.

Case IV. Elfo elledougale - cat 30 - eljelapara - Dec. 13-12-00.

Induction of labour at the 8th month - eljele child, dead, weight 7½ lbs., length 22". weight of Placenta 1¾ lbs.
Fresh specimen showed normal appearances of red cells, with slight leucocytosis, + only slight tendency towards early fibrin formation.

Haeminations (2):-

Date	Time	red cells	white cells	Hb.	Remarks.
12-12-00	12 noon	4,200,000	12,400	65%	On admission
17-12-00	5.30 pm	3,500,000	3,600	70%	2 hours after food.

Differentiation of leucocytes :-

Polymorphonuclear neutrophils 66.7%
 Large lymphocytes 13.3%
 Small lymphocytes 19.7% } 32%
 Eosinophiles 1.3%

Temperature + Pulse remained normal throughout.
Uterine Involution normal.

Case V. Jennia Gibson - act 23 - elypeipara.

Full time male child, weight 8 lbs, length 20". Del. 14-12-00.
weight of Placenta 1½ lbs.

Fresh specimen shows abundant vascular formation,
slight leucocytosis, + early fibrin formation.

Haemiatoms (3) :-

Date	Time	Red cells	White cells	Hts.	Remarks
14-12-00	3 pm.	4,500,000	12,200	70%	2 hours after delivery.
19-12-00	3 pm.	4,600,000	10,000	70%	2½ hours after food.
22-12-00	11 am.	5,000,000	9,000	75%	1 hour after food.

Differentiation of leucocytes :- 14-12-00.

Poly-morphonuclear neutrophils 71.2%
Large lymphocytes 10%
Small lymphocytes 18.2% } 28.2%
Eosinophils 6%

Temperature + Pulse remains normal throughout residence.
Uterine Involution satisfactory.

Case VI. Elpelee - act. 24 - Prinipara - Del. 15-12-00.

Full time male child, weight 7 lbs, length 18".

weight of Placenta 1½ lbs.

Fresh specimen shows very abundant vascular formation,
marked leucocytosis, + tendency towards early formation of
fibrin.

Case VI (contd).Examinations (3) :-

Date	Time	Red cells	White cells	Hb.	Remarks.
15-12-00	5.30 pm	3,670,000	14,200	70%	9 hours after delivery
21-12-00	5.30 pm	4,200,000	10,800	70%	2 hours after food.
23-12-00	5.30 pm	4,000,000	12,800		2 " " "

Differentiation of Leucocytes :- 15-12-00.

Polymorphonuclear neutrophils		80%
Large lymphocytes	10%	} 19.5%
Small lymphocytes	9.5%	
Eosinophiles		.5%

Temperature + Pulse remained normal throughout.

Uterus. Involution normal.

Case VII

Janie Reid - Oct 19 - 2nd Pregnancy.

Premature labour at 5½ months - Dead female child weight 3 lbs. + length 15". Weight of Placenta 2 lbs.

Placenta adherent, removed under chloroform.

Fresh specimen showed evident leucocytosis.

Examinations (4) :-

Date	Time	Red cells	White cells	Hb.	Remarks.
16-12-00	10.15 pm	3,800,000	18,200	70%	Immediately after Cxkz.
19-12-00	7 pm	3,900,000	16,200	65%	3½ hours after food
22-12-00	7.40 pm	3,500,000	6,000	65%	¾ " " "
25-12-00	3 pm	3,833,000	10,800	70%	2½ " " "

Case VII (contd.).

Differentiation of leucocytes :- 16-12-00.

Poly morphonuclear neutrophils	85%	
Large lymphocytes	8%	} 11.5%
Small lymphocytes	3.5%	
Eosinophiles		3.5%

Temperature & Pulse remained normal throughout residence.

Uterus showed normal involution.

Case VIII. Kate McClann - aet. 25 - Ellulapana - Del. 7-1-01.

Admitted 15-12-00 with marked edema + swelling of legs, abdomen, + vulva, of short duration, urine loaded with albumen, but no blood or tube casts present. Under rigorous treatment with Salts, diuretics, + milk diet patient became much improved + went on to term, + was delivered of a live female child, weight 5 lbs, length 16". Placenta weighed 1 1/2 lbs.

Fresh specimen on 16-12-00 showed a marked absence of vasa formation, early formation of fibrin, + a decided leucocytosis, with many very large leucocytes.

Examinations (5) :-

Date	Time	Red cells	White cells	Hb.	Remarks.
16-12-00	9 pm.	3,400,000	20,200	65%	Day after admission
26-12-00	9.15 pm.	3,600,000	16,800	65%	Great improvement.
7-1-01.	4 pm.	4,000,000	16,400	60%	Day of delivery.
12-1-01.	8.30 pm	4,300,000	10,600		1 1/2 hours after food.
13-1-01	4 pm.		19,600	70%	1/2 " " "

Temperature & Pulse remained normal throughout residence.

Case VIII (contd).

Uterus - Involution satisfactory.

Differentiation of leucocytes :-

Polymorphonuclear neutrophils
 Large lymphocytes
 Small lymphocytes
 Eosinophiles

	On admission	At term
	85%	85%
	13.5%	11%
	1.5%	4%

Case IX: Bella Ironside - aet 21 - Primipara - Del. 18-12-00.

Full term male child, weight $6\frac{1}{2}$ lbs, length 22". Wt. of placenta $1\frac{3}{4}$ lbs.

Fresh specimen showed only slight rouleaux formation, but a tendency to irregular clumping of the red corpuscles; only slight leucocytosis + tendency towards early fibrin formation.

Examinations (3):-

Date	Time	Red cells	White cells	Hb.	Remarks.
18-12-00	3/2 pm	3,900,000	14,000	70%	Just before delivery.
24-12-00	5.30 pm	4,800,000	15,000	75%	2 hours after food.
27-12-00	1.45 pm	4,700,000	11,000		1 1/2 " " "

Temperature + pulse remains normal throughout residence.

Uterus - Involution satisfactory.

Differentiation of leucocytes :- - 18-12-00.

Polymorphonuclear neutrophils 81.1%
 Large lymphocytes 10.7%
 Small lymphocytes 7.5% } 18.2%
 Eosinophiles .7%

Case X. Sh. Sh. Dani - aet. 20 - Alulapara - Del. 18-12-00.

Slight postpartum haemorrhage otherwise normal delivery.
Full time female child, weight 7 lbs, length 20". Wt. of placenta 2 1/2 lbs.

Fresh specimen examined 12 hours after delivery shows abundant nucleic formation, and marked clumping of the red cells, which were slightly altered both in size and shape.

Leucocytosis was very marked + there was early formation of fibrin.

Examinations (3) :-

Date	Time	Red cells	White cells	Hb.	Remarks.
18-12-00	8.30 pm	3,500,000	32,000	60%	12 hours after delivery.
22-12-00	8 pm	4,300,000	14,200		1 hour after food
26-12-00	8 pm	4,200,000	9,600		1 " " "

Differentiation of Leucocytes :-

Poly morphonuclear neutrophils 75 %
 Large lymphocytes 4 %
 Small lymphocytes 18 % } 22 %
 Eosinophiles 3 %

Temperature + pulse remained normal throughout residence.

Uterus shows satisfactory involution.

Case XI. Maggie Donnelly - aet. 23 - Primipara.

Del. 23-12-00. Full time male child weight 7 lbs.

length 20". weight of placenta $1\frac{3}{4}$ lbs.

Fresh specimen showed only slight nucleux formation, considerable leucocytosis, + marked tendency towards irregular clumping of the red corpuscles. There was also much fibrin.

Examinations (3) :-

Date	Time	Red cells	White cells	Hto.	Remarks
23-12-00	3 pm	3,600,000	22,000	75%	1/2 hr. before delivery.
25-12-00	4.45 pm	3,800,000	16,200	75%	1 1/4 hours after food.
1-1-01	4.45 pm	4,100,000	10,400	70%	1 1/4 " " "

Temperature showed a slight evening rise for 3 days.

Pulse - normal.

Uterus showed normal involution.

Differentiation of leucocytes :-

Polymorphonuclear neutrophils		72.4%
Large lymphocytes	8.9%	} 26.1%
Small lymphocytes	17.2%	
Eosinophiles		1.5%

Case XII. Eliza Boyle - aet. 28 - Multipara - Del. 24-12-00.

Live full time male child, weight 7 lbs., length 20".

Weight of placenta 1 1/2 lbs.

Fresh specimen shows fairly abundant nucleant formation, slight variation in size of the red corpuscles, + a very marked leucocytosis. (Patient looked very anaemic).

Examinations (3) :-

Date	Time	Red cells	White cells	Hb.	Remarks.
24-12-00	3 pm.	3,160,000	31,400	65%	1 hour after delivery.
28-12-00	3 pm.	3,500,000	12,200	65%	2 1/2 hrs. after food.
31-12-00	8.45 pm.	3,400,000	14,400	70%	1 3/4 " " "

Differentiation of leucocytes :- 24-12-00.

Polymorphonuclear neutrophils 71.7%

Large lymphocytes 11% }
Small lymphocytes 15.3% } 26.3%

Eosinophiles 2%.

Temperature + Pulse remains normal throughout residence.

Uterus shows normal involution.

Case XIII. Eliza Thompson - aet. 32 - Multipara.

Del. 23-12-00. Live full time male child, weight 8 lbs.,

length 20". Weight of placenta 2 lbs.

Fresh specimen showed normal nucleant formation, and slight leucocytosis, with a marked tendency towards early formation of fibrin.

Case XIII (contd.).

Examinations (3) :-

Date	Time	Red cells	White cells	Hto.	Remarks.
24-12-00	5 pm.	4,750,000	10,600	70%	21 hours after delivery
28-12-00	4.45 pm.	5,000,000	14,400	70%	1 1/4 hrs. after food.
31-12-00	10.30 am	4,500,000	9,500	75%	1/2 hour " " "

Differentiation of leucocytes :- 24-12-00.

Polymorphonuclear neutrophils		79.2%
Large lymphocytes	8.8%	} 18.8%
Small lymphocytes	10%	
Eosinophiles		2%

Temperature + Pulse remained normal throughout residence.

Uterus. shows normal involution.

Case XIV. Effie Nelson - aet. 25 - Multipara - Del. 26-12-00.

Live full time male child, weight 8 lbs., 21" long, weight of Placenta 2 lbs.

Fresh specimen shows marked tendency towards irregular clumping of the red corpuscles, + only slight rouleaux formation, + leucocytosis. Abundant + early fibrin formation evident.

Examinations (3) :-

Date	Time	Red cells	White cells	Hto.	Remarks.
26-12-00	7.30 pm.	4,400,000	14,200	70%	1/2 hr. before delivery.
29-12-00	8.15 pm.	4,200,000	12,000	70%	1 1/4 hrs after food
2-1-01.	8.30 pm.	4,300,000	8,800	75%	1 1/2 " " "

Case XIV (contd.)

Differentiation of leucocytes :- 26-12-00.

Polymorphonuclear neutrophiles	70%	
Large lymphocytes	9.5%	} 28.5%
Small lymphocytes	19%	
Eosinophiles	1.5%	

Temperature + Pulse remained normal throughout residence.
Uterus showed normal involution.

Case XV. Kate Jones - Oct. 25 - 2nd Pregnancy - Del. 27-12-00.

On admission moderate edema of lower limbs, albuminuria only slight, normal delivery - live full time female child, 6 1/2 lbs weight, + 20" long. Weight of Placenta 1 1/4 lbs.

Fresh blood shows normal rouleaux formation, moderate leucocytosis + scanty formation of fibrin.

Examinations :- (4)

Date	Time	Red cells	White cells	Hb.	Remarks.
27-12-00	10 pm.	3,500,000	15,200	80%	Just before delivery.
30-12-00	4.45 pm.	3,200,000	11,600	75%	1 1/4 hrs. after food.
2-1-01	4 pm.	3,450,000	8,800	75%	1/2 " " "
5-1-01	8 pm.	3,400,000	13,000	80%	1 " " "

Differentiation of leucocytes :- 27-12-00

Polymorphonuclear neutrophiles	72%	
Large lymphocytes	16%	} 26%
Small lymphocytes	10%	
Eosinophiles	2%	

1 nucleated red corpuscle seen in counting 400 leucocytes.

Temperature, pulse, + uterine involution normal.

Case XVI. Mary Riley - Oct. 19 - Prinipara - Del. 27-12-00.

Dead full time female child, weight 9 lbs., length 20".

Weight of placenta $1\frac{1}{2}$ lbs.

Fresh blood examined on 28-12-00 showed slight nucleant formation, with considerable leucocytosis.

Only one examination was made in this case, 28-12-00.

Red cells 3,600,000. White cells 18,200. Haemoglobin 80%.

Differentiation of leucocytes :- 28-12-00.

Polymorphonuclear neutrophils		78.6%
Large lymphocytes	9%	
Small lymphocytes	11.9%	20.9%
Eosinophiles		.5%

There were occasional rises of temperature.

Uterine involution - quite satisfactory.

Case XVII. Kate Anderson - Oct 24 - Ushlipara - Del. 30-12-00.

Live full time female child, 8 lbs weight, 21" long. Wt. of placenta $1\frac{1}{2}$ lbs.

Fresh blood showed only slight nucleant formation, + considerable leucocytosis.

One examination made just before delivery :-

Red cells 5,000,000 White cells 20,800. Haemoglobin 75%.

Differentiation of leucocytes :- 30-12-00.

Polymorphonuclear neutrophils		81.6%
Large lymphocytes	7.1%	} 17.1%
Small lymphocytes	10%	
Eosinophiles		1.3%

Temperature, Pulse, + uterine involution normal.

Case XVIII. Erys. Erythraemia - aet. 24 - Primipara - Del. 31-12-00.

Admitted in an eclamptic condition after delivery. Chloroform was administered + a saline infusion of 2 pints given.

Thereafter there was steady improvement + no more fits.

Blood was examined at 7.30 pm. It was noted that there was a very poor flow of blood from the needle prick + that the blood coagulated much more readily than normal.

Fresh specimen showed very abundant rouleaux formation, clumping of the red corpuscles, also a marked leucocytosis many very large leucocytes being seen. Fibrin formed early.

Examinations :- (5).

Date	Time	Red cells	White cells	Hb.	Remarks.
31-12-00	7.30 pm	4,000,000	34,400	70%	3 hrs. after CCl_2 + saline
2-1-01	9 pm	3,200,000	25,400	70%	2" " food.
6-1-01	8.30 pm	4,400,000	15,200	70%	1 1/2" " "
12-1-01.	3 pm.	4,200,000	12,800	65%	2 1/2" " "
16-1-01.	8.15 pm	4,000,000	13,200	65%	1 1/4" " "

Fresh specimen examined on 2-1-01. showed some alteration in shape + size of the red corpuscles, but little rouleaux formation. There was still considerable leucocytosis.

Thereafter the blood presented practically normal appearances.

Differentiation of leucocytes :-

- Polymorphonuclear neutrophils
- Large lymphocytes
- Small lymphocytes
- Eosinophiles

31-12-00 (after CCl_2). 12-1-01.

80%	73%
10%	12%
7%	14%
3%	1%

5 nucleated red cells were seen on 31-12-00 in counting 400 leucocytes.

Case XIX. Bella elskenzie - aet 22 - el multipara - Delo. 1.1.01.

Live full time male child, weight 9 1/4 lbs, length 22".
weight of placenta 2 lbs.

Fresh blood shows abundant rouleaux + fibrin formation
+ marked leucocytosis.

Examinations (4) :-

Date	Time	Red cells	White cells	Hb.	Remarks.
31-12-00	10.30 pm	3,500,000	24,600	70%	On admission
3-1-01	5 pm	3,500,000	19,400	70%	1 1/2 hrs. after food.
7-1-01.	5 pm	3,625,000	9,600	75%	1 1/2 " " "
10-1-01.	5 pm.	3,750,000	10,400	75%	1 1/2 " " "

Differentiation of leucocytes :- 31-12-00.

Polymorphonuclear neutrophils		70.5%
Large lymphocytes	13.75%	} 28%
Small lymphocytes	14.25%	
Eosinophiles		1.5%

Temperature, pulse, + uterine involution normal.

Case XX. Elgar elquire - aet 21 - el multipara - Delo. 2-1-01.

Live full time male child, 9 lbs weight, + 19" long.

weight of placenta 1 1/2 lbs.

Fresh blood shows abundant leucocytosis + fibrin formation.

Examinations (3) :-

Date	Time	Red cells	White cells	Hb.	Remarks.
2-1-01.	10.15 pm.	3,200,000	34,600	60%	Before delv - excitement.
6-1-01.	7.45 pm	3,300,000	12,200	65%	3/4 hr. after food.
11-1-01.	3.45 pm	3,540,000	9,800	65%	1/4 " " "

Case XX (contd.).

Differentiation of leucocytes :- 2-1-01.

Poly morphonuclear neutrophils		86%
Large lymphocytes	7%	} 12%
Small lymphocytes	5%	
Eosinophiles		2%

Temperature was at first irregular but never very high.

Uterus shows normal involution till 7th day when slight enlargement was noted, but this disappeared under Ergot.

Case XXI. Maggie White - Oct 29 - Prunizara - Del. 8-1-01.

Considerable edema of vulva on admission, but no albuminuria.

Live male child, weight 9½ lbs., + 21" long delivered by forceps, + C.H.C.3.

Placenta weighed 1¼ lbs.

Fresh blood shows abundant rouleaux + fibrin formation, with considerable leucocytosis.

Examinations (11) :-

Date	Time	Red cells	White cells	Hb.	Remarks.
7-1-01.	12 MN	4,520,000	27,600	70%	On admission - Sick
8-1-01.	2 am.		30,600		½ hr. after Chloroform
	7:30 am	4,340,000	41,200	75%	18 " " "
9-1-01.	3 pm	4,530,000	24,800	75%	2½ hrs. after food.
10-1-01.	1:30 pm	4,500,000	13,200	75%	1 " " "
11-1-01.	3 pm	4,500,000	13,800	80%	2½ " " "
12-1-01.	2:30 pm	5,200,000	17,200	80%	2 " " "
13-1-01.	12:45 pm		16,600		4 " " "
14-1-01.	7 pm	4,700,000	12,000	80%	3½ " " "
15-1-01.	7 pm		14,800		3½ " " "
16-1-01.	8:30 pm	4,740,000	16,800	80%	1½ " " "

Temperature + Pulse remained normal throughout residence.

Uterus shows normal involution.

(See chart XVIII).

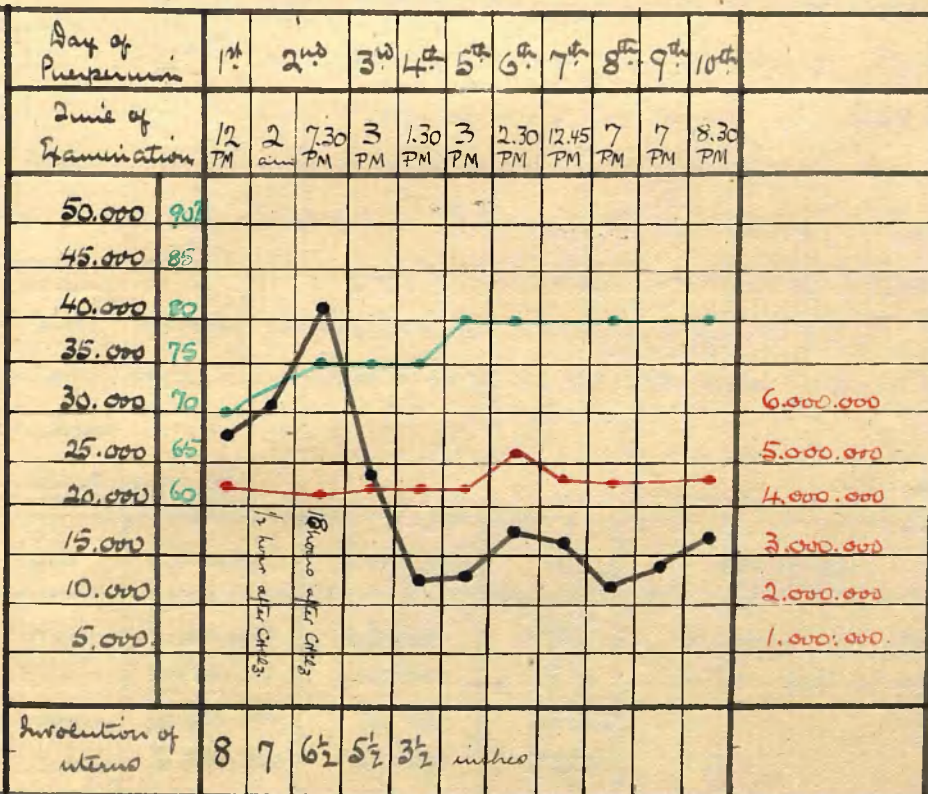
Chart XVIII.

Showing the course of the leucocytes, red corpuscles, and haemoglobin, during the first 10 days after delivery. Case XXI.

Delivery required chloroform & forceps.

Live male child, weighing 9½ lbs, and 21" long.

Weight of Placenta 1¼ lbs.



Leucocytes are represented in black.

Red corpuscles .. - " - .. red

Haemoglobin is - " - .. green.

The figures showing the involution of the uterus represent the distance in inches from symphysis pubis to the fundus uteri.

Case XXI (Contd.)Differentiation of leucocytes :-

Polymorphonuclear neutrophils

Large lymphocytes

Small lymphocytes

Eosinophiles

Before Cxcl3

After

84.1%	80%
10%	6.5%
4.5%	5%
1.4%	8.5%

Case XXI. Elye Damahill. aet. 48 - Mytilipara - Del. 8-1-01.

Ad. 7-1-01. with history of loss of blood for about 24 hours before, + of slight bleeding at intervals during one month before admission.

Partial Placenta Praevia - Delivered under Cxcl3 - Dead full time child 6 lbs in weight + 20" long. Weight of placenta 1 lb.

Fresh blood shows abundant rouleaux formation, with some alteration both in shape + size of the red corpuscles, also marked leucocytosis.

Examinations (5) :-

Date	Time	Red cells	White cells	H ₂	Remarks
8-1-01.	8.45 pm.	2,660,000	43,600	45%	8 hours after Chloroform.
10-1-01.	11 am.	2,930,000	40,800	45%	1 hr. after food.
12-1-01.	1.30 pm.	3,280,000	32,200	50%	1 " " "
14-1-01.	7 pm.	3,300,000	22,400	55%	3 1/2 " " "
16-1-01.	7 pm.	3,360,000	13,400	60%	3 1/2 " " "

Differentiation of leucocytes :- 8-1-01. after Cxcl3.

Polymorphonuclear neutrophils

82.6%

Large lymphocytes

4.4%

Small lymphocytes

9.7%

14.1%

Eosinophiles

3.3%

Temperature + Pulse fairly satisfactory throughout residence.
Uterine involution normal.

Case XXIII. Eliza Donald - aet 38 - Mytilipara - Delv. 8-1-01.

Live full time female child, weight 8 lbs, length 20".

Weight of Placenta $1\frac{1}{2}$ lbs.

Fresh blood shows slight leucocytosis, but was otherwise normal.

Examinations :- (2).

Date	Time	Red cells	White cells	Hts	Remarks.
8-1-01.	11 pm.	4,800,000	14,800	80%	Just before delivery.
12-1-01.	8.30 pm.		9,400		1 1/2 hours after food.

Differentiation of leucocytes :- 8-1-01.

Polymorphonuclear neutrophils		77.5%
Large lymphocytes	10.8%	} 21.6%
Small lymphocytes	10.8%	
Eosinophiles		9%

Temperature, Pulse, & uterine involution normal.

Case XXIV. Eliza Craig - Mytilipara - Delivered 9-1-01.

History of alcoholic excess some weeks before admission.

Two female children, weights $5 + 5\frac{1}{4}$ lbs, lengths 18" each.

Single placenta weighing 3 lbs.

Fresh blood shows little rouleaux formation, but marked clumping of the red corpuscles, only slight leucocytosis but excessive fibrin.

Examinations :- (4).

Date	Time	Red cells	White cells	Hts.	Remarks.
7-1-01.	12.45 am	4,800,000	13,000	70%	Just after delivery.
10-1-01.	3.30 pm.	3,830,000	8,800	70%	3 hours after food.
12-1-01.	8 pm.		5,800		1 " " "
15-1-01.	2 pm	4,200,000	11,800	75%	1 1/2 " " "

Temperature febrile on 5/7th day, but uterus was hard and painless, & involution was normal.

Case XXIV (contd.)

Differentiation of leucocytes :- 9-1-01.

Polymorphonuclear neutrophils		82.8%
Large lymphocytes	2.8%	} 16.4%
Small lymphocytes	13.6%	
Eosinophils		.8%

1 nucleated red cell observed in counting 400 leucocytes.

Case XXV. Elgar, Dingley. - Oct. 23 - Primipara - Del. 10-1-01.

Live full time female child, weight 5½ lbs, length 20". Wt. placenta 2 lbs.

Delivered with forceps, Chloroform being given.

Fresh blood showed abundant venous formation, early fibrin formation, + considerable leucocytosis.Examinations (?) :-

Date	Time	Red cells	White cells	Hb.	Remarks.
10-1-01	3.45 p.m.		47000		½ hour after Chloroform
11-1-01	4.30 p.m.	4,400,000	32,800	70%	1 hour after food
12-1-01	7.30 p.m.		28,800		½ " " "
13-1-01	4 p.m.		44,200		Temp. 102.4 " "
14-1-01	8 p.m.	4,066,000	26,600		1 hour after food
15-1-01	7.15 p.m.		11,800		¼ " " "
17-1-01	2 p.m.	4,550,000	9,400	75%	½ " " "

Differentiation of leucocytes :- after Cxcl₃ 10-1-01.

Polymorphonuclear neutrophils		79.6%
Large lymphocytes	4.3%	} 11.9%
Small lymphocytes	7.6%	
Eosinophils		8.5%

Temperature rose to 102° + over on 12th + 13th Jan^y respectively but otherwise remains normal.Uterus showed slight enlargement of labours on 7th day of pregnancy (16th) but otherwise normal involution.

Case XXVI. Elagge Smiths - aet 26 - Primipara - Del. 11-1-01.

Livid full time male child, weight 7 lbs, length 19". Weight of placenta 2 lbs. Chloroform given for removal of retained membranes.

Fresh blood specimen showed abundant rouleaux + fibrin formation with considerable leucocytosis.

Examinations (6) :-

Date	Time	Red cells	White cells	Hb.	Remarks.
11-1-01	5.30 pm	3,100,000	38,200	65%	2 hours after Chloroform
12-1-01	7 pm.		16,800		3/4 " " food, Temp. 103°
13-1-01.	4.30 pm	2,900,000	14,000		1 " " "
14-1-01.	9 pm.	2,500,000	13,400		2 " " "
15-1-01.	8 pm.		16,000		1 " " "
17-1-01.	4.15 pm	3,250,000	12,800	70%	3/4 " " "

Differentiation of leucocytes :-

After Chloroform 11-1-01.

Polymorphonuclear neutrophils		82.7%
Large lymphocytes	8%	9.3%
Small lymphocytes	1.3%	
Eosinophiles		7%

Temperature reached 103° on 2nd day, + patient complained of pain in head + limbs. There was also slight relaxation of the uterus. This however passed off + recovery was satisfactory.

Case XXVII. Mary Thomson - aet. 32 - Primipara - Del. 15-1-01.

Livid full time female child, weight 6 1/2 lbs, length 20". Weight of placenta 1 1/2 lbs. Chloroform was given in this case.

Fresh blood specimen examined 2 hours after Chloroform showed marked scarcity of rouleaux formation, very distinct brownian movement, + considerable leucocytosis. There was no variation in shape, but considerable variation in size of the red corpuscles.

Temperature + pulse remained normal throughout residence.

Involution of uterus normal.

Case XXVII (contd.)

Differentiation of leucocytes :- After Chloroform 15-1-01.

Polymorphonuclear neutrophils		84%
Large lymphocytes	4%	} 11.3%
Small lymphocytes	7.3%	
Eosinophiles		4.7%

Case XXVIII. Elyary Ballantyne - aet 24 - Primipara.

Delivered 15-1-01. Live full time female child, 8½ lbs wt, length 21".
Weight of placenta 1½ lbs. Chloroform & forceps used in delivery.
Fresh blood examined before Chloroform showed scarcity of nucleant formation, marked leucocytosis, & very evident early fibrin formation.

Examinations (6) :-

Date	Time	Red cells	White cells	%	Remarks.
15-1-01	2.45 pm	3.950.000	30.000	80%	Before Chloroform.
	8.15 pm		33.000		4 hours after Chloroform.
17-1-01.	4 pm.	3.940.000	21.000	85%	½ hour after food.
19-1-01.	8.30 pm	4.200.000	18.000	85%	1½ " " "
21-1-01.	8 pm.	4.320.000	13.400		1 " " "
23-1-01.	8 pm.	4.500.000	10.200	85%	1 " " "

Differentiation of leucocytes :- Before CxCl₃ After CxCl₃.

Polymorphonuclear neutrophils		84.6%	78.3%
Large lymphocytes	}	12.8%	14%
Small lymphocytes			
Eosinophiles		2.6%	7.7%

Temperature reached 100° on 17th Jan? but otherwise was normal throughout residence.

Uterus shows normal involution.

Case XXX. Elphrose - Elphitara - Del. 22-1-01 under CHez.
 Admitted for induction of labour. Bougie introduced under CHez on 17-1-01. Premature male child, weight 2½ lbs, 13" long. Weight of placenta ¾ lb. Child only lived a few hours. Fresh blood showed normal rouleaux formation & with evident leucocytosis, + very abundant fibrin formation.
Examinations (10) :- (See chart XXX).

Date	Time	Red cells	White cells	Hb.	Remarks
17-1-01.	4.30pm.	3,490,000	19,800	70%	8 hours after CHez
21-1-01.	3pm.	3,800,000	14,200	65%	2½ " " food.
22-1-01	5am.		28,200		2 " " CHez.
23-1-01.	11.45am.	3,950,000	19,400	70%	1¾ " " food.
24-1-01.	8.30pm	4,300,000	12,800	75%	1½ " " "
26-1-01.	1.30pm	4,250,000	12,200		1 " " "
27-1-01.	3.30pm	4,650,000	10,800	75%	3 " " "
28-1-01.	1.45pm	4,200,000	10,600		1¼ " " "
29-1-01	8.30pm	4,350,000	12,000		1½ " " "
30-1-01	2pm	4,300,000	13,800	80%	1½ " " "

Differentiation of Leucocytes :- After Chloroform 17-1-01.

- Polymorphonuclear neutrophiles 74%
 - Large lymphocytes 9.1%
 - Small lymphocytes 7.4%
 - Eosinophiles 9.5%
- } 16.5%

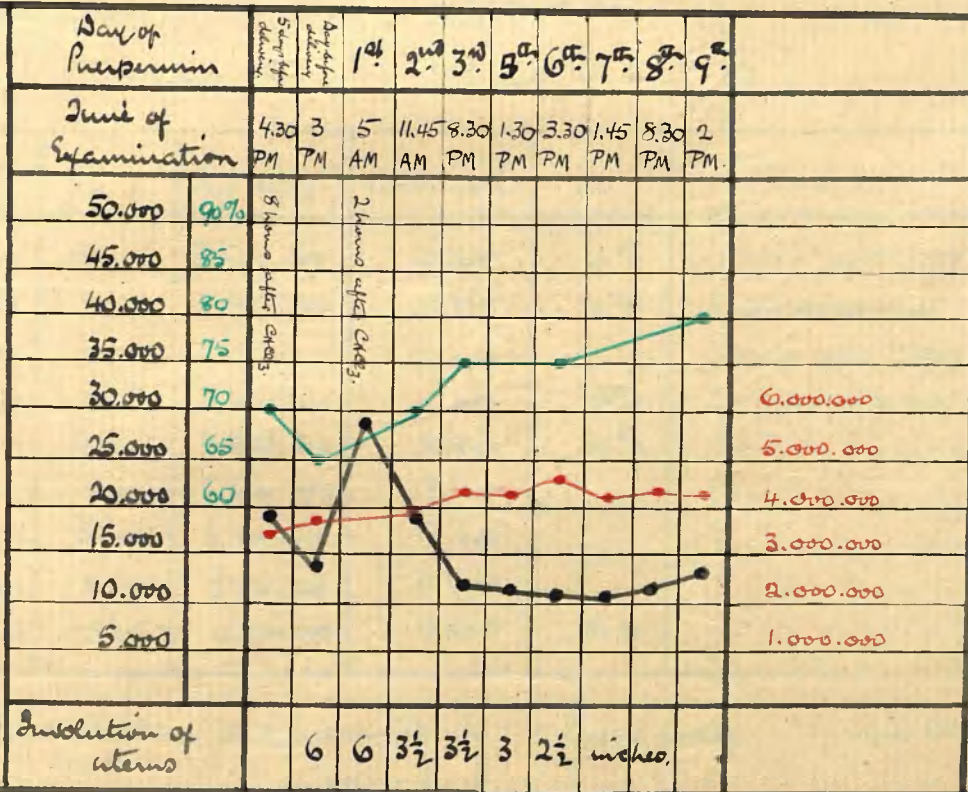
Temperature & Pulse remains normal throughout residence.

Uterus showed normal involutions.

Chart XIX.

Showing the course of the leucocytes, red corpuscles, and haemoglobin, from 5 days before until 9 days after delivery in Case XXIX.

Labour was induced by introduction of bougies under Caes. Male child, premature, weight $2\frac{1}{2}$ lbs, 13" long. Weight of Placenta $\frac{3}{4}$ lb. Child lives a few hours.



Leucocytes are represented in black.

Red corpuscles " " " red

Haemoglobin is " " green.

The figures showing the evolution of the uterus represent the distance in inches from symphysis pubis to the fundus uteri.

Case XXX, elystani - elulipara - Delivered 20-1-01.

Admitted for induction of labour, Bougie introduced under Chloroform on 16-1-01. Delivered under Chloroform on 20-1-01. of a male child, weight 5 lbs, length 19" weight of placenta 1 1/4 lbs.

Fresh blood examined on 18-1-01 shows normal nucleant formation, with median leucocytosis, excessive fibrin formation.

Examinations (9) :- (See chart XX).

Date	Time	Red cells	White cells	H ₂ O	Remarks
18-1-01	8 pin.	3,950,000	10,800	70%	1 hour after food.
20-1-01.	8 pin.	3,933,000	22,800	70%	Great excitement
21-1-01.	12.15 am.		27,600		1 hour after CHCl ₃ .
22-1-01.	6 pin.	3,800,000	11,000	75%	2 1/2 hours after food.
24-1-01.	9.15 pin.	3,950,000	9,800	80%	2 1/4 " " "
26-1-01.	2 pin.	3,600,000	13,000		1 1/2 " " "
27-1-01.	3.30 pin.	4,200,000	13,600		3 " " "
28-1-01	7.30 pin.	3,960,000	11,600		1/2 " " "
29-1-01	5.30 pin.	4,100,000	15,000	80%	2 " " "

Differentiation of leucocytes :-

	Before CHCl ₃	After CHCl ₃ .
Polymorphonuclear neutrophils	82.6%	89.2%
Large lymphocytes	8.7%	2%
Small lymphocytes	6.7%	2.8%
Eosinophiles	2%	6%

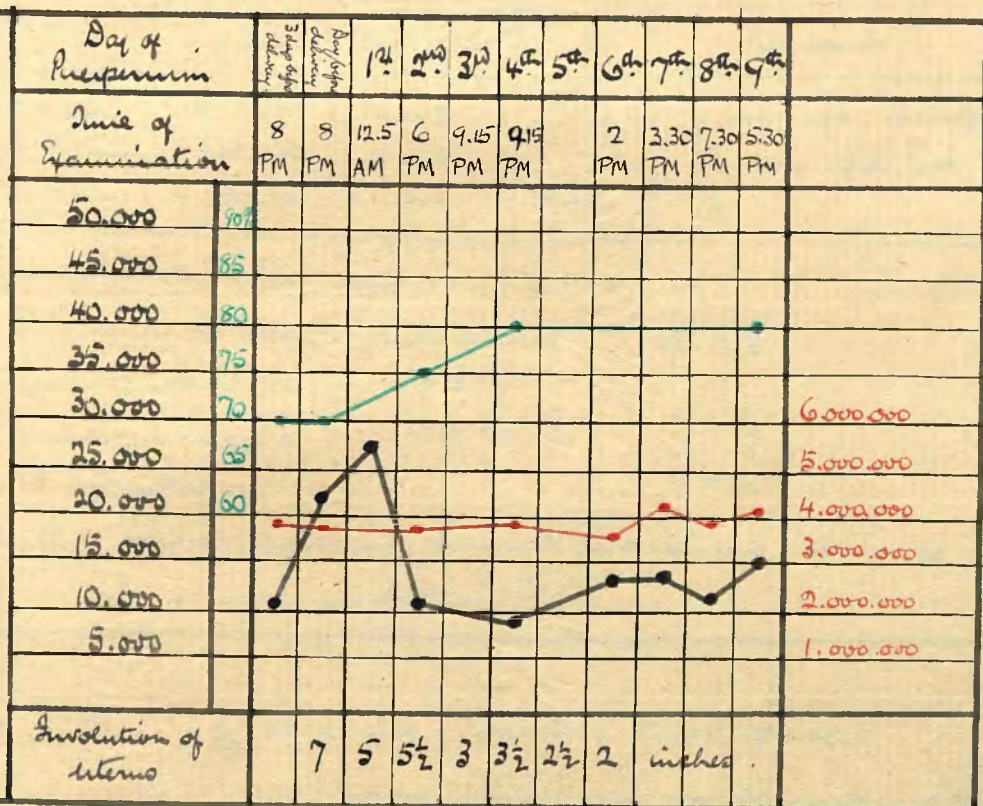
Temperature & pulse remained normal throughout pregnancy.

Uterus shows satisfactory involution.

Chart XX

Showing the course of the leucocytes, red corpuscles, and haemoglobin from 3 days before, until the 9th day after delivery in Case XXX.

Labour was induced by the introduction of bougie under Cæz. exs. child, weight 5 lbs. length 19".
weight of placenta 1 1/4 lbs.



Leucocytes are represented in black.

Red corpuscles " " " red.

Haemoglobin is " " green.

The figures showing the involvement of the uterus represent the distance in inches from the upper margin of the symphysis pubis to the fundus uteri.

Case XXXI. Elizabeth Wright - Primipara - Delv. 19-1-01.

Live male child 6 1/2 lbs weight. Chloroform administered for the removal of retained membranes.

Fresh specimen examined 1/2 hour after chloroform showed marked degree of leucocytosis, but no other noteworthy feature.

Examinations (3) :-

Date	Time	Red cells	White cells	Hb	Remarks
20-1-01	1 am.	3,560,000	22,600	70%	1/2 hour after chloroform
22-1-01	4 pm.	3,950,000	15,600		1/2 hour after food
26-1-01.	4 pm	4,250,000	9,800	75%	1/2 " " "

Differentiation of leucocytes . 20-1-01.

Polymorphonuclear neutrophils		80.5%
Large lymphocytes	8.5%	} 18.7%
Small lymphocytes	10.2%	
Eosinophiles		.8%

Temperature pulse remained normal throughout residence.

Uterus showed normal involution.

Case XXXII. Elizabeth Kennedy, - act 34 - ellipipara.

Delivered with forceps under chloroform on 20-1-01. Patient was under anaesthetic for about an hour.

Fresh blood examined about an hour after chloroform showed but little rouleaux formation, + medium leucocytosis.

Patient about a week after delivery showed signs of commencing melancholia, with intervals of considerable excitement but these latterly passed off. She was dismissed well.

Temperature showed occasional rises, but there was no fever.

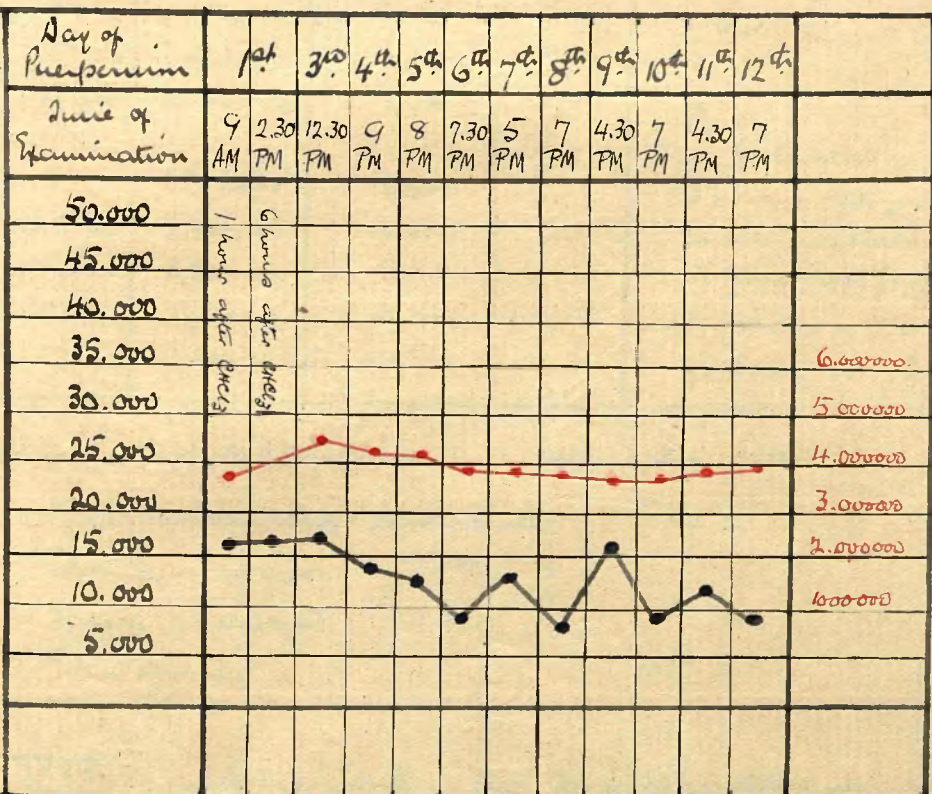
Uterus showed normal involution.

Chart XXI

Showing the course of the leucocytes + red corpuscles during the first 12 days after delivery, in

Case XXXII.

Prolapse of cord. Delivery with forceps under Chloroform.



Leucocytes are represented in black.

Red corpuscles " " " red.

Case XXXII (contd.)

Examinations (17) :- (See chart XXI).

Date	Time	Red cells	White cells	Hb	Remarks.
20-1-01	9 a.m. 2.30 p.m.	3.850.000	16.000	70%	1 hour after Chloroform
23-1-01	12.30 p.m.	4.320.000	17.000		6 1/2 hours after "
24-1-01	9 p.m.	4.250.000	14.600		Pain in joints.
25-1-01	8 p.m.	4.200.000	13.200		2 hours after food.
26-1-01	7.30 p.m.	3.960.000	9.600	75%	1 hour " "
27-1-01	5 p.m.	3.966.000	13.400		1/2 " " "
28-1-01	7 p.m.	3.900.000	8.800		1 1/2 " " "
29-1-01	4.30 p.m.	3.750.000	16.000		Excitement.
30-1-01	7 p.m.	3.800.000	9.000		3 1/2 hours after food.
31-1-01	4.30 p.m.	3.900.000	12.000		considerable excitement.
1-2-01	7 p.m.	3.950.000	9.400		3 1/2 hours after food.

Differentiation of leucocytes :- after Cereb. 20-1-01.

Poly-nuclear neutrophils	89.3%
Large lymphocytes	1.7%
Small lymphocytes	2.3%
Eosinophiles	6.7%
	4%

Case XXXIII Elfr. Elfriff - act 28 - Elulipara.

On admission patient was in a very hysterical excited condition. Chloroform was administered & delivery effected by forceps. Live male child, weight 9 lbs, length 20".

Weight of Placenta 1 1/2 lbs.

Fresh blood examined before Chloroform showed a marked degree of leucocytosis, but otherwise normal appearances.

Temperature & Pulse remained normal throughout residence.

Uterus showed normal involution.

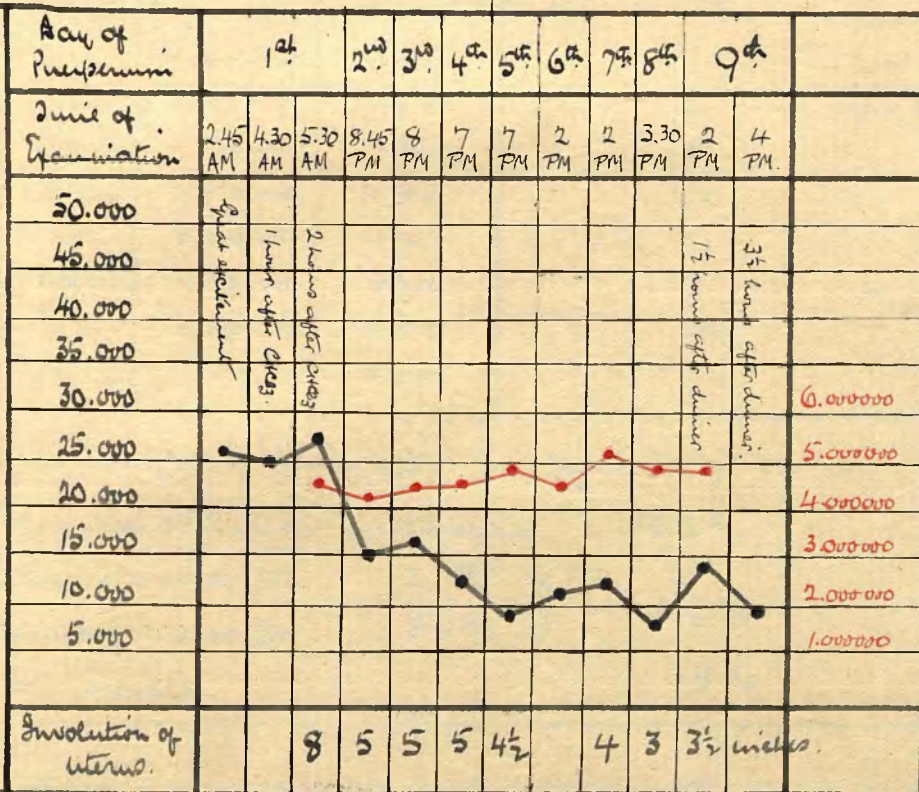
Chart XXXII

Showing the course of the leucocytes, + red corpuscles during the first 9 days after delivery in

Case XXXII.

Labour effected by means of chloroform + forceps.

Live male child 9 lbs wt. + 20" long. Placenta .wt. 1 1/2 lbs.



Leucocytes are represented in black.

Red Corpuscles red.

The figures showing the involution of the uterus represent the distance in inches between the upper margin of the symphysis pubis and the fundus uteri.

Case XXXIII (contd.)Examinations (12) :- (See chart XXII).

Date	Time	Red cells	White cells	Hb	Remarks.
22-1-01	2.45 am		25.400	75%	Great excitement
	4.30 am		25.000		1 hour after Chloroform.
	5.30 am	4.600.000	27.200		2 " " "
23-1-01	8.45 pm	4.200.000	15.000	80%	1 3/4 " " food.
24-1-01	8 pm	4.500.000	16.400		1 " " food.
25-1-01	7 pm	4.650.000	13.800		3 1/2 hours after food.
26-1-01	7 pm	4.960.000	9.500		3 1/2 " " "
27-1-01	2 pm	4.570.000	11.800		1 1/2 " " "
28-1-01	2 pm	5.100.000	13.200		1 1/2 " " "
29-1-01	3.30 pm	4.930.000	8.200		3 " " "
30-1-01	2 pm	4.900.000	14.000		1 1/2 " " "
	4 pm		9.500		3 1/2 " " "

Differentiation of leucocytes :- before CCl₃ 22-1-01.

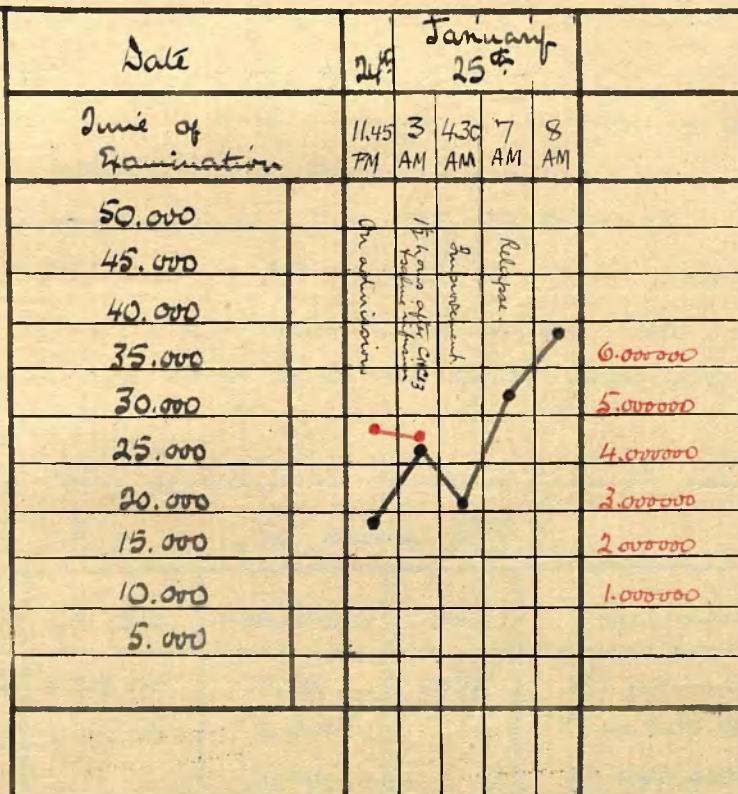
Polymorphonuclear neutrophils		93.6%
Large lymphocytes	2%	} 5.6%
Small lymphocytes	3.6%	
Eosinophiles		: 8%

Case XXXIV. Mrs Stepburn - Oct 26 - Pinripara.
Eclampsia.

Admitted 24-1-01 at 11.35 pm. having fits. There was a history of anaemia, & oedema of some days duration. Urine was almost solid with albumen on boiling. At 1 am. on 25-1-01 she was put in a hot pack, & 3 pints saline infusion (consisting of Sodium chloride, acetate, and Phosphate, of each 3i to 1 pint) was given subcutaneously. She improved considerably, & for a time was quite conscious.

Chart XXIII

Showing the course of the leucocytes in Case XXXIV a fatal case of Eclampsia. On admission patient had a saline infusion of 3 pints, under chloroform. Thereafter an improvement was seen, but a relapse soon follows.



Leucocytes are represented in black.

Red corpuscles " " " red.

An interesting feature, in this chart, is that while at 7 am. on 25th the general state of the patient appeared to be improved, the blood condition pointed towards relapse, & this soon followed.

Case XXXIV (contd.).

About 5 a.m. however she became very drowsy, & restless, and at 8.40 a.m. had another fit. This was followed a few hours later by a series of fits. Shortly after 12 noon she was delivered by accouchement force under Chloroform.

In the afternoon she became quite collapsed, & died at 5 1/2 p.m.

Fresh blood examined 24-1-01 at 11.45 p.m. showed great clumping of the red corpuscles, & marked absence of rouleaux formation, with some alteration in shape & size of the red cells. Abundant leucocytosis was observed.

Patient bled very copiously from the needle prick.

Fresh blood examined 1 1/2 hours after the saline infusion showed the presence of increased rouleaux formation, with considerable alteration in shape & size of the red cells, & apparently increased leucocytosis.

There was still considerable bleeding from the needle prick.

Haemations (5) :- (See chart XXIII).

Date	Time	Red cells	White cells	Hts.	Remarks.
24-1-01.	11.45 p.m.	4,800,000	19,400	60%	On admission
25-1-01.	3 a.m.	4,600,000	26,600		1 1/2 hrs. after Cl ₂ infusion considerable improvmt. Relapse
	4.30 a.m.		20,400		
	7 a.m.		32,400		
	8 a.m.		38,800		

Differentiation of leucocytes :-

	24-1-01.	
	On admission	After infusion
Polymorphonuclear neutrophils	70%	72%
Large lymphocytes	9%	5.8%
Small lymphocytes	20.4%	10.6%
Eosinophils	.6%	11.6%

In counting 500 leucocytes on each slide 25 uncleated red cells were observed. In the slide on admission they were all of the normoblast type, but in the 2nd slide, one megaloblast was seen.

Case XXXV. Elly Simpson - Oct. 31 - Elfultysara.

Del. 31-1-01 of a live female child 2 1/4 lbs weight, + 13" long.
Placenta weighed 1 lb. Premature child 6 1/2 months.

Fresh blood examined 30-1-01. showed marked leucocytosis,
+ abundant formation of fibrin, otherwise normal.

Temperature + Pulse remained normal throughout residence.
Urine evolution satisfactory.

The child was kept in an incubator + was not suckled
by the mother.

Examinations (12) :- (see chart XXXV).

Date	Time	Red cells	White cells	Hb	Remarks
30-1-01	12 pm.		27,600		2 hours before delivery.
31-1-01	3.45 am	3,950,000	23,600	70%	13/4 " after "
1-2-01	8 1/2 pm.	3,750,000	16,400		1 hour after food
2-2-01	3 pm.	3,950,000	15,800		2 1/2 hours " "
3-2-01	7 pm.	4,200,000	22,000		3 1/2 " " "
4-2-01	4.45 pm.	4,150,000	13,400		1 1/4 " " "
5-2-01	9 pm.	4,250,000	16,400		2 " " "
6-2-01	5 pm.	4,330,000	15,400		1 1/2 " " "
7-2-01	4.30 pm.	4,300,000	13,800		1 hour " "
8-2-01	2.30 pm.	4,533,000	15,000		2 hours " "
9-2-01	5 pm.	4,320,000	15,600		1 1/2 " " "
10-2-01.	12 N	4,230,000	9,600		2 " " "

Differentiation of leucocytes :- 30-1-01.

Polymorphonuclear neutrophils		82.5%
Large lymphocytes	6.7%	} 16.5%
Small lymphocytes	9.8%	
Eosinophiles		1%

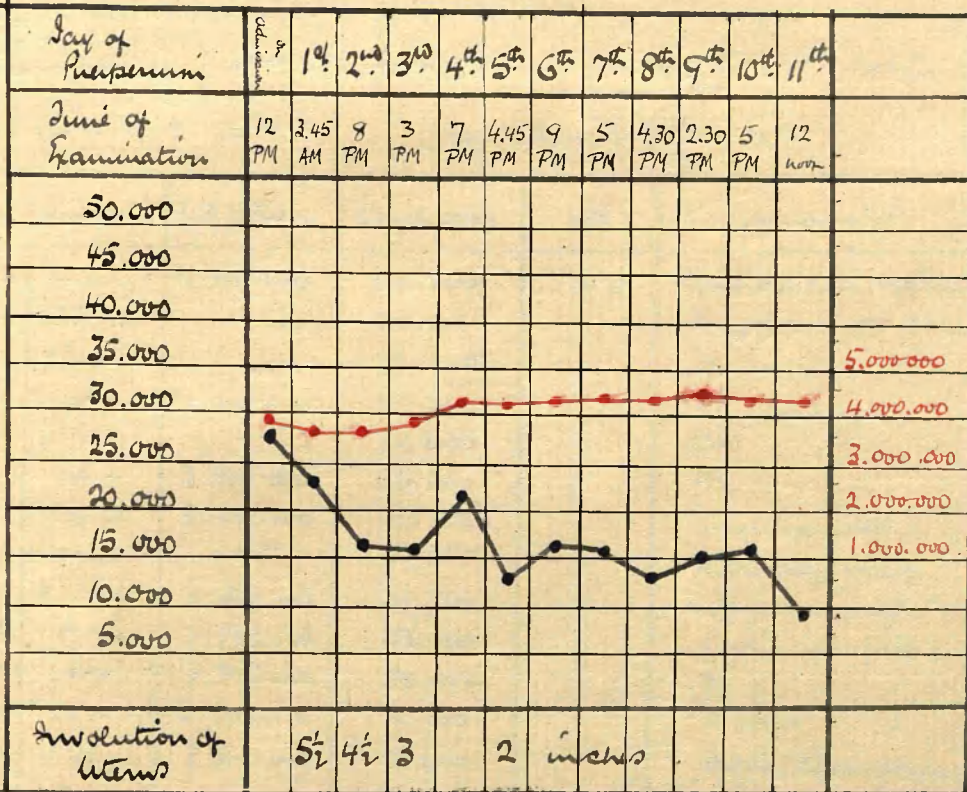
Chart XXXV

Showing the course of the leucocytes + red corpuscles during the first 11 days after delivery, in

Case XXXV

Premature female child (6½ months). weight 2½ lbs. + length 13". weight of Placenta 1 lb.

Child lived, but was not suckled by the mother. It was kept in incubator while in hospital.



Leucocytes are represented in black

Red corpuscles " " " red.

The figures showing the process of uterine involution represent the distance in inches between the upper margin of the symphysis pubis + the fundus uteri.

Case XXXVI. Elfus Anderson - act 23 - Primipara.

Ad. 1-2-01 after failure of delivery by doctor outside after 1 1/2 hours trial under anaesthetic. On admission patient was much excited + in a state of nervous shock. Chloroform was administered + delivery accomplished. After delivery she was much collapsed, but improved later. On the 8th day as temperature was running very high + uterus showed no signs of involution, chloroform was again administered + patient was thoroughly examined + drenched. Thereafter the temperature fell, but only to rise again, + it remained febrile until dismissal to her own home on the 13th day.

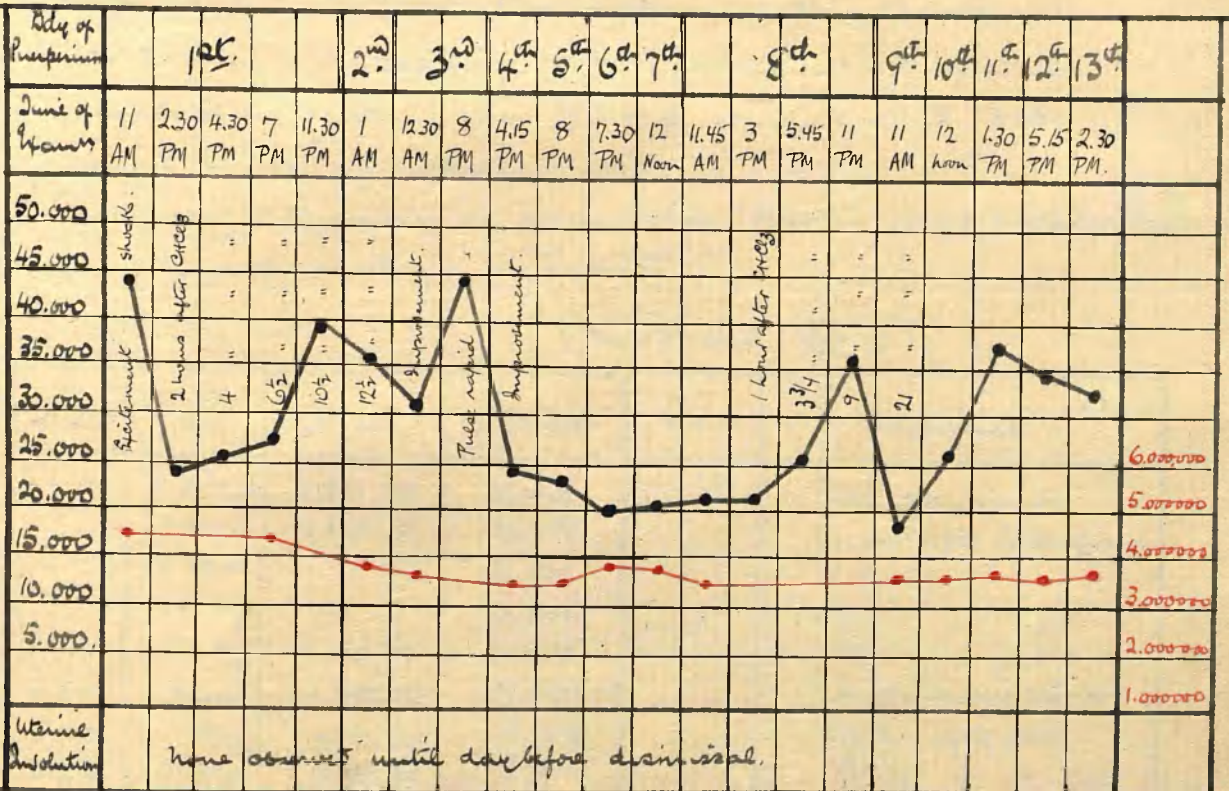
Examinations (21) :- (see charts XV + XVI).

Date	Time	Red cells	White cells	Hb	Remarks
1-2-01	11 am.	4,300,000	44,200	70%	Considerable excitement 2 hours after C&Cz.
	2.30 pm.		24,000		
	4.30 pm.		25,200		
	7 pm.	4,260,000	27,200		
	11 pm.		39,600		
2-2-01	1 am.	3,800,000	35,600		12 1/2 " " "
3-2-01	12.30 am	3,650,000	31,600		Improvement.
	8 am.		39,800		Pulse very rapid.
4-2-01	4.15 pm.	3,500,000	24,200		Improvement.
5-2-01	8 pm.	3,533,000	23,600		1 hour after food.
6-2-01	7.30 pm.	3,850,000	20,000		1/2 " " "
7-2-01	12 N	3,800,000	20,600		2 hours " "
	11.45 am.	3,500,000	21,400		before Chloroform
8-2-01	3 pm.		21,800		1 hour after C&Cz.
	5.45 pm.		25,600		3 3/4 hrs. " "
	11 pm.		36,000		9 " " "
9-2-01	11 am.	3,630,000	18,000		21 " " "
10-2-01	12 N	3,600,000	26,200		2 " " food.
11-2-01	1.30 pm.	3,750,000	37,800		1 " " "
12-2-01	5.15 pm.	3,600,000	34,200	75%	1 3/4 " " "
13-2-01	2.30 pm.	3,750,000	32,600		2 " " "

See charts XV + XVI.

Chart XV.

Showing the course of the leucocytes + red corpuscles during the first 13 days after delivery, in Case XXXVI, one of Puerperal Sepsis. Delivery was accomplished by means of forceps, Cl₂ being given. Her doctor had failed to deliver her after repeated attempts, under Chloroform, + on admission she was in a state of severe nervous shock + excitement.



Leucocytes are represented in black.

Red corpuscles " " " red.

Chart XVI, shows the course of the temperature compared with that of the leucocytes.

Case XXXVI (contd.)

Differentiation of leucocytes :- 1-2-01.

after Chloroform outside.

Polymorphonuclear neutrophiles		84.5%
Large lymphocytes	1.8%	} 8.1%
Small lymphocytes	6.3%	
Eosinophiles		7.4%

Case XXXVII Barbara Jameson - aet. 26 - Primipara.

Delv. 2-2-01. Forceps failed, + craniotomy was performed.

Female child 7 1/2 lbs weight, 15" long, wt. of placenta 14 lbs.

Patient made an excellent recovery.

Fresh blood examined on admission showed marked leucocytosis, but otherwise nothing noteworthy.

Examinations (13) :- (See chart ~~XXX~~).

Date	Time	Red cells	White cells	Hto.	Remarks.
2-2-01.	11.30 am	4,800,000	22,400	70%	On admission
	4.30 pm	4,650,000	28,400		1 hour after Chloroform
	8.30 pm		31,800		5 hrs. " "
	11.45 pm.		28,800		8 1/2 " " "
3-2-01.	12 N	4,250,000	20,400		2 " " food
4-2-01.	4 pm.	4,540,000	17,800		Improvement marked.
5-2-01.	7 pm	4,750,000	15,600		3 1/2 hrs. after food.
6-2-01	1.45 pm	4,650,000	13,400		1 1/2 " " "
7-2-01.	7.45 pm	4,865,000	11,200		3/4 " " "
8-2-01	4.15 pm	4,563,000	9,600		3/4 " " "
9-2-01	7.15 pm.	4,500,000	10,400		1/4 " " "
10-2-01	4 pm	4,533,000	7,800		1/2 " " "
11-2-01	5 pm	4,450,000	12,000		1 1/2 " " "

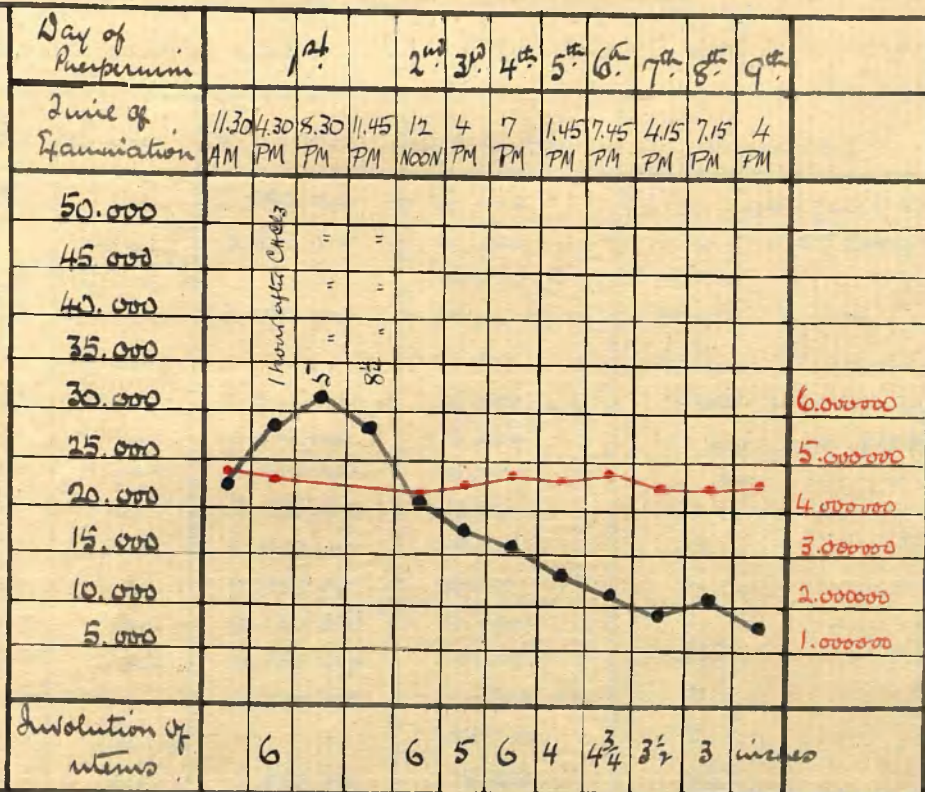
Differentiation of leucocytes :- 2-2-01 after Chloroform.

Polymorphonuclear Neutrophiles		84.5%
Large lymphocytes	3.5%	} 6.5%
Small lymphocytes	3.0%	
Eosinophiles		9%

Temperature, Pulse, + uterine involution normal.

Chart XXV

Showing the (effect) course of the leucocytes and red corpuscles during the first 9 days after delivery, in Case ~~XXXX~~ XXV. (where Craniotomy was performed).
 Female fetus $7\frac{1}{2}$ lbs weight, + 18" long.
 Placenta weighed $1\frac{1}{4}$ lbs.



Leucocytes are represented in black.

Red Corpuscles " " " red.

The figures showing uterine involution represent the distance in inches between the upper margin of the Symphysis pubis and the fundus uteri.

Case XXXVIII.

Elgar Hendry - aet 23 - Primipara.

Delv. 3-2-01. Failure of delivery by forceps at 11.30 a.m.

Cesarean performed at 7.30 p.m. Female child, 7½ lbs wt.
length 18". weight of placenta 1½ lbs.

Fresh blood on admission showed decided leucocytosis, but no other noteworthy feature. 8 hours after saline infusion, some alteration in shape & size of the red corpuscles was noted.

Temperature & uterine involution normal.

Examinations (16) :- (See chart XXVI).

Date	Time	Red cells	White cells	Remarks.
3-2-01.	1 p.m.	3,850,000	31,000	½ hr. after first ChCl ₃ .
	3.45 p.m.	3,530,000	61,000	1 hr. " 2 nd ChCl ₃ + saline
	6.30 p.m.		63,400	4 hrs. " " " "
	10.30 p.m.	3,250,000	57,600	8 " - do - do -
	12 mid.		61,400	9½ " - do - do -
4-2-01.	3.15 p.m.	3,600,000	35,000	Great improvement.
5-2-01.	2 p.m.	4,100,000	33,400	½ hr. after food.
6-2-01.	11 p.m.	3,950,000	19,000	1 hr. " "
7-2-01.	7 p.m.	3,460,000	15,400	3½ hrs. " "
8-2-01.	3 p.m.	3,540,000	18,600	2½ " " "
9-2-01.	1 p.m.	3,857,000	16,200	½ " " "
10-2-01.	1 p.m.	4,130,000	15,200	½ " " "
11-2-01.	7 p.m.	3,750,000	18,200	3½ " " "
12-2-01.	5 p.m.	4,000,000	16,200	1½ " " "
13-2-01.	2.30 p.m.		25,200	2 " " "
14-2-01.	3 p.m.	3,850,000	18,000	2½ " " "

Differentiation of leucocytes :- 3-2-01. after 2nd Chloroform.

Polymorphonuclear neutrophils 89.5%

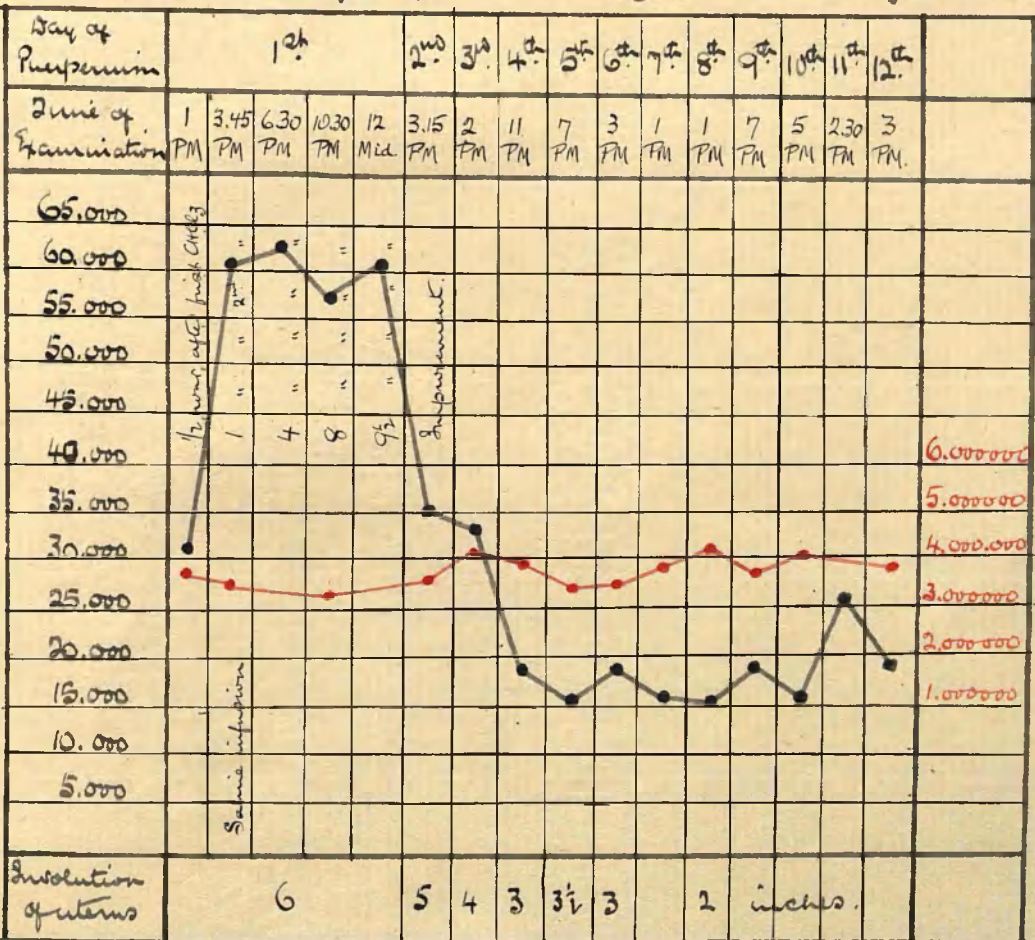
Large lymphocytes 1.5% }
Small lymphocytes 5% } 6.5%

Eosinophiles 4%

Drugs. After first chloroform ½ gr. Eserphina was injected hypodermically. During & after second chloroform fully ¼ gr. of Strychnine was given hypodermically for the collapsed condition, along with ʒiii Ether + ʒii Brandy. In addition a little Ether was given by the mouth.

Chart XXVI

Showing the course of the leucocytes + red corpuscles during the first 12 days after delivery, in Case XXXVIII (Caesarean). Female fetus 7½ lbs weight, + 18" long. Weight of Placenta 1½ lbs. Patient had Chloroform twice within a few hours. After the first administration she had ½ gr. etherphic; during + after 2nd chloroform she had ¼ gr. Strychamine hypodermically, in addition to Ether 3rd + Brandy 3rd, also Ether by the mask along with ChClz.



Leucocytes are represented in black.

Red corpuscles " " " red.

The figures showing uterine involution represent the distance in inches from the upper margin of the symphysis pubis to the fundus uteri.

Case ~~XXXX~~. Elfe Campbell - Oct. 30 - Alphitipara.

Del. 8-2-01. Live male child, weight 8 lbs., + length 19".

Weight of Placenta $1\frac{3}{4}$ lbs.

Patient had consumed a good deal of whisky, just before admission, + was very much excited.

Fresh blood examined before delivery, showed very abundant leucocytosis, + formation of fibrin. No other noteworthy feature.

Temperature + Pulse remained normal throughout residence.

Uterus showed normal involution.

Examinations (10) :-

(See chart XXVII).

Date	Time	Red cells	White cells	Hb.	Remarks.
8-2-01	12.30 pm.	3,800,000	30,500	75%	On admission.
9-2-01	7.30 pm.	3,466,000	19,800		$\frac{1}{2}$ hr. after food.
10-2-01	3.30 pm.	3,533,000	11,800		$\frac{3}{4}$ " " "
11-2-01	8 pm.	3,950,000	12,800		1 " " "
12-2-01	3.30 pm.	4,080,000	10,600		$\frac{3}{4}$ " " "
13-2-01	3.30 pm.	4,000,000	9,800		$\frac{3}{4}$ " " "
14-2-01	4 pm.	4,150,000	12,200		$\frac{1}{2}$ " " "
15-2-01	3.30 pm.	4,200,000	10,000		$\frac{3}{4}$ " " "
16-2-01	4 pm.	4,350,000	10,200		$\frac{1}{2}$ " " "
17-2-01	7 pm.	4,330,000	9,800	80%	$\frac{3}{4}$ " " "

Differentiation of leucocytes :- 8-2-01.

Polymorphonuclear neutrophils		81%
Large lymphocytes	7.8%	} 17.5%
Small lymphocytes	9.7%	
Eosinophiles		1.5%

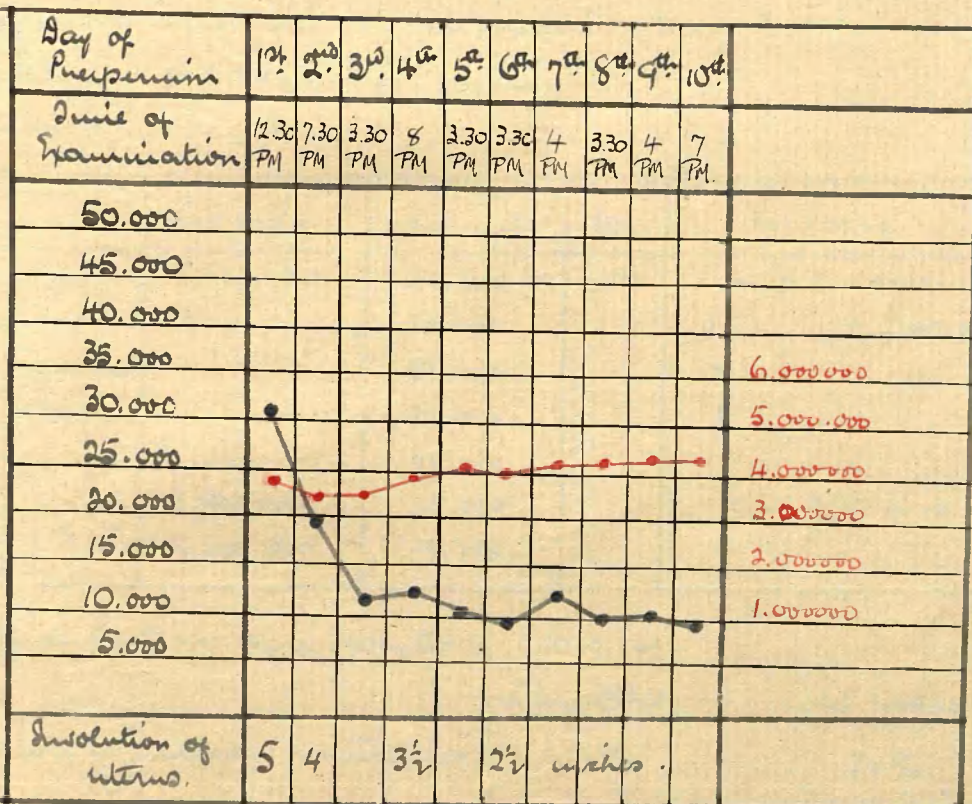
Chart XXVII

Showing the course of the leucocytes & red corpuscles during the first 10 days after delivery, in Case XXXIX.

Live male child, weight 8 lbs., length 19".

Weight of placenta $1\frac{3}{4}$ lbs.

Patient was much excited on admission.



Leucocytes are represented in black.

Red Corpuscles " " " red.

The figures showing uterine involution represent the distance in inches from upper margin of the symphysis pubis to the fundus uteri.

Case XL Jane Adams - act 22 - Multipara.

Very rigid os, incised under chloroform, 10-2-01, and child delivered with forceps. Male child. Cbts weight, 418" long. Placenta weighed 1 lb.

There were several dirty sores of a syphilitic nature on the genitals, both externally, & internally, & patient developed a papular rash over the body, under observation.

Fresh blood examined on admission showed extensive leucocytosis, & early fibrin formation.

Examinations (7) :-

Date	Time	Red cells	White cells	Hb	Remarks
10-2-01	11.30 pm	3.830.000	24.200	65%	on admission
11-2-01	1.45 am		34.600		1 hour after CxCl ₃ .
	2.45 am		38.000		2 hrs. " "
	3.45 am		33.000		3 " " "
	12.30 pm		24.000		12 " " "
12-2-01	4 pm	3.860.000	25.000		1/2 hr. after food.
13-2-01	3 pm	4.000.000	14.200		2 1/2 hrs. " "

Differentiation of leucocytes :- 10-2-01.

	<u>before CxCl₃.</u>	<u>after CxCl₃.</u>
Polymorphonuclear neutrophils	71%	72%
Large lymphocytes	7.8%	5.5%
Small lymphocytes	5%	4%
Eosinophiles	16.2%	18.5%

11-2-01.

Polymorphonuclear neutrophils	73%
Large lymphocytes	6%
Small lymphocytes	5.5%
Eosinophiles	15.5%

Case XLI - Eliza Gordon - Elulitpana.

Admitted for Caesarian section, which was performed on 19-2-01. when she was delivered of a live male child, 7½ lbs weight. Patient was much troubled by after sickness, but this passed off, + was succeeded by slight bronchitis. Thereafter she made an uninterrupted recovery.

Fresh blood examined on admission showed normal red cells, medium leucocytosis, + early excessive fibrin formation.

Examinations (21):- (See chart. XIV).

Date	Time	Red cells	White cells	Remarks.
11-2-01	9.30 pm.	3.360.000	11.200	2½ hours after food.
12-2-01	7.15 pm.	3.430.000	10.800	¼ hour
13-2-01	8.30 am	3.380.000	10.200	before breakfast.
	11 am.		10.400	2½ hrs after "
14-2-01	3 pm.		11.400	2½ " " food
15-2-01	3 pm		10.800	2½ " " "
16-2-01	no	examination	made.	
17-2-01	6 pm.		10.200	2½ " " food.
18-2-01.	4.30 pm		12.800	1 " " "
19-2-01	11 am.	3.250.000	12.200	Just before Chloroform.
	2 pm.		18.400	1 hr. after Cæz stopped.
	3 pm.		26.200	2 " " " "
	5.30 pm.		23.400	4½ " " " "
	8 pm		23.200	7 " " " "
	11 pm.		19.000	10 " " " "
20-2-01	11.45 am.		28.200	Stychnine as below.
	5 pm		29.400	- do -
	12 MID.		30.800	- do -
21-2-01	10 pm.	3.450.000	27.000	3 hours after food.
22-2-01	10 pm.		17.600	3 " " "
23-2-01	10 pm.		10.200	3 " " "
24-2-01	12 MID		8.400	2 " " "

Drugs. A little ether was given on the mask with the chloroform. ½ gr Stychnine was injected hypodermically. On 19th at 8 pm ¼ gr. Atropine was given, + thereafter Stychnine as follows :-
 19th - 12 midnight - 5 m liquor 20th 1 pm 5 m liquor
 + at 4.45 pm. ½ gr. + 7.40 pm. 5 m liquor Stychnine.

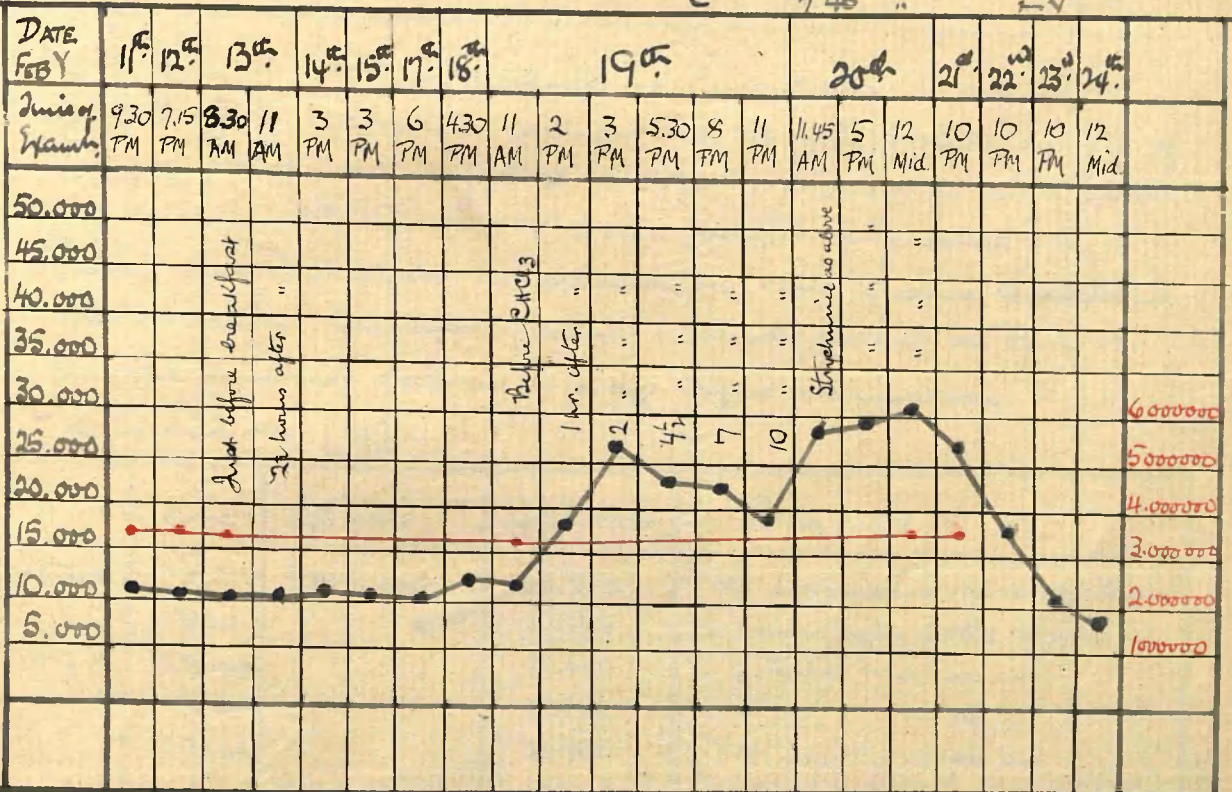
Chart XIV.

Showing the course of the leucocytes and corpuscles from 9 days before, until the 5th day after delivery in Case XL.

Caesarian Section was performed in this case on 19th Feb.

One male child, weighing 7½ lbs.

Good recovery. Strychnine given { 14⁴⁵ 12 midnight mV
20⁴⁵ 1 12m. mV
4.45 " gr ½
7.40 " 1V



Leucocytes are represented in black.

Red corpuscles " " " red.

Case XLI (contd.)

Differentiation of leucocytes :- 19-2-01.

	<u>Before CxCl₃</u>	<u>After CxCl₃</u>
Polymorphonuclear neutrophils	83.2%	51%
Large lymphocytes	9.2%	9%
Small lymphocytes	6.1%	5%
Eosinophiles	1.5%	4%

Case XLII - Mrs. M. Caffery - Primipara - aet 38.

Ad. 13-2-01. Caesarian section was the only possible means of delivery & this was performed at 9 pm. Eviscerated male foetus was delivered 4 1/4 lbs wt. + 18" long. Weight of placenta 1 lb.

Patient had Bronchitis on admission, & this became troublesome after operation. She never rallied, & death ensued on 15-2-01.

She had been in labour 4 days before admission.

Examinations (10):-

Date	Time	Red cells	White cells	Remarks
13-2-01.	7 1/2 pm.	3,800,000	25,200	On admission - much excitement
	11.30 pm.		27,800	
14-2-01.	12.30 am	3,880,000	23,600	2 hrs - do -
	1.30 am		18,600	3 " - do -
	2.30 am		21,400	4 " - do -
	3.30 am		23,600	5 " - do -
	12 noon		26,000	13 1/2 " - do -
	5 pm.		28,400	18 1/2 " - do -
15-2-01.	1.15 pm		19,200	3/4 hour after nourishment.
	8 pm		17,600	Patient in state of collapse. Blood would hardly flow.

Differentiation of leucocytes :- 13-2-01.

	<u>Before CxCl₃</u>	<u>After CxCl₃</u>
Polymorphonuclear neutrophils	85%	83%
Large lymphocytes	8.3%	4.5%
Small lymphocytes	6%	5%
Eosinophiles	.7%	7.5%

Case XLIII. Elfr. Cuthen - alt. 21 - Prinipara.

Ad. 15-2-01. with complete occlusion of the os uteri, under Chloroform a live male child was delivered, weight $6\frac{3}{4}$ lbs, length 17". Weight of Placenta 14 lbs. Patient was only 20 minutes under the anaesthetic.

Examinations (13):- (See chart XXVIII).

Date	Time	Red cells	White cells	Remarks.
15-2-01.	7.45 pm.	4.080.000	16.000	Considerable excitement.
	10 pm.		16.600	1 hour after Chloroform.
	11 pm.		16.400	2 hours - do -
	12 Midn.		16.000	3 " - do -
16-2-01	1 am.		14.800	4 " - do -
	7 pm.	3.950.000	22.400	22 " - do -
17-2-01.	7.30 pm.	3.780.000	17.600	$\frac{1}{2}$ hour after food.
18-2-01.	3.30 pm.	3.830.000	15.400	3 hours " "
19-2-01.	3.30 pm.		12.400	3 " " "
20-2-01	3.30 pm.	4.000.000	10.200	3 " " "
21-2-01	8 pm.	4.200.000	9.800	1 hour " "
22-2-01	2.30 pm.		10.800	2 hours " "
23-2-01	3.30 pm.	4.250.000	9.800	3 " " "

Temperature & pulse remained normal throughout.

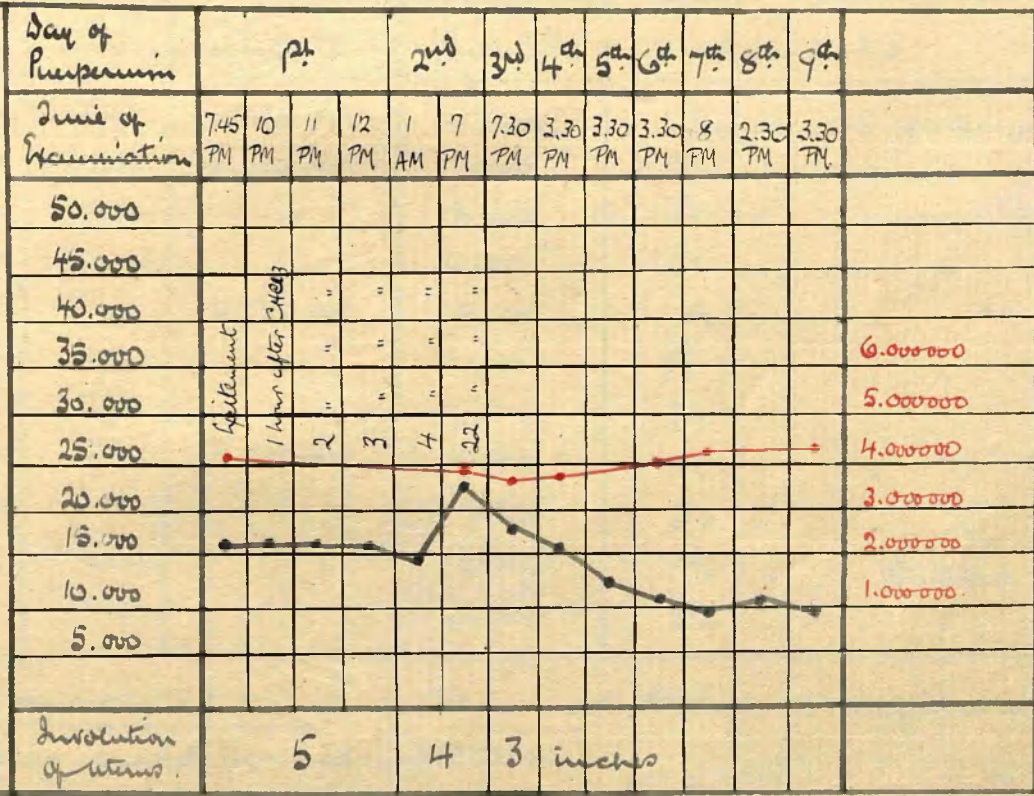
Uterus shows normal involution.

Differentiation of leucocytes :- 15-2-01.

	<u>Before CHCl₃.</u>	<u>After CHCl₃.</u>
Polymorphonuclear neutrophiles	86.6%	86%
Large lymphocytes	6.7%	2%
Small lymphocytes	2.7%	5%
Eosinophiles	4%	7%

Chart XXVIII

Showing the course of the leucocytes and corpuscles during the first 9 days after delivery, in Case XLIII. Chloroform was given as there was occlusion of the os. Live male child was delivered, weight 6 $\frac{3}{4}$ lbs, length 17". weight of placenta 1 $\frac{1}{4}$ lbs.



Leucocytes are represented in black.

Red corpuscles " " " red.

The figures showing uterine involution represent the distance in inches between the upper margin of the symphysis pubis, & the fundus uteri.

Case XLIV. Miss Cuthbertson - Oct 21 - Clifton, Pa.

Adm. 19.2.01. - Delivery normal - Live male child, weight 7 lbs. length 18". weight of Placenta 1 1/2 lbs.

Fresh blood examined on admission shows considerable wolcott formation, decided leucocytosis, with early fibrin formation.

Examinations (11) :- (see chart XXIX).

Date	Time	Red cells	White cells	Remarks.
19-2-01	11.30 pm	3,950,000	20,800	Considerable excitement
20-2-01	3 pm	3,500,000	17,000	2 1/2 hours after food.
21-2-01	7 pm		13,400	3 1/2 " " "
22-2-01	7 pm		10,800	3 1/2 " " "
23-2-01	7 pm	4,250,000	8,000	3 1/2 " " "
24-2-01	2 pm		10,000	1 1/2 " " "
25-2-01	7 pm		9,000	3 1/2 " " "
26-2-01	2 pm	4,200,000	10,000	1 1/2 " " "
29-2-01	12.15 am		7,400	5 1/4 " " "
	2 am		10,200	1 3/4 " " Strychnine
	4 am		12,600	3 3/4 " " "

Temperature + Pulse remained normal throughout puerperium. Uterus shows normal involution.

Differentiation of Leucocytes :- 19.2.01.

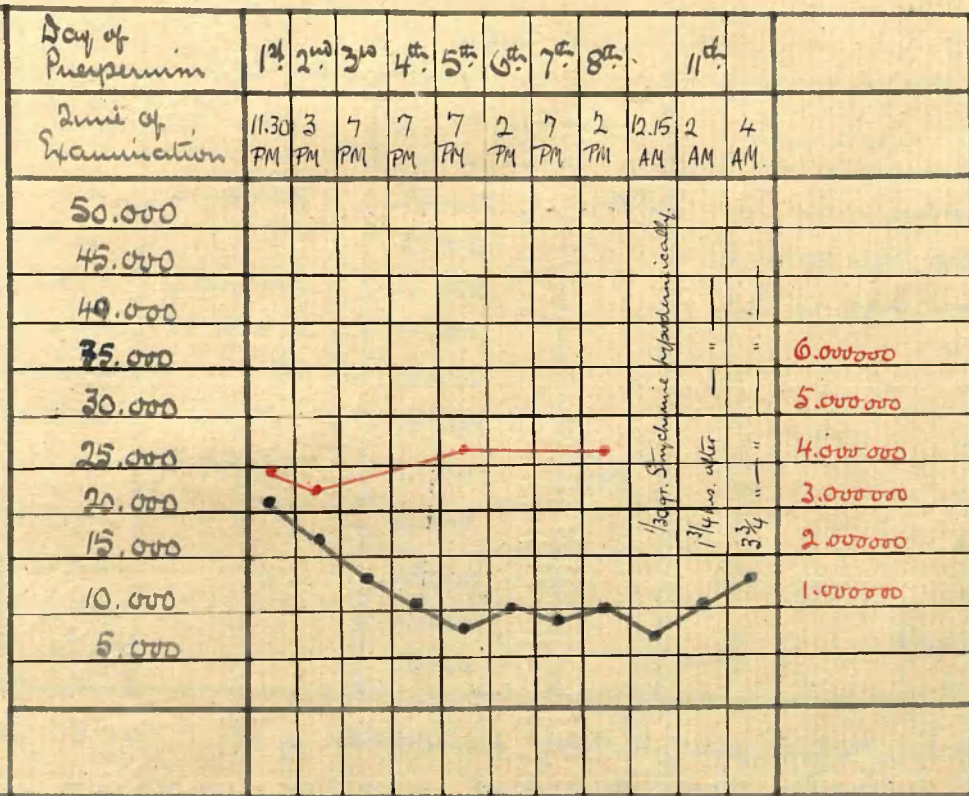
Polymorphonuclear neutrophils	81%
Large lymphocytes	7%
Small lymphocytes	11.2%
Eosinophiles	.8%

Chart XXX

Showing the course of the leucocytes and corpuscles during the first 11 days after delivery, in Case XLIV.

Live male child, weight 7 lbs., length 18".

Weight of placenta 1 1/2 lbs.



Leucocytes are represented in black.

Res corpuscles " " " red.

Case XLV Miss Calderwood - act 36 - erythipara.

Admitted 21-2-01 at 1 am. in a very breathless + exhausted state.
Patient looked very anaemic, having almost a lemon yellow color.
Delivery occurred at 2 am - child macerated.

Fresh blood examined on admission was very pale + watery.
Red corpuscles showed variations both in shape + size. There was an abundant leucocytosis.

Examinations (11) :- (See chart XXX).

Date	Time	Red cells	White cells	Hb	Remarks
21-2-01	1.15 am	2.260.000	36.600	60%	On admission
	8 pm		23.600		18 hours after delivery
22-2-01	4.30 pm	2.500.000	16.000		1 hour after food
23-2-01	8 pm	2.780.000	14.800		1 " " "
24-2-01	4.30 pm		18.000		1 " " "
25-2-01	5 pm		15.000		1 1/2 hours " "
26-2-01	4 pm	3.000.000	11.000	65%	1/2 hour " "
27-2-01	4 pm		10.200		1/2 " " "
28-2-01	12.30 am		8.800		5 1/2 hours " "
	2.30 am		10.400		2 " " Strychnine
	4 ³⁰ am		13.000		4 " " "

On 28-2-01. 1/30 gr Strychnine given hypodermically at 12.30 am.

Temperature + Pulse remained normal during puerperium.
Uterus showed normal involution.

Differentiation of leucocytes :- 21-2-01.

Poly morphonuclear neutrophils	72.5%
Large lymphocytes	13.5%
Small lymphocytes	13.7%
Eosinophiles	3%

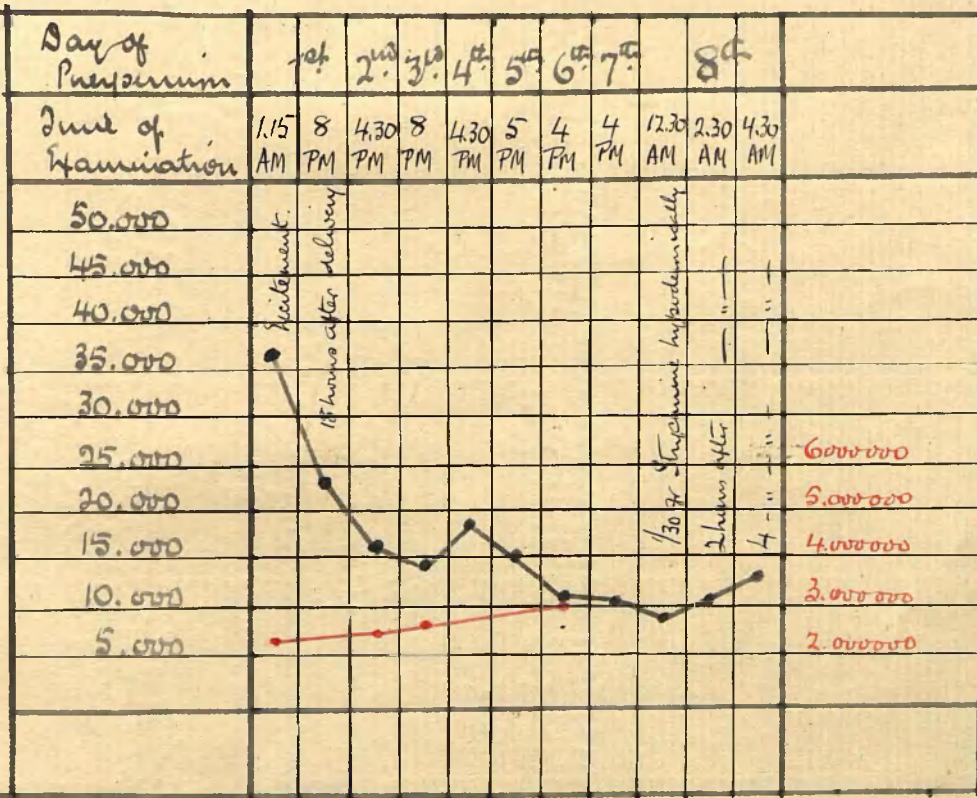
3 nucleated red cells observed in counting 400 leucocytes.

Chart XXX

Showing the course of the leucocytes + red corpuscles during the first 8 days after delivery, in Case XLV.

Very anaemic patient.

emaciated male child.



Leucocytes are represented in black.

Red corpuscles " " " red.