A Study of

PUERPERAL SEPSIS

with particular reference to

ANAEMIA as a Clinical Feature

and

BLOOD TRANSFUSION as a Therapeutic Measure.

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INTRODUCTION.

Puerperal sepsis is an infection which is accompanied by a high mortality rate, and many methods have been suggested for its treatment, all of which have been followed by conflicting reports as to their value.

Blood transfusion has proved no exception to the general rule in this respect, numerous contributions having been made to the literature in the past ten years, testifying to its efficacy or inefficacy according to the individual experience of the investigators.

It must be remembered, however, that puerperal sepsis is not a single disease, but a name covering a variety of conditions; and the results of treatment will, therefore, vary according to the type and severity of the infection in general at the time of investigation. Before proceeding to estimate results, therefore, an adequate definition of the cases included, the method of classification used, and an indication as to the type of case predominant at the time, would appear to be essential. A preliminary survey of this nature forms part I of the thesis.

Most of the disappointing results of transfusion in sepsis have been obtained from its use as an anti-bacterial agent, and, in this respect, it would appear to fall into line with most of the other anti-bacterial measures which

have been advocated. More recently, the view appears to be gaining ground that its chief value lies in its power to correct anaemia, by enriching an impoverished blood stream.

That a very severe anaemia may accompany puerperal sepsis is no new observation, and it is mentioned in most of the older textbooks. Although in recent years, a considerable amount of study of a productive nature has been applied to anaemia in general, including anaemia of pregnancy, no contribution has appeared dealing with the anaemia of puerperal sepsis.

As it is intended in this thesis to use the anaemia as a measure of the efficacy of transfusion, it is essential that its nature, progress and response to other methods of treatment should be thoroughly understood. To permit of this, an investigation was undertaken and the results are detailed in part II. Though not by any means an exhaustive study, sufficient information was gained to allow use to be made of the anaemia as an index to the value of transfusion, as is set forth in part III.

In presenting this thesis, I wish to record my thanks to Dr. John Reid, Physician Superintendent of the County Hospital, Motherwell, for granting the facilities which made this work possible, and for his valuable advice, criticism

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PART I

on

PUERPERAL SEPSIS.

SECTION A.

HISTORICAL REVIEW.

The occurrence of a severe and frequently fatal malady afflicting women in the lying-in period following childbirth has been known to observers since ancient times. Hippocrates noted it and described it in his writings (1), and in his thesis on "Female Maladies", drew attention to its contagious and frequently fatal nature ("few escape it") (2,3).

It is mentioned in the literature of the middle ages as "Febris Puerperarum" by Thomas Willis (De febribus) (3), in 1660, and its epidemic nature was pointed out by Mauriceau in his "Traité des maladies des femmes grosses" (4), in 1668. The term "Puerperal Fever" was introduced by Edward Strother (Criticon Febrium) in 1716 (5), and its contagious nature was pointed out by Malouin in an outbreak in the Hôtel Dieu in 1746, by Joseph Clarke in the British Lying-in Hospital, 1767-1788, by Alexander Gordon in Aberdeen in 1760, and in the Swiss epidemics of 1762 by Zimmermann (5).

The first steps to try to improve the conditions of Midwifery practice were taken by Charles White in 1773 (3), who, in a treatise on "The Management of Pregnant and Lying-in Women", made a plea for cleanliness in obstetrics (6). In addition, he was the first to describe the condition of Phlegmasia Alba Dolens (7).

An important contribution towards the control of puerperal sepsis was made by Oliver Wendell Holmes, in 1843 (2).

In a paper "On the Contagiousness of Puerperal Fever" he asserted that women at childbirth should not be attended by physicians who have been attending post-mortem examinations, or cases of puerperal fever, as the disease may be conveyed in this manner from patient to patient. He suggested that washing the hands in calcium chloride and changing the clothes after attending a case of puerperal fever were likely to act as a preventive measure. He also noted the connection between erysipelas and puerperal fever. His suggestions were received very unfavourably, but he wrote a further treatise on "Puerperal Fever as a Private Pestilence" in 1855, in which he quoted the work of Semmelweis in Vienna.

The true nature of "puerperal fever" was not appreciated, however, until Semmelweis studied the problem in Vienna (8). In 1846, he was appointed assistant in a maternity ward where the mortality from puerperal fever was so high that women begged in tears not to be taken there. He observed that the mortality was much higher in this ward, where the patients were attended by students coming directly from the dissecting room, than in the neighbouring ward which was devoted to the training of midwives.

In 1847, a colleague died as a result of a dissection wound, and Semmelweis, at the post-mortem examination, observed that the pathological findings were closely similar to those which he had seen in fatal puerperal cases. Remembering the fact that his patients were being attended by students from

the dissecting room, he concluded that puerperal fever was analogous to the "cadaveric" poisoning (3) which had caused the death of his colleague.

By insisting on all coming into contact with his maternity cases washing their hands in calcium chloride, he reduced the death rate in his ward from 9.92 per cent. to 3.8 per cent. in one year, and to 1.27 per cent. in the following year (8).

In addition to this important contribution, he was the first to recognise "puerperal fever" as a blood poisoning or septicaemia.

His doctrines met with severe opposition, and he was forced to leave Vienna for Budapest, where he ultimately became Professor of Obstetrics, and published his treatise on the "Cause, Concept and Prophylaxis of Puerperal Fever" in 1861.

The association of the Streptococcus Pyogenes with puerperal septicaemia was first discovered by Pasteur in 1878-9 (9). He described the organism as "microbe en chapelet de grains" (rosary of beads).

In 1867, Lister (10) introduced carbolic acid as an antiseptic in general surgery, but in spite of this and the teaching of Semmelweis, it was not until 1881, when carbolic acid was introduced in obstetrics by Tarnier of Paris (11), that antiseptics became generally employed in midwifery practice.

"Puerperal fever" was made notifiable in London in 1889 (12), in Scotland in 1897 (13), and in England and Wales in 1899 (14). These regulations were very badly observed, however, and Gordon (15), commenting on the state of affairs in 1905, writes of patients admitted to the Monsall Hospital, Manchester, that they were not notified until they were in a hopeless condition clinically. He states that in some the severity of the illness had not been recognised until it had become strikingly obvious; in others every effort had been made to keep them at home until the onset of delirium had rendered the patients unmanageable, or the fear of impending death had bred in the minds of the patients' attendants, a desire that this should not happen in the house. He continues that in either case the hospital is regarded as a receptive rather than a curative institution. The bulk of his cases were admitted in the second week of the fever or later.

In order to bring cases of puerperal sepsis to the notice of the Public Health Authorities, and to enable them to gain the full advantage of early hospital treatment, "Puerperal Pyrexia" was made notifiable in 1926 in England (16), and in 1929 in Scotland (17). The effect of these regulations has been noted in the County Hospital, Motherwell, by Dr. Reid (18), who states that on the average, more than three times the number of cases are coming to the hospital: the corrected diagnosis figure is doubled: the average day

of disease on admission is halved: the percentage of severe cases is practically halved: and the death rate taken over a ten year period has been reduced from 30.2 per cent. to 21.1 per cent. of the discharges.

SECTION B.

CLASSIFICATION OF PUERPERAL SEPSIS.

Introductory.

The term puerperal sepsis covers a very wide field and is generally regarded as including all infective conditions which arise from the entrance of organisms into wounds of the generative tract in connection with labour or the puerperium. It has long been realised that there is no such entity as "puerperal fever", a specific fever striking women in the lying-in period following childbirth. The realisation that puerperal sepsis is analogous to wound sepsis dates from the work of Semmelweis in the middle of last century.

Being analogous to wound sepsis, there must be a multiplicity of forms and degrees with which it can manifest itself, from a slight localised infection of a superficial laceration, to a general widespread septicaemia. It is, therefore, necessary, before trying to conduct an investigation into the subject, to define, accurately, what cases are included in the investigation, and to classify them into groups.

Cases included as Puerperal Sepsis.

Lea (19) states that all cases of fever during the puerperium, unless clearly attributable to some extraneous cause, should be considered as forms of wound (puerperal) infection.

Fothergill (20) asks how it is possible to bring this large heterogeneous aggregation of conditions within the bounds of a group with a single name. He applies the name "Puerperal pelvic infection" and states that each case must present three features, one for each word in the name. It must be puerperal in time, the inflammatory reaction must be pelvic in place, and it must be infective in origin. He adds, however, that in the absence of any obvious pelvic lesion, any infective febrile disturbance must be regarded as pelvic infection if no cause for the fever can be found in any other part of the body. This is in agreement with Lea, and is certainly the proper view to take at the beginning of the illness, when the physical signs may be few but where a very virulent infection is about to follow (19). It was for this reason, too, that the addition of Puerperal Pyrexia was made to the list of notifiable diseases in 1926.

Thus, of cases admitted as puerperal pyrexia, all should be regarded as puerperal sepsis unless some obvious extra-genital focus of infection can be found. Gordon (21) states that, in the great majority of cases, it is impossible to be sure of the diagnosis of Puerperal infection until the mischief has spread beyond the uterus.

Classification of Puerperal Sepsis.

The classification of the cases, for the same reason, cannot well be made until the patient has been observed for some time, and, in the same way, a definite prognosis cannot

be given immediately, as early impressions are frequently misleading (19). The classification of the cases into groups is a difficult task, as it is undesirable to have too many groups, yet the cases vary so much that a few will not suffice.

Herman, writing in 1905 on the clinical aspects of "puerperal fever" (22) describes the different situations in which the infection occurs, starting with Puerperal Ulcers, Hospital Gangrene and Spreading Traumatic Gangrene - conditions seldom seen nowadays. This he follows with Sapraemia, Septicaemia, Pyaemia, Peritonitis and Pelvic Cellulitis.

It was suggested at one time that classification might be made according to the organism present, but, as Lea (19) points out, this is impracticable, as there is greater variety in the clinical phenomena, and several types of organism may be present at the same time.

Lea (19) gives a very complete classification based on the anatomical distribution of the lesions, but points out that different general manifestations may accompany the various localised infective processes. The different general conditions of the body produced by infection, he gives as follows:-

(a) Toxaemia.

(b) Bacteriaemia - two forms,

(i) Septicaemia.
(ii) Pyaemia.

He has abandoned the use of the term Sapraemia, substituting for it, the word Toxaemia, which includes the absorption

of toxins produced by both pathogenic and so-called saprophytic organisms, the symptoms of which are identical. Since then it has been shown that the anaerobic organisms, which were previously believed to be purely saprophytic, putrefactive bacteria, do possess definite pathogenicity (23, 24, 25, 26).

From a pathological point of view, Lea's classification is very thorough and complete, but clinically, it is impossible to use, as many of the finer subdivisions can be diagnosed only at post-mortem examination. It is too unwieldy to use as a classification upon which to base further investigations.

Rivett (27) suggests the following classification:-

(a) Local sepsis of the genital tract.

(b) Spread of the infection to the blood stream - Septicaemia.

(c) Spread of the infection to the peritoneum - Peritonitis.

(d) Infection spreading into clots in thrombosed veins.

(e) Direct extension along the Fallopian tubes, or lymphatic spread to the cellular tissues at the base of the broad ligament - Salpingitis and pelvic cellulitis.

(f) Infection of the urinary tract - Pyelitis.

This classification seems to be a very good working one. It is not unduly cumbersome, yet it clearly differentiates the various clinical types. The first group, local sepsis of the genital tract, is the forerunner of all the other types. Cases which remain in this group, however, vary

considerably in severity from a mild septic laceration, or a slightly enlarged uterus with an offensive, increased lochial discharge with transient pyrexia, to cases where there is profound prostration from the toxic substances absorbed, almost resembling those in the septicaemia group.

Rivett's classification is accepted in this thesis as a basis upon which to work, as being convenient to handle, and clearly dividing the different conditions which may arise to alter the blood picture, the general prognosis and expected reaction to treatment. It is, however, incomplete in that further subdivision of the first group is necessary to indicate the degree of toxaemia from which the patient is suffering. For this reason, in the cases to be described, where the infection is localised to the uterus, a subdivision has been made into "local infection" and "local infection with toxaemia". This subdivision has been made mainly on the reaction of the patient to local treatment. Where the toxaemia manifestations subsided quickly on the institution of glycerine and postural drainage, the cases have been allocated to the first group: where the toxaemia was sustained over a period of several days, they were put into the second group.

The final classification used in the general survey of cases, in estimating the studies on the blood, and the result of blood transfusion, is as follows:-

Group 1. Local Infection with no sustained Toxaemia.

Group 2. Local Infection with Toxaemia.

Group 3. Septicaemia.

Group 4. Generalised Peritonitis.

Group 5. Infection of the Parametrium.

Group 6. Thrombo-phlebitis.

In the review of cases to follow, a distinction is made between cases occurring post partum and post abortum. In the studies on the anaemia, however, all the cases have been taken together in their appropriate subgroups, as the number of cases post abortum was too small to be studied separately.

SECTION C.

CLINICAL ASPECTS OF PUERPERAL SEPSIS.

Local Infections. Goodall (28) states that eighty per cent. of cases with a localised infection are symptom free, the temperature serving alone as a guide that infection has occurred. Involution is slowed down (27, 28), and, indeed, it has been stated (28) that the commonest cause of sub-involution is infection and that many of the common gynaecological troubles can be ascribed to undiagnosed sepsis.

Infection of the cervix is also described by Goodall, and he states that, in the absence of lacerations, the cervix should return to its normal shape and consistency in 48 hours after delivery.

In this group also, are included infection of severe lacerations, which present a most suitable soil for the growth of anaerobic organisms (25, 29).

In general, infection in localised cases is fairly easily eradicated by glycerine and postural drainage, but it must be remembered that this group is also the forerunner of all the other and more serious types of infection (27).

Septicaemia. The septicaemic cases are, fortunately, fewer than those in the local groups. Rivett (27) diagnoses septicaemia only on the presence of a positive blood culture, but points out the difficulties attendant upon obtaining

reliable results. In this series, blood culture was made into Hartley's broth in all cases on admission, and also into a bullock heart broth for possible anaerobes. In some of the cases, the culture was repeated if the temperature remained high. Unfortunately, however, the degree of success with positive results described by Rivett was not obtained, and in some cases it was necessary to use other means to confirm the clinical diagnosis, such as isolating the organisms from the spleen at post-mortem examination, or finding haemolytic streptococci in small secondary abscesses.

In no case was an anaerobic organism isolated. Haemolytic streptococci and coliform bacilli were the organisms most frequently found, and in one instance, a diphtheroid was reported. According to Goodall (25), coliform infections are comparatively uncommon, but in this series, fourteen cases were found. In the coliform infections, the lochia were offensive and profuse, while in the streptococcal cases they were usually scanty. Offensive lochia are usually associated with anaerobic infection (28), and in some of the coliform cases, streptococci were found post-mortem in the walls of the uterus and in the spleen, though they were not detected during life.

The severity of cases with organisms present in the blood stream varies greatly, some subsiding quickly. Goodall (30) describes such cases as mild septicaemias and points out that the pulse rate is slow in comparison with the degree of

pyrexia. He states that in such cases, the organism is usually an aerobic streptococcus, but Rivett (27) finds the prognosis very much better in cases with an anaerobic infection.

In direct contrast, some of the septicaemic cases run a very rapid course, quickly sinking into the typhoid state or developing a delirium of a very much more noisy nature. To such cases, Goodall gives the name of grave septicaemias, and he distinguishes two types, a stimulating type where the temperature remains sustained and gradually rises with the pulse rate until death; and a paralytic type where the temperature falls below normal while the pulse rate rises.

Generalised Peritonitis. The difficulty of early diagnosis of peritonitis is well recognised on account of the fact that the classical signs and symptoms are frequently absent (27, 31, 32). Much importance is placed on the facial expression of the patient (27, 32), which has been described as anxious-looking (27) (Facies Hippocratica). Rivett (27) stresses the absence of pain and muscular rigidity, and the doubtful value even of tenderness; and describes diarrhoea and distension of the abdomen as very valuable early signs. James (31) attributes the absence of clinical signs, firstly to the loss of the usual abdominal reflexes due to the stress and strain of the pregnancy, and secondly to the masking effect of the accompanying toxaemia or septicaemia. He also notes the early abdominal distension and diarrhoea, and Pyrah and Oldfield (32) agree that these

two features are strongly suggestive of the occurrence of peritonitis.

The prognosis of generalised peritonitis is very bad, unless diagnosed early and operated upon at once (27, 32). It is also accepted that the earlier the onset of the peritonitis in the puerperium, the less chance the patient has of recovery. Pyrah and Oldfield (32) state that peritonitis occurring within four days of labour is almost universally fatal.

Rivett (27), and Pyrah and Oldfield (32) have had the experience of finding peritonitis for the first time at post-mortem examination, and in this series, one case was, unfortunately, not diagnosed during life.

Parametritis. This is a localised infection in the appendages, or, as more frequently occurs, in the pelvic cellular tissues at the base of the broad ligament. It may follow a mild intra-uterine infection, or it may occur in the course of a severe general infection. It is usually fairly easily diagnosed, a hard tender mass being palpable in one or other iliac fossa, and on bimanual examination, the mass is easily palpable in the broad ligament (27).

Salpingitis is somewhat more difficult to diagnose, and less frequent in its occurrence. There is usually fairly severe pain in one iliac fossa, with considerable muscular rigidity. A mass may be palpable after the muscular rigidity has gone.

Thrombo-phlebitis. When this occurs in the pelvic veins, the diagnosis is very difficult, and the condition may be diagnosed as pelvic cellulitis until the occurrence of pyaemic abscesses provides the clue (33). Repeated rigors also point to such a diagnosis (27). Goodall (33) points out that it is frequently free from pain, and may be accompanied only by a very slight rise in the temperature with a rapid pulse. As a direct consequence many cases are undiagnosed.

Phlegmasia Alba Dolens, or the occurrence of thrombo-phlebitis in the deep saphenous veins is, however, much more frequent in its occurrence, and also much more easily diagnosed. It is usually fairly late in its onset, and may occur in a mild or severe case. One or both legs may be affected, and in addition to the greatly swollen white leg, with tenderness and tenseness of the calf muscles, the thrombosed veins can frequently be palpated in the femoral triangle.

If care is taken to keep the patient confined to bed for a lengthy period, the prognosis is usually good. Such cases should, however, be distinguished from aseptic thrombosis occurring in previously existing varicose veins, a condition not nearly so serious as phlegmasia, and which does not leave behind it the persistent swelling of the feet so often seen after "whiteleg".

Cases post abortum. The puerperium being the period of time following the termination of a pregnancy, during which the uterus returns to its pregravid condition, puerperal sepsis may just as readily follow abortion as full time labour. The line of differentiation between what is generally known as a "septic abortion" and puerperal sepsis following abortion is not very clearly defined. Frequently the term "septic abortion" is used when part of the chorion has been retained, and an offensive discharge follows. Using sepsis post partum as an analogy, however, it will at once be seen that a case of abortion with a piece of chorion inside the uterus is really a case of puerperal sepsis, as the finding of a piece of retained placenta or membranes in a case following labour does not alter the diagnosis of puerperal sepsis in such a case. Similarly, retained products of conception following abortion should rather strengthen the diagnosis of puerperal sepsis.

It is not possible to compare the incidence of sepsis post partum and post abortum, because there is no method of knowing how many abortions occur. The infection may spread from the uterus in the same way in both types of case, but it would appear that the incidence of the complications is not the same.

Watson (34) and Lash (35) have found in America that the incidence of peritonitis is much higher after abortion, and they state that, in consequence, the mortality is higher

in such cases. This they ascribe to the absence of an adequate defensive mechanism in the uterus in the early stages of pregnancy, which is developed as pregnancy proceeds.

The cases reviewed by Pyrah and Oldfield (32) did not confirm this finding with regard to peritonitis in this country.

SECTION D.

REVIEW OF 188 CASES OF PUERPERAL SEPSIS.

The review to follow includes all the cases of puerperal sepsis admitted to the County Hospital, Motherwell, in a two year period from October 1934 till October 1936. The cases where the diagnosis on discharge was altered, are not included.

It is not intended to furnish a complete clinical review of the cases, but simply to give an indication of the type and severity of the infection at the time when this work was carried out. A few of the more important salient features will be brought out.

TYPE OF INFECTION.

Table 1 shows the distribution of the cases into the different groups according to the type of infection present. Only one case of pelvic thrombo-phlebitis occurred, and, as it was associated with pelvic cellulitis, it has been included in that group. Thus all the cases classified as Thrombo-phlebitis were cases of Phlegmasia, so this term will be used in the review to follow.

Table 1.

	POST-PARTUM			POST-ABORTUM		
	Recvd.	Died	Total	Recvd.	Died	Total
LOCALISED INFECTION: (No toxaemia	65	0	65	10	0	10
(With toxaemia	24	0	24	4	0	4
SEPTICAEMIA	14	18	32	2	4	6
PERITONITIS	2	6	8	1	0	1
PELVIC CELLULITIS	10	0	10	5	0	5
PHLEGMASIA	22	0	22	1	0	1
TOTAL:	137	24	161	23	4	27

Mortality post partum = 14.9 per cent.
Mortality post abortum = 14.8 per cent.

Table 2 shows the comparative percentage of the different types of case post partum and post abortum.

Table 2.

	Post partum	Post abortum
LOCALISED INFECTION: (No toxaemia	40.37	37.04
(With toxaemia	14.91	14.81
SEPTICAEMIA	19.88	22.22
PERITONITIS	4.97	3.70
PELVIC CELLULITIS	6.21	18.52
PHLEGMASIA	13.66	3.70

Comparing the mortality post partum and post abortum, little difference is seen. Table 2 shows that in the local, septicaemic and peritonitis groups, the distribution of the cases is very much the same after full time delivery and after abortion, but the incidence of pelvic cellulitis is seen to be much higher after abortion, and the incidence of phlegmasia, greater after full time delivery. Thus the statements of Watson and others (34, 35) that puerperal sepsis is more fatal after abortion and that peritonitis in such cases is more frequent, is not substantiated, and the finding of Pyrah and Oldfield (32) is confirmed. A localised infection of the parametrium is, however, found to be much more frequent post abortum, and phlegmasia more frequent after full time delivery.

PARITY OF THE PATIENTS.

The number of cases following different pregnancies is seen in Table 3.

Table 3.

PARA.	1	2	3	4	5	6	7 and over
Cases. No.	74	29	23	16	7	15	24
%	39.36	15.42	12.23	8.51	3.72	7.97	12.76

It is at once seen that the largest proportion of the cases is subsequent to the first pregnancy. The succeeding

pregnancies are followed by progressively fewer cases until the fifth is reached, after which the incidence rises again. It must be remembered, however, that first pregnancies are much more frequent than subsequent ones, so that the high figure in that group may be of little significance, but the increasing incidence after the fifth pregnancy definitely suggests that with repeated pregnancies, the resistance of the patient becomes less. This finding agrees with figures published by FitzGibbon (36) based on the total maternal mortality.

The relationship between the type of infection and the parity of the patient is seen in Table 4.

Table 4.

PARA	Local	Toxic	Septicaemia			Peritonitis			Pelvic Cellulitis	Phlegmasia	Abortions		
			R	D	T	R	D	T			R	D	T
I	31	12	8	9	17	1	3	4	3	3	2	2	4
II	8	4	4	3	7	1	1	2	3	2	3	0	3
III	9	4	1	0	1	0	0	0	1	2	6	0	6
IV	4	0	1	3	4	0	0	0	2	3	2	1	3
V	2	1	0	0	0	0	1	1	1	2	0	0	0
VI	5	1	0	1	1	0	0	0	0	3	5	0	5
VII & over	6	2	0	2	2	0	1	1	0	7	5	1	6

R = Recovered, D = Died, T = Total.

As regards the distribution of the cases in general, it is seen that there is little departure from the average except in the groups of cases with phlegmasia and abortions, where an unusually large number of cases had had six and more pregnancies. In the part of the table showing the distribution of the fatal cases it is seen that practically all the cases of septicaemia and peritonitis with four and more pregnancies, die.

MODE OF DELIVERY.

In 84 cases, the delivery was unassisted, and in 77 there was interference. Table 5 shows the distribution of these cases according to the type of infection which followed.

Table 5.

	Local	Toxic	Septicaemia		Peritonitis		Pelvic Cellu-litis.	Phlegmasia
			R	D	R	D		
Forceps	26	10	6	9	2	4	3	7
Breech	5	2	1	1	0	0	0	1
Normal	34	12	7	8	0	2	7	14

R = Recovered, D = Died.

It is clearly seen that the cases where there was no interference predominate in the milder types of infection, while of the patients who died, the cases with interference are more numerous. This observation would appear to be of significance.

INFLUENCE OF HAEMORRHAGE.

In eleven cases only, was a definite history of haemorrhage obtained. Table 6 shows how this may influence the type of infection occurring.

Table 6.

	Local	Toxic	Septicaemia		Peritonitis		Pelvic Cellu-litis	Phlegmasia
			R	D	R	D		
Cases	2	1	3	3	0	0	1	1

R = Recovered, D = Died.

The figures are admittedly small, but it would appear from the table that haemorrhage predisposes to a septicaemic infection.

EFFECT OF LACERATION.

During delivery, the birth canal may become lacerated at any part. The commonest part is at the perineum, less commonly, the cervix uteri, the vaginal mucous membrane, and the vulva. In estimating the degree of laceration, the first group of "slight tears" includes the cases where the skin only is broken. In the second group are included cases where the laceration has gone into the perineal body, and the last group includes complete perineal tears, and extensive vaginal or vulvar lacerations in association with a perineal tear of the type included in the second group.

Lacerations were found in 98 patients, and none in 63. Of the 98 lacerations, 43 were slight, 35 were moderate, and 20 were extensive. The influence of tearing on the type of infection is seen in Table 7.

Table 7.

Showing the type of infection in relation to the degree of laceration.

	Local	Toxic	Septicaemia		Peritonitis		Pelvic Cellulitis	Phlegmasia
			R	D	R	D		
Laceration: Slight	18	7	5	4	0	0	5	4
Moderate	19	7	3	1	2	1	1	1
Extensive	5	4	2	6	0	3	0	0
Total:	42	18	10	11	2	4	6	5
None:	23	6	4	7	0	2	4	17

R = Recovered, D = Died.

In all the cases except those of phlegmasia, tearing was present in the majority. It is clearly seen that the incidence of fatal cases is much greater in the presence of extensive laceration.

These few tables may serve to indicate the type and severity of the cases upon which the observations to follow, were made.

They also show some of the factors which seem to determine the course which the infection will follow.

SECTION E.

THE TREATMENT OF PUERPERAL SEPSIS.

The great variety of methods suggested for the treatment of Puerperal Sepsis (37, 41, 42) testifies only to the comparative inefficacy of them all. A brief review of the chief methods used will perhaps not be out of place.

GENERAL TREATMENT.

In the treatment of septicaemia, indeed of any serious illness, it is agreed that general measures are of paramount importance in assisting the patient in his fight for recovery, and in no case is this more true than in puerperal sepsis (37, 41).

Chief among these is good and careful nursing (38), to avoid fatigue and ensure as much rest as possible. The diet should be nutritious and easily digested, and Horder (38) states that it should be pushed to the limits of digestive capacity. Mellanby (39), in 1929, reported 100 per cent. recovery in a series of cases of puerperal streptococcal septicaemia, which he attributed to the giving of large doses of vitamin A, and he suggests in consequence, that the diet should contain a high vitamin A content. His series was, however, small, and his findings have not been confirmed.

Copious fluids should be given (38, 40) to dilute and eliminate the toxins, and should contain glucose and

alkalis (38, 40). Elimination by other channels should also be encouraged (41). General hygiene, including fresh air, is essential (42), and indeed, treatment in the open air has been suggested (38, 41). The heart's action should be conserved and not over stimulated, and sleep should be assured by mild hypnotics if necessary.

LOCAL TREATMENT.

In any case of septicaemia, it is recognised that the primary focus of infection should be removed if possible (38, 40). This is difficult in puerperal sepsis, where the primary focus is the uterus and its lymphatics, and, in pyaemic cases, septic thrombi in the pelvic veins.

In the earlier part of this century, active measures were taken in an effort to remove infected material from the uterine cavity, including curettage (43), digital exploration (44), and écouvillonage, or the use of brushes (42). These measures were usually followed by packing or swabbing the inside of the uterus with antiseptics, or by the use of the intra-uterine douche (42).

These methods have now given place to more conservative lines of treatment. Complete 'masterly inactivity' is advocated by some (45), reliance being placed on postural drainage alone. In 1924, however, Hobbs (46) introduced a method of postural drainage assisted by glycerine carefully injected into the uterus through a soft rubber catheter. This method of treatment

enjoys the greatest popularity now, and is the method used in this series of cases.

Heroic measures have also been employed to remove the primary focus of infection, including hysterectomy (47), and ligation or excision of thrombosed pelvic veins (48).

In cases of generalised peritonitis, immediate laparotomy gives the only possible hope of recovery (27, 32), and in pelvic abscess, drainage is necessary, though warnings are given as to the mistake of operating too soon (32, 34, 49). Metastatic abscesses must also be drained.

Local Treatment Adopted. Hobbs' glycerine drainage, with the patient nursed in Fowler's position, was used in all cases. The original method suggested by Hobbs was modified by the addition of proflavine to the glycerine (1:1,000), and by the use of a large (No. 14) de Pezzer self-retaining rubber male catheter, which was left inside the uterus as suggested by Dame A. Louise McIlroy (50), glycerine and proflavine being injected every four hours. She suggests stitching the catheter in position, and leaving it for five or six days. In these cases, the catheter was held in position by inserting a gauze swab around it, just inside the vaginal orifice, and it was removed at the end of 48 hours, but if necessary, it could be reinserted.

SPECIAL METHODS OF TREATMENT.

No specific treatment has yet been found for puerperal sepsis. Chemical antiseptics and colloids have been given intravenously, sera, vaccines, protein shock, leucocyte stimulants, and blood transfusion have all been used without universal success (37, 42, 49, 51).

With regard to blood transfusions, many reports are to be found in the literature, favourable and otherwise.

Blood transfusion may be used in two ways, according to the method of selection of the donor. The donor may be immunised specially beforehand, or blood may be taken from a suitable donor not previously prepared.

Immunotransfusion.

In this method, the donor is immunised beforehand by vaccines specially prepared from the organisms cultured from the patient's blood (52), and some workers estimate the bactericidal power of the donor's blood after immunisation (53).

Clinically, good results have been obtained by this method (52, 53, 54, 55), and the opsonic index and agglutination titre of the patient's blood have been found to be increased after the transfusion (54, 56). Cadham (57) has had very good results using a combined rabbit and human serum from immunised donors.

The best results obtained by this method have been found in cases of endocarditis and in septicaemias where the course is prolonged, giving time for the preparation of the

vaccine and the immunisation of the donor. Stetson (58) has pointed out, however, that in the face of acute sepsis, there is seldom time for this preliminary work. In order to gain time, Unger (59) suggests the use of a nonimmunised donor with a high phagocytic index in the first place while the immunised donors are being made ready.

With immunotransfusion, however, expert bacteriological assistance must be at hand, and close co-operation between bacteriologist and clinician is necessary.

In this work, no attempt was made to immunise the donors, the investigation being confined to the effect of unmodified blood.

Unmodified Blood Transfusion.

Opinions vary as to the value of blood not specially prepared, and the literature contains numerous conflicting results of its use.

Stetson (58), discussing blood therapy in sepsis, states:-

> "We have a two-edged weapon - the power it has to overcome the secondary anaemia and build up the general condition of the patient, and the direct bactericidal action of the fresh blood on the infecting organism. The latter is, of course, the more variable."

I. Bactericidal Action. In an address on blood transfusion, Sir Humphry Rolleston (60), quoting the work of Sir Almroth Wright in support of his statement, ascribes bactericidal properties to fresh human blood in virtue of the leucocytes

acting in conjunction with the opsonic power of the serum, the serum having little direct effect. A similar statement is also made by Jayasuriya of Ceylon (61).

Using blood for such properties alone, conflicting results have been recorded. Favourable results have been obtained by Waugh (62), Brodhead (63), Thalhimer and Hogen (64), Stetson (58), Bacon (65), and favourable opinions expressed by Jayasuriya (61), Hofbauer (66), and Vogt (67). Very unfavourable and disappointing results were obtained by Keynes (68), Lederer (69), and Polayes and Morrison (70).

II. As a Supportive Measure. More recent reports on the value of transfusion in sepsis tend to stress this action of blood as more valuable than the bactericidal action.

Ottenberg and Libman (71), in 1915, pointed out that, particularly in prolonged sepsis, mere anaemia and exhaustion may be all that prevent the overcoming of the infection, and report good results from transfusion in such cases.

Dorrance (72), in 1917, stated that in infectious diseases, blood transfusion had no specific effect, but if there was any anaemia present, there was a temporary improvement.

In 1930, Landon (73), discussing infectious diseases in general, found that as a general tonic in protracted cases in which anaemia and malnutrition develop, the use of transfusion is strongly indicated.

Sir Thomas Horder (38), discussing the treatment of septicaemia, states that blood transfusion is definitely useful,

but chiefly to combat the anaemia due to haemolysis.

Martland (74) believes that supportive blood transfusion is the only treatment of any value, and Watson (34) considers blood transfusion as his standby in puerperal sepsis, and transfuses if the patient is losing ground or showing progressive anaemia, giving repeated small transfusions every three or four days.

It has been pointed out (75) that considerable care is necessary in judging the efficacy of any therapeutic measure in puerperal sepsis, because of the misleading nature of the illness. Recoveries and deaths depend on too many other factors, including the virulence of the organism and the resistance of the patient, to be of any value in assessing the worth of any one measure, without controls, and accurate controls in puerperal sepsis are well nigh impossible to obtain. This may account for the conflicting results obtained with blood transfusion as a general therapeutic measure. Such methods as estimating the bactericidal power of the blood, the opsonic index, complement estimations and other serological tests require a high degree of skill in bacteriological methods.

If the power of transfusion to combat anaemia is now being regarded as the more important in the treatment of sepsis, it would not appear to be unreasonable to use the anaemia frequently seen accompanying puerperal sepsis as a suitable guide both as an indication for, and to estimate the value of, blood transfusion as a therapeutic measure.

In order to use it as a guide, however, the peculiar nature of the anaemia in puerperal sepsis must first of all be studied.

PART II

on

ANAEMIA AS A CLINICAL FEATURE

IN

PUERPERAL SEPSIS.

SECTION A.

ON THE AETIOLOGY OF ANAEMIA IN PUERPERAL SEPSIS.

INTRODUCTORY.

A marked anaemia is a frequent feature in many cases of puerperal sepsis. Some idea of its severity and of its reaction to treatment will be seen later. The purpose of this section is to review the aetiological factors giving rise to it.

In recent years, the whole subject of anaemia has undergone considerable revision, owing to the great advance which has been made in the conception of blood formation, and, following on that, the better understanding of the factors responsible for the production of anaemia. The aetiological factors being now more clearly differentiated, the classification of the anaemias has of necessity been undertaken on a sounder basis than underlay that given in the textbooks of a few years ago. For example, in two textbooks dated 1930 (76, 77), the anaemias are divided simply into two groups, Primary or Idiopathic, and Secondary or Symptomatic.

Classification of Anaemia.

The modern conception of haemopoiesis is clearly expressed in the writings of Witts (78), Turnbull (79), and Davidson (80). Using the aetiological factors as far as they are known, various writers have suggested methods of classifi-

cation (80-84), which differ in detail and nomenclature, but which are essentially the same. Four distinct groups are recognised:-

I. Post haemorrhagic Anaemias.

II. Anaemias due to Nutritional Deficiency. This group includes

(a) Megalocytic anaemias of various types, including Addisonian anaemia.

(b) Microcytic anaemias, due to deficient intake or utilisation of iron.

(c) Deficiency of other substances, including vitamin C, and thyroxin.

III. Haemolytic Anaemias, from various causes.

IV. Aplastic Anaemias, partial or complete.

Nomenclature.

As there still exists some difference of opinion as to exact terminology, a definition of some of the terms to be used subsequently will be of advantage at this stage.

In the classification of anaemia, Vaughan (82) includes all the cases in groups II and IV under the single name of "Dyshaemopoietic anaemia", and Witts (81) and Cappell and McCluskie (83) use the terms "Anhaemopoietic" and "Dyspoietic" respectively for cases in group II. As the defect appears to be essentially nutritional, Davidson's nomenclature (80) has been adopted, but as this group includes both megalocytic and microcytic anaemias, the term nutritional anaemia will be reserved for cases where the defect appears to be in the supply of iron, and the older name, Addison's anaemia, will be used

to indicate the megalocytic type.

The term 'haemopoietic system' is used to indicate the blood forming organs in general (78, 80, 85) in preference to the term 'haematopoietic' used by Vaughan (82).

The words 'hypochromic' and 'microcytic' are used in the literature as synonymous, but each has its own particular meaning. Both are associated with anaemia with a low colour index, but, without measuring the mean corpuscular diameter, or estimating the haematocrit readings and cell volume index, it is not possible to distinguish between them. As these estimations were not carried out in this investigation, the term 'hypochromic' will be used throughout in cases with a low colour index. With reference to cases with a colour index over unity, Witts (78) has pointed out that this is always associated with megalocytosis, but for the sake of consistency, the term 'hyperchromic' will be used in reference to such cases.

AETIOLOGICAL FACTORS CONCERNED.

The anaemia associated with puerperal sepsis may be the continuance of a pre-existing anaemia, or it may be produced by the sepsis itself. A detailed study of these two factors is desirable.

I. Pre-existing Anaemia.

This may be further subdivided into anaemia before, during or after pregnancy.

A. Anaemia before pregnancy. It has been pointed out that, during reproductive life, women frequently suffer from a progressive anaemia of a hypochromic nature. Recent work has shown that this may be of two types:-

(a) The type originally described by Witts (86), and frequently associated with his name. It is accompanied by defective secretion of hydrochloric acid in the stomach, and is referred to by Witts as "Simple achlorhydric anaemia".

(b) Davidson and his co-workers (87, 88) in a very thorough investigation into the diet of the poorer classes in Aberdeen, have found that the iron content is very much below the minimum requirements of the body, and they have shown that a nutritional anaemia is very prevalent in women, particularly during the reproductive period.

B. Anaemia during pregnancy. This has been the subject of a considerable amount of work in the past few years (89-101). The majority of the workers agree that the most important of this group of anaemias is one of hypochromic nature, similar to, but more severe than those seen in women apart from pregnancy.

Strauss and Castle (90) have shown that, during pregnancy, the secretion of hydrochloric acid in the stomach is frequently diminished, and that this is directly associated with the degree of anaemia occurring (92), because, as has been shown by Mettier and Minot (102), iron is best absorbed from an acid medium. This hypochlorhydria usually clears up after parturition (91), but Davies and Shelley (96), studying a series of cases where the anaemia dated from a previous pregnancy, found that in some cases, particularly in women with

many pregnancies, the hypochlorhydria persists and the anaemia gradually merges into the achlorhydric anaemia of Witts. In a series of cases during pregnancy, they found that the presence of a normal gastric juice was associated with the absence of anaemia.

Deficiency of the diet and the demands of the foetus also play a considerable part in the production of this anaemia (89, 96, 98, 99). Fullarton, however, has shown (103) that the iron loss from menstruation in 18 months is as great as that lost to the foetus, at parturition, and during lactation. He believes (100) that pregnancy alone seldom produces a severe anaemia, unless previously existent, in which case it might become more obvious by physiological hydraemia. Smallwood (99), however, believes that this so-called physiological anaemia of pregnancy seldom reduces the haemoglobin level below 80 per cent.

The other types of anaemia associated with pregnancy, such as the so-called Pernicious Anaemia of Pregnancy, and the Tropical Megalocytic Anaemia, are rarely seen in this country.

C. Anaemia from haemorrhage at parturition. Although haemorrhage is mentioned as a cause of anaemia in pregnancy in most of the works quoted (89, 93, 95, 97, 98, 99), it is passed over without further discussion. Wide variations in blood loss at parturition occur, however, and if excessive, severe hypochromic anaemia will result (100, 105).

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It is thus obvious that many patients may suffer from anaemia before the onset of puerperal sepsis. Indeed, it has been stated that the presence of anaemia may predispose to the occurrence of sepsis (94, 98, 104), and Witts states that anaemic patients are particularly unresistant to streptococcal infections (107).

II. Anaemia occurring as part of Puerperal Sepsis.

In 1919, Sir William Osler (105) pointed out that a severe anaemia frequently occurs in association with puerperal sepsis, and at that time, he stated that it was an anaemia not sufficiently recognised or studied. In the works referred to on anaemia of pregnancy, although puerperal sepsis is mentioned by some of the writers (93, 95, 98, 99) as one of the causes, all dismiss the subject without further discussion.

Puerperal sepsis, however, may produce anaemia or further accentuate a previously existing one, and it would appear to do so in two ways.

A. Hypochromic Anaemia associated with Sepsis. In most of the works on anaemia (80, 82, 83, 84, 85), sepsis is mentioned as one of the factors having an inhibitory effect on haemopoiesis. It is believed (80, 83) to be of a partially aplastic nature, but little is known as to its exact aetiology, and most writers are content to state that it improves when the sepsis has been eradicated, and that large doses of iron are required to maintain a satisfactory blood picture in such cases.

B. Haemolytic Anaemia of bacterial origin. Haemolytic anaemia associated with the bacillus Welchii is mentioned by Vaughan (106), but she makes no mention of the possibility of blood destruction in vivo by the toxins of the haemolytic streptococcus. Dyke (84) makes no mention of it either, and though it is mentioned by Davidson (80) and Cappell and McCluskie (83), no comments are offered. Witts (107), discussing the subject in general, states that it is exceedingly uncommon for ordinary streptococci to cause haemolytic anaemia, but that anaerobic streptococci, such as are often responsible for puerperal sepsis, are more potent. He gives first place to the bacillus Welchii, but classes gas gangrene and puerperal sepsis as the only two infections in which the occurrence of haemolytic anaemia due to the direct action of the bacterial toxins, is not uncommon. He qualifies this with a warning, however, that anaemic patients are very unresistant to infection, especially by streptococci, and states that many mistakes have been made in attributing anaemia to the infection where a more complete history would have shown that the infection was the complication or termination of a pre-existing idiopathic anaemia.

Lea (108) states that the average loss of red cells varies from 200,000 to 1,000,000 per week, and in some instances the count may be reduced to 1,500,000 or even as low as 500,000 per c.mm. Emery (109) states that a loss of 50,000 corpuscles per c.mm. and 2-5 per cent. haemoglobin may be expected per diem.

SUMMARY.

The foregoing discussion shows that many factors are at play, independently or together, in producing the anaemia associated with puerperal sepsis. The most important of these may be tabulated thus:-

PRE-EXISTING ANAEMIA:

Before Pregnancy:

Achlorhydric Anaemia of Witts.
Nutritional Iron Deficiency Anaemia.

During Pregnancy:

Hypochromic Anaemia from
Deficient absorption of iron.
Dietary deficiency in iron.
Increased demands of the foetus.

Other rare forms of Anaemia in pregnancy.

After Pregnancy:

Anaemia from ante-partum or post-partum haemorrhage.

ANAEMIA AS PART OF PUERPERAL SEPSIS:

Aplastic Anaemia
associated with sepsis in general.

Haemolytic Anaemia
from haemolysis by the toxins of the streptococcus haemolyticus.

A close study of this summary shows that there are really only two fundamental causes of the pre-existing anaemia, namely dietary deficiency, in some cases aggravated by achlorhydria, and haemorrhage at parturition. For the anaemia

occurring during the infection, there are also two types, an aplastic and a haemolytic type. This grouping of the causes will be used in the subsequent discussions.

SECTION B.

OBSERVATIONS ON THE BLOOD IN 106 CASES ON ADMISSION.

In the previous section, the aetiological factors producing the anaemia in puerperal sepsis were discussed. When the cases are admitted to an isolation hospital, however, the anaemia is present, and frequently it is impossible to deduce from the history available, which of these factors have been at play in its production. This section is, therefore, devoted to a study of the incidence and severity of the anaemia as present on admission, and an attempt made to correlate it with any relevant information available, and to ascertain if it has any prognostic significance. The course of the anaemia throughout the disease will be studied in a later section.

HAEMATOLOGICAL METHODS USED.

In this and subsequent sections, the blood examinations were carried out as detailed here.

1. Haemoglobin Estimation. Haldane's haemoglobinometer was used, the blood being pipetted into distilled water. A new standard control colour was obtained at the beginning of the investigations, so that accuracy might be ensured.

2. Red Cell Count. The blood was collected in standard pipettes, and diluted 1 in 200 with Hayem's solution. The count was made in Brandt's haemocytometer, cohesion between the coverglass and the slide being obtained by the use of a minute quantity of vaseline. The production of Newton's lines was taken to indicate satisfactory cohesion. This instrument was chosen because the scale is spread over an area of 4 sq. mm.; and the cells were counted in 240 squares each 1/400 sq. mm. in area, the final calculation being made by multiplying the total by ten thousand, and dividing by three.

3. Blood Films were made in the usual way on plain glass slides, and stained by Leishman's method.

INCIDENCE AND SEVERITY OF ANAEMIA ON ADMISSION.

In 106 cases where the blood was examined on admission, varying degrees of anaemia were found, the haemoglobin percentage varying from 23 to 90. In Table 8, the cases have been grouped according to the degree of anaemia present, judged both by the cell count and the haemoglobin percentage. The groups rise by half million steps from one million to four million for the cell count, and from twenty to eighty per cent. by ten per cent. steps for the haemoglobin. The groups at either end show the number of cases above and below these limits. The percentage of cases in each group is also shown.

Table 8.

Showing the incidence and severity of anaemia on admission.

R.B.C.Millions	-1	1-1.5	1.5-2	2-2.5	2.5-3	3-3.5	3.5-4	4 & over
Haemoglobin %	-20	21-30	31-40	41-50	51-60	61-70	71-80	80 over
Cases in R.B.C. group.	0	6	14	16	22	18	14	16
Cases in haemoglobin group.	0	12	17	17	31	11	11	7
% cases R.B.C. group.	0	5.6	13.2	15.1	20.8	17	13.2	15.1
% cases in haemoglobin group.	0	11.3	16.1	16.1	29.2	10.4	10.4	6.6

Percentage of cases under 3 million = 54.7
" " " " 2 " = 18.8
" " " " 60% = 72.6
" " " " 40% = 27.3

Table 8 shows that anaemia is a feature of major importance in puerperal sepsis, and one demanding more than passing attention. It is also seen that the haemoglobin values record a more severe anaemia than the cell count, so it may be assumed that, on the whole, the anaemia is of a hypochromic nature.

Standard Adopted in Estimating the Severity of the Anaemia.

Davidson (88) classifies as severe anaemia in adults all cases with a haemoglobin value below 70 per cent. If this standard were adopted in this series, 83 per cent. of the cases would be allocated to this group. For convenience, there-

fore, the following standards will be used in the discussions to follow.

Normal blood value:- 88-108 per cent. (98±10) haemoglobin (Davidson(88)).
Mild anaemia:- over 60 per cent. haemoglobin.
Moderate anaemia:- 41-60 per cent. haemoglobin.
Severe anaemia:- Under 40 per cent. haemoglobin.

Table 8 thus shows that 45.3 per cent. of the cases had moderate anaemia, and 27.3 per cent., severe.

THE INFLUENCE OF THE INDIVIDUAL AETIOLOGICAL FACTORS.

A review of all the cases was made to ascertain from the history in how far the individual aetiological factors had been at play in the production of the anaemia. It was at once obvious that such a review would be fruitless in all except the cases with severe anaemia, as the histories given were, in many cases, unsatisfactory, making it impossible to associate the anaemia with any particular feature of the case.

Review of Cases with Severe Anaemia.

Of the 29 cases with a haemoglobin value below 40 per cent., 23 were after full time delivery, and 6 were after abortions. Table 9 shows the distribution of the cases according to the cause of the anaemia as far as could be ascertained.

Table 9.

Cause of Anaemia.		Number of cases.
HAEMORRHAGE:		
Actual	9	
Presumed	4	
Abortions	2	
Total		15
NUTRITIONAL:		
Post partum	7	
Post abortum	2	
Total		9
OTHERS:		
Addison's	1	
Chronic Nephritis	2	
Toxaemia of Pregnancy	1	
Prolonged Septicaemia	1	
Total		5
		29

The cases where haemorrhage has been presumed were cases where the history of considerable interference, and the presence of extensive laceration, made the likelihood of haemorrhage very great. Nutritional anaemia has been assumed when the patient gave a history of pallor of long duration, and where no other cause for the anaemia could be found. Further discussion of these individual points will follow.

The Effect of Haemorrhage.

In 106 cases, a definite history of haemorrhage was obtained in 14, and presumed in 4, making a total of 18, or 16.9 per cent. As all these cases had a haemoglobin value

below 50 per cent., it seems obvious that only the occurrence of severe haemorrhage has been reported, and it must be assumed that haemorrhage of a lesser degree was responsible for a proportion of the cases classified as moderate anaemia. Haemorrhage is seen in Table 9 to have been responsible for half the cases of severe anaemia, but whether the same proportion of cases in the moderate group owed their anaemia to this cause is a matter for conjecture.

Causes other than Haemorrhage.

It has been shown in Table 9 that, apart from haemorrhage, the commonest cause of severe anaemia was of a nutritional nature. This nutritional group included 5 cases of phlegmasia alba dolens, and anaemia in this type of infection will be discussed later. Of the causes classified as 'others' in the table, chronic nephritis is well known to be associated with a very refractory type of anaemia (110, 111), and toxaemia of pregnancy of the pre-eclamptic type is also associated with anaemia (112).

As with haemorrhage, however, the case histories were of little value in assessing the cause of the anaemia in the moderate group. The remainder of this section will, therefore, be devoted to an attempt to correlate the degree of anaemia with various relevant factors.

ASSOCIATION BETWEEN THE ANAEMIA AND THE MODE OF DELIVERY.

Tables 10 and 11 show the relationship between the degree of anaemia and the mode of delivery.

Table 10.

Showing the classification of the cases according to the haemoglobin value.

Delivery	Haemoglobin per cent.							
	-20	21-30	31-40	41-50	51-60	61-70	71-80	over 80
Normal	0	5	6	5	13	4	2	4
Interference	0	4	8	10	14	6	5	3
Abortions	0	3	3	2	4	1	2	2

Table 11.

	Normal Delivery	Interference	Abortions	Cases with haemorrhage
Total cases	39	50	17	12
Cases under 50% Hb.	16 41%	22 44%	8 47%	12 100%
Average Hb.%	53.2	53.7	53.0	36.0
Cases with haemorrhage. Ave. Hb.%	6 36.3	6 35.7	- -	- -
Average Hb.% others.	56.2	56.1	-	-

The tables show that the percentage of cases with a haemoglobin value of less than 50 per cent. was greatest in abortions, and greater in cases where there had been interference than in those where the delivery was normal. The average haemoglobin percentage for the two groups post partum was almost identical, the similarity being even more marked when the cases associated with severe haemorrhage have been removed. The level for the cases post abortum was lower than that for the cases post partum.

Thus it may be concluded:-

(i) that actual interference does little to influence the blood picture unless accompanied by severe haemorrhage, and

(ii) that the severity of the anaemia is greater after abortion than after full time delivery.

RELATIONSHIP BETWEEN THE ANAEMIA AND THE DAY OF ONSET IN THE PUERPERIUM.

The rise in the haemoglobin content after haemorrhage or after severe anaemia of pregnancy is relatively slow, and cannot be measured in daily improvement, so this consideration is unlikely to affect the blood picture. This section might, however, indicate whether the presence of severe anaemia in any way influences the day of onset of the disease.

Nine of the cases with severe haemorrhage took ill within the first four days of the puerperium. The other three

were well until a week or more had elapsed.

Of twenty three cases with severe anaemia, seven began on the first day of the puerperium, thirteen before the fourth day, and ten were delayed beyond the end of the first week. Of these ten cases, six were cases of phlegmasia, in which condition the onset is always late.

Table 12.

Showing the relationship between the anaemia and the day of onset in the puerperium.

	Day of Onset in the Puerperium						
	1	2	3	4	5	6	later
Total cases	15	14	9	15	7	7	22
Average Hb.%	46.4 **51.27**	63.1 **53.34**	52.3 **55.41**	56.7 **57.48**	56.0 **59.55**	64.3 **61.62**	46.2
Cases under (a) 60% Hb.	14 93.3%	7 50.0%	8 88.8%	9 60.0%	5 71.4%	3 42.9%	19 86.4%
(b) 40% Hb.	7 46.6%	1 7.1%	2 22.2%	3 20.0%	0 0%	0 0%	10 45.4%

Trend values in red.

Figures 1 and 2, showing relationship between the Anaemia and the Day of Onset in the Puerperium.

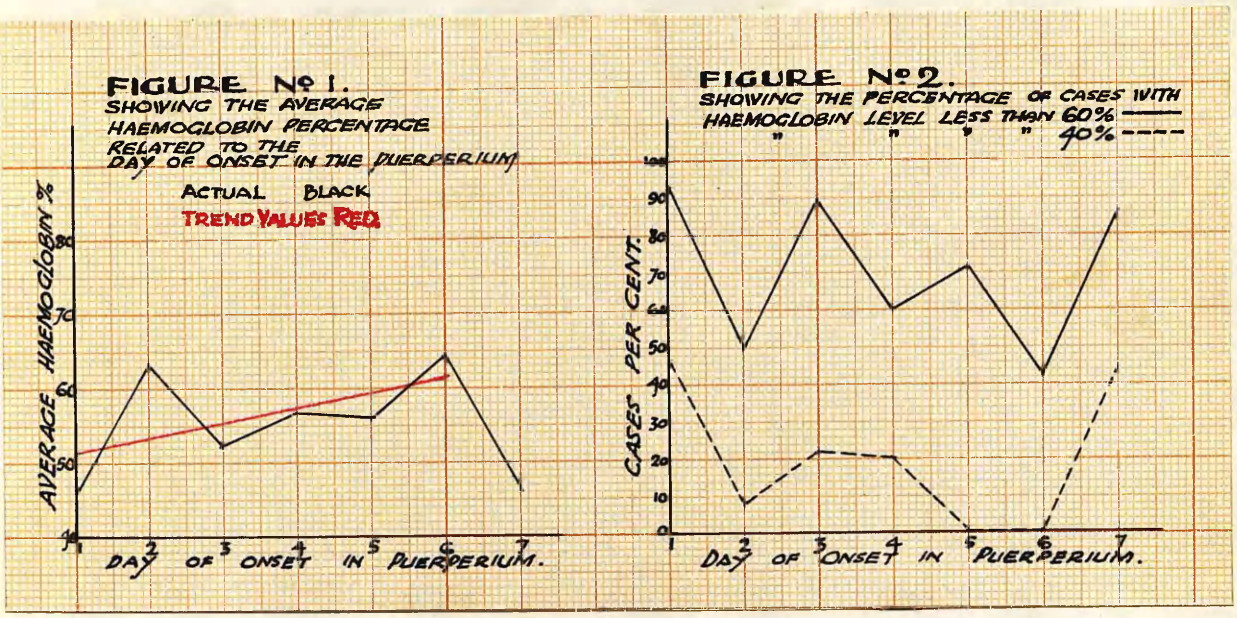


Table 12 and Figure 1 show that the average haemoglobin level in cases occurring on each of the first six days of the puerperium was lowest on the first day, and, with some irregularity in the graph, gradually rose to its highest point on the sixth day. The trend values, shown in red, calculated for the first six days by the method of least squares, bear this out. In the same way, as is seen in the table, and in Figure 2, the proportion of cases under 40 per cent. haemoglobin was greatest on the first day, gradually falling to zero on the fifth and sixth days. In cases where the onset was delayed for a week or more, however, the average haemoglobin level was low, and the incidence of

severe anaemia high, mainly on account of the large number of cases of phlegmasia in this group.

Thus it would appear that the presence of a severe anaemia tends to hasten the onset of the illness in the puerperium. This might be expected in view of the statement made on page 42 that anaemia predisposes to the occurrence of sepsis (94, 98, 104, 107).

Having survived the first few days, the very anaemic patients make up a large proportion of cases where the onset is late; and the majority of those being cases of Phlegmasia, it would appear that severe anaemia may play some part in the production of this condition. These figures, though giving an indication of the state of affairs, cannot be regarded as accurate, as the blood counts were done on the admission of the cases to hospital, and make no allowance for the time during which the illness was progressing beforehand. How this alters the picture is seen in the next subsection.

RELATIONSHIP BETWEEN THE ANAEMIA AND THE DAY OF DISEASE ON ADMISSION.

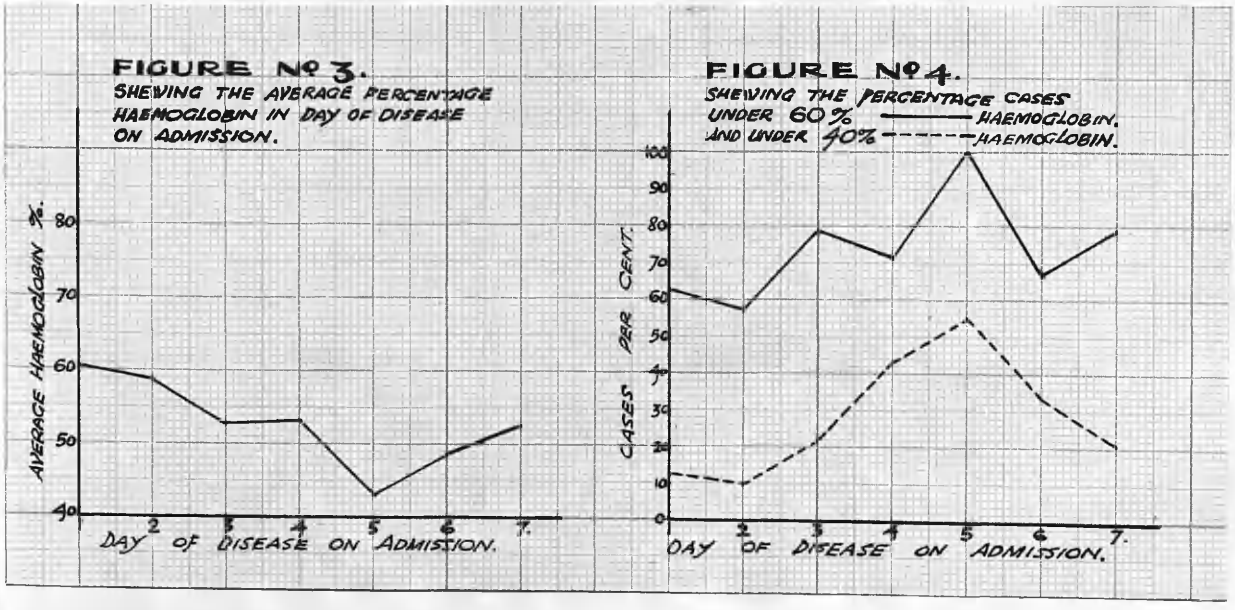
Table 13 and Figure 3 show that the average haemoglobin percentage for cases admitted in the first five days of the disease gradually fell from 60.7 for cases admitted on the first day, to 43.0 for cases admitted on the fifth day.

Table 13.

Showing the relationship between the anaemia and the day of disease on admission.

	Day of Disease on Admission						
	1	2	3	4	5	6	later
Total cases	8	21	14	14	9	9	14
Average Hb. %	60.7	58.5	52.9	53.2	43.0	48.5	52.4
Cases under (a) 60% Hb.	5 62.5%	12 57.1%	11 78.6%	10 71.4%	9 100%	6 66.6%	11 78.6%
(b) 40% Hb.	1 12.5%	2 9.5%	3 21.4%	6 42.8%	5 55.5%	3 33.3%	3 21.4%

Figures 3 and 4, illustrating Table 13.



Thus it would appear that the longer the disease progresses, the more severe does the anaemia become. This is confirmed by Figure 4, in which it is seen that the percentage of cases under 40 per cent. haemoglobin rose from 12.5 on the first day to 55.5 on the fifth, and the cases under 60 per cent. haemoglobin rose from 62.5 on the first day to 100 per cent. on the fifth.

Figures 4 and 5 both show, however, that the anaemia present in cases who had been kept at home for six or more days was less severe than that in cases admitted on the fourth and fifth days. This seems peculiar, but the explanation is that the majority of cases kept at home as long as a week were milder and therefore the degree of blood destruction less.

Thus, generally speaking, the degree of anaemia progresses as the patient is kept longer untreated, a fact which may account for the number of irregularities seen in Figures 1 and 2.

RELATIONSHIP BETWEEN THE ANAEMIA AND THE AGE OF THE PATIENT.

In Table 14 and Figure 5 it is seen that the average haemoglobin level varied only slightly from one age group to another, being highest in the group under 20 years, and lowest in the group 26-30 years.

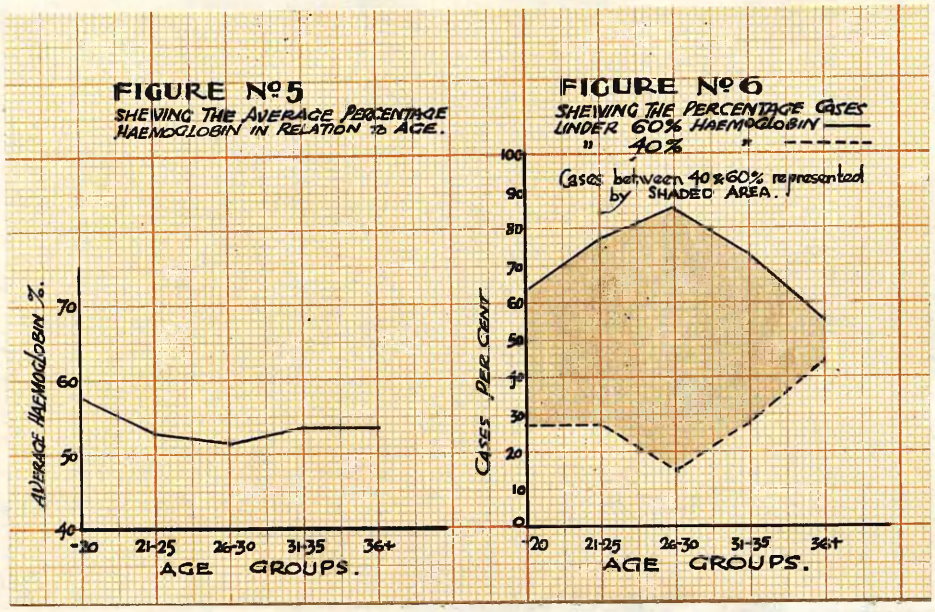
Table 14.

Showing the relationship between the anaemia and the age of the patients.

	Age Groups				
	-20	21-25	26-30	31-35	36+
Total cases	11	22	26	29	18
Average Hb. %	57.7	52.8	51.8	53.6	53.3
Cases under (a) 60% Hb.	7 63.6%	17 77.0%	22 85.4%	21 72.4%	10 55.5%
(b) 40% Hb.	3 27.3%	6 27.3%	4 15.4%	8 27.6%	8 44.4%

Table 14 and Figure 6 show that in the age group 26-30, most of the cases had a haemoglobin value between forty and sixty per cent., very few indeed being outside this limit; whereas in the age group of 36 and over, the number of cases with a haemoglobin percentage between forty and sixty was very small, the majority of the cases being either over sixty or under forty.

Figures 5 and 6, illustrating Table 14.



A detailed study of the cases with a haemoglobin percentage of forty and less showed that in the age group 26-30, all in this category had a history of haemorrhage, or indications pointing to the likelihood of haemorrhage, while in the age group 36 and over, only three of eight cases had a history of haemorrhage, the other five coming under the heading of 'other causes', indicating in this group the presence of a severe anaemia, probably nutritional in origin. In Table 15, showing the comparative distribution of the cases according to the cell count and the haemoglobin percentage, it is seen that the disparity in the distribution of the cases according to the two methods was obvious in the higher age groups, beginning to manifest itself in the age

group 26-30, and becoming more pronounced as the age increased. This would indicate that this nutritional anaemia is of a progressive hypochromic nature.

Table 15.

Showing the comparison between the cell count and the haemoglobin percentage according to the age of the patient.

R.B.C.Millions	-1	1-1.5	1.5-2	2-2.5	2.5-3	3-3.5	3.5-4	4+
Haemoglobin %	-20	21-30	31-40	41-50	51-60	61-70	71-80	80+
Age -20	0 **0**	0 **1**	3 **2**	1 **2**	2 **2**	1 **0**	1 **3**	3 **1**
" 21-25	0 **0**	2 **3**	4 **3**	1 **2**	4 **9**	4 **3**	4 **1**	3 **1**
" 26-30	0 **0**	1 **1**	2 **3**	5 **9**	8 **9**	7 **2**	2 **1**	1 **1**
" 31-35	0 **0**	2 **5**	4 **3**	3 **4**	8 **9**	3 **2**	5 **3**	4 **3**
" 36+	0 **0**	1 **2**	1 **6**	6 **0**	0 **2**	3 **4**	2 **3**	5 **1**

Classification according to the cell count - Black.
Classification according to the haemoglobin - Red.

Fullarton (103) has shown that in both pregnant and non pregnant women, a hypochromic anaemia of nutritional origin manifests itself and gradually progresses throughout reproductive life, becoming most pronounced between the ages of 35 and 45. While this nutritional anaemia would explain the large proportion of cases with moderate anaemia in the age group 26-30, and the high incidence of severe anaemia in the

group "36 and over", it does not explain the large proportion of cases in the last group with a haemoglobin percentage over sixty.

Of eight such cases, four were mild, three were abortions and one was a case of septicaemia. The explanation might be that while a high haemoglobin level may protect a patient in the lower age groups from a mild infection, it does not have the same effect in older patients.

RELATIONSHIP BETWEEN THE ANAEMIA AND PARITY.

Table 16 and Figures 7 and 8 show the relationship between the anaemia and the parity of the patients.

Table 16.

	Number of Pregnancies					
	1	2	3	4	5 & 6	over 7
Total cases	40	13	12	14	13	14
Average Hb. %	53.2	57.8	58.9	55.3	42.4	53.3
Cases under (a) 60% Hb.	29 72.5%	9 69.2%	8 66.6%	10 71.4%	12 92.0%	9 64.3%
(b) 40% Hb.	10 25.0%	2 15.4%	2 16.6%	4 28.5%	7 54.0%	4 28.5%

Figures 7 and 8.

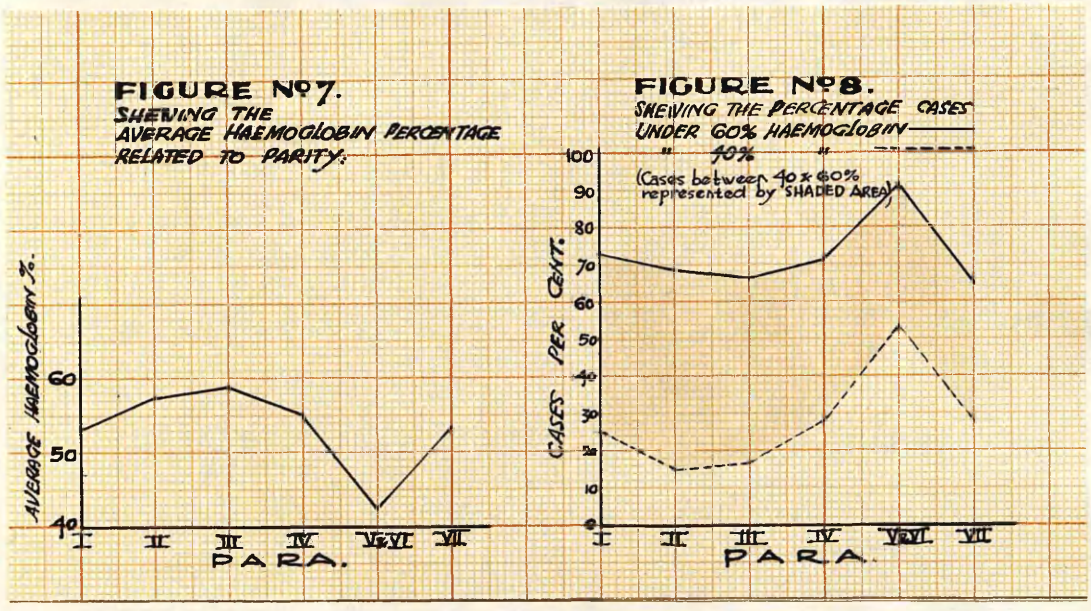


Table 16 and Figure 7 show that the average haemoglobin level in cases following the first pregnancy was lower than that in cases following the second and third. It then fell somewhat in cases following the fourth pregnancy, and very markedly in the group of cases who had had five or six, and to a less extent in cases who had seven or more pregnancies.

Figure 8 shows the proportion of cases with a haemoglobin value under sixty and under forty per cent. The similarity between the two graphs indicates that the proportion of cases falling between forty and sixty per cent. haemoglobin was practically constant, and that the fluctuation in the average haemoglobin level as seen in Figure 7

was influenced only by the number of cases of severe anaemia. A review of this group of cases, therefore, may provide the explanation of the factors underlying the variations. Table 17 shows the distribution of these cases according to the cause.

Table 17.

Showing the cause of severe anaemia according to parity.

Cause of Anaemia.	Number of Pregnancies					
	1	2	3	4	5 & 6	7+
Haemorrhage	8	1	1	2	2	1
Nutritional	2	1	1	2	5	3
Total	10	2	2	4	7	4

It is seen from the table that, in the first group, the fairly high percentage of cases with severe anaemia was due mainly to cases of haemorrhage. In the second, third and fourth groups, the numbers were small, but the cases were equally divided between haemorrhage and nutritional causes. In the fifth and sixth groups, most of the cases were nutritional in origin, corresponding with those in the higher age groups. Table 18 confirms the falling colour index in the last three groups.

Table 18.

Showing the comparative distribution of the cases according to the cell count and haemoglobin level.

R.B.C. Millions	-1	1-1.5	1.5-2	2-2.5	2.5-3	3-3.5	3.5-4	4+
Haemoglobin %	-20	21-30	31-40	41-50	51-60	61-70	71-80	80+
Para I	0 **0**	2 **4**	7 **6**	5 **8**	10 **11**	6 **5**	5 **5**	5 **1**
Para II	0 **0**	1 **1**	1 **1**	1 **2**	1 **5**	4 **1**	3 **1**	2 **2**
Para III	0 **0**	0 **1**	3 **1**	1 **3**	3 **3**	0 **0**	1 **2**	4 **2**
Para IV	0 **0**	1 **1**	0 **3**	2 **0**	3 **6**	5 **2**	2 **1**	1 **1**
Para V and VI	0 **0**	2 **5**	3 **2**	2 **2**	2 **3**	2 **0**	2 **1**	0 **0**
Para VII and over	0 **0**	0 **0**	0 **4**	5 **2**	3 **3**	1 **3**	1 **1**	4 **1**

Classification according to cell count - Black.
Classification according to haemoglobin- Red.

The very low figure of the average haemoglobin percentage in the "para 5 and 6" group, and the higher figure in the "para 7 and over" group was somewhat unexpected. Reviewing the distribution of the cases in the age group "36 and over", it was seen that most of the cases with a low blood value fell into the "para 5 and 6" group, the higher values being distributed between the lower and higher parities. This may be coincidence, but if it is not, no ready explanation is available.

PROGNOSTIC SIGNIFICANCE OF THE ANAEMIA.

It was seen on page 53 that the degree of anaemia following abortion was greater than that following full time delivery. As the total number of abortions was too small for subdivision, these cases have been included with the others in their appropriate groups.

Table 19.

R.B.C. Millions	-1	1-1.5	1.5-2	2-2.5	2.5-3	3-3.5	3.5-4	4+
Haemoglobin %	-20	21-30	31-40	41-50	51-60	61-70	71-80	80+
Local Infection	0 **0**	1 **3**	4 **4**	2 **2**	6 **7**	5 **3**	5 **5**	3 **2**
Toxaemia	0 **0**	1 2	4 **2**	2 **4**	5 **7**	3 **1**	1 **1**	2 **1**
Septicaemia and Peritonitis - Recovd.	0 **0**	3 **2**	1 **1**	1 **4**	2 **5**	3 **1**	2 **3**	6 **2**
Deaths	0 **0**	0 **1**	3 **6**	7 **4**	3 **4**	2 **3**	2 **1**	4 **2**
Pelvic Cellulitis	0 0	0 0	0 0	0 0	2 **4**	1 **2**	2 **0**	1 **0**
Phlegmasia	0 **0**	1 **4**	2 **4**	4 **3**	4 **4**	4 **1**	2 **1**	0 **0**

Cases according to cell count shown in Black.
Cases according to haemoglobin shown in Red.

In Table 19, the degree of anaemia on admission is shown in relation to the type of infection which occurred, according to the classification adopted. For possible prognostic significance, the deaths have been put into a group

by themselves. The degree of anaemia is shown as judged both by the blood count and the haemoglobin percentage.

Table 20 shows the proportion of cases in each group with a haemoglobin percentage of less than sixty and under forty.

Comparing the "local" and "toxic" groups, it is seen that, although the percentage of "toxic" cases under sixty per cent. haemoglobin was greater, the proportion under forty was less than in the "local" group. Thus it may be inferred that the presence of anaemia rather predisposes to a "toxic" infection, but the higher figure for severe anaemia in the "local" group suggests a very mild infection in some of these cases, which might not have arisen had the blood value been higher.

Comparing the recoveries and the deaths in the septicaemia and peritonitis groups, it is seen that the incidence of anaemia, particularly of severe degree, was greater in those who died, suggesting that the presence of a severe anaemia tends to adduce to a fatal conclusion.

The group of cases of pelvic cellulitis shows that severe anaemia was not a feature of this type of infection. The reverse, however, is seen in the "phlegmasia" group, where the incidence both of moderate and severe anaemia was exceptionally high.

Table 20.

	Type of Infection					
	* A	B	C	D	E	F
Total cases	26	18	18	21	6	17
Cases under (a) 60% haemoglobin	16 61.5%	15 83.3%	12 66.7%	15 71.4%	4 66.6%	15 88.2%
(b) 40% haemoglobin	7 26.9%	4 22.2%	3 16.7%	7 33.3%	0 0%	8 47.1%

* A = Local Infection;
B = Toxaemia;
C = Septicaemia and peritonitis, recovered;
D = Cases who died;
E = Pelvic Cellulitis;
F = Phlegmasia.

Referring again to Table 19, and comparing the grouping according to the cell count with that as shown by the haemoglobin level, nothing of note is seen in any of the groups except the one including the cases of phlegmasia, where the disparity was much greater than in any of the other types of infection, indicating that this anaemia accompanying phlegmasia is associated with an unusually low colour index.

SECTION C.

PROGRESS OF THE ANAEMIA THROUGHOUT THE COURSE OF THE DISEASE.

In the last section, the anaemia present on the admission to hospital of the patient suffering from puerperal sepsis was discussed. In order to ascertain how the anaemia progresses throughout the disease, and to determine whether any degree of spontaneous recovery of the blood value is possible, a series of twenty six cases was studied (Nos. C-CXXV), in which no anti-anaemia treatment was given throughout the period of active sepsis. In some, it was necessary to establish such treatment during convalescence. In four of the cases, all of whom died, iron preparations were administered over a few days, but the effect of this was negligible, and in one blood transfusion was administered as a terminal measure, but not until such information was obtained as would be more conveniently studied in this section.

Blood examinations, consisting of the red cell count and haemoglobin estimation were carried out at weekly intervals, and the findings are shown graphically in the charts in Volume II. The charts are specially designed to show the relationship between the blood behaviour and the degree of constitutional upset as indicated by the temperature and pulse rate; and are arranged in the order in which the cases are mentioned in the text, in this and subsequent sections.

Cases representative of all the types of puerperal sepsis, as defined in the section on classification, have been included in the series, and the course of the anaemia separately studied in each group. The distribution of the cases into the various disease groups is seen in Table 21.

Table 21.

Showing the distribution of the cases into the various disease groups.

Type of Infection.	Number of Cases.
Localised.....	8
Sustained Toxaemia.....	4
Septicaemia) - recovered. Peritonitis)	3
- died.....	5
Pelvic Cellulitis.....	2
Phlegmasia.....	4

CASES WITH THE INFECTION LOCALISED TO THE UTERUS, with little, if any, toxaemic manifestations.

In this group, the cases were eight in number (Nos.C-CVII, Charts 1-8, Vol. II), the degree of anaemia varying from 30 per cent. haemoglobin in the lowest, to 80 per cent. in the highest. In three of the cases, treatment for the anaemia was instituted when it became obvious that no spontaneous recovery would occur.

In three of the cases (Nos. C-CII, Charts 1-3), the sepsis was very mild, and the blood rapidly improved after admission. In one, however (No. CII), the colour index remained at a low

level, 0.85, indicating an inadequacy in the supply or absorption of iron.

In two cases (Nos. CIII-CIV), the Charts (4, 5) show a period of slight deterioration in the blood values, corresponding accurately with the period during which there were manifestations of toxaemia, as indicated by the temperature and pulse rate. This deterioration was followed by a spontaneous improvement after the sepsis had subsided.

These cases showing a slight deterioration in the blood value during the presence of a well localised sepsis, would appear to point to the conclusion that even a mild toxaemic disturbance is capable of producing a temporary paralysis of the haemopoietic system. The sepsis having been removed, however, a spontaneous recovery may occur.

In two cases, however (Nos. CV, CVI), although the sepsis had quite subsided, no effort at spontaneous recovery manifested itself during the convalescence, the blood values remaining at approximately the same level as on admission. In one case (No. CV, Chart 6), there was a history of albuminuria during the pregnancy, and it was assumed that this was the cause of the more prolonged paralysis of the haemopoietic system. This case responded well to iron therapy, showing that this anaemia associated with albuminuria of pregnancy differs in this respect from that accompanying chronic nephritis, in which there is no response to iron (111). Parsons (110) has shown that the anaemia in chronic nephritis is in direct

relation to the degree of renal inefficiency. It has been shown, however (113), that the renal inefficiency in toxaemia of pregnancy usually clears up after parturition, and this may provide the explanation for the difference in the response of the respective anaemias to iron.

The other case (No. CVI, Chart 7) showed no obvious reason for the persisting anaemia. Her age, however, was 31 years, and she had already had six pregnancies, which presumably were in quick succession. As has been stated on page 40 there is frequently a diminished secretion of hydrochloric acid in the stomach during pregnancy, leading to a deficient absorption of iron unless administered in large doses. Although this usually clears up after the pregnancy, it has been shown (96) that in women with many pregnancies, this condition may persist, setting up a chronic hypochromic anaemia.

Fullarton (103), though not agreeing that the factor of many pregnancies produces a more severe anaemia in patients in similar age groups, admits that repeated pregnancies may cause a permanent hypochlorhydria, which will lead to a liability to the development of a hypochromic anaemia from deficient absorption of iron, and a close study of his figures shows that in the younger age groups, the degree of anaemia is greater in women with more than three pregnancies, suggesting that a quick succession of pregnancies may in some measure lead to this occurrence.

In the case under review, the gastric analysis was

not done, but, in view of these facts, it seems reasonable to assume that the succession of pregnancies was responsible for the persisting anaemia. Treatment with large doses of iron was attended by gratifying results.

The remaining case in this group (No. CVII, Chart 8) was one of severe anaemia. The recovery in the blood value after the termination of the period of pyrexia was very slow, with a gradually decreasing colour index. After eight weeks, the blood assumed a stationary level, at 3,500,000 red blood corpuscles per c.mm., and a haemoglobin value of 55 per cent. On the institution of iron therapy, some improvement occurred in the cell count and the haemoglobin level, but not in the colour index.

CONCLUSIONS.

In mild, localised sepsis, after a period of inactivity of the bone marrow corresponding to the duration of the sepsis, a spontaneous recovery may occur, with a tendency to the production of a hypochromic anaemia due to lack of iron. The more severe the initial anaemia, the more marked is the iron deficiency.

Other factors tending to produce a chronic anaemia, retard of prevent this spontaneous recovery.

CASES WITH LOCALISED SEPSIS AND WELL-MARKED TOXAEMIA.

Four cases with well-marked toxaemia were given no treatment for the anaemia, and the results of blood examinations noted (Cases CVIII-CXI).

Each of these cases showed an arrest in the process of blood regeneration corresponding to the period during which the toxaemia was manifest, as judged by the temperature and pulse rate, and shown in Charts 9-12, Volume II. One case (No. CVIII) showed a marked fall in the cell count and haemoglobin percentage; two (Nos. CIX, CX) showed gradual falls, and the fourth (CXI) remained stationary. In one of the cases (No. CX), the count fell proportionately more than the haemoglobin, resulting in a colour index slightly over unity. In all four cases, a natural recovery took place after the sepsis had subsided. In none of the cases was the recovery complete, and in three, the tendency was for the haemoglobin level to fall behind the blood count.

Comparing these cases with those where there was no sustained toxaemia, it is seen that the fall in the blood values was greater and more sustained in the cases with toxaemia.

CONCLUSIONS.

It may thus be concluded that, in puerperal sepsis, the period of inactivity of the bone marrow bears a direct relation to the duration and severity of the toxaemia present.

CASES WITH SEPTICAEMIA.

There was a very marked difference between the behaviour of the blood in the cases of septicaemia who recovered, and in those who died.

Three cases with septicaemia, who recovered, were included in this series (Cases CXII-CXIV, Charts 13-15). In one (No. CXII), the streptococcus haemolyticus was isolated in the blood, in the other two, the diagnosis was made on clinical grounds. All three showed a gradual fall in the blood count and haemoglobin percentage corresponding to the period of pyrexia, with a spontaneous, though incomplete, recovery after the temperature had settled. In Case CXII, there was a marked disparity in the recovery of the haemoglobin compared with the cell count, and Case CXIII assumed a stationary position at 3,750,000 red cells per c.mm. and 73 per cent. haemoglobin. Case CXIV showed a tendency for the haemoglobin to remain at a level of 55 per cent., and required iron treatment for three weeks to bring it to 72 per cent. (from a lowest level of 35 per cent.).

There were five fatal cases of septicaemia, all of whom died a few days after admission (Cases CXV-CXIX, Charts 16-20). All showed a sharp fall in the blood count, with a lesser fall in the haemoglobin level. The greatest fall seen was in Case CXV, where the blood count fell from 3,950,000 to 2,486,000 per c.mm., a fall of one and a half million within three days. The haemoglobin, however, only fell from 66 to 62

per cent., and the van den Bergh reaction, performed on two occasions, gave an "indirect positive" result, showing that this great fall was of a destructive nature. The blood culture was negative, but the streptococcus haemolyticus was isolated in the uterine wall after death. Clinically, the case was an acute fulminating septicaemia, and the anaemia may be assumed to have been of an acute haemolytic nature resulting from the toxins of the haemolytic streptococcus.

In Case CXVI, the blood count fell one million in three days, from 3,996,000 to 2,970,000 per c.mm. There was little change in the haemoglobin reading, but an examination made five minutes before death, showed a slight rise in the blood count, with a fall in the haemoglobin level. The van den Bergh reaction was not done.

Similar results were obtained in cases CXVII, CXVIII, and CXIX. In the latter two cases, the van den Bergh reaction gave an "indirect positive" result.

In these five cases, then, there was a rapid fall in the blood value, with, in the three cases in which it was carried out, an indirect positive van den Bergh reaction, showing the presence in the blood stream of the products of rapid blood destruction.

CONCLUSIONS.

It would thus appear that in the septicaemia cases, there are two different types of anaemia, differing according to the severity of the infection:-

(i) An anaemia of gradual onset resembling that seen in the "local" and "toxaemic" groups, due to a temporary paralysis of the haemopoietic system, persisting as long as the patient is febrile, and of no very grave significance, occurring as it does in the milder cases of septicaemia.

(ii) An acute haemolytic anaemia, caused by the rapid destruction of the red blood corpuscles by the toxins of the circulating haemolytic streptococcus, and characterised by a more rapid fall in the blood count than in the haemoglobin level, and a positive indirect van den Bergh reaction. This anaemia is of very grave prognostic significance.

CASES WITH PELVIC CELLULITIS.

Two of these cases were included in this series (Cases CXX, CXXI, Charts 21-22). In one (No. CXX), the onset of the cellulitis occurred after admission, and the blood picture, which had been rising as the local sepsis subsided, immediately fell away again as the cellulitis manifested itself, the red blood corpuscles and haemoglobin falling from 4,110,000 per c.mm. and 72 per cent. to 3,010,000 and 58 respectively, in two weeks. It remained at this level, with a slight further fall in the haemoglobin level, until the temperature had subsided, after which there was a gradual spontaneous recovery, which was accelerated after the mass had completely disappeared. The haemoglobin, however, did not keep pace with the recovery in the cell count, and on dismissal, the colour index was 0.8.

The second case (No. CXXI) showed a similar picture, but the case was further complicated by the occurrence of a pelvic abscess, which was accompanied by a further fall in the blood values. On draining the abscess, a spontaneous recovery took place, but with a decreasing colour index.

CONCLUSIONS.

A moderate degree of anaemia occurs with the onset of pelvic cellulitis, which persists until the sepsis has subsided, and is accentuated by the occurrence of abscess formation. An incomplete spontaneous recovery may occur as the sepsis is eradicated.

CASES WITH PHLEGMASIA ALBA DOLENS.

It has already been pointed out that this type of infection was accompanied by a very severe anaemia, characterised by a low colour index. In 17 of these cases in which the blood was examined, the colour index was below 0.9 in 14, ten of these being under 0.8 and four under 0.7.

Of these cases, four were included in this series (Cases CXXII-CXXV, Charts 23-26).

In one case (No. CXXII), the patient was admitted with an infection accompanied by severe toxaemia, and in the first week there was a fairly sharp fall in the blood value. The colour index was unity. There was also a breast abscess which was incised. The sepsis began to subside, and in the second

week, the blood value rose a little. In the beginning of the third week, however, first a right then a left phlegmasia occurred, and the blood maintained a stationary level until the phlebitis had subsided, after which, a spontaneous recovery took place. Case CXXIII showed a similar course. The phlegmasia complicated a fairly toxic infection, and was accompanied by rigors for a period of two weeks, after which it subsided. The blood values fell with the original sepsis and maintained a stationary level until the phlegmasia had subsided. After this, there was a gradual recovery, less complete for the haemoglobin than for the red blood corpuscles.

In Case CXXIV the colour index on admission was 0.62. The blood recovery was very slow, the discrepancy between the cell count and the haemoglobin level being maintained throughout. In Case CXXV, the phlegmasia had almost subsided on admission. The blood chart shows a gradual spontaneous recovery, with a decreasing colour index.

GENERAL CONCLUSIONS.

From these cases, it will be seen that except in the very mild, localised cases, the blood value either deteriorates or remains stationary while the septic process is active, whether it be absorption of toxins from the uterus, a pelvic inflammatory mass, or a thrombo-phlebitis; that the fall is in direct relation to the degree of toxaemia present; that in the milder cases, this appears to be due to a temporary

paralysis of the haemopoietic system, that is, of an aplastic nature, but in the more severe cases, there is active lysis of the cells in circulation.

It is also seen that in most cases, after the septic process has subsided, there is a natural effort on the part of the body to bring the blood value to a satisfactory level, but that the colour index tends to fall owing to a deficiency in iron.

The next section is, therefore, devoted to a study of cases treated with various iron preparations, to see whether the haemopoietic system can be stimulated in this way during the septic process, and to ascertain what dosage of iron is necessary to produce a satisfactory blood picture on dismissal, within a reasonable time.

SECTION D.

THE EFFECT OF IRON THERAPY ON THE ANAEMIA IN PUERPERAL SEPSIS.

INTRODUCTORY.

The recognised treatment of anaemia of a hypochromic nature is the administration of iron, to replace that which is deficient, and to act as a haematinic (114). As a result of recent work (115, 116), the dosage of iron required has been the subject of revision, much larger doses being now given than were formerly considered necessary. The dose of pilula ferri, or Blaud's pill in the British Pharmacopoea is 5-~~15~~ 30 grains, and of ferri et ammonii citras, 5-~~10~~ 15 grains*. In the treatment of idiopathic hypochromic anaemia, Vaughan (117) and Wilkinson (85) advise at least 45 grains of Blaud's pill, or 60 grains of the scale preparations daily.

The action of other metals to supplement the iron has been studied recently. Hart (118) and Sheldon (119) have shown that to obtain its maximal value, iron must be supplemented by copper. Beard and Myers (120), however, consider that iron alone is effective. In a later article (121), they show that a large number of metals may be used to supplement the iron, copper not being specific, and they conclude that these metals act as catalysts to the iron. It is well recognised that arsenic acts as a useful adjuvant to iron (114), and in some of the cases in this series, it has been used

* N.B. 1911 dose in typescript.
1932 dose in ink.

for this purpose.

Whipple and his co-workers (122) claim to have isolated a factor in liver which is essential for haemoglobin regeneration and which they have studied extensively on dogs (123). Clinical results, though encouraging, are not yet conclusive (115).

It has been shown (111, 124) that in patients with a mild degree of sepsis, much larger doses of iron are required to maintain a satisfactory blood picture than in patients without sepsis.

In this series of cases with puerperal sepsis, various doses and preparations of iron were given to estimate the comparative value of each, and to determine what dose of iron is required to overcome the concomitant anaemia. The preparations used in this series were:-

(1) "Mixed Treatment", a Parke Davis preparation in tablets, each containing syrupi ferri iodidi, m.v.

(2) Ferrous sulphate in pills each containing 3 grains of the exsiccated salt, prepared by the Glaxo Laboratory, and recommended by Wilkinson (85).

(3) Ferrous carbonate, in the form of Blaud's pill, with arsenious acid, made up in capsules by Allen and Hanbury, each containing Blaud's pill, gr. x and arsenious acid, gr. 1/60.

The blood was examined at weekly intervals and the findings are recorded in detail in Volume II. Included in the series are cases representative of all the various types of puerperal sepsis according to the classification adopted. The results will be studied separately in each group, to

ascertain:-

(1) If the iron is capable of overcoming the persistent and sometimes progressive anaemia present during the active stage of the sepsis, and, if so, what dosage is necessary, and

(2) If iron will produce a complete recovery of the blood value within a reasonable time during the convalescence. These patients are usually very anxious that their convalescence should be as brief as is consistent with safety, as they have left a new-born baby at home, and domestic arrangements require her presence. It is obvious, however, that such a patient will not be fit for her duties at home if she is dismissed with an anaemia of any great degree, and they usually find it very inconvenient to attend as out-patients after dismissal.

Thirty eight cases treated with iron have been included in this series (Cases CXXVI-CLXIII, Charts 27-64). The distribution of these cases in the various disease groups is seen in Table 22.

Table 22.

Showing the distribution of iron treated cases in the various disease groups.

Type of Infection.	Number of Cases.
Localised.....	16
Toxaemic.....	7
Septicaemia.....	5
Peritonitis.....	0
Pelvic Cellulitis.....	2
Phlegmasia.....	8
Total:-	38

To this may be added the four cases of septicaemia included in the last section, which proved fatal in a few days, and in which the iron given obviously had no effect.

In the cases in this series, the iron preparations were administered throughout the whole course of the disease. Cases where iron was given in convalescence only, or as an adjuvant to blood transfusion, are not included.

CASES WITH THE INFECTION LOCALISED TO THE UTERUS.

Sixteen such cases (Nos. CXXVI-CXLI) were treated with varying doses and preparations of iron, and the results are shown in Charts 27-42, Volume II.

Cases treated with small dosage of iron.

Two cases (Nos. CXXVI, CXXVII) were treated with "Mixed Treatment." The results in these two cases in no way differ from those seen in similar cases left untreated. In both, the improvement in the haemoglobin was very much slower than that of the cell count, resulting in a considerable reduction in the colour index.

Cases treated with ferrous sulphate.

Three cases were included in this group (Nos. CXXVIII-CXXX, Charts 29-31).

One case (No. CXXVIII) was treated with small dosage of ferrous sulphate (gr. vi daily). The blood recovery was very slow and incomplete with a decided fall in the colour index.

Larger doses were given to two cases (Nos. CXXIX, CXXX). In Case CXXIX, 12 grains were given daily, but the improvement was very slow, though the colour index remained at unity. In the other case (No. CXXX), the anaemia was very severe, but with 18 grains daily, a sharp rise occurred in both the blood count and the haemoglobin level. Unfortunately, the observations were discontinued before the blood recovery was complete, but in the period during which the blood was examined, a tendency to a reduction in the colour index was becoming obvious.

Cases treated with ferrous carbonate and arsenic.

The remaining eleven cases were treated with Blaud's pill with arsenic in doses of 30 and 60 grains daily.

Cases with 30 grains daily. Eight cases (Nos. CXXXI-CXXXVIII, Charts 32-39) were studied.

Five (Nos. CXXXI-CXXXV) showed a period of hesitancy in the blood recovery corresponding with the period of active sepsis, three (Nos. CXXXIII-CXXXV) showing a very slight reduction in the colour index in an otherwise rapid and satisfactory blood recovery. One (No. CXXXVI) made a good blood recovery, but with a persistently low colour index, and another (No. CXXXVIII) had a persistent high colour index, with a slow recovery in the cell count. This case was rather suggestive of Addison's anaemia, but the blood films showed no evidence of anisocytosis, poikilocytosis, or megalocytosis,

and the response to iron made this diagnosis unlikely.

Cases with 60 grains daily. Massive dosage was tried in three cases (Nos. CXXXIX-CXLI, Charts 40-42). In all three, the blood recovery was rapid and more or less complete with no pause during the stage of active sepsis.

CONCLUSIONS.

Small dosage of iron is inadequate in treating the anaemia during the stage of active sepsis, and incapable of producing complete recovery of the blood in convalescence.

Using similar dosage of ferrous sulphate alone, and ferrous carbonate with arsenic, a more complete recovery was obtained with the latter, but neither produced any improvement during the active sepsis.

With massive dosage of ferrous carbonate (60 grains of Blaud's pill daily) combined with arsenious acid, some improvement was obtained in the anaemia during the active sepsis, and a more complete recovery obtained in the convalescence. It must be remembered, however, that in these cases the sepsis was of mild degree.

CASES OF LOCALISED SEPSIS WITH TOXAEMIA.

Seven cases were included (Nos. CXLII-CXLVIII, Charts 43-49). Three were treated with small dosage of iron and four with larger doses.

Cases treated with small dosage of iron.

Three cases (Nos. CXLII-CXLIV) were treated with ferrous sulphate, 6 grains daily, two (Nos. CXLII, CXLIII) showing a distinct fall during the stage of active sepsis, followed by a sharp but incomplete recovery of the blood during convalescence. The third (No. CXLIV) was given liver extract (campolon) intramuscularly twice daily during the period of active sepsis and a very slight improvement occurred in the blood value. During convalescence, ferrous sulphate, in a dose of 6 grains daily, was given, which produced a very incomplete recovery in the blood value, the colour index falling considerably.

Cases treated with large dosage of iron.

Two cases (Nos. CXLV, CXLVI) were given large doses of ferrous sulphate, 18 grains and 12 grains daily, respectively. In both, there was a distinct period of hesitancy, and an incomplete blood recovery; in one (No. CXLV), the colour index being considerably reduced, and in the other (No. CXLVI) the blood taking up a stationary position at 3,750,000 red cells per c.mm. and 74 per cent. haemoglobin.

Two cases (Nos. CXLVII, CXLVIII) were treated with ferrous carbonate (Blaud's pill) gr. xxx daily. In both, there was a fall corresponding to the febrile period, followed by a more complete recovery than in cases treated with other preparations. In one (No. CXLVIII), however, the colour index remained somewhat low.

A series of cases with massive dosage of this preparation would have been instructive, to determine whether the improvement seen in the mild cases during the stage of active sepsis would occur in cases with well-marked and prolonged toxaemia. Unfortunately, during the period when massive dosage was being used, no such cases were admitted.

CASES WITH SEPTICAEMIA.

It was seen in the last section that in cases of septicaemia running a rapid fatal course, there occurs a sharp destruction of the red blood corpuscles, which is quite uninfluenced by iron.

Five cases with septicaemia, all of whom recovered, are reviewed in this group (Nos. CXLIX-CLIII, Charts 50-54). In one case (No. CLII), the haemolytic streptococcus was isolated from the blood. In the other four, members of the coliform group were isolated.

In one case (No. CXLIX), small dosage of iron was given - ferrous sulphate, 6 grains daily. A fall in the blood values occurred corresponding to the period of pyrexia, and was followed by a very incomplete blood recovery with a decreasing colour index.

Two cases (Nos. CL, CLI) were given larger doses of ferrous sulphate, 18 and 12 grains daily respectively. Both showed a fall corresponding to the pyrexial period, followed by a blood recovery tending to settle at 3,750,000 red cells

per c.mm. and 75 per cent. haemoglobin.

Two cases (Nos. CLII, CLIII) were treated with ferrous carbonate in massive dosage.

In Case CLII (Chart 53), a haemolytic streptococcal septicaemia, a sharp fall occurred, corresponding to the period of pyrexia, followed by a more complete recovery than in the last groups. In Case CLIII, a coliform septicaemia following abortion, an initial fall occurred, further complicated by a severe uterine haemorrhage. This was followed by a fairly rapid recovery, but with a persisting low colour index, in spite of the massive dosage of iron.

CONCLUSIONS.

In the more severe cases with toxaemia, and in the septicaemic cases, the administration of large doses of iron is incapable of improving the anaemia during the stage of active sepsis.

Small dosage of iron is incapable of producing a satisfactory recovery in convalescence, and ferrous carbonate with arsenious acid gives a more satisfactory end result than does ferrous sulphate.

CASES WITH PELVIC CELLULITIS.

Two such cases were included in this series (Nos. CLIV, CLV, Charts 55, 56). The cases were quite different in their course, so could not be used for comparison.

Case CLIV was a mild case, in which the inflammatory mass quickly subsided without abscess formation. With ferrous carbonate, and arsenic, the blood showed a gradual improvement over a period of four weeks.

Case CLV ran quite a different course. The cellulitis was of long duration, and was finally followed by abscess formation. The anaemia became fairly severe in spite of the administration of ferrous sulphate, which had no effect until the sepsis was finally eradicated, after which a fairly good recovery occurred.

CONCLUSIONS.

Iron in the dosage given is ineffective in preventing or improving the anaemia accompanying the long continued septic process in pelvic cellulitis.

CASES WITH PHLEGMASIA ALBA DOLENS.

Iron therapy was used to combat the anaemia in eight cases with phlegmasia (Nos. CLVI-CLXIII, Charts 57-64).

In one of these cases (No. CLVI), the phlegmasia occurred as a terminal feature, a few days before death. The case was unusual, and is given here in full.

Case CLVI. Age 40, para 12. The patient had a history of having had a nephrectomy several years previously, which had been followed by a succession of abortions. On this occasion, she had had an incomplete abortion, which had been completed at a local maternity hospital. Three days later, her temperature rose, and she complained of headache. The pyrexia continued, and five days later, she was transferred to the isolation hospital. On admission, her general condition was very poor, her uterus appeared to be empty, and her cervical swab and blood culture were sterile. Her blood count showed a marked degree of anaemia of a hypochromic type, the blood count being 2,470,000 red cells per c.mm. and haemoglobin 36 per cent., giving a colour index of 0.73. Urinary examination showed the presence of albumen. Her temperature remained elevated after admission, and a few days later, she had a short rigor followed by breathlessness and pain in the chest. Auricular fibrillation was found to be present, together with systolic and diastolic murmurs at the apex. There was a good response to intravenous strophanthin followed by digitalin Nativelle orally every four hours.

This was followed by frequent rigors during the succeeding week, but the pulse remained fairly good. The patient became gradually weaker, and phlegmasia occurred three days before death. During this time, the blood count rose to 3,000,000 red cells per c.mm. but in spite of large doses of iron (ferrous sulphate, gr. xii daily), there was no improvement in the haemoglobin percentage, the colour index falling to 0.63. This anaemia was believed to be of the nature of that found in association with renal inefficiency.

It is interesting to note that the phlegmasia occurred only three days before death, when the circulation was failing, and the colour index falling. Remembering the association of a low colour index with cases of phlegmasia, this case would seem to suggest that the presence of a low colour index favours the occurrence of phlegmasia, thus confirming the suggestion made in page 56. Other cases would seem to suggest that phlegmasia accompanying cases with a high colour index runs a shorter course than in cases where the colour index is low (Case CLIX, vide infra).

The remaining cases recovered. In five, the colour index was low, all but one being below 0.8.

One case (No. CLVII), with a low colour index was treated with small dosage of iron ("Mixed Treatment".). There was a gradual improvement in the cell count and the haemoglobin percentage, but not in the colour index.

In Case CLVIII, the whiteleg occurred in hospital, in a patient with a fair degree of toxaemia, and was active for a period of one week. An initial fall in the blood values had occurred with the sepsis, the patient being treated with ferrous sulphate, gr. vi daily. The blood maintained a stationary position until the phlegmasia subsided, after which a very incomplete recovery occurred.

In Case CLIX, there was marked toxaemia for one week, accompanied by a slight fall in the blood values in spite of Blaud's pill gr. xxx daily. Phlegmasia occurred suddenly, but subsided quickly in a few days. The colour index was almost unity. The blood made a fairly good recovery in spite of the phlegmasia, but with a decreasing colour index.

In the remaining four cases (Nos. CLX-CLXIII), in spite of large doses of iron - ferrous sulphate, gr. xviii daily in the first two, and Blaud's pill, gr. lx daily in the other two, - the recovery of the blood values was very slow, with no improvement in the colour index.

CONCLUSIONS.

Treatment with massive dosage of iron over a prolonged period would appear to be necessary to overcome the severe hypochromic anaemia associated with phlegmasia.

GENERAL CONCLUSIONS ON IRON THERAPY IN THE ANAEMIA ASSOCIATED WITH PUERPERAL SEPSIS.

These observations show that in all except the very mild cases, iron has little or no effect on the anaemia during the active stage of the sepsis, - the time when it is most desirable to have the blood in a satisfactory condition to combat the disease; when the metabolic process is at its highest level (125) and the demand on the blood as an oxygen carrier therefore at its greatest. A deficiency in the haemoglobin at such a time will obviously increase the work to be carried out by a heart already poisoned by the circulating toxins. In the more severe cases, indeed, it is seen that the anaemia becomes accentuated, thereby setting up a vicious cycle.

The inability of iron to break this vicious cycle would seem to demand, in cases at least where the anaemia is of severe degree, and the margin of safety therefore small, more drastic measures to bring the blood rapidly to a more satisfactory level. The obvious method of achieving this aim is to use blood transfusion, by which means a measured quantity of fresh red blood corpuscles and haemoglobin can rapidly be added to the patient's circulation.

Before studying the effect of such treatment, a

further review of the cases with severe anaemia, their progress and response to treatment, seems desirable, to ascertain what special problems such cases present.

These cases have already been included in the foregoing sections, but without special attention having been paid to their detailed study. The next section is therefore devoted to such a study.

SECTION E.

FURTHER CONSIDERATIONS ON THE COURSE AND TREATMENT OF SEVERE ANAEMIA IN PUERPERAL SEPSIS.

As has previously been stated, a haemoglobin percentage of forty and under is taken as representing severe anaemia.

In the sections on the progress and treatment of anaemia in puerperal sepsis, such cases have been mentioned, but without paying any particular attention to the special problems which they set. Such cases really fall into a group by themselves, as a considerable part of the clinical picture which they present may be directly attributable to the anaemia present.

On admission, the most striking feature of such cases is the extreme degree of pallor which they exhibit, giving them a waxy appearance. They complain of feeling tired and listless and "done", and mentally appear to be apathetic and to care little whether they recover or not. Some complain of headache, noises in the head and giddiness, all symptoms directly due to the anaemia. Such cases, too, present a picture which would lead the observer to believe that the degree of sepsis is more severe than, on retrospect, it was found actually to be.

The incidence of this severe anaemia, and its distribution among the various disease groups has already been

studied (Part II, Section B).

It has been seen in Part II, Sections C and D, that in the presence of severe or sustained toxaemia, the blood value frequently deteriorates. In the presence of severe anaemia, a further fall in the blood values is very undesirable for obvious reasons. As has been pointed out, however, these patients may exhibit a considerable degree of distress due to the anaemia, but which might be ascribed to toxaemia, so that early diagnosis of severe or sustained toxaemia in such cases is difficult and uncertain. As it is undesirable to risk waiting to see if the blood count is falling or not, it is safer to regard the presence of severe anaemia as an indication for immediate blood transfusion.

Of twenty nine such cases, serial blood counts were made in twenty eight, one having died a few days after admission.

Of these 28 cases, blood transfusion was administered to nineteen, which will be discussed later, and nine were kept as controls.

Of the nine controls, three were given no anti-anaemic treatment, and six were treated with various doses and preparations of iron. Of the three untreated cases (Nos. CV, CVII, CXXIV), two have already been described under "cases with the infection localised to the uterus" and one under "cases with phlegmasia." In all three cases, the blood recovery was extremely slow and incomplete, even

with the administration of iron in the convalescence.

Of the cases treated with iron, two (Nos. CXXVI, CXXX)came under the heading of "localised" infection, and in the one examined completely, the blood recovery was very slow and incomplete. The remaining four cases (Nos. CLVI, CLVII, CLXII, CLXIII) were cases of phlegmasia. In the three who recovered, even with massive dosage of iron the blood recovery was very slow and incomplete, especially as regards the colour index.

In none of these cases was a fall in the blood count or haemoglobin percentage noted, as, in patients with severe anaemia, such an occurrence was regarded as an indication for immediate transfusion.

CONCLUSIONS.

In severe anaemia, even in mild sepsis, the recovery of the blood is so protracted as to make the patient's convalescence unduly long and wearisome, and, before the blood is in a satisfactory condition, the patient is feeling well enough to be begging to be allowed home to her domestic duties. The same is seen in patients with severe anaemia in association with phlegmasia.

It would seem, therefore, that blood transfusion would appear to be indicated in all cases of severe anaemia, to counteract any possible further fall in the blood value,

and to give an initial impetus to the blood recovery, which could be supplemented with iron to shorten the convalescence.

Further consideration of this indication for transfusion is dealt with in Part III of the thesis.

PART III

on

BLOOD TRANSFUSION

in

PUERPERAL SEPSIS.

SECTION A.

HISTORICAL SURVEY OF BLOOD TRANSFUSION.

The giving of blood of a healthy person to one who is weak from disease is no product of modern medicine, but was advocated in very ancient times. Roussel expressed this very clearly in 1877, when he said (126):-

> "To bestow blood on a man who is dying from having
> "lost too much, or to replace with healthy youthful
> "blood that which disease or age has impaired,
> "seems so logical a process and practically so
> "easy of execution, that human ingenuity has seized
> "upon the idea from the very infancy of the world,
> "or at least from the very earliest ages of Medical
> "Science."

He goes on to assert that the ancient Egyptians, the Hebrews and the Syrians practised transfusions and that Ben Habad, King of Syria, was treated for leprosy by blood transfusion. For these statements, however, he gives no reference which can be verified.

Ovid, however, wrote as if the idea was not new at that time, when he made Medea say (127):-

> "..... quid nunc dubitatis inertes?
> "Stringite, ait, gladios: veteremque haurite cruorem,
> "Ut repleam vacuas juvenili sanguine venas."

Other classical writers are reported to have described the drinking of the blood of dying gladiators for rejuvenation

purposes (128). These classical references to the use of blood are, however, vague, and it is very doubtful if true blood transfusion was ever carried out in these ancient times. Feinblatt (129) considers that in the older records, transfusion and ingestion of blood were sometimes confused, as it is difficult to conceive how blood transfusion could have been practised at a time when the circulation of the blood was not recognised. He considers this to be the case in the so-called transfusion said to have been given to Pope Innocent VIII in 1492. Roussel assumed (126) that an attempt had been made to perform direct arterio-venous connection, but more recent opinions are that no attempt was made to transfuse the blood and that it was given as a potion (128, 130, 131).

In the following century, however, Cardanus and Pegelius are reported to have suggested the possibility of transferring blood directly from the vessels of one individual to those of another (128). In 1615, the technique of blood transfusion was first described by Andreas Libavius, a translation of which is given by Keynes in his book (130). There is no evidence, however, of this technique ever having been put into practice.

It was not until the following year that Harvey discovered the circulation of the blood, and some twelve years later (1628) that he published his works (130). This discovery may be said to have laid the foundation stone upon which the real work on transfusion was built. What were theories before

could now be put into practice, first on animals, and later on Humans. Wren and Boyle led the way by injecting drugs into the veins of animals, and later, of Humans (130).

The date of the first transfusion is somewhat doubtful. Francesco Folli in a paper dated 1680 claimed to have demonstrated blood transfusion to the Grand Duke Frederick II in August, 1654, and he described the technique which he used (126). Daniel, in Germany, described a process which he had employed in 1664 for transfusion of blood, in which he used salts of ammonia to prevent coagulation of the blood (126).

These two claims are uncorroborated by other evidence, and the first authentic blood transfusion recorded was that of Richard Lower, in 1665, when he joined an artery of one dog to a vein of another by means of a silver canula (130).

The first transfusion in man was carried out by Jean Denys of Montpellier in 1667, using the blood of a sheep on a human patient, and recorded in the Philosophical Transactions, July 22, 1667 (130). The patient was extremely exsanguinated as a result of numerous therapeutic bleedings, and on receiving about 9 ounces of blood from the sheep, seems to have made a remarkable recovery.

The first warnings of the possible dangers of transfusion are contained in an early account of a case by de Gurye in the Philosophical Transactions, October 21, 1667. He noted that:-

> "An expert Acquaintance of his, transfusing a great "quantity of blood into several Doggs, observed "alwayes, that the Receiving Doggs pissed Blood". (130)

Denys, too, gave a full account of the symptoms which we now know are produced by acute haemolysis following the transfusion of incompatible blood. He was using calf's blood and wrote as follows:-

> "As soon as the blood began to enter into his veins, "he felt the like heat along his Arm and under his "Arm-pits which he had felt before. His pulse rose "presently, and soon we observed a plentiful sweat "all over his face. His pulse varied extremely at "this instant and he complained of great pain in his "Kidneys, and that he was not well in his stomach "and that he was ready to choak unless they gave him "his liberty." This was followed by vomiting, after which, he fell asleep. When he awoke, "He made a "great glass full of Urine, of a colour as black as "if it had been mixed with the soot of Chimneys." (130).

There are several references to this early work on transfusion in the diary of Samuel Pepys, who seems to have taken a great interest in the work of his friends, and it is believed that on one occasion, he witnessed the operation (130).

After this enthusiastic beginning, the practice of blood transfusion fell into disrepute, and was abandoned for over a century. Public opinion was opposed to it, for superstitious reasons, and because they feared that humans might grow horns after the injection of animal blood. In addition, there were many disasters, and in France, the practice was forbidden by the Supreme Court.

About the end of the eighteenth century, interest

began to awaken again, but it was not until 1818 that general interest was taken in the subject, when Blundell published his work (130), which had been stimulated by his having seen a young mother succumb to a puerperal haemorrhage (126, 128). He used human blood and introduced a cumbersome but ingenious apparatus which was fixed to the back of a chair, to which he gave the name of an Impellor. His results were disappointing, but he was quite convinced that there was a great future for blood transfusion (130).

Bischoff, in 1835, introduced the use of defibrinated blood to overcome the difficulties presented by coagulation (130), and Sir Thomas Smith (132), in 1873, also using defibrinated blood, described a weird and motley collection of instruments necessary for the operation. Accidents at this time were attributed to the entry of air bubbles into the circulation.

Higginson, in 1857 (130), introduced an apparatus for transfusion, in which he incorporated the rubber hand pump with ball valves, as is used to-day in the syringe which bears his name.

Roussel (133) believed that the least contact with the air altered the blood and caused its coagulation, either in the apparatus or in the veins, and his apparatus was a most ingenious affair, the main aim of which was to exclude this possibility. He regarded rigors after transfusion as inevitable (134), and ascribed them to the "digestion" of the

new blood by the vasomotor system. He stated that towards the end of the operation "it is quite possible that a slight difficulty in breathing may be experienced together with a trifling cyanosis and a nervous excitement" and advised that "the patient should swallow at once, a large glass of some warm and alcoholic drink". One of the cases which he described (135) had symptoms suggestive of the use of incompatible blood, though there does not appear to have been any haemoglobinuria, and fortunately, the patient recovered.

The greatest contribution towards making for safe transfusion was the discovery in 1901 by Landsteiner of the presence in the blood of agglutinins, and the subsequent classification of these into four groups by Jansky in 1907 and Moss in 1910 (136).

With the increased safety of the operation, more ingenious methods were devised to improve the technique, Crile's piece of delicate surgery on the blood vessels being but one example (137). Curtis and David introduced a paraffin-coated syringe in 1911 (138) and Kimpton and Brown introduced their paraffin-coated glass cylinder in 1913 (139), thus making accurate measurement and indirect transfusion possible.

The last obstacle to making blood transfusion a comparatively simple operation was overcome in 1915 by the introduction of sodium citrate as an anticoagulant by Lewisohn of America (140). This method was introduced into this country

by Robertson in 1918 (141).

After this, blood transfusion may be said to have left its experimental stage, and the real work of assessing its worth begun. The Great War of 1914-1918 gave many opportunities for proving its value in injury; and, in the years which have followed, its application to disease has had considerable attention.

INTRODUCTION OF BLOOD TRANSFUSION IN SEPSIS.

In the revival of interest in blood transfusion in the latter half of last century, Madge, in 1874 (142) suggested its use in "blood poisoning" and in pyaemia to replace the poisoned blood with fresh. Barwell, in 1877 (143), reported a case of chronic sepsis accompanied by anaemia in which a blood transfusion performed by Roussel was followed by a definite improvement. Roussel (144) described three cases of septicaemia which he treated by means of transfusion. In two, no benefit was noted, but in the third, although the patient died, a temporary improvement occurred after the transfusion.

Before the introduction of sodium citrate as an anticoagulant, the possible value of transfusion in sepsis does not appear to have been realised. Soresi, in 1912, made no mention of it in his indications for transfusion (145), neither did Bernheim in 1913 (146).

Discussing therapeutic measures in puerperal sepsis, in 1914, Hirst (147) advocated the use of five to seven ounces

of human serum in addition to antistreptococcal serum, but he made no mention of whole blood transfusion.

In 1915, however, Miller (148) included as indications for transfusion, puerperal, post partum and post abortive anaemia, and "toxic conditions". In a series of 23 cases transfused, he had two of post abortive sepsis, and one of puerperal sepsis. Unfortunately, he did not give the result. Ottenberg and Libman, in 1915 (71), in their indications for transfusion, included infections with pyogenic organisms, and in their review of cases, there were 10 of sepsis, of whom two were puerperal.

Waugh, in 1919 (62), obtained very encouraging results from the use of transfusion in a series of cases of pyaemia.

Immuno-transfusion seems to have appeared first in the literature of 1917, when Hooker (52) reported very favourably on its value. Fry (149), however, in 1920, did not have the same measure of success with his cases of acute sepsis, but this he ascribed to the fact that most of his patients were moribund at the time of the transfusion.

Following these pioneer workers on transfusion in sepsis many reports have been recorded, favourable and otherwise, but on the whole, they show that blood transfusion must be added to the other anti-bacterial disappointments. The use of blood transfusion as a general method of increasing the resistance of the patient and in this way assisting in the overcoming of the infection, is still strongly advocated. (See Part I,

Section E, page 34).

In the sections which follow, the effect of transfusion in correcting the anaemia, and as a general therapeutic measure, will be studied.

SECTION B.

THE TECHNIQUE OF BLOOD TRANSFUSION.

THE SELECTION OF THE DONOR.

The discovery by Landsteiner in 1901 of specific agglutinins in the blood, and the classification of these agglutinins into four groups by Jansky in 1907 and Moss, 1910, made the careful selection of donors for blood transfusion imperative (136).

The ideal method of selection is to use a donor belonging to the same group as the patient, but it has been found that this practice need not be strictly adhered to, group 1 (Moss) patients being able to receive blood from any donor (universal recipients), and group IV being able to give blood to any patient (universal donors).

In some of the large hospitals, voluntary or paid corps of donors are formed, and the members' blood groups determined, so that a blood of a known group can be obtained at the shortest possible notice.

In view of the small number of the cases in this series, the comparative infrequency of the operation in a fever hospital, and the absence of urgency as a factor, no such corps was formed, the male friends of the patient being asked to volunteer.

Technique of Matching the Bloods.

From each prospective donor, one large drop of blood was obtained by puncturing the skin at the tip of the finger, after cleansing the part with spirit. The blood was allowed to drop into a small test tube containing 2 c.c. of a 3.8 per cent. solution of sodium citrate, with which it was thoroughly mixed. From the patient, 5 c.c. of blood was obtained by venepuncture, the blood being received into a sterile glass bottle. The serum was allowed to separate in the ice-chest, or by centrifugalisation when necessary. The patient's serum was put into the incubator at 37° Centigrade to raise its temperature to blood heat to eliminate errors due to Cold Agglutinins (vide page 114). Two loopfuls of the warmed serum were put on to a clean, dry, square coverglass with a sterilised platinum loop, and, to this were added two loopfuls of the donor's cell suspension, and the drops thoroughly mixed. A very small quantity of cedarwood oil was then applied to the edges of the coverglass, and a hanging drop preparation made over a hollow-ground glass slide. The hanging drop preparation allows agglutination to occur freely, an occurrence which might be prevented if a level slide were used (150); and in addition, the cedarwood oil prevents the specimen from drying.

The preparations were examined immediately and at intervals over a period of twenty minutes, both macroscopically and under the low power of the microscope. Gross incompati-

bility was observed immediately with the naked eye but a few of the preparations showed slow, microscopic clumping. It is questionable if this was true agglutination, but such cases were rejected as doubtful, as Bordley (151) had an accident using such a blood. Only donors whose corpuscles remained discrete and separate over a period of twenty minutes were accepted.

No standard typing sera were used, compatibility of the donors being determined by direct matching of the donor's corpuscles with the serum of the patient. It is recognised that mistakes may occur by simply using groups which ought to match. This may be due to errors in grouping the bloods as in the cases described by Bordley (151) and Witts (152), but Plummer (153) points out that bloods of the same group may be incompatible as a result of the presence of subgroups, and Parr and Krischner (154) have described a fatal reaction using bloods of the same group. Thus it is essential to test the actual bloods to be used (155, 156), making it unnecessary to find out to which group the bloods belong, provided that direct matching demonstrates that the donor's corpuscles can be given to the patient without agglutination occurring.

Having determined which of the volunteers were compatible, a final selection was made of the most robust, who were questioned carefully as to the possibility of syphilis or tropical diseases. Unfortunately, it was seldom possible to obtain the result of the Wassermann Reaction before the transfusion.

Difficulties in the Selection of a Donor.

No difficulty was experienced in finding volunteers to act as donors, as many as a dozen being obtained on short notice. This was usually left to the husband of the patient.

Fallacies in the Agglutination Reaction.

With the technique used, no difficulty was experienced in determining compatibility except in one case (No. CVII), where the fallacy of Pseudo-agglutination was met with. After twenty one volunteers had been tested and had all been found to be incompatible, the patient's serum was tested against her own corpuscles, and "clumping" occurred within a few minutes. This obviously could not be true agglutination. The condition underlying pseudo-agglutination was discovered in 1899 by Shattock (157) while examining suspensions of red blood corpuscles in the serum of patients suffering from pneumonia. He ascribed the phenomenon to the rapid formation of rouleaux.

The factor which produces this condition of pseudo-agglutination is the same as that which produces rapid sedimentation of the red blood corpuscles in the blood of patients suffering from toxaemia, and though the sedimentation rate in this case was not ascertained, it was observed that in the blood taken off to obtain serum, the red cells had sedimented to the bottom of the specimen bottle before

clotting had occurred, leaving at the top, the "buffy layer" described by Shattock.

It has been pointed out (157, 158) that pseudo-agglutination seldom occurs if the serum is diluted 1 in 2, or 1 in 3 with normal saline. The serum of this case was therefore diluted with an equal quantity of normal saline, so that in the tests the serum would be diluted 1 in 4. It was found that the patient's cells still showed a tendency to run into clumps, but smaller in size. The tests were repeated with some of the volunteers' cell suspensions, and in some the clumping was modified, but in none did the cells remain discrete. Microscopically it is possible to distinguish true and pseudo-agglutination by the presence of rouleaux in the latter, as is pointed out by Coca (159), who produces very good micro-photographs to illustrate the difference. In this case, however, it was found to be very difficult to determine which of the specimens showed true and which pseudo-agglutination, so the transfusion was withheld, as it was considered that to hazard a transfusion under such circumstances would be to subject the patient to an unnecessary risk.

A week later, her serum was again tested against her own corpuscles and it was found that clumping still occurred, but to a lesser extent than formerly. Two months later, when the patient was convalescent, the test was repeated and it was found that there was a slight tendency

to the formation of rouleaux, but no clumping occurred. At this time, too, a specimen of blood taken for serological purposes was observed, and it was found that only a very slight "buffy layer" had formed before coagulation occurred (see Figure 9). Another peculiar feature about the case was that, at first, her Wassermann reaction was reported strongly positive, later, doubtful, and finally, when she was convalescent, frankly negative.

FIGURE Nº9.

CASE CVII: Showing method of Coagulation of the blood in a case of PSEUDO-AGGLUTINATION.

1st SPECIMEN
17:11:35.

2nd SPECIMEN
16:1:36.

Cold Agglutinins form another important fallacy in blood grouping. They are described by Landsteiner and Levine (160) and have been found to be present in most normal sera. They act only at low temperatures (0 to 5 degrees Centigrade), never at blood temperature, and seldom at room temperature. Stewart and Harvey (161), however, have recorded two cases where such auto-agglutinins acted at room temperature but not at incubator temperature. Transfusion in each case was

followed by a fairly severe reaction. It was to eliminate this fallacy that the blood serum was put into the incubator after removal from the ice chest. No example of this fallacy was experienced.

Panagglutination: This is a condition which occurs when the cell suspension used has been kept for some time, agglutination occurring with almost any animal or human serum (162).

This phenomenon was not observed, as fresh suspensions were used throughout.

CHOICE OF METHOD FOR BLOOD TRANSFUSION.

Since the introduction of sodium citrate as an anti-coagulant (140) many excellent and comparatively simple methods are available for blood transfusion. With the use of citrate, the high degree of surgical skill demanded for Crile's method (137), the haste demanded for the method of multiple syringes, and the very careful preparation of the apparatus with paraffin required for the method of Kimpton and Brown (139) are no longer necessary, and transfusion has now become available to every practitioner with average skill.

As to the comparative value of citrated blood and whole, unmodified blood, it might be expected that in blood diseases like haemophilia, whole blood would be preferable

for its coagulating powers, as the presence of an anti-coagulant might be expected to interfere with this property of the transfused blood. Weil (163), however, has pointed out that the coagulation time of the recipient's blood is shortened after the injection of citrated blood and Keynes (164) stated that the addition of citrate does not render the blood any less valuable as a haemostatic agent; in fact, it has been found (165) that sodium citrate alone reduces the clotting time in haemophilia.

In the earlier days of its use, Unger (166), as the result of experimental work, criticised citrate as harming the blood cells by rendering them more fragile, diminishing the available complement, reducing the opsonic index, and destroying the phagocytic action of the white cells. Although his experiments were repeated (167), the results were not confirmed, and, working on animals, Salant and Wise have shown that nearly 90 per cent. of the salt is eliminated from the body within ten minutes (168). Lewisohn (169) has stated that 5 grammes of sodium citrate can be injected intravenously without harm, the average required for a transfusion being 2 grammes.

Early evidence seemed to show that reactions were more common after transfusion with citrated blood than with unmodified blood, and Bernheim (170), in 1921, strongly advised against the use of citrated blood in extremely

exsanguinated patients, in whom the reaction might be sufficiently severe to prove fatal. Lederer (69) found reactions in 49.5 per cent. using citrate, and none with unmodified blood, but Meleney (171) and his co-workers found that the percentage of reactions was no greater with the use of citrate, than without. In his earlier work, Lewisohn (172) found reactions in 13 per cent. and 8 per cent. of cases using citrated, and unmodified blood respectively, but later (173), in a well controlled series of cases, he found that the incidence of reactions was no greater with citrated than with non-citrated blood. By using triple-distilled water and very careful cleansing of the apparatus, he was able to reduce "chills" from 12 per cent. to under 1 per cent.

Feinblatt (174) expressed the opinion that these so-called citrate reactions are not so severe as to discourage the use of this method, and Keynes (175) has drawn attention to their transitory nature, concluding that "the reaction is of so little importance that it is greatly outweighed by the numerous advantages that are conferred by the use of citrate", and that "the experience of a great many observers has established the fact that citrated blood is quite as effective as whole blood in its therapeutic effects."

Supported by this volume of evidence, citrated blood was chosen as the method to be used in this series.

Dosage of Citrate.

The dosage advised by Lewisohn (169) was 2 grammes in 1,000 c.c. blood, that is, 100 c.c. of a 2 per cent. solution for 900 c.c. of blood. Robertson (141) recommended 160 c.c. of a 3.8 per cent. solution added to 800 c.c. of blood, to give an isotonic solution.

The dosage adopted in this series was that most commonly accepted nowadays (156, 176) of 10 c.c. of a 3.8 per cent. solution of sodium citrate for each 100 c.c. of blood required. The solution was obtained in ampoules, each containing 100 c.c., prepared by Allen and Hanbury.

Choice of Apparatus.

There are many different apparatus described by which citrated blood may be administered to the patient. They are all, however, modifications of three original methods, the simplest being that described by Lewisohn (172), in which the blood is run into the vein by gravity, using a funnel and a long piece of rubber tubing. The second type is the apparatus described by Robertson (141), in which the blood is collected into a graduated bottle, and pumped out again from there to the patient by means of a rubber hand pump. There are some very good variations of this method (176, 177). The third method is that of syringes of the type introduced by Unger (178, 179), originally intended for whole blood, but sometimes used for citrated blood (156).

Which of these methods is chosen is mainly a matter of personal choice, as all three seem to be simple to use, and seem to have few serious disadvantages.

Apparatus used.

The apparatus used in this series of cases is illustrated in Figure 10 , and consisted of the following:-

2 plain glass bottles, capacity 450 c.c., marked at 40 c.c., 100 c.c., 200 c.c., 300 c.c., 400 c.c. and 450 c.c. *

2 rubber stoppers to fit the glass bottles. *

1 enamelled can with a tray to hold the above bottles, and capable of holding water to immerse the bottles to their necks.

1 modified Kimpton-Brown tube, with a rubber stopper, and bellows. *

2 French's needles.

2 wide bore "serum" needles, gauge 14.

2 adaptors for the above needles.

2 pieces of rubber tubing, 6 inches in length, size 10. *

2 pieces of rubber tubing, 3½ inches in length, size 10. *

1 glass canula. *

1 hypodermic syringe with fine needles.

Novutox, catgut, silkworm gut and cutting needles, aneurysm needle.

1 fine scalpel, dissecting forceps, pressure forceps, fine and blunt pointed scissors.

1 tourniquet of rubber tubing.

Gauze swabs, * sterile towels, * bandages*
Tincture of Iodine.

The articles marked * were kept in a sterilising drum.
The scissors, needles and scalpel were sterilised in spirit, and the syringe in carbolic acid 1 in 40.
The other metal instruments were boiled.

Figure 10.

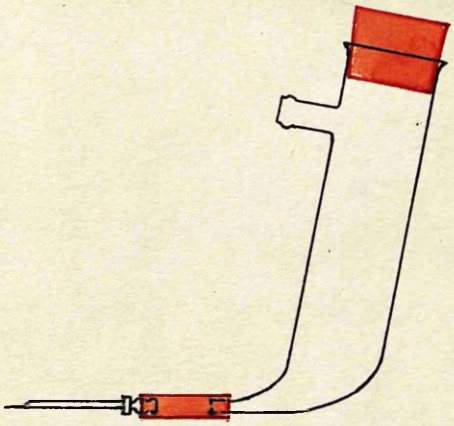
Illustrating the apparatus used for blood transfusion.

The actual apparatus used to inject the blood consisted of a glass cylinder similar to that described by Kimpton and Brown (139), with the canula at the lower end straight, and with a side piece at the upper end for the attachment of the bellows. Originally, this side-tube was situated at the opposite side of the cylinder to the canula, but it was found that this position was awkward, as, in filling the cylinder with blood, it was difficult to prevent it running into the side-tube. The cylinder was therefore remodelled with the canula and the side-tube on the same side. This had the additional advantage of making it easier to hold the rubber stopper in position (vide p. 130).

The apparatus was originally intended to be used in one piece, the canula being introduced directly into the patient's vein. This meant exposing the vein and ligating it afterwards, which is undesirable, so the fine end of the canula was cut off, and a short piece of rubber tubing, with an adaptor to fit a large serum needle, fitted in its place. When it was necessary to expose the vein, and use a glass canula, it was found to be of advantage to have a short rubber connection to allow a certain amount of movement of the glass cylinder to occur without the point of the canula being pushed against the wall of the vein.

FIGURE No 11.

ORIGINAL APPARATUS.



MODIFIED APPARATUS.

DISCUSSION ON THE TECHNICAL DETAILS.

The Withdrawal of the Blood from the Donor.

At first sight, it would appear that there should be little difference of opinion as to the technique to be employed in withdrawing a quantity of blood from an individual. A glance at the literature, however, shows that considerable controversies have arisen over the details of this procedure.

Whatever method of transfusion is used, the principle is the same, namely, the insertion of a needle into the

vein of the donor. The donor should be recumbent, with the forearm supinated, and the arm may be abducted to a right angle (180), or close to the side (181). In this series of cases, the arm was placed in a position of slight abduction, this being found to be the most convenient position. The skin was prepared with iodine, and the operation area protected with sterile towels, and the most prominent vein at the bend of the elbow chosen (182).

The use of a local anaesthetic, and a scalpel to puncture the skin, are details which recently caused considerable controversy. Barling (183), Tidy (184) and Colebrook (185) maintained that with the use of really sharp needles, an anaesthetic is unnecessary, and a nick with a scalpel superfluous. Wright (186), however, pointed out that needles are not always sharp, and Thrower (187) wisely stated that "one should adjust one's methods to the circumstances of the case, a successful transfusion being the aim of the whole affair."

Oldham (188) raised the objection that the National Blood Transfusion Regulations forbid cutting the skin at all, but Brewer (189), the Medical Officer of the London Blood Transfusion Services, found that in the experience of donors who had given over ten transfusions, the use of a local anaesthetic and a small nick with the point of a scalpel were associated with their most painless and

satisfactory services.

Canti (190) summed up the position very well:-

"We now come to the much debated use of the "scalpel. Why on earth not make the tiny nick? "A hole has to be made in the skin, so why not "make it with the best instrument available, "namely the scalpel, - only, do not make it "larger than the needle would have made it, "viz. 1/8th inch.

"If this nick is not made, --- there is a "certain amount of pushing, with (1) the possible "dislodgment of the vein to one or other side --- "and (ii) the possible puncturing of the deeper "as well as the superficial wall of the vein.

"With regard to the use of a local anaes- "thetic, bearing in mind the guiding principle "(consideration for the donor) surely it follows "that a local anaesthetic should always be used."

This passage has been quoted in full as it exactly coincides with the views which we had formulated.

Using French's needles, a few cases were tried without any nick, and it was found to be very easy to make a faulty entry with this method, the tendency being for the point of the needle to pierce the posterior wall of the vein.

By injecting a few minims of novutox into the skin, sufficient to raise a weal, then making a tiny nick through the weal, it was found to be an easy matter to pick up the anterior wall of the vein with the point of the needle, then slip the needle well into the lumen of the vein. The absence of resistance from the skin to the passage of the needle made all the difference between a coolly performed

manipulation with almost certain success, and one where the lurking fear of failure was ever present.

The annoying vein which slips away from the point of the needle was also found to be more easily entered by introducing the needle through a nick in the skin. Keynes (191) suggested rather an ingenious method of steadying such a vein, by using a fine curved round-bodied needle to transfix it, the French's needle then being passed along under the transfixing needle. This is a modification of a similar device suggested by Watson in 1911 (192).

Theoretically, the needle should be inserted so as to meet the blood in the direction of its flow, that is, in a distal direction (180). In actual practice, however, it is much more convenient to insert it in a proximal direction, the vein being sufficiently large and the collateral flow sufficiently free to allow the blood to flow easily through the needle, provided that the correct pressure is maintained on the upper arm.

Colebrook (185) and Moore (180) prefer the use of a sphygmomanometer to a tourniquet, the pressure being raised to 80 m.m. of mercury. This was tried and, though theoretically it is ideal, the apparatus was found to be cumbersome and a nuisance, requiring much more attention that a simple rubber tourniquet, which, when properly applied, gives good results (176). The exact tension required was soon

discovered with practice, and this was used in the present series.

On inserting the needle, the bevel was kept uppermost, with the needle at a very acute angle with the skin. McNab (156) prefers to have the bevel downwards so that the whole lumen of the needle enters the vein at the same time.

Attached to the end of the needle was a piece of rubber tubing, size 10 and six inches in length, leading to the collecting bottle. McNab (156), using a long rubber tube filled with citrate, has introduced a new needle with a glass connection between the needle and the rubber, so that the blood can be seen at once as it enters the needle. This was not found necessary, as it was noticed that, as the blood entered the needle and pushed the air in front of it, a peculiar sensation was imparted to the rubber, which indicated, immediately, that the vein had been entered.

Marriott and Kekwick (193) have found difficulty in obtaining, on occasion, even a few hundred c.cm. of blood on account of clotting in the needle, and they suggest the use of strong suction to assist the flow. In this series, no suction was used, as it was found to be unnecessary. Provided the blood was flowing in a steady stream, and not coming in drops, no difficulty was experienced in obtaining 600 to 900 c.cm. of blood before clotting occurred. When the flow was very slow, it usually indicated that the tourniquet was too tight. In order to hasten the flow,

the patient was told to open and close his fist to drive the blood out of the muscles (176). This procedure must not be carried out too rapidly, or it becomes ineffective, 15 or 20 times per minute being sufficient (193), as a reasonable time must be allowed for the vein to fill up again. If the donor became tired his arm was massaged from the wrist upwards at a somewhat more rapid speed, 30-40 times a minute (181).

Before commencing, 3.8 per cent. sodium citrate was put into the receiving bottle to the '40' mark, and during the filling of the bottle, a circulatory movement was kept up, to ensure proper mixing of the blood and the citrate. After the bottle was filled, a sterile rubber stopper was inserted and the bottle transferred to the special receiver containing water at 110 degrees Fahrenheit. The bottles were kept there until required, being gently agitated from time to time to prevent sedimentation of the red cells.

The Injection of Blood into the Patient.

In this series of cases, the patients were all women being nursed in Fowler's position. This made steadying the arm somewhat difficult, but a convenient position was found by resting the arm on a pillow on the edge of the bed.

The same considerations as to the selection of a vein held with the patient as with the donor, the most prominent vein at the elbow being chosen. In females, however, the

most prominent vein was sometimes difficult to find, seldom standing out as prominently as in men. Frequently the veins were invisible and palpation alone could determine their position. In such a case, it was found very useful to scratch the skin along the line of the vein, as determined by palpation, then to use the scratch later as a guide in introducing the needle. Oldham (181) described a difficulty of finding the vein obscured by the weal raised by the local anaesthetic, a difficulty more frequently experienced in women than in men, and for this reason, the line of the vein was marked whether it was visible or not.

The ideal aimed at was to introduce the blood through a needle, thus leaving the vein open and capable of being used again if necessary. The method of choice, therefore, was to anaesthetise the skin, make a tiny nick with the point of a scalpel and introduce the needle as with the donor. The tourniquet was applied in such a way that it could be released immediately the vein was entered. While this was the method of choice, it was not always found possible, and on all occasions, a glass canula and the necessary instruments for exposing the vein were available.

It was found that a vein which had been badly entered, with some extravasation of blood into the tissues, could be exposed by cutting down, but was very difficult to find and isolate owing to the extravasated blood. For this reason,

if the veins were very deep, or collapsed, or had previously given difficulty with a serum needle, the canula was used from the start, rather than have to cut down on a vein damaged by an unsuccessful effort to insert the needle.

In inserting the canula, the vein was exposed through an incision half an inch in length, isolated from the surrounding tissues, and a double strand of catgut passed behind it by means of an aneurysm needle. The strands were separated as far as the incision would allow, the distal one tied and a half loop made on the proximal one. By holding the two strands taut, the intervening portion of vein was kept empty of blood. A V-shaped incision was then made in the anterior wall of the vein, the canula introduced and the proximal strand of catgut pulled tight round it to hold it in position.

The needle or canula in position, the remainder of the technique was the same.

A few cubic centimetres of sodium citrate were put into the cylinder and allowed to fill up the rubber connection and adaptor, and the apparatus fixed to the needle as soon as the vein had been entered. When the canula was used, the apparatus was assembled before introducing the canula into the vein, the canula and lower end of the tube being filled with citrate beforehand. The citrate prevented the clotting of any blood flowing back into the apparatus before the transfusion was started.

The blood was strained through gauze as it was poured from the bottle into the cylinder, to remove any clots which might have formed.

The rubber stopper was then applied to the cylinder and the apparatus held in the left hand, the fingers engaging around the side-tube at the top, and the thumb holding the stopper in position. The needle was steadied by the right hand, and the bellows worked by an assistant.

To prevent any air entering the vein at the end of the operation, the rubber stopper was removed as the last of the blood entered the narrow part at the bottom of the cylinder.

The needle was then removed, and a pad and bandage applied.

In the cases where the canula was used, the second catgut ligature was tied after the canula had been removed, the catgut cut off short, and the skin edges approximated by two silkworm gut stitches.

SECTION C.

INDICATIONS FOR BLOOD TRANSFUSION IN PUERPERAL SEPSIS.

The observation on the course and treatment of the anaemia in puerperal sepsis would appear to indicate that blood transfusion might be of value in certain cases.

1. In all cases with extreme anaemia, to counteract any possible further deterioration in the blood value, and to give an initial impetus to the blood recovery to shorten the convalescence.

2. In cases where a rapid deterioration of the blood value is occurring, in order to replace the blood being destroyed, and if possible, to check the blood destruction.

3. In cases of prolonged sepsis where the blood has assumed a stationary position at an unsatisfactory level, and is resistant to treatment with iron.

In addition to these cases indicated by the blood behaviour, may be included cases with profound toxaemia, irrespective of the blood picture, to estimate the value of blood *per se* as a non-specific measure.

These are the indications which have been used for blood transfusion in the cases to follow, and the results will be studied to estimate the value of blood transfusion, firstly as an anti-anaemic factor, and secondly as a general

therapeutic measure.

Division of the cases into these ~~three~~ *two* groups cannot be absolute, however, as cases showing profound toxaemia may be included as cases showing a rapid deterioration of the blood. Where, however, a very poor or rapidly changing blood picture was observed, the cases have been included in the first group. Where the transfusion was used irrespective of the blood value, they have been included in the second group.

In all, blood transfusion was administered to 31 patients, the blood picture being used as the indication in 22, and the general condition of the patient in 9.

SECTION D.

BLOOD TRANSFUSION IN THE CORRECTION OF ANAEMIA.

IN SEVERE but not PROGRESSIVE ANAEMIA.

In using the blood behaviour to estimate the value of blood transfusion, definite criteria must be used to judge the results. In none of the cases transfused, was iron or any other substance given which might stimulate haemopoiesis, until well on in the convalescence, so that the effect of the transfusion alone might be seen.

Cases with Localised Sepsis.

In cases where the infection was confined to the uterus, it will be remembered that spontaneous recovery of the blood was not unusual, though apt to be prolonged and incomplete in the presence of severe anaemia. Thus in such cases, the time taken for the blood to reach a satisfactory condition may be regarded as a suitable criterion as to the efficacy of transfusion.

The initial impulse given by the transfusion by the mechanical addition of new red blood corpuscles and haemoglobin will materially alter this time, so that the time factor cannot be used alone. To estimate the haemopoietic action of the new blood, however, comparison might be made with other cases, taking the starting level in transfusion

cases as that immediately after the transfusion, and comparing the increase in different cases over a definite period of time.

Table 23.

Showing the comparative rise in the blood values in the first three weeks in untreated cases, cases following transfusion, and iron treated cases.

	Red Blood Corpuscles.			Haemoglobin.		
	Total gain.	Immed. gain Trans-fusion.	Net gain.	Total gain.	Trans. gain.	Net gain.
Transfusion Cases: CLXV	1,900,000	480,000	1,420,000	34	10	24
CLXIV	2,200,000	693,000	1,507,000	38	12	26
Untreated Cases: CXXIV	820,000		820,000	17		17
CIV	444,000		444,000	11		11
CVII	1,134,000		1,134,000	12		12
CII	1,063,000		1,063,000	23		23
Iron treated Cases: CXXVI	880,000		880,000	13		13
CXXVII	1,417,000		1,417,000	18		18
CXXVIII	453,000		453,000	5		5
CXXIX	310,000		310,000	4		4
CXXXII	733,000		733,000	16		16
CXXXIII	570,000		570,000	12		12
CXXXIV	740,000		740,000	13		13
CXXXVI	1,560,000		1,560,000	28		28
CXXXIX	1,380,000		1,380,000	29		29
CXLI	1,017,000		1,017,000	16		16

Table 23 shows the comparative rise in the blood values over the first three weeks in transfusion cases and in untreated and iron treated cases. The gross increase in the blood count and haemoglobin percentage in the transfusion cases is shown in the first columns of each section of the table, and the net figures after deduction of the increase due to the mechanical action of the transfusion are shown in the last columns.

Comparing the net figures in the last columns, it is seen that the only cases where the gain was comparable with that seen in the transfusion cases were those where massive dosage of iron was used. In the two transfusion cases, iron was given to one (No. CLXIV) for one week of the period under review, the other having none during that time.

Thus it would appear that the addition of fresh blood in cases with severe anaemia accompanying a well-localised infection not only improves the blood value mechanically, but also stimulates haemopoiesis to a degree comparable with massive dosage of iron.

Though Whitby (89) considers that the effect of transfusion is more than mechanical, Feinblatt (194) believes that any stimulus to haemopoiesis is solely in virtue of the improved nutrition of the bone marrow as a result of the larger number of cells in circulation.

Three cases of localised infection were treated with blood transfusion (Nos. CLXIV-CLXVI).

Case CLXIV (Chart 65). This was a case of mild puerperal infection with a profuse offensive lochial discharge, accompanied by severe anaemia resulting from post partum haemorrhage from a retained placenta. On admission, three large pieces of partly decomposed placenta were removed from the uterus. Blood transfusion was administered, and the temperature and pulse rate settled in a few days. The blood value rose from 2 million red cells per c.mm. and 38 per cent. haemoglobin, to 4,610,000 red cells per c.mm. and 86 per cent. haemoglobin in four weeks. The blood transfusion was supplemented with iron during the last two weeks. This case compares very favourably with some of the other cases of severe anaemia not transfused.

Case CLXV (Chart 66) was a case of localised sepsis following abortion where no particular history of haemorrhage was given. On institution of local treatment, followed by blood transfusion, the temperature soon settled, and the blood values rose from 1,530,000 red cells per c.mm. and 28 per cent. haemoglobin, to 3,430,000 and 62 per cent. in three weeks. As the blood showed a tendency to remain at this level iron was administered in large doses (ferrous sulphate, gr. 18 daily), which brought the blood level to 4,450,000 red cells per c.mm. and 81 per cent. haemoglobin in a further three weeks.

Case CLXVI (Chart 67). This case was not included in the table, as it followed a most unusual course. It was a case of mild localised sepsis with an extreme anaemia of unknown origin, the blood count on admission being 1,340,000 red cells per c.mm. and haemoglobin 28 per cent., the colour index being slightly over unity. Transfusion produced an immediate improvement in the general condition of the patient, but, although the sepsis subsided quickly, the blood remained at the level to which the transfusion had brought it. Iron given in large doses (Blaud's pill, 60 grains daily) produced a very slight effect only, so the dose was increased to 90 grains daily. This had the effect of raising the haemoglobin level considerably above that of the red cells, which remained stationary. Liver extract was therefore given (Hepatex, 1 ampoule daily) in conjunction with the iron, but the colour index still remained high, so the iron was stopped and the hepatex given alone. This produced an immediate effect, reducing the colour index to just under unity. Eleven weeks after the transfusion, the blood values were 4,000,000 red cells per c.mm., and 77 per cent. haemoglobin. Believing that the absence of the liver factor might be temporary, the patient was advised to continue with iron treatment alone. Seven weeks later she returned, complaining of "feeling out of sorts", and blood examination revealed:- Red cells 3,560,000 per c.mm., haemoglobin 87 per cent., colour

index 1.21. She was advised to stop the iron and recommence liver treatment, and to continue the treatment indefinitely. Although instructed to return in a month, she failed to do so.

This was evidently a case of true Addison's anaemia in which the picture was masked by the sepsis. Her blood films, however, at no time showed any sign of anisocytosis, or poikilocytosis, and would have passed easily as normal.

Discounting this case, then, it is seen that blood transfusion is capable of shortening the convalescence in localised cases with severe anaemia in a manner which no other method of treatment could possibly do.

Cases with Phlegmasia.

The other type of severe anaemia, which is not rapidly progressive, is that associated with phlegmasia. It has already been seen that, in spite of large doses of iron, although it does not become progressively worse, this anaemia is very resistant to treatment, particularly when the phlegmasia is active.

Three such cases (Nos. CLXVII-CLXIX) were treated with blood transfusion, and all three showed, after the initial rise in the blood values due to the mechanical effect of the transfusion, little further improvement until the institution of iron treatment. All three charts show that the haemoglobin in particular assumed a stationary position until iron preparations were given in large doses, after

which a decided improvement occurred. This would seem to indicate that this type of anaemia is associated with deficient absorption of iron, and might be of the same nature as the cases of chronic microcytic or hypochromic anaemia described by Witts.

IN PROGRESSIVE ANAEMIA.

Preliminary Discussion.

In the septicaemic cases, and cases with sustained toxaemia, it has been seen that it was not uncommon for the blood to deteriorate in value during the stage of active sepsis, the duration and degree of the deterioration of the blood corresponding fairly accurately with the length of time the active sepsis was sustained, and with its severity. As these are variable factors, the time factor of blood recovery cannot be used in these cases. The immediate improvement which follows the addition of the fresh blood corpuscles is a fact which is without dispute, and it is the purpose of this study to ascertain if this improvement is simply temporary, or if it can be sustained in the presence of active sepsis. The tendency being for the blood to deteriorate in value at such a time, a steady rise in the blood value while the patient is still pyrexial may be taken as indicating sustained benefit from the transfusion, while replacement of a previously falling blood value by a rising or stationary

one, during active sepsis, will be more positive proof of lasting benefit (See Figure 12).

A stationary blood value during sepsis, following the immediate transfusion result, without knowledge of the blood behaviour before the transfusion, though presumptive evidence of a good result, is not so definite, as it was seen in Part II, Section B that this occasionally occurred in untreated cases.

On the other hand, a continued fall in the blood values after the temporary immediate response to the transfusion, must be taken to indicate a failure of the transfusion to impart any lasting benefit (See Figure 12).

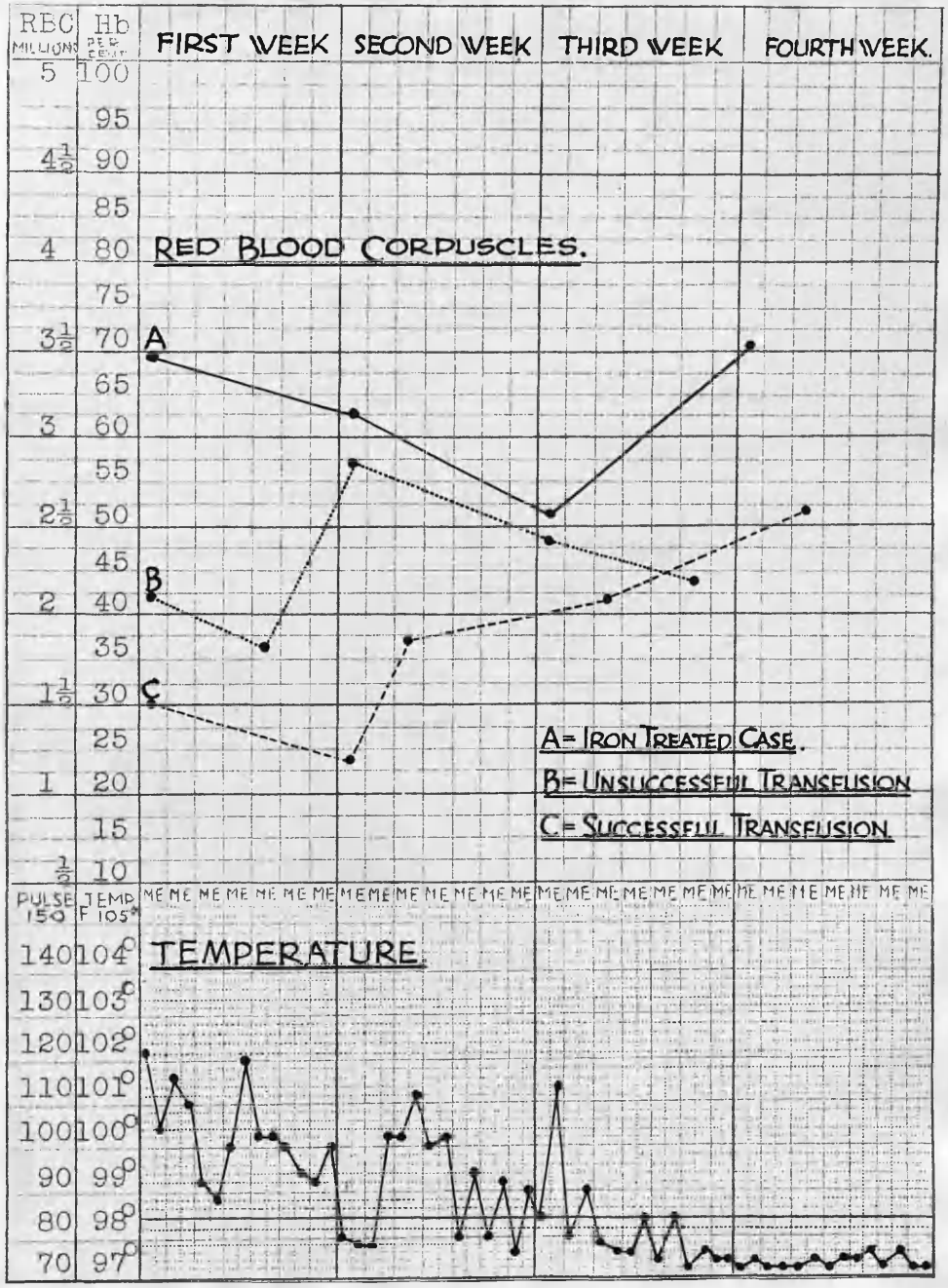
Cases with Sustained Toxaemia and Septicaemia.

Transfusion was administered to 16 patients belonging to the toxaemic and septicaemic groups. In six, the blood count was observed to fall before the transfusion was administered, and in nine, it was administered on admission without waiting to see how the blood would behave. In one case (No. CLXX) the transfusion was administered after the temperature had subsided, so it is of no value in estimating the efficacy of transfusion and must be discounted.

The six cases in which the blood fell previous to the transfusion were all cases of septicaemia. In two (CLXXI, CLXXII) the fall was immediately arrested, being replaced in one (CLXXI) by a steady rise, and in the other

Figure 12.

Illustrating the blood behaviour in relation to the temperature in iron treated and transfusion cases.



NOTE: A. Fall in blood count in iron treated case till temperature settled. Case CLII.

B. Fall in blood count at same rate after as before transfusion - unsuccessful result. Case CLXXV.

C. Fall in blood count immediately arrested by transfusion, and replaced by steady rise - successful result. Case CLXXI.

by a stationary period coinciding with the duration of the sepsis. In both, organisms of the coliform group were isolated in the blood, and both were accompanied by very offensive lochial discharges.

The other four cases terminated fatally. One (No. CXVIII), which has been mentioned before (page 76) was a case of haemolytic streptococcal septicaemia with a very sharp blood destruction, and an indirect positive van den Bergh reaction. She died 12 hours after the transfusion, before further observations could be made on the blood.

Case CLXXIII was also a very severe septicaemia following abortion, in which at post mortem examination, numerous small abscess cavities were found in the uterine wall. The blood showed a fairly sharp fall after admission. After blood transfusion, no improvement was noted in the general condition of the patient, and as only one further blood examination was made before she died, no information is available as to her blood behaviour.

These two cases demonstrate complete failure of blood transfusion to confer any benefit whatsoever.

Case CLXXIV was one of prolonged septicaemia in which coliform organisms were found in the blood during life, and streptococci isolated from the uterus and spleen post mortem. For three weeks after admission, she had very frequent rigors and the blood values fell, but gradually. The rigors ceased, and the blood values improved, but, with a return of the

rigors and indications pointing to kidney infection, the blood deteriorated again. Intravenous antiseptics of all kinds were used without avail and finally, nine weeks after admission, blood transfusion was tried. No improvement occurred, and the patient died a week later.

In this case, it was felt that had transfusion been administered earlier, and repeated, a different outcome might have resulted. The fact that she lived for ten weeks showed that she was capable of putting up a good resistance, and the additional benefit of transfusion in the early stages might have made a difference.

Case CLXXV, though at first appearing to be a complete failure, was partly lost by accident. The case was one of post-abortive septicaemia (coliform and streptococcal), accompanied by rigors. In spite of iron during the first week, the blood values fell, so transfusion was administered but with temporary improvement only, the blood count falling afterwards at much the same rate as before. Two weeks later, a second transfusion was given, following which the blood destruction ceased, the count becoming stationary. It was felt that the desired result had been obtained, when a large pleural effusion occurred on the right side, with considerable dyspnoea. Aspiration gave temporary relief, but she died a few days later. The patient had a definite history of tuberculosis, the right hip joint having been ankylosed a few years previously for tuberculous disease. At post mortem examination, streptococci

were found in the uterine wall, and several small cavities were present in the lung close to the pleura. Section of these showed "small round cell infiltration," but no tubercle bacilli were seen.

This case gave the impression that the septicaemia was yielding to treatment, as indicated by the blood picture, and that, had the tuberculous infection remained dormant, recovery might have taken place.

Thus of six cases showing a preliminary fall in the blood values, two showed definite sustained improvement following blood transfusion, one showed a partial success following a second transfusion, and three were definitely unsuccessful.

Of the nine cases transfused without previous knowledge of the blood behaviour, 6 recovered and three died.

Of the six who recovered, three (CLXXVI-CLXXVIII) showed a progressive rise in the blood values after the transfusion, during active sepsis, indicating quite definitely, a sustained benefit from the transfusion. One other (CLXXIX), in whom three small transfusions were given at four-day intervals, also showed a progressive rise in the blood values while still pyrexial. In the other two cases (CLXXX, CLXXXI), the blood remained stationary at the level to which the transfusion had brought it, until the sepsis had cleared up, after which spontaneous recovery took place. As neither case showed any fall in the blood picture in the

presence of sustained and fairly severe toxaemia, the transfusion may be regarded as having conferred more than passing benefit.

Of the three cases who died, one (CLXXXII) was frankly attended by no more than temporary improvement. A case of contracted pelvis on whom forceps had been applied on nine occasions before delivery was completed, she was admitted with her perineum, vagina and cervix in a sloughing condition, so bad that it was impossible to insert a catheter into the uterus. Transfusion produced a marked improvement in the blood picture and general condition, but this was only temporary, as the blood picture immediately deteriorated and the general condition of the patient gradually declined. The second (CLXXXIII) was extremely ill on admission, with severe anaemia and evidence of cardiac embarrassment with aortic regurgitation. Although cardiac decompensation is regarded as a contra-indication (195), a small transfusion was risked, and was followed by a striking improvement in the general condition. The pyrexia continued and the pulse remained very rapid, but the blood picture maintained a stationary position for five weeks, after which it began to deteriorate. A second transfusion was given but was completely unsuccessful in preventing further blood destruction, the count falling to 860,000 red cells per c.mm. before death ensued. This case appeared to show some sustained improvement after the first transfusion, but none after the second. Throughout her whole

illness, there was evidence of cardiac inefficiency, which made transfusion a risk. At post-mortem examination, however, no endocarditis was found, but there was marked myocardial degeneration.

The third case (CLXXXIV) was definitely successful as far as the sepsis was concerned, and as seen in the blood picture. The pregnancy, however, followed by the puerperal infection had the effect of lighting up an old tuberculous infection, which advanced rapidly throughout both lungs and produced a fatal conclusion. This was confirmed at post-mortem, when no evidence of puerperal sepsis was found, but extensive tuberculosis was present in both lungs.

Thus, in these nine cases, definite sustained benefit was found in six, one was benefited, but died of tuberculosis, one had temporary benefit after the first transfusion, but not after the second; and one case had no sustained benefit at all.

Summary: Using the criteria previously described to judge the effect of transfusion in such cases, the following results were obtained:-

Table 24.

Definite sustained benefit.....		8
Sustained benefit but died of tuberculosis.....	1	
Sustained benefit from first, but not from second transfusion.....	1	
No benefit from first, but benefit from second and Tuberculosis contributed towards fatal conclusion.....	1	
Total partial success.....		3
Unsuccessful.....		4
		15

Discussion on the results obtained. It is thus seen that in toxaemic cases, and cases of mild septicaemia, benefit may be expected from a single blood transfusion, which can break the vicious cycle of deteriorating blood in active sepsis, and replace it by a steady rise in the blood count, thus enabling the patient to deal more effectively with the infection.

In very severe septicaemia, however, blood transfusion was of evanescent if of any value.

Between these two extremes there would appear to be a type of case where carefully administered and repeated transfusions might swing the balance from a fatal to a successful conclusion. These are the cases of prolonged and fairly severe septicaemia which often terminate fatally. Although in the three cases in this series (CLXXIV, CLXXV,

CLXXXIII), a fatal result occurred, they may teach a valuable lesson. In Case CLXXXIII, a temporary sustained benefit was found after the first transfusion, and, had a second transfusion been given earlier, before the effect of the first had passed off, instead of waiting until the blood was deteriorating, a greater measure of success might have been found. A second transfusion was obviously indicated earlier, but was withheld on account of the fear of upsetting a delicately balanced cardiac compensation. That this fear was unfounded was seen later when the second transfusion was taken without any great constitutional upset.

Case CLXXV would appear to show that in cases where the first transfusion is unsuccessful, benefit may be obtained from a second. It would perhaps be advisable not to delay longer than one week before administering the second.

In Case CLXXIV, it was felt that, although the transfusion given was of no value, if repeated transfusions had been administered earlier, a successful result might have been obtained.

These observations would appear to suggest that Watson's indication (34) of " a patient who is losing ground or showing a progressive anaemia" for the administration of transfusions, repeated every four or five days, would be particularly valuable in cases such as these.

CONCLUSIONS (SECTION D).

Cases with Progressive Anaemia.

1. In toxaemia and mild septicaemia, one single blood transfusion is of definite, lasting value, not only in virtue of the improved state of the blood immediately afterwards, but also by checking the deterioration of the blood, and replacing it with a rising blood count during the sepsis, an achievement not found possible by any other method of treatment.

2. In rapidly advancing, severe septicaemia, the value of transfusion is at the best, doubtful. Further observations of this point will be made later.

3. In cases falling between these two extremes, transfusions repeated at intervals of not more than one week, as suggested by Watson (34), may be of life-saving value.

Cases with Severe but not Progressive Anaemia.

1. In mild localised infections, accompanied by severe anaemia, blood transfusion is of value in two ways:-

   (a) By relieving the immediate symptoms due to anaemia:

   (b) By shortening the convalescence, not only by improving the blood value mechanically, but also by its stimulating effect on haemopoiesis.

To obtain the most satisfactory effect in shortening the convalescence, iron preparations should be administered

in massive doses in addition to the transfusion, as there is insufficient iron in the blood transfused and in the food to supply what is required in active blood regeneration. Whitby (89) has pointed out a similar finding in the use of blood transfusion in the anaemias of pregnancy.

2. It would appear that in cases of phlegmasia associated with severe anaemia, the essential defect is in the supply or absorption of iron, which blood transfusion alone cannot correct. In such cases blood transfusion is of value in relieving the symptoms directly attributable to the anaemia but adjuvant treatment with massive dosage of iron is necessary to complete the blood recovery.

SECTION E.

BLOOD TRANSFUSION AS A GENERAL THERAPEUTIC MEASURE.

In nine cases, blood transfusion was administered as a general therapeutic measure, quite apart from the indications of severe anaemia or falling blood values used in the last section. In three of the cases, however, prolonged blood examinations were made, the results of which have also been noted. In one other case, severe anaemia was present, but the information gained was insufficient to warrant its inclusion in the last section. In the remaining five cases, such blood examinations as were made, gave no relevant information.

Of the nine cases, five died and four recovered. All were regarded as extremely ill when the transfusion was given. The disposition of the cases into disease groups, with the ultimate result, is seen in Table 25.

Table 25.

Type of Infection.	Number recovered.	Number died.	TOTAL.
Toxaemia	1	0	1
Septicaemia	0	3	3
Peritonitis	2	2	4
Pyaemia	1	0	1
Total:	4	5	9

CASE OF TOXAEMIA.

This case (No. XCV, Appendix III, Volume I) had an infection with fairly profound toxaemia, accompanied by phlegmasia. Transfusion was followed by a considerable improvement in the general condition, and a good recovery was made.

CASES OF SEPTICAEMIA.

Of these three cases, two (XCVI, Appendix III, Volume I; CLXXXV, Volume II) were extremely ill on admission, with a rapidly progressive septicaemia. In neither was any benefit seen as a result of the transfusion.

In the third case (No. XCVII, Appendix III, Volume I), a blood count made ten days after admission showed a very low result, 1,630,000 red cells per c.mm. and 30 per cent. haemoglobin. A degree of icterus present indicated that in part at least, the septicaemia was responsible for the anaemia. Transfusion was followed by a slight improvement in the general condition, which, however, proved to be temporary and the patient gradually declined and died. This case might be classed with those mentioned in the last section, for whom early repeated transfusions were advocated. It was included in this section, however, as insufficient data as to the blood behaviour were obtained.

CASE OF PYAEMIA.

On admission, this case (No. CLXXXVI, Chart 87, Volume II) showed a very severe degree of toxaemia, accompanied by delirium. Blood transfusion was followed by a marked improvement. The pyrexia continued, however, and three weeks after admission, a tender mass was found in the right iliac fossa. This was incised three weeks later, as the impression had been formed that abscess formation had occurred. Little pus was obtained, though a large piece of slough was removed. This was followed by a regular succession of pyaemic abscesses, and it appeared as though the operation had disturbed a septic thrombus in one of the pelvic veins. After a very stormy convalescence, the patient was dismissed, having been in the hospital for six months.

It is difficult to judge to what extent the transfusion contributed to the ultimate recovery in this case. It was felt at the time that the immediate improvement following the transfusion had prevented the patient's demise at that early stage. The pelvic thrombosis and subsequent pyaemic abscesses occurred after the critical stage of the initial septicaemia had been overcome. In this way, the transfusion was believed to have been of value.

Observations on the blood, made at weekly intervals during the whole illness, showed that the initial benefit from the transfusion was soon lost, and was followed by a gradual fall in the blood value which, however, was not of a

haemolytic nature, but resembled that seen in chronic sepsis. Iron preparations had no effect on this anaemia until the last abscess was drained and healed.

CASES OF PERITONITIS.

Of the four cases of peritonitis, septicaemia was present also in three, one having a sterile blood culture.

In the case where the blood culture was sterile (Case CLXXXVII, Chart 88, Volume II), the abdomen was opened and drained as soon as the diagnosis was certain. Free fluid from which haemolytic streptococci were isolated, was found. The operation was followed by a blood transfusion, and the patient made a remarkable recovery, which could be ascribed partly to the early operation and partly to the transfusion.

Anaemia of moderate degree was present, and observations were made on the blood at weekly intervals. It was found that, in spite of the presence of puerperal streptococcal peritonitis, the blood gradually rose in value after the transfusion. In a case of this severity, a fall would be expected, and the absence of such a fall would appear to indicate definite sustained value from the transfusion.

In the other case who recovered (CLXXXVIII, Chart 89, Volume II), haemolytic streptococci were found in the blood stream and in the fluid obtained from the peritoneal cavity. In addition to generalised peritonitis, there was also a

large abscess lying between the layers of the broad ligament. Operation followed by blood transfusion produced a very decided improvement in the patient's general condition. The pelvic inflammatory mass was very slow in subsiding, but ultimately the patient made a good recovery.

Observations on the blood at weekly intervals showed that after the transfusion, although no haemolytic anaemia occurred, the chronic septic mass in the pelvis produced a partial aplastic anaemia, which persisted until the sepsis was eradicated.

In the other two cases (XCVIII, XCIX, Appendix III, Volume I), the peritonitis was part of a severe, rapidly progressive septicaemia. In one (XCVIII), laparotomy was performed; in the other, the peritonitis was found at post mortem examination. Blood transfusion was without success in either case.

CONCLUSIONS (SECTION E).

1. Corroboration is given to the finding in the last section, that in cases of severe, rapidly progressive septicaemia, blood transfusion is of little or no value.

2. In cases where peritonitis is part of a severe septicaemia, blood transfusion, with or without laparotomy, is valueless.

3. In peritonitis without blood stream infection, and in cases where the common source of infection both of the blood stream and the peritoneal cavity is extra-uterine and can be eradicated, early operation and blood transfusion may be attended by very gratifying results.

4. In an occasional case, blood transfusion may tide the patient over the critical stage of the initial septicaemia, and leave her capable of dealing with any complications which may follow.

5. Blood transfusion is powerless to prevent the development of the anaemia associated with chronic sepsis of long duration.

SUMMARY AND FINAL CONCLUSIONS.

SUMMARY AND FINAL CONCLUSIONS.

The Anaemia in Puerperal Sepsis.

1. A severe degree of anaemia has been shown to be of frequent occurrence in patients admitted to hospital suffering from puerperal sepsis. Although haemorrhage was found to be the commonest cause in the younger patients, as age advances, it is more frequently of a nutritional nature.

2. Not only does this anaemia predispose to the occurrence of infection, but it also hastens its onset in the puerperium and adds to its gravity.

3. The anaemia is further accentuated throughout the course of the infection, in milder cases by a failure of response of the haemopoietic system, and in severe cases by haemolysis. The reduction in the value of the blood during the sepsis is in proportion to the degree of toxaemia present. The effect of this is to reduce the resistance of the patient and to prolong the convalescence.

4. Treatment with iron, even in massive dosage, is ineffective in correcting, or even arresting, the progress of the anaemia during the stage of sepsis in all except the very mildest cases.

5. The progressive nature of the anaemia makes it a useful guide in assessing the value of blood transfusion.

6. Anaemia of severe degree and of hypochromic nature has been demonstrated in cases with phlegmasia alba dolens. This anaemia is due to deficient intake or absorption of iron, and would appear to play some part in the production of phlegmasia.

7. In cases accompanied by chronic suppuration, there is a slowly progressive anaemia which is very resistant to treatment with iron until the sepsis has been eradicated.

8. As a result of these investigations, blood transfusion would appear to be indicated in certain cases:-
   (i) In all cases with a haemoglobin value below 40 per cent., irrespective of the degree of toxaemia.
   (ii) In all cases where a rapid deterioration of the blood value is occurring.
   (iii) In cases of prolonged sepsis where the blood is stationary at an unsatisfactory level.
   (iv) In all cases with profound toxaemia, irrespective of the degree of anaemia.

The Value of Blood Transfusion.

1. In cases of localised sepsis with severe toxaemia, and in mild cases of septicaemia, blood transfusion is of value in arresting the blood deterioration and replacing it with an improving blood picture.

2. In rapidly advancing septicaemia, with or without peritonitis, blood transfusion is of little or no value.

3. In cases falling between these extremes, blood transfusions, repeated at short intervals, may be of life-saving value.

4. In peritonitis occurring in cases other than very acute septicaemia, blood transfusion following early laparotomy is of considerable value.

5. In the anaemia accompanying phlegmasia, transfusion will produce an immediate improvement, but only by reason of its mechanical effect, iron in massive dosage being required to complete the treatment.

6. In cases with prolonged chronic sepsis, transfusion is powerless to prevent the occurrence of anaemia, but it may be of value in tiding the patient over a critical period early in the illness.

7. Blood transfusion alone provides insufficient iron to meet the demands of the body in all except the mildest degrees of anaemia, and adjuvant treatment with iron is necessary. The best preparation for this purpose was found to be Blaud's pill in doses of 30 to 60 grains daily, combined with arsenious acid.

8. Transfusion is of considerable value in cases with severe anaemia, by relieving the symptoms immediately due to the anaemia, and by providing a stimulus to haemopoiesis, which considerably shortens the convalescence.

APPENDICES I, II, III.

APPENDIX I.

CASES IN WHICH THE BLOOD WAS NOT EXAMINED.

A. Cases with Localised Sepsis.

CASE I. (2304/34) Mrs. C.

Age 23, para 2. Normal delivery.

Illness commenced on 4th day of the puerperium with headache and shivering.

Admitted on 3rd day of illness.

Perineum. Slightly torn, cervix soft and ulcerated. Lochia profuse and purulent.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, sterile.

Progress. Temperature settled at once on institution of local treatment. Lochia persisted for 12 days.

CASE II. (10/35) J.C.

Age 24, para 2. Normal delivery.

Illness commenced on 8th day of the puerperium with headache and pyrexia.

Admitted on 2nd day of the illness.

Perineum. Intact, and cervix firm. Lochia retained.

Bacteriology. Cervical swab, negative. Blood culture, sterile.

Progress. Temperature settled at once on institution of free drainage. Lochia profuse for 3 weeks.

CASE III. (234/35) J.W.

Age 30, para 1. Forceps delivery.

Illness commenced on 10th day of puerperium with shivering and headache.

Admitted on 4th day of illness.

Perineum. 1st degree tear. Cervix slightly lacerated. Lochia profuse, purulent and haemorrhagic.

Bacteriology. Cervical swab and blood culture: negative.

Progress. Temperature subsided immediately. Lochia persisted for 12 days.

CASE IV. (275/35) M.C.

Age 18, para 1. Normal delivery.

Illness commenced on 3rd day of puerperium with pyrexia.

Admitted on 2nd day of illness.

Perineum. 1st degree tear. Cervix large, soft and ulcerated. Lochia profuse.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, sterile.

Progress. Temperature settled quickly. Lochia persisted for 11 days.

CASE V. (484/35) Mrs H.

Age 26, para 1. Forceps delivery.

Illness commenced on 3rd day of puerperium, with pyrexia.

Admitted on 1st day of illness.

Perineum. Septic 2nd degree tear. Cervix large, soft and ulcerated. Lochia profuse, purulent and blood stained.

Bacteriology. Cervical swab and blood culture negative.

Progress. Some toxaemia persisted for 1 week, then subsided completely. Lochia persisted for 12 days.

CASE VI. (707/35) Mrs C.
Age 24, para 2. Normal delivery.

Illness commenced on 1st day of puerperium with abdominal pain.

Admitted on 6th day of illness.

Perineum. Septic 2nd degree tear, slight laceration also of vulva. Cervix large, soft and ulcerated. Lochia haemorrhagic with debris. Acute bronchitis also.

Bacteriology. Cervical swab and blood culture negative.

Progress. Temperature settled at once. Lochia persisted for 17 days.

CASE VII. (779/35) Mrs M.
Age 22, para 1. Forceps delivery.

Illness commenced on 2nd day of puerperium with headache and shivering.

Admitted on the 2nd day of the illness.

Perineum. Vagina and vulva extensively lacerated. Cervix large, soft and ulcerated. Lochia profuse, haemorrhagic, with debris.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature fell immediately, and lacerations healed quickly. Lochia persisted for 13 days.

CASE VIII. (786/35) Mrs R.
Age 34, para 3. Normal delivery.

Illness commenced on 4th day of puerperium, with headache and shivering.

Admitted on 1st day of the illness.

Perineum deficient and slightly torn. Cervix swollen and ulcerated. Lochia retained, haemorrhagic.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture sterile.

Progress. Temperature subsided almost immediately, on institution of adequate drainage. Lochia persisted for 16 days.

CASE IX. (809/35) Mrs B.

Age 30, para 1. Forceps delivery.

Illness commenced on the 9th day of the puerperium, with shivering.

Admitted on the 3rd day of the disease.

Perineum. 2nd degree tear. Cervix soft and septic. Lochia profuse and purulent.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature settled at once. Lochia persisted for 13 days.

CASE X. (850/35) Mrs S.

Age 30, para 1. Forceps delivery.

Illness commenced on the 11th day of the puerperium, with shivering.

Admitted on the 3rd day of the disease.

Perineum. 2nd degree perineal tear. Vulva bruised. Cervix firm. Lochia profuse, purulent and blood stained.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, sterile.

Progress. Temperature settled at once. Lochia persisted for 7 days. Urinary infection in the 2nd week.

CASE XI. (951/35) Mrs D.

Age 34, para 1. Normal delivery.

Illness commenced on the 11th day of the puerperium, with weakness.

Admitted on the 17th day of the disease.

Perineum. Slight tear. Cervix firm, slight lochial discharge.

Bacteriology. Cervical swab and blood culture, sterile.

Progress. Uterus not completely involuted. Very mild sepsis only. Lochia persisted for 7 days.

CASE XII. (989/35) Mrs K.

Age 22, para 1. Normal delivery.

Illness commenced on the 2nd day of the puerperium with pyrexia.

Admitted on the 2nd day of the disease.

Perineum. 1st degree tear. Cervix large, soft and ulcerated. Lochia profuse and haemorrhagic.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature settled after 3 days. Lochia persisted for 13 days.

CASE XIII. (1020/35) Mrs S.

Age 33, para 2. Normal delivery.

Illness commenced on the 4th day of the puerperium with abdominal pain.

Admitted on the 2nd day of the disease.

Perineum. No fresh laceration. Cervix large and soft. Lochia profuse and haemorrhagic with debris and blood clots.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature never high, but slightly irregular for 11 days. Lochia persisted for 23 days.

CASE XIV. (1049/35) Mrs W.

Age 28, para 3. Normal delivery.

Illness commenced on the 10th day of the puerperium with shivering and headache.

Admitted on the 3rd day of the disease.

Perineum. Intact. Cervix firm. Lochia scanty, purulent.

Bacteriology. Cervical swab and blood culture sterile.

Progress. Temperature settled after 2 days. Lochia persisted for 7 days.

CASE XV. (1063/35) Mrs B.
Age 31, para 1. Forceps delivery in hospital after failure outside.

Illness commenced on the 9th day of the puerperium with pyrexia.

Admitted on the 4th day of the illness.

Perineum. 2nd degree tear. Cervix lacerated, and septic. Lochia profuse and purulent.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature settled after 7 days. Lochia persisted for 7 days. Numerous boils on buttocks.

CASE XVI. (1111/35) Mrs McI.
Age 35, para 3. Normal delivery.

Illness commenced on the 5th day of the puerperium with pyrexia.

Admitted on the 2nd day of the disease.

Perineum. Superficial laceration. Cervix large, soft and ulcerated. Lochia retained, purulent and offensive.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture sterile.

Progress. Pyrexia continued for 7 days, and lochia persisted for 19 days.

CASE XVII. (1321/35) Mrs F.
Age 34, para 1. Craniotomy.

Illness commenced on the 16 day of the puerperium with pyrexia.

Admitted on the 3rd day of disease.

Perineum. Torn but well healed. Small vesico-vaginal fistula. Cervix small and firm. Slight haemorrhagic lochia. Separation of the symphysis pubis.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature irregular for 2 weeks, but never much toxaemia. Lochia persisted for 25 days.

CASE XVIII. (1385/35) Mrs H.
Age 30, para 5. Normal delivery.

Illness commenced on the 7th day of the puerperium with pyrexia.

Admitted on the 2nd day of the disease.

Perineum. Intact. Cervix firm. Lochia scanty. Slight debris washed out of the uterus by the glycerine.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature settled immediately on institution of local treatment. Lochia persisted for 9 days.

CASE XIX. (1409/35) Mrs C.
Age 22, para 1. Normal delivery.

Illness commenced on the 3rd day of the puerperium with pyrexia.

Admitted on the 12th day of the disease.

Perineum. Intact. Cervix injected, but small and firm. Lochia fairly profuse, and purulent.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature subsided immediately. Lochia persisted for 12 days.

CASE XX. (1475/34) Mrs McI.
Age 43, para 16. Normal delivery.

Illness commenced on the 12th day of the puerperium, with shivering.

Admitted on the 1st day of the disease.

Perineum. Deficient, but intact. Cervix small and firm. Lochia fairly profuse, haemorrhagic with debris.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature settled at once. Lochia persisted for 18 days.

CASE XXI. (1428/35) Mrs N.

Age 22, para 4. Normal delivery.

Illness commenced on the 3rd day of the puerperium with headache.

Admitted on the 2nd day of the illness.

Perineum. Slightly torn. Cervix large, soft, ulcerated. Lochia profuse, haemorrhagic, purulent.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, sterile.

Progress. Temperature settled almost at once. Lochia persisted for 17 days.

CASE XXII. (1711/35) Mrs A.

Age 29, para 2. Forceps delivery.

Illness commenced on the 16th day of the puerperium with headache.

Admitted on the 5th day of the disease.

Perineum. Intact. Cervix small and firm. Lochia slight.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Lochia persisted for 7 days. Subinvolution present on admission, quickly improved.

CASE XXIII. (544/36) H.O.

Age 24, para 2. Normal delivery.

Illness commenced on the 2nd day of the puerperium, with sickness and headache.

Admitted on the 9th day of the disease.

Perineum. Intact. Cervix small and firm. Lochia mucopurulent and fairly profuse.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature subsided immediately. Very marked subinvolution present on admission. Responded quickly to local treatment.

CASE XXIV. (606/36) Mrs McA.
Age 40, para 6. Breech delivery.

Illness commenced on the 17th day of the puerperium with shivering.

Admitted on the 3rd day of the illness.

Perineum. Intact. Cervix small and firm, and almost closed. Lochia profuse, bright red and haemorrhagic.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature settled within 3 days. Lochia persisted for 6 days.

CASE XXV. (680/36) Mrs K.
Age 27, para 1. Normal delivery.

Illness commenced on the 1st day of the puerperium, with shivering.

Admitted on the 7th day of the illness.

Perineum. 2nd degree perineal tear. Cervix small and ulcerated around the external os. Lochia retained, haemorrhagic, with debris.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature settled 4 days after institution of adequate drainage. Lochia persisted for 8 days.

CASE XXVI. (683/36) J.W.
Age 17, para 1. Normal delivery.

Illness commenced on the 9th day of the puerperium, with pyrexia.

Admitted on the 2nd day of the disease.

Perineum. 2nd degree tear. Cervix small, and ulcerated on the surface. Lochia haemorrhagic, and scanty. Very marked subinvolution.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature subsided within 2 days. Lochia persisted for 7 days. Uterus involuted well after glycerine drainage, and with ergot medication.

CASE XXVII. (766/36) Mrs D.
Age 29, para 5. Normal delivery.

Illness commenced on the 1st day of the puerperium, with pain in the lumbar region.

Admitted on the 3rd day of the illness.

Perineum. Intact, but deficient. Cervix small and firm. Lochia retained, brownish. Left pyelitis also present on admission.

Bacteriology. Cervical swab and blood culture negative. Urine, non-haemolytic streptococci and coliform bacilli isolated.

Progress. Temperature immediately subsided. Lochia persisted for 8 days. Urinary infection yielded quickly to potassium citrate.

CASE XXVIII. (803/36) Mrs M.
Age 35, para 1. Forceps delivery.

Illness commenced on the 21st day of the puerperium, with headache and shivering.

Admitted on the 1st day of the illness.

Perineum. Second degree perineal tear, fairly well healed. Cervix small and soft, but not ulcerated. Lochia retained, profuse, but not offensive.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature immediately subsided. Lochia persisted for 12 days. Nephritis occurred 12 days after admission, and subsided 2 weeks later.

CASE XXIX. (830/36) Mrs McL.
Age 30, para 3. Forceps delivery.

Illness commenced on the 5th day of the puerperium, with pyrexia.

Admitted on the 2nd day of the illness.

Perineum. Septic 2nd degree tear. Cervix large, soft and septic, with ulceration. Lochia profuse and haemorrhagic, with some partially organised blood clot at the external os.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature fell immediately. Lochia persisted for 9 days.

CASE XXX. (892/36) Mrs R.
Age 26, para 1. Forceps delivery.

Illness commenced on the 9th day of the puerperium, with headache and sickness.

Admitted on the 2nd day of the illness.

Perineum. Superficial tear, and also superficial vaginal laceration. Cervix ulcerated. Lochia retained, profuse, haemorrhagic.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature normal within two days. Lochia persisted for 6 days, after institution of adequate drainage.

CASE XXXI. (914/36) Mrs L.
Age 26, para 1. Normal delivery.

Illness commenced on the 12th day of the puerperium, with a rigor.

Admitted on the 7th day of the illness.

Perineum. Superficial laceration. Cervix large, soft and ulcerated. Lochia fairly profuse, and brownish.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature subsided within 3 days, and lochia persisted for 9 days. Bilateral suppurative mastitis occurred at the end of the 2nd week after admission.

CASE XXXII. (923/36) Mrs W.
Age 26, para 1. Forceps delivery.

Illness commenced on the 23rd day of the puerperium, with pyrexia and haemorrhage.

Admitted on the 7th day of the illness.

Perineum. Superficial laceration, healed. Cervix patent and ulcerated on the surface. Lochia haemorrhagic.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture sterile.

Progress. Piece of placental tissue presenting at the external os on admission, which was removed. The temperature immediately subsided, and the lochia persisted for 8 days.

CASE XXXIII. (928/36) Mrs B.
Age 33, para 1. Normal delivery.

Illness commenced on the 3rd day of the puerperium, with pyrexia.

Admitted on the 4th day of the illness.

Perineum. Deep sloughing perineal tear. Cervix large and soft. Lochia retained, profuse and offensive.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature elevated for 8 days, but little toxaemia. Lochia persisted for 16 days.

CASE XXXIV. (979/36) Mrs W.
Age 18, para 1. Normal delivery.

Illness commenced on the 5th day of the puerperium, with a rigor.

Admitted on the 3rd day of the disease.

Perineum. Second degree tear. Cervix soft and ulcerated. Lochia fairly profuse, and brownish.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature slightly irregular for one week, but little constitutional upset. Lochia persisted for 8 days.

CASE XXXV. (1908/34) Mrs McP.
Age 42, para 6. Normal delivery. P.P.H.

Illness commenced on the 1st day of the puerperium with pyrexia.

Admitted on the 13th day of the illness.

Perineum. Slightly lacerated. Cervix small. Lochia fairly profuse and brownish.

Bacteriology. Cervical swab and blood culture, sterile.

Progress. Slightly irregular for one week. Lochia persisted for 6 days. N.B. Had puerperal fever antitoxin, 30 c.cm. and blood transfusion before admission.

CASE XXXVI. (1979/34) Mrs C.
Age 38, para 11. Normal delivery.

Illness commenced on the 3rd day of the puerperium, with shivering and headache.

Admitted on the 3rd day of the illness.

Perineum. Intact. Cervix ulcerated on the surface. Lochia haemorrhagic.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature subsided immediately, and lochia persisted for 9 days.

CASE XXXVII. (2187/34) J.D.
Age 17, para 1. Forceps delivery.

Illness commenced on the 2nd day of the puerperium, with headache and shivering.

Admitted on the 4th day of the illness.

Perineum. Septic 2nd degree tear. Cervix ulcerated. Lochia profuse and haemorrhagic.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, sterile.

Progress. Temperature subsided within 3 days. Lochia persisted for 17 days.

CASE XXXVIII. (2195/34) Mrs McC.
Age 30, para 6. Normal delivery.

Illness commenced on the 6th day of the puerperium, with a rigor.

Admitted on the 5th day of the illness.

Perineum. Intact. Cervix not lacerated. Lochia profuse, purulent, and offensive.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, sterile.

Progress. Temperature subsided immediately. Lochia persisted for 16 days.

CASE XXXIX. (1166/36) Mrs G.
Age 20, para 1. Normal delivery.

Illness commenced on the 1st day of the puerperium, with abdominal pain.

Admitted on the tenth day of the illness.

Perineum. Intact. Cervix large, soft and deeply ulcerated. Lochia profuse, brownish and offensive.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature subsided immediately. Lochia persisted for 13 days.

CASE XL. (1080/36) Mrs L.
Age 21, para 2. Normal delivery.

Illness commenced on the 3rd day of the puerperium, with shivering.

Admitted on the 3rd day of the illness.

Perineum. Intact. Cervix large, soft and ulcerated. Lochia fairly profuse and purulent.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, negative.

Progress. Temperature subsided after 5 days. Lochia persisted for 16 days.

CASE XLI. (1239/36) Mrs A.
Age 30, para 3. Normal delivery.

Illness commenced on the 14th day of the puerperium, with headache.

Admitted on the 7th day of the illness.

Perineum. Old tear re-opened. Cervix large and soft, but intact. Lochia profuse and purulent.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, negative.

Progress. Immediate fall in the temperature after local treatment. Lochia persisted for 13 days.

CASE XLII. (1241/36) Mrs M.
Age 42, para 11. Breech delivery.

Illness commenced on the 1st day of the puerperium, with headache.

Admitted on the 4th day of the illness.

Perineum. Septic, sloughing tear. Bruising of the vulva with a large haematoma on the left side. Cervix large and soft, with oedema and ulceration of the anterior lip. Lochia haemorrhagic with clots and debris.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Temperature irregular for one week. Haematoma became septic and was incised. Lochia persisted for 25 days.

B. Cases with Sustained Toxaemia.

CASE XLIII. (1966/34) Mrs B.
Age 28, para 1. Forceps delivery.

Illness commenced on the 10th day of the puerperium, with shivering.

Admitted on the 1st day of the illness.

Perineum. Second degree tear. Cervix soft and ulcerated. Lochia profuse and haemorrhagic with blood clots.

Bacteriology. Cervical swab and blood culture, sterile.

Progress. Considerable toxaemia for a period of 10 days. Lochia persisted for 15 days. Mammary abscess occurred at the end of the 4th week.

CASE XLIV. (2124/34) Mrs W.
Age 27, para 3. Normal delivery.

Illness commenced on the 3rd day of the puerperium, with headache and shivering.

Admitted on the 4th day of the illness.

Perineum. Superficial laceration. Cervix soft and patulous. Lochia profuse and purulent.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, sterile.

Progress. Toxaemia sustained for 2 weeks. Lochia persisted for 27 days.

CASE XLV. (839/35) Mrs S.
Age 20, para 1. Forceps delivery.

Illness commenced on the 3rd day of the puerperium, with pyrexia.

Admitted on the 3rd day of the illness.

Perineum. Second degree tear, with long septic vaginal laceration. Cervix large and soft. Lochia profuse, brownish and offensive.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Swinging temperature for 14 days with fairly profound toxaemia. Lochia persisted for 21 days.

CASE XLVI. (859/35) Mrs F.
Age 30, para 1. Forceps delivery.

Illness commenced on the 2nd day of the puerperium, with pyrexia and sickness.

Admitted on the 2nd day of the illness.

Perineum. Septic 2nd degree tear. Long septic lacerations on the vulva and along both sides of the vagina. Cervix soft and ulcerated. Lochia profuse and offensive.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, negative.

Progress. Extremely toxic on admission. Toxaemia continued for 3 weeks. Para-vaginal abscess occurred in the 5th week. Lochia profuse and offensive for 17 days.

CASE XLVII. (974/35) Mrs C.
Age 29, para 1. Forceps delivery.

Illness commenced on the 3rd day of the puerperium, with pyrexia.

Admitted on the 4th day of the illness.

Perineum. Septic 2nd degree tear. Cervix large, soft and ulcerated. Lochia profuse and offensive.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, negative.

Progress. Temperature irregular for 3 weeks. Lochia persisted for 19 days.

CASE XLVIII. (1454/35) Mrs B.
Age 37, para 3. Normal delivery.

Illness commenced on the 3rd day of the puerperium, with shivering.

Admitted on the 2nd day of the illness.

Perineum. Intact. Cervix large, soft and split. Lochia profuse and purulent.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Toxaemia sustained for more than one week. Lochia persisted for over 5 weeks. Urinary infection in the 4th week which responded well to hexamine.

CASE XLIX. (681/36) Mrs D.
Age 27, para 5. Normal delivery.

Illness commenced on the 5th day of the puerperium, with a rigor.

Admitted on the 2nd day of the illness.

Perineum. Intact. Cervix large and soft, with superficial ulceration. Lochia profuse and offensive.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Piece of membranes and partially organised blood clot protruding through the external os on admission. Removed. Profound toxaemia for 5 days. Temperature subsided by crisis. Lochia persisted for 12 days.

CASE L. (924/36) Mrs B.
Age 28, para 2. Normal delivery.

Illness commenced on the 5th day of the puerperium, with pyrexia and abdominal pain.

Admitted on the 2nd day of the illness.

Perineum. Second degree tear. Cervix soft and oedematous. Lochia profuse and brownish.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Fairly profound toxaemia for 8 days. Lochia persisted for 16 days.

CASE LI. (1141/36) Mrs F.
Age 28, para 2. Normal delivery.

Illness commenced on the 3rd day of the puerperium, with headache and shivering.

Admitted on the 4th day of the illness.

Perineum. Intact. Cervix large, soft, but not ulcerated. Lochia fairly profuse, and brownish.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, negative.

Progress. Fairly toxic for the first 2 weeks. Lochia persisted for 15 days.

CASE LII. (1068/36) Mrs M.
Age 26, para 1. Forceps delivery.

Illness commenced on the 3rd day of the puerperium, with pyrexia.

Admitted on the 3rd day of the illness.

Perineum. Second degree tear. Cervix large, soft and ulcerated. Lochia profuse and haemorrhagic with clots and debris.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, negative.

Progress. Toxaemia sustained for 11 days. Lochia persisted for 9 days.

C. Cases of Septicaemia.

CASE LIII. (1934/34) Mrs M.
Age 19, para 1. Normal delivery. Died.

Illness commenced on the 2nd day of the puerperium, with shivering.

Admitted on the 4th day of the illness.

Perineum. Slightly torn. Cervix intact. Lochia profuse and offensive.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Extremely ill and toxic for one week. Streptococcal serum without effect. Temperature sustained about 104°F. for one week. Died.

Post Mortem Examination. Uterus large, with necrotic mucous membrane. Haemolytic streptococci isolated from the uterus and spleen.

CASE LIV. (1110/35) Mrs P.
Age 19, para 2. Forceps delivery. Died.

Illness commenced on the 1st day of the puerperium, with pyrexia.

Admitted on the 9th day of the illness.

Perineum. Intact. Cervix small and firm. Lochia scanty, haemorrhagic.

Bacteriology. Cervical swab, negative. Blood culture not taken.

Progress. Died 9 hours after admission.

Post Mortem Examination. Uterus: soft, containing debris. Abscesses in the uterine wall, from which haemolytic streptococci were isolated. Kidneys showed toxic nephritis.

CASE LV. (1094/36) Mrs B.
Age 32, para 10. Normal delivery. Died.

Illness commenced on the 12th day of the puerperium, with headache.

Admitted on the 4th day of the illness.

Perineum. Intact, but deficient. Cervix large and soft. Lochia retained, and profuse.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, haemolytic streptococci isolated.

Progress. Not apparently very ill in the first 4 days. Sudden death on the 4th day, like cardiac collapse or embolus.

Post Mortem Examination. Portion of placenta inside uterus. Vegetative endocarditis on aortic valve. Thrombosis in pelvic veins. No evidence of embolism.

D. Cases with Generalised Peritonitis.

CASE LVI. (1742/34) Mrs F.
Age 23, para 2. Forceps delivery. Recovered.

Illness commenced on the 2nd day of the puerperium, with headache and shivering.

Admitted on the 2nd day of the illness.

Perineum. Septic 2nd degree tear. Cervix soft and lacerated. Lochia profuse and purulent.

Bacteriology. Haemolytic streptococci isolated from the cervical swab, blood culture, peritoneal exudate, and all the specimens of pus.

Progress. Peritonitis occurred 3 days after admission. Turbid fluid was found in the abdomen. Drained through the abdominal wall and the Pouch of Douglas. Followed by septic arthritis of the knee, and abscesses in the right thigh, buttock and arm. Finally recovered.

CASE LVII. (316/35) Mrs B.
Age 37, para 8. Normal delivery. Died.

Illness commenced on the 3rd day of the puerperium with shivering.

Admitted on the 6th day of the illness.

Perineum. Intact. Cervix small and firm. Lochia purulent.

Bacteriology. Cervical swab and blood culture, negative. Haemolytic streptococci isolated in the peritoneal exudate.

Progress. Physical signs of peritonitis indefinite. Pus in abdominal cavity. No improvement after laparotomy, and died the following morning.

Post Mortem Examination. Uterus: streptococci in section of uterine wall. Heart pale; toxic nephritis.

CASE LVIII. (902/35) Mrs T.
Age 20, para 1. Forceps delivery. Died.

Illness commenced on the 1st day of the puerperium, with headache, delirium and pain in the left side of the abdomen.

Admitted on the 4th day of the illness.

Perineum. Extensive perineal and vaginal lacerations with vulvar bruising. Cervix soft, septic and lacerated. Lochia haemorrhagic and fairly profuse.

Bacteriology. Haemolytic streptococci isolated from the cervical swab and the peritoneal fluid, but not from the blood.

Progress. Peritonitis diagnosed the day after admission, and laparotomy performed. Peritoneal exudate frankly purulent. Died the same night.

Post Mortem Examination. Pus around uterus. Lungs congested. Heart flabby. Liver and kidneys pale.

CASE LIX. (927/35) Mrs M.
Age 23, para 2. Forceps delivery. Died.

Illness commenced on the 2nd day of the puerperium, with headache, shivering and abdominal pain.

Admitted on the 5th day of the illness.

Perineum. Intact. Cervix large, soft and septic. Lochia purulent and fairly profuse.

Bacteriology. Cervical swab and blood culture, negative. Haemolytic streptococci isolated from the peritoneal and pleural exudates.

Progress. Laparotomy on the day of admission. Thin fluid found. Drainage through abdominal wound. Drainage satisfactory, but died finally of empyema, aspiration of which was ineffective.

Post-mortem Examination. Uterus clean and abdomen well drained. Pus in right pleural cavity. Myocardial degeneration.

E. Cases with Parametritis.

CASE LX. (1905/34) Mrs C.
Age 21, para 1. Forceps delivery.

Illness commenced on the 11th day of the puerperium, with headache and abdominal pain.

Admitted on the 2nd day of the illness.

Perineum. Slightly torn. Cervix firm and intact. Lochia haemorrhagic and scanty.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, negative. Pus, haemolytic streptococci.

Progress. Tenderness in right iliac fossa on admission. Mass palpable five days later. Abscess formation four weeks later. Drained and made a good recovery.

CASE LXI. (1928/34) Mrs B.
Age 28, para 5. Normal delivery.

Illness commenced on the 14th day of the puerperium, with shivering.

Admitted on the 4th day of the illness.

Perineum. Intact. Cervix high and fixed. Lochia profuse and purulent.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Very ill and toxic on admission, with rigors for 2 weeks. Pain in left side of abdomen 8 days after admission, but no mass palpable till 9 weeks later. Subsided without abscess formation.

CASE LXII. (425/35) Mrs G.
Age 20, para 1. Forceps delivery.

Illness commenced on the 35th day of the puerperium, with abdominal pain and diarrhoea.

Admitted on the 3rd day of the illness.

Perineum. Healed tear. Small recto-vaginal fistula. Cervix small, firm and closed. No lochia.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Abdomen on admission had indefinite feeling of resistance, but no mass palpable until 5 days later. Followed by an offensive mucoid discharge from the uterus, accompanied by 'bearing down' pains. Mass became smaller as discharge continued, and both disappeared simultaneously.

CASE LXIII. (1048/35) Mrs F.
Age 25, para 2. Normal delivery.

Illness commenced on the 11th day of the puerperium, with pain in right side of abdomen.

Admitted on the 7th day of the illness.

Perineum. Intact. Cervix soft, but small. Lochia slight, and haemorrhagic.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Tenderness in lower abdomen, but no mass palpable on admission. Mass present 2 weeks later. Subsided without abscess formation.

CASE LXIV. (1231/36) Mrs McW.
Age 32, para 2. Normal delivery.

Illness commenced on the 28th day of the puerperium with shivering and abdominal pain.

Admitted on the 13th day of the illness.

Perineum. Healing tear. Cervix small, firm and closed. Lochia slight, bloodstained.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Definite mass in left iliac fossa on admission. Subsided without abscess formation.

CASE LXV. (1157/36) Mrs M.
Age 26, para 1. Forceps delivery.

Illness commenced on the 1st day of the puerperium, with pyrexia and abdominal pain.

Admitted on the 12th day of the illness.

Perineum. Second degree tear. Cervix small and firm. Lochia retained, haemorrhagic.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Tenderness with rigidity of the abdominal muscles 3 weeks after admission. Definite mass not palpable. Subsided 3 weeks later without abscess formation.

F. Cases with Phlegmasia.

CASE LXVI. (2277/34) Mrs C.
Age 37, para 9. Forceps delivery.

Illness commenced on the 1st day of the puerperium, with sickness.

Admitted on the 18th day of the disease.

Perineum. Lacerated, well healed. Cervix large, soft and septic. Lochia profuse and purulent.

Bacteriology. Cervical swab and blood culture negative.

Progress. Sepsis subsided quickly. Thrombosis occurred on the 12th day of the puerperium.

CASE LXVII. (876/35) Mrs B.
Age 25, para 3. Normal delivery.

Illness commenced on the 12th day of the puerperium, with pyrexia.

Admitted on the 4th day of the illness.

Perineum. Intact. Cervix soft but not ulcerated. Lochia scanty.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Phlegmasia occurred on day after admission, with pyrexia which persisted for 10 days. Good recovery.

CASE LXVIII. (854/35) Mrs W.
Age 30, para 6. Normal delivery.

Illness commenced on the 12th day of the puerperium with headache and shivering.

Admitted on the 2nd day of the illness.

Perineum. Deficient, but intact. Cervix small and firm. Lochia slight.

Bacteriology. Blood culture and cervical swab, negative.

Progress. Swinging temperature with repeated rigors for 17 days. Phlegmasia occurred on left side 3 weeks after admission, but subsided fairly quickly.

CASE LXIX. (1467/35) Mrs H.
Age 37, para 4. Normal delivery.

Illness commenced on the 3rd day of the puerperium with pain in right side of abdomen.

Admitted on the 3rd day of the illness.

Perineum. Intact. Cervix large, soft and ulcerated. Lochia brownish.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Local sepsis subsided quickly. Right phlegmasia occurred on 10th, and left on 14th day after admission, with elevation of temperature.

CASE LXX. (1782/35) Mrs McG.
Age 34, para 3. Normal delivery.

Onset in the puerperium not determined.

Perineum. Intact. Cervix small, firm and closed. Slight lochia.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Myocarditis with cardiac decompensation. Phlegmasia occurred a few days before admission. Temperature irregular for three weeks. Subsided satisfactorily.

CASE LXXI. (976/36) Mrs S.
Age 39, para 9. Normal delivery.

Illness commenced on the 8th day of the puerperium, with "weakness."

Admitted on the 2nd day of the illness.

Perineum. Intact. Cervix soft and ulcerated. Lochia profuse and brownish.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Local sepsis subsided quickly on glycerine and postural drainage. Left phlegmasia occurred on the 10th day, and right on the 15th day after admission. Subsided in 5 weeks.

G. Cases post abortum.

CASE LXXII. (188/35) Mrs A.
Age 27, para 4. Abortion.

Stage of pregnancy. 3 months.

Cervix. Patulous. Uterus enlarged, but empty. Lochia profuse.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, negative.

Progress. Very toxic on admission with scarlatiniform rash. Subsided quickly on local treatment.

CASE LXXIII. (521/35) Mrs W.
Age 21, para 2. Abortion.

Stage of pregnancy. 12 weeks.

Cervix. Patulous. Uterus enlarged and contained chorionic debris. Lochia profuse and offensive.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Good response to glycerine injection. Lochia persisted for 11 days.

CASE LXXIV. (1017/35) Mrs T.
Age 33, para 8. Abortion.

Stage of pregnancy. 2 months.

Cervix. Patulous and ulcerated. Uterus large and not completely empty. Lochia profuse and offensive with chorionic debris.

Bacteriology. Cervical swab, haemolytic streptococci isolated. Blood culture, negative.

Progress. Patient left the hospital without sanction before the sepsis had completely subsided.

CASE LXXV. (1373/35) Mrs G.
Age 35, para 3. Abortion.

Stage of pregnancy. 5 months.

Cervix. Patent. Uterus enlarged to the umbilicus. Lochia normal.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Piece of placenta and membranes passed on the day after admission. Followed by an uneventful recovery.

CASE LXXVI. (1384/35) Mrs S.
Age 36, para 7. Abortion.

Stage of pregnancy. 3 months.

Cervix. Patulous. Uterus slightly enlarged and apparently empty. Lochia haemorrhagic with debris.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Immediate response to glycerine.

CASE LXXVII. (1422/35) J.B.
Age 19, para 1. Abortion.

Stage of pregnancy. 2 months.

Cervix. Patulous. Uterus enlarged. Chorionic tissue presenting at the external os. Removed. Lochia profuse, brownish and offensive.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Settled immediately on local treatment.

CASE LXXVIII. (1496/35) Mrs G.
Age 30, para 7. Abortion.

Stage of pregnancy. 18 weeks.

Cervix. Patulous. Uterus enlarged and not empty. Lochia offensive.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Injection of glycerine followed next day by the passage of a piece of chorion and membranes. Followed by a good recovery.

CASE LXXIX. (2318/34) M.S.
Age 23, para 2. Abortion.

Stage of pregnancy. 5½ months.

Cervix. Patulous. Uterus slightly enlarged with some debris. Lochia purulent. Salpingitis.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Severe pain and muscular rigidity over the left iliac fossa on admission. Mass palpable a few days later, which gradually subsided.

CASE LXXX. (512/35) E.C.
Age 22, para 1. Abortion.

Stage of pregnancy. 3 months.

Cervix. Closed, and no lochia. Uterus small, but mass palpable in the right broad ligament, and in right iliac fossa. Admitted 3 months after the abortion.

Progress. Mass subsided quickly with hot vaginal douching.

CASE LXXXI. (723/36) Mrs McA.
Age 34, para 6. Abortion.

Stage of pregnancy. 10 weeks.

Cervix. Closed. Slight haemorrhagic discharge. Uterus small and firm, but displaced forwards by mass in the posterior fornix.

Bacteriology. Cervical swab and blood culture, negative.

Progress. Mass palpable in the broad ligament and in the right iliac fossa and hypogastrium. Accompanied by frequency of micturition. Subsided in 4 weeks without abscess formation.

APPENDIX II.

CASES WITH BLOOD EXAMINATION ON ADMISSION ONLY.

A. Cases with Localised Sepsis.

Nil.

B. Cases with Sustained Toxaemia.

CASE LXXXII. (647/35) Mrs Q.
Age 40, para 12. Breech delivery.

Illness commenced on the 11th day of the puerperium with a rigor.

Admitted on the 6th day of the illness.

Perineum. Deficient, but intact. Cervix large and soft. Lochia profuse, brownish and offensive.

Bacteriology. Cervical swab and blood culture, negative.

Haematology. Red cells: 3,240,000 per c.mm.
Haemoglobin: 52 per cent.

Progress. Toxaemia and lochia persisted for 14 days.

CASE LXXXIII. (101/35) Mrs L.
Age 32, para 7. Normal delivery.

Illness commenced on the 1st day of the puerperium, with a rigor.

Admitted on the 6th day of the illness.

Perineum. Slightly torn. Cervix soft and ulcerated. Lochia brownish and profuse.

Bacteriology. Cervical swab and blood culture, negative.

Haematology. Red Cells: 2,110,000 per c.mm.
Haemoglobin: 50 per cent.

CASE LXXXIII (Contd.)

Progress. Temperature sustained for the 1st week and irregular till the end of the 3rd week. Lochia persisted for 3 weeks.

C. Cases with Septicaemia.

CASE LXXXIV. (2027/34) Mrs G. Recovered.
Age 21, para 1. Normal delivery.

Illness commenced on the 6th day of the puerperium, with erythematous rash.

Admitted on the 3rd day of the illness.

Perineum. Intact. Cervix small. Lochia profuse and brownish.

Bacteriology. Cervical swab, haemolytic streptococci. Blood culture, Non-lactose fermenting coliform bacilli.

Haematology. Red cells: 4,400,000 per c.mm.
Haemoglobin: 60 per cent.

Progress. Septic rash on admission, and fair degree of toxaemia. Anti-streptococcal serum followed by gradual fall in temperature over 1 week.

CASE LXXXV. (2188/34) Mrs F. Recovered.
Age 22, para 2. Normal delivery.

Illness commenced on the 1st day of the puerperium, with shivering and headache.

Admitted on the 3rd day of the illness.

Perineum. Slightly torn. Cervix ulcerated. Lochia profuse and brownish.

Bacteriology. Cervical swab, haemolytic streptococci. Blood culture, Bacillus coli isolated.

Haematology. Red cells, 3,830,000 per c.mm.
Haemoglobin, 60 per cent.

Progress. Temperature fell after 3 days. Good response to local treatment.

CASE LXXXVI. (472/36) Mrs W. Recovered.
Age 29, para 3. Forceps delivery.

Illness commenced on the 2nd day of the puerperium, with headache.

Admitted on the 4th day of the illness.

Perineum. 2nd degree tear. Cervix large and soft with ulceration and sloughing. Lochia scanty.

Bacteriology. Cervical swab, haemolytic streptococci. Blood culture, haemolytic streptococci. Pus, haemolytic streptococci isolated.

Haematology. Red cells, 4,310,000 per c.mm. Haemoglobin, 90 per cent.

Progress. Typical scarlatinal rash, peeling tongue and inflamed throat. Followed by desquamation. Abscess of left buttock occurred. Incised. Good recovery.

CASE LXXXVII. (198/35) Mrs O. Died.
Age 35, para 1. Forceps delivery.

Illness commenced on the 4th day of the puerperium, with abdominal pain.

Admitted on the 2nd day of the illness.

Perineum. Extensive laceration of the vulva, perineum and vagina. Cervix large and soft. Lochia profuse and purulent.

Bacteriology. Cervical swab, haemolytic streptococci. Blood culture, repeatedly negative.

Haematology. Red cells, 2,377,000 per c.mm. Haemoglobin, 50 per cent.

Progress. Clinical septicaemia with gradual decline and final cardiac failure.

Post-mortem examination. Not allowed.

CASE LXXXVIII. (366/35) Mrs I. Died.
Age 33, para 2. Normal delivery.

Illness commenced on the 2nd day of the puerperium, with shivering and headache.

Admitted on the 1st day of the illness.

Perineum. Intact. Cervix large and soft. Lochia haemorrhagic and profuse.

Bacteriology. Cervical swab, haemolytic streptococci. Blood culture, negative.

Haematology. Red cells, 4,550,000 per c.mm. Haemoglobin, 82 per cent.

Progress. Marked icterus. Died on 2nd day in spite of serum.

Post-mortem Examination. Heart: fatty. Uterus: clean. Streptococci in section. Spleen: streptococci isolated.

CASE LXXXIX. (1105/35) Mrs McC. Died.
Age 38, para 4. Normal delivery.

Illness commenced on the 1st day of the puerperium, with pain in the limbs.

Admitted on the 5th day of the illness.

Perineum. Intact. Cervix soft and ulcerated. Lochia retained, frankly purulent, offensive.

Bacteriology. Cervical swab, haemolytic streptococci. Blood culture, negative.

Haematology. Red cells, 2,443,000 per c.mm. Haemoglobin, 40 per cent.

Progress. Had antistreptococcal serum 2 days before admission. Extremely toxic with mental apathy. Refused all food. Continuous intravenous saline. Cardiac failure.

Post-mortem Examination. Not allowed.

D. Cases with Peritonitis.

CASE XC. (2332/34) Mrs B. Died.
Age 32, para 1. Forceps delivery.

Illness commenced on the 4th day of the puerperium, with abdominal pain.

Admitted on the 3rd day of the illness.

Perineum. 2nd degree tear, with extensive sloughing vaginal lacerations. Cervix ulcerated and sloughing. Lochia purulent and offensive.

Bacteriology. Cervical swab, haemolytic streptococci. Blood culture, negative. Peritoneal exudate, haemolytic streptococci isolated.

Haematology. Red cells, 2,580,000 per c.mm. Haemoglobin, 55 per cent.

Progress. Abdomen distended and tympanitic on admission with muscular rigidity and tenderness. Laparotomy followed by slight improvement, but died 4 days later.

Post-mortem Examination. Not allowed.

E. Cases with Pelvic Cellulitis.

Nil.

F. Cases with Phlegmasia.

CASE XCI. (175/35) Mrs T.
Age 35, para 6. Normal delivery.

Illness commenced on the 3rd day of the puerperium with shivering.

Admitted on the 5th day of the illness.

Perineum. Intact. Cervix large, soft and ulcerated. Lochia fairly profuse and brownish.

Bacteriology. Cervical swab, haemolytic streptococci. Blood culture, negative.

Haematology. Red cells, 3,080,000 per c.mm. Haemoglobin, 55 per cent.

CASE XCI. (Contd.)

Progress. Very toxic for 1 week. Phlegmasia occurred in the 4th week, followed by pleural effusion in the 6th. Good recovery.

G. Cases post-abortum.

CASE XCII. (92/35) Mrs McI.
Age 34, para 6. Abortion.

Stage of pregnancy. 2½ months.

Cervix. Patulous. Uterus enlarged and empty. Lochia haemorrhagic.

Bacteriology. Cervical swab and blood culture, negative.

Haematology. Red cells, 3,090,000 per c.mm.
Haemoglobin, 56 per cent.

Progress. Fairly toxic for 1 week and lochia persisted for 7 days. Good recovery.

CASE XCIII. (2296/34) Mrs W.
Age 28, para 6. Abortion.

Stage of pregnancy. 3 months.

Cervix. Patulous. Uterus enlarged and retroverted, but empty. Lochia offensive and profuse.

Bacteriology. Cervical swab and blood culture, negative.

Haematology. Red cells, 3,583,000 per c.mm.
Haemoglobin, 60 per cent.

Progress. Pain occurred in the right groin a few days after admission, but no mass palpable. Followed by flexion at the hip joint. Deep retroperitoneal abscess opened 5 weeks after admission.

CASE XCIV. (789/35) Mrs Y. Died.
Age 24, para 4. Abortion.

Stage of Pregnancy. 4½ months.

Cervix. Patulous, ulcerated. Uterus high and fixed.
Lochia profuse, brownish and offensive.

Bacteriology. Cervical swab and blood culture, negative.

Haematology. Red cells, 3,173,000 per c.mm.
Haemoglobin, 56 per cent.

Progress. Very toxic on admission. Frequent rigors.
No response to treatment. Died in 5 days.

Post-mortem Examination. Not allowed.

APPENDIX III.

CASES TRANSFUSED WITHOUT REPEATED BLOOD EXAMINATIONS.

CASE XCV. (2064/34) Mrs O. Recovered.
Age 36, para 4. Forceps delivery.

Illness commenced on the 2nd day of the puerperium, with headache and shivering.

Admitted on the 2nd day of the illness.

Perineum. Intact. Cervix small and not ulcerated. Lochia profuse and purulent.

Bacteriology. Cervical swab and blood culture, negative.

Haematology. Red cells, 3,225,000 per c.mm.
Haemoglobin, 55 per cent.

Progress. Very toxic on admission. Blood transfusion, 600 c.cm. through needle followed by quick recovery. Phlegmasia present on admission.

CASE XCVI. (847/36) Mrs S. Died.
Age 20, para 1. Forceps delivery.

Illness commenced on the 6th day of the puerperium, with headache.

Admitted on the 2nd day of the illness.

Perineum. Slightly torn. Cervix large, soft and ulcerated. Lochia scanty.

Bacteriology. Cervical swab and blood culture, haemolytic streptococci isolated.

Haematology. Red cells, 4,470,000 per c.mm.
Haemoglobin, 76 per cent.

Progress. Very ill and toxic on admission, becoming rapidly worse. Transfusion, 400 c.cm. 2 days after admission. No effect.

Post-mortem Examination. Not allowed.

CASE XCVII. (1859/34) Mrs D. Died.
Age 35, para 6. Normal delivery.

Illness commenced on the 3rd day of the puerperium, with headache and shivering.

Admitted on the 5th day of the illness.

Perineum. Intact. Cervix enlarged and soft. Lochia profuse, purulent and offensive.

Bacteriology. Cervical swab and blood culture, haemolytic streptococci isolated.

Haematology. Red cells, 1,630,000 per c.mm. Haemoglobin, 30 per cent. (10 days after admission.)

Progress. Several rigors after admission. Transfused 11 days after admission, followed by slight temporary improvement. Died 3 weeks after admission.

Post-mortem Examination. Not allowed.

CASE XCVIII. (2077/34) Mrs R. Died.
Age 36, para 5. Forceps delivery (Twins).

Illness commenced on the 1st day of the puerperium with sickness and vomiting.

Admitted on the 4th day of the illness.

Perineum. Extensive laceration and bruising. Cervix lacerated. Lochia profuse.

Bacteriology. Blood culture and cervical swab, negative. Peritoneal exudate, haemolytic streptococci.

Haematology. Red cells, 2,300,000 per c.mm. Haemoglobin, 40 per cent.

Progress. Generalised peritonitis diagnosed on admission. Laparotomy followed by blood transfusion of no value. Died 2 days later.

Post-mortem Examination. Inflammatory mass in right broad ligament. Haemolytic streptococci in uterus and spleen.

CASE XCIX. (1961/34) Mrs R. Died.
Age 21, para 1. Normal delivery.

Illness commenced on the 6th day of the puerperium, with abdominal pain.

Admitted on the 2nd day of the puerperium.

Perineum. 2nd degree tear. Cervix large and soft. Lochia purulent.

Bacteriology. Cervical swab and blood culture, negative repeatedly.

Haematology. Blood not examined.

Progress. Very ill and toxic from the start with ill defined vague abdominal signs. Blood transfusion, 500 c.cm. of no value, and died 2 days later.

Post-mortem Examination. Fair amount of thin purulent fluid in abdominal cavity, with flakes. Uterine mucous membrane, necrotic. Haemolytic streptococci in uterine wall, spleen and pus.

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Personal.

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The Royal Infirmary
Glasgow.

A Study of

PUERPERAL SEPSIS

with particular reference to

ANAEMIA as a Clinical Feature

and

BLOOD TRANSFUSION as a Therapeutic Measure.

By

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Thesis for the degree of M.D.,
presented to the
UNIVERSITY of GLASGOW,
January, 1937.

VOLUME II.

APPENDIX IV: Combined haematological and temperature Charts, with Case Summaries:-

i. 26 untreated cases (Cases C-CXXV).

ii. 38 cases treated with Iron Preparations (Cases CXXVI-CLXIII).

iii. 25 cases treated by Blood Transfusion (Cases CLXIV-CLXXXVIII).

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
C.

AGE.
25.

PARA.
3.

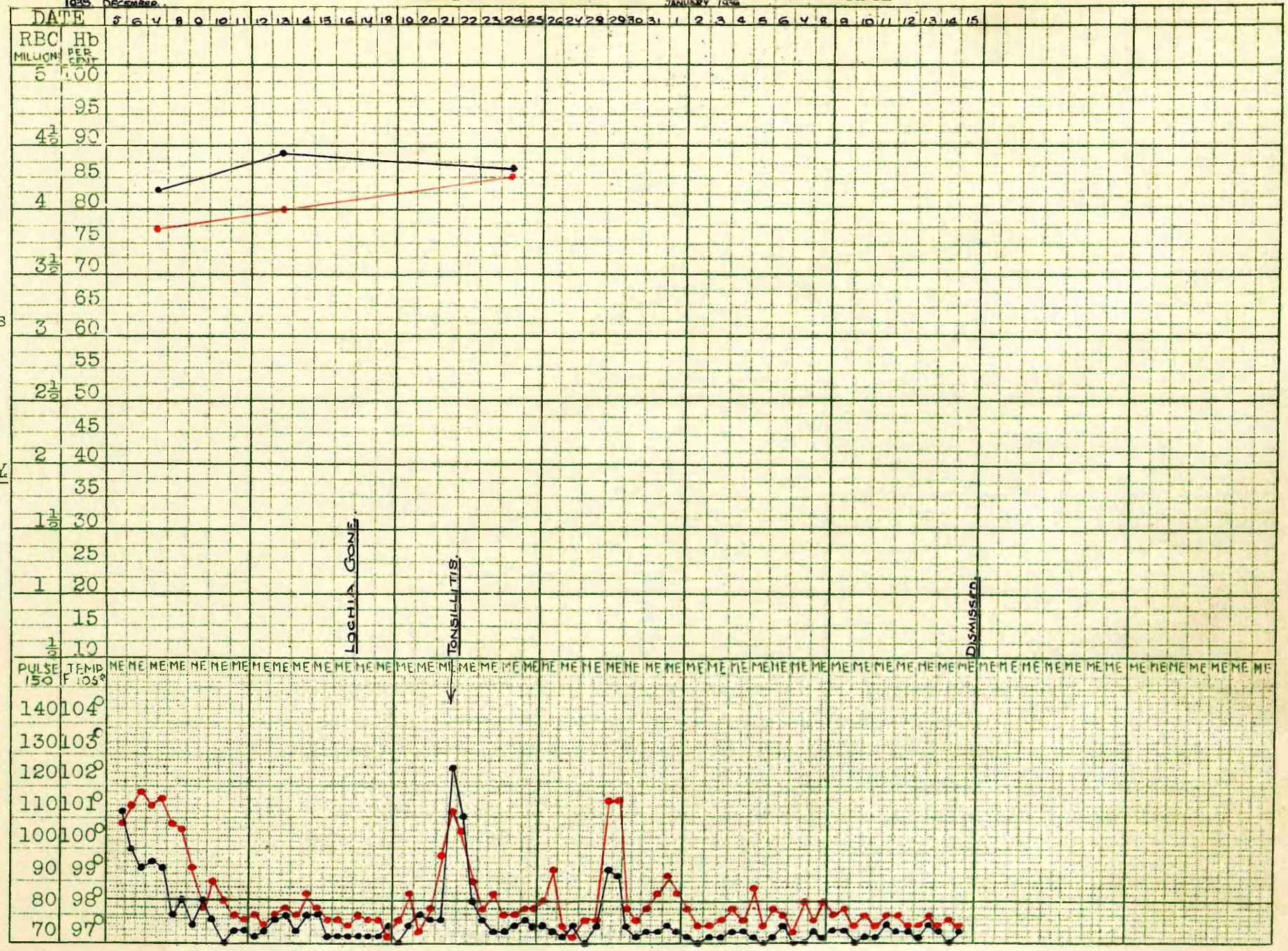
DISEASE.
Puerperal Sepsis

TYPE.
Localised.

MODE OF DELIVERY
Normal.

TREATMENT.
Intra-uterine glycerine.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 5th day of puerperium, with headache and shivering.
Admitted: 1st day of illness.
Perineum: Superficial laceration.
Cervix: Large, soft and ulcerated.
Lochia: Fairly profuse, brownish.

Bacteriology:
Cervical swab, haemolytic streptococci.
Blood culture, negative.

Progress: Sepsis quickly eradicated.

Note:
Little anaemia present.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CI.

AGE.

39.

PARA.

3.

DISEASE.
Puerperal Sepsis

TYPE.

Septicaemia (coliform).

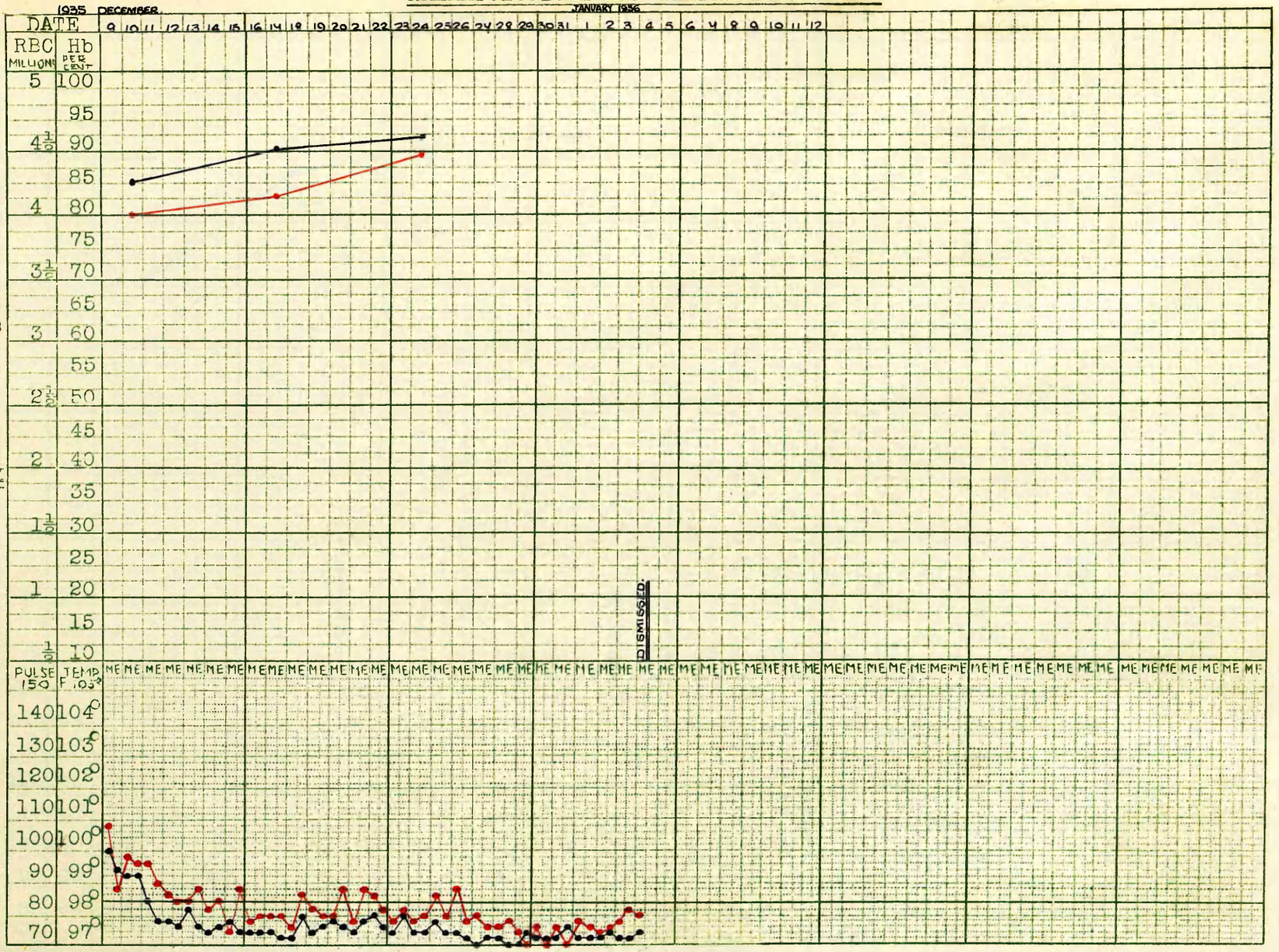
MODE OF DELIVERY.

Abortion.

TREATMENT.

Intra-uterine glycerine.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Stage of pregnancy: 2 months.
Uterus: Enlarged, but empty.
Cervix: Patent.

Bacteriology: Cervical swab, negative.
Blood culture: coliform bacilli isolated.

Progress: Several rigors before admission.
Extremely mild septicaemia with little constitutional upset. Yielded quickly to local treatment.

Note: Little anaemia.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CII.

AGE.
32.

PARA.
3.

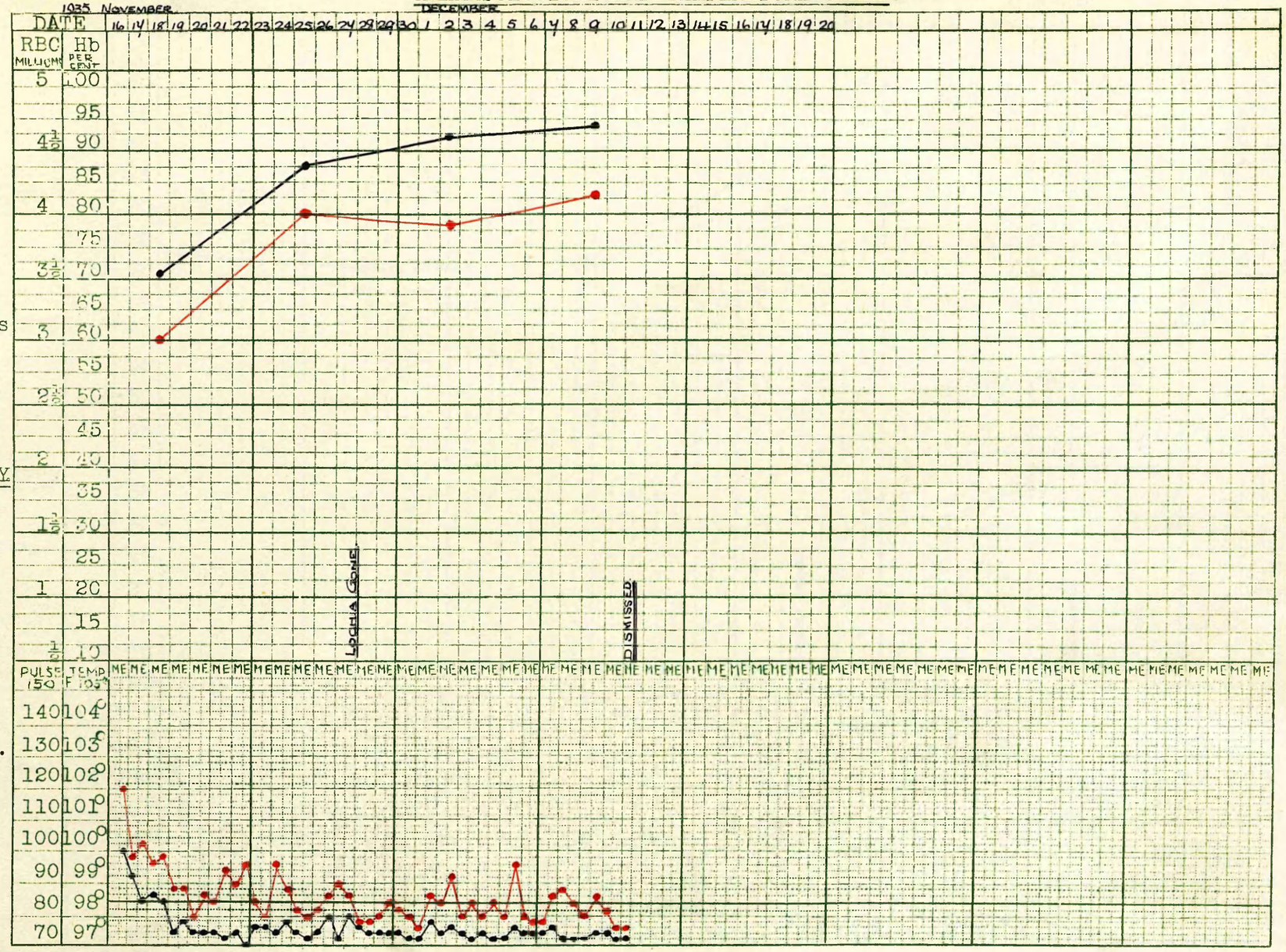
DISEASE.
Puerperal Sepsis

TYPE.
Localised.

MODE OF DELIVERY.
Forceps.

TREATMENT.
Intra-uterine glycerine.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 4th day of puerperium, with shivering.
Admitted: 2nd day of illness.
Perineum: 2nd degree tear.
Cervix: Large, soft, ulcerated.
Lochia: Brownish, profuse.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Mild sepsis, quickly eradicated.

Note: Falling colour index, due to inadequacy of iron.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CIII.

AGE.
31.

PARA.
2.

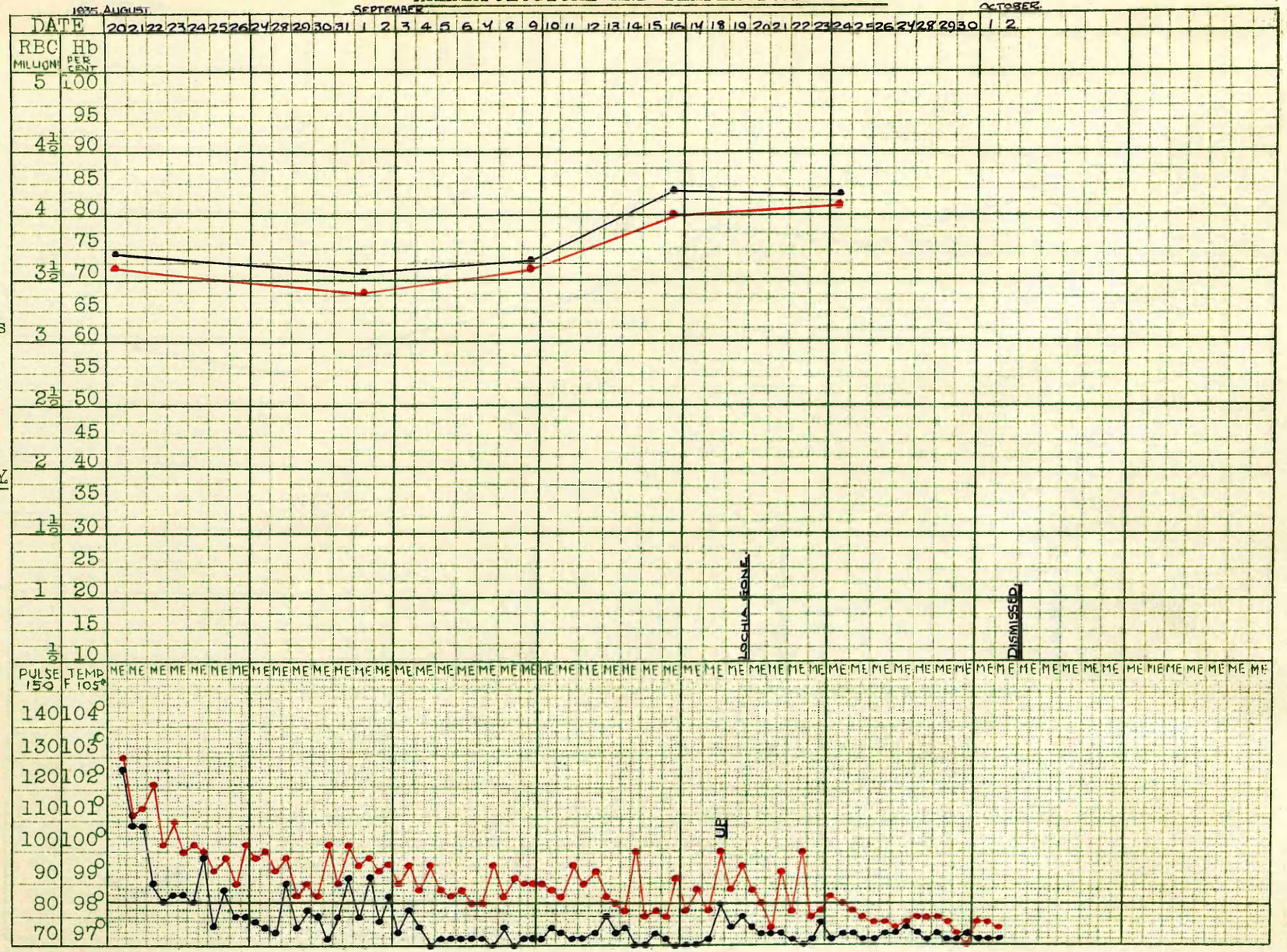
DISEASE.
Puerperal Sepsis

TYPE.
Localised.

MODE OF DELIVERY
Forceps.
Extensive tearing.

TREATMENT.
Intra-uterine glycerine.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 1st day of puerperium, with pyrexia.
Admitted: 6th day of illness.
Perineum: Complete tear.
Vagina: Long laceration each side.
Cervix: Firm.
Lochia: Offensive, profuse.

Bacteriology: Cervical swab, haemolytic streptococci isolated. Blood culture, negative.

Progress: Extensive laceration with local sepsis, also intra-uterine sepsis, responding well to local treatment.

Note: Hesitancy in blood recovery till temperature completely settled.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CIV.

AGE.
27.

PARA.
1.

DISEASE.
Puerperal Sepsis

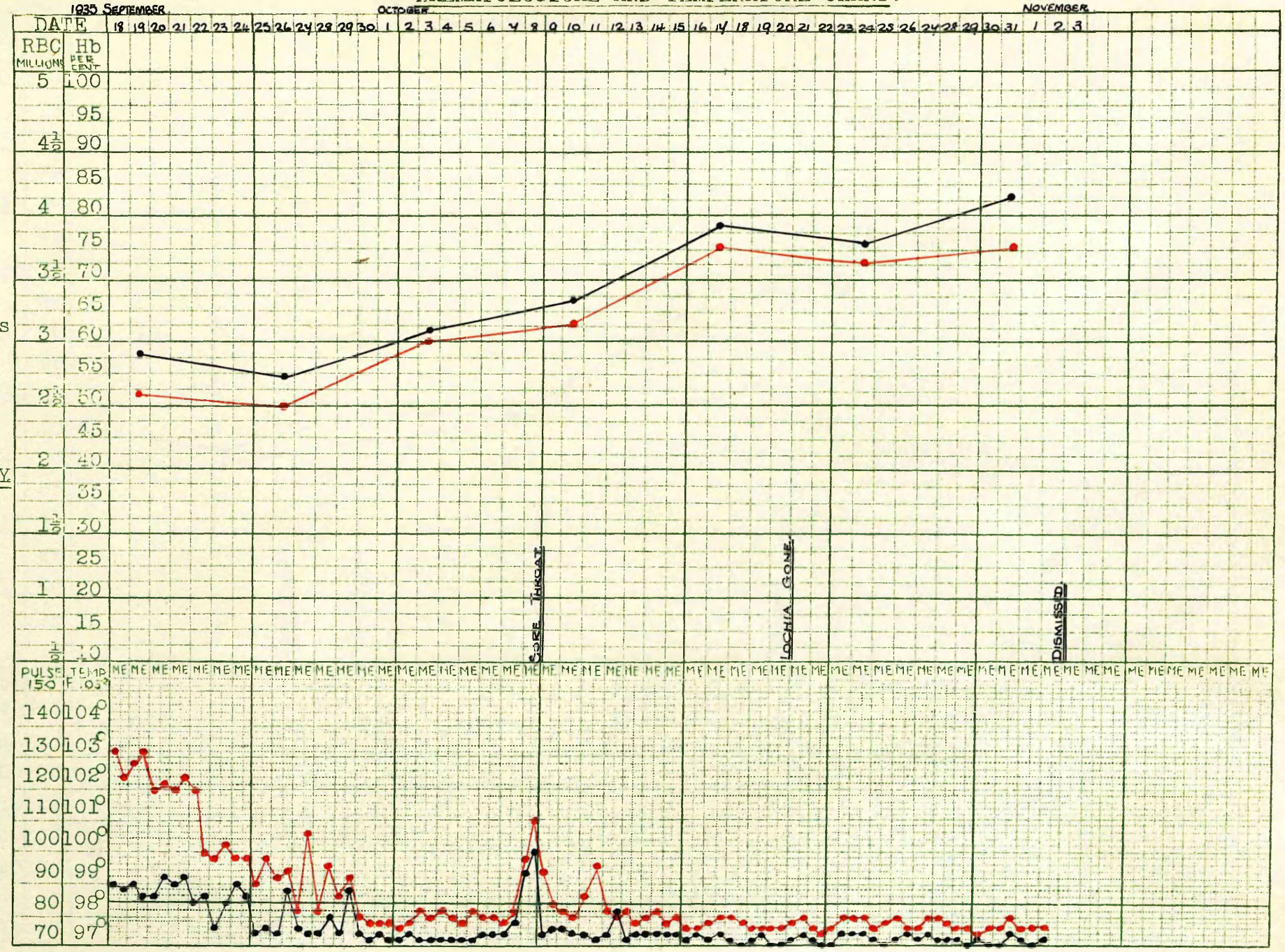
TYPE.
Localised.

MODE OF DELIVERY.
Forceps.

Extensive laceration.

TREATMENT.
Intra-uterine glycerine.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 1st day of puerperium, with pyrexia.
Admitted: 6th day of illness.
Perineum: Extensive septic tear.
Vagina: Lacerated.
Cervix: Soft and ulcerated.
Lochia: Profuse and brownish.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Sepsis localised. Toxaemia manifested mainly by rapid pulse.

Note: Slight fall in blood value until sepsis eradicated.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CV.

AGE.
37.

PARA.
8.

DISEASE.
Puerperal Sepsis

TYPE.
Localised.

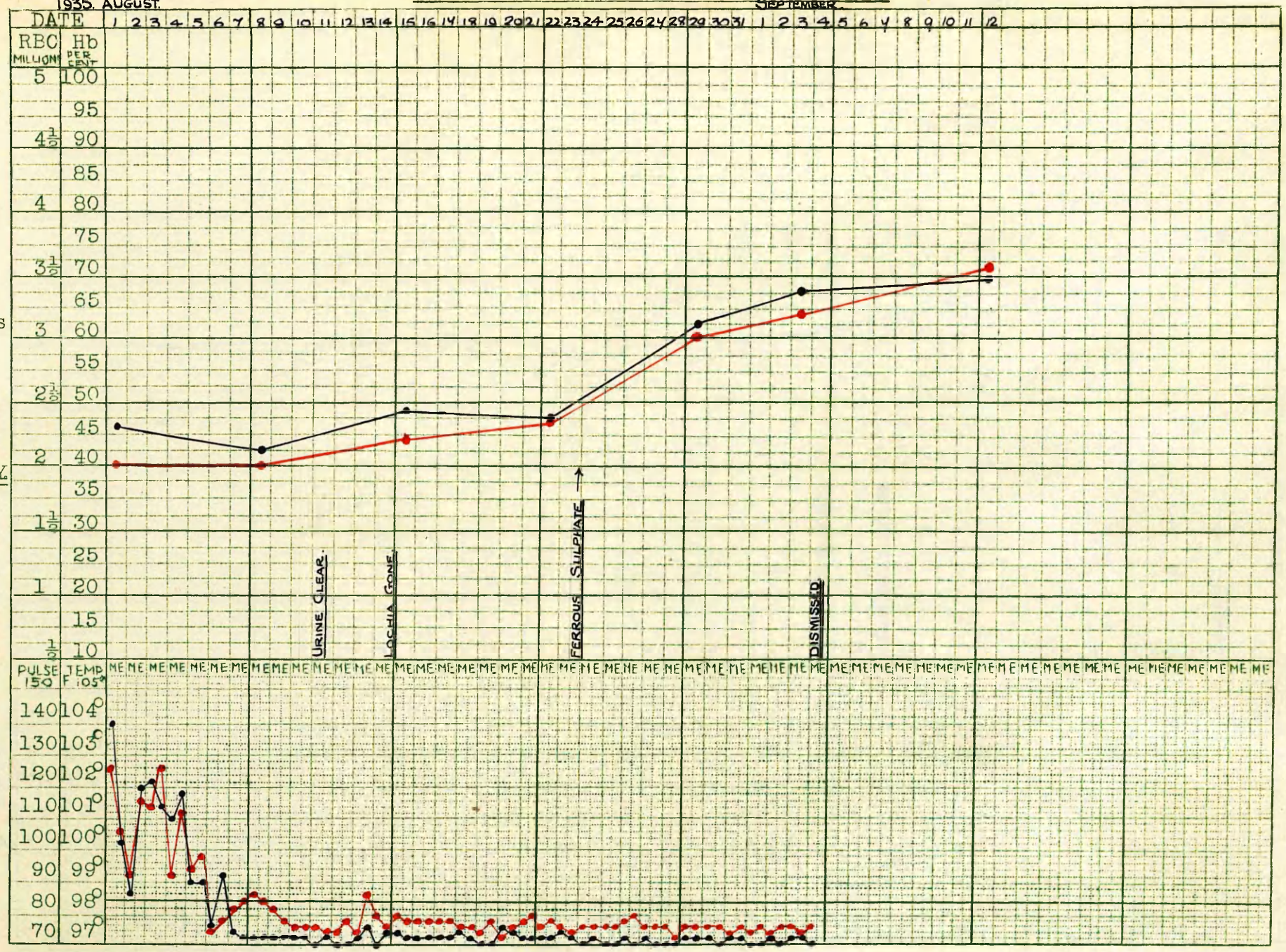
MODE OF DELIVERY
Normal.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

23/8 Ferrous Sulphate, gr. xviii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 8th day of puerperium, with headache and shivering.
Admitted: 3rd day of illness.
Perineum: Intact.
Cervix: Large, soft.
Lochia: Retained, haemorrhagic with debris.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Fairly profound toxaemia for a few days, but subsided quickly.

Note: No recovery in blood values till iron therapy instituted.
Case of albuminuria of pregnancy.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CVI.

AGE.

31.

PARA.

6.

DISEASE.

Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY.

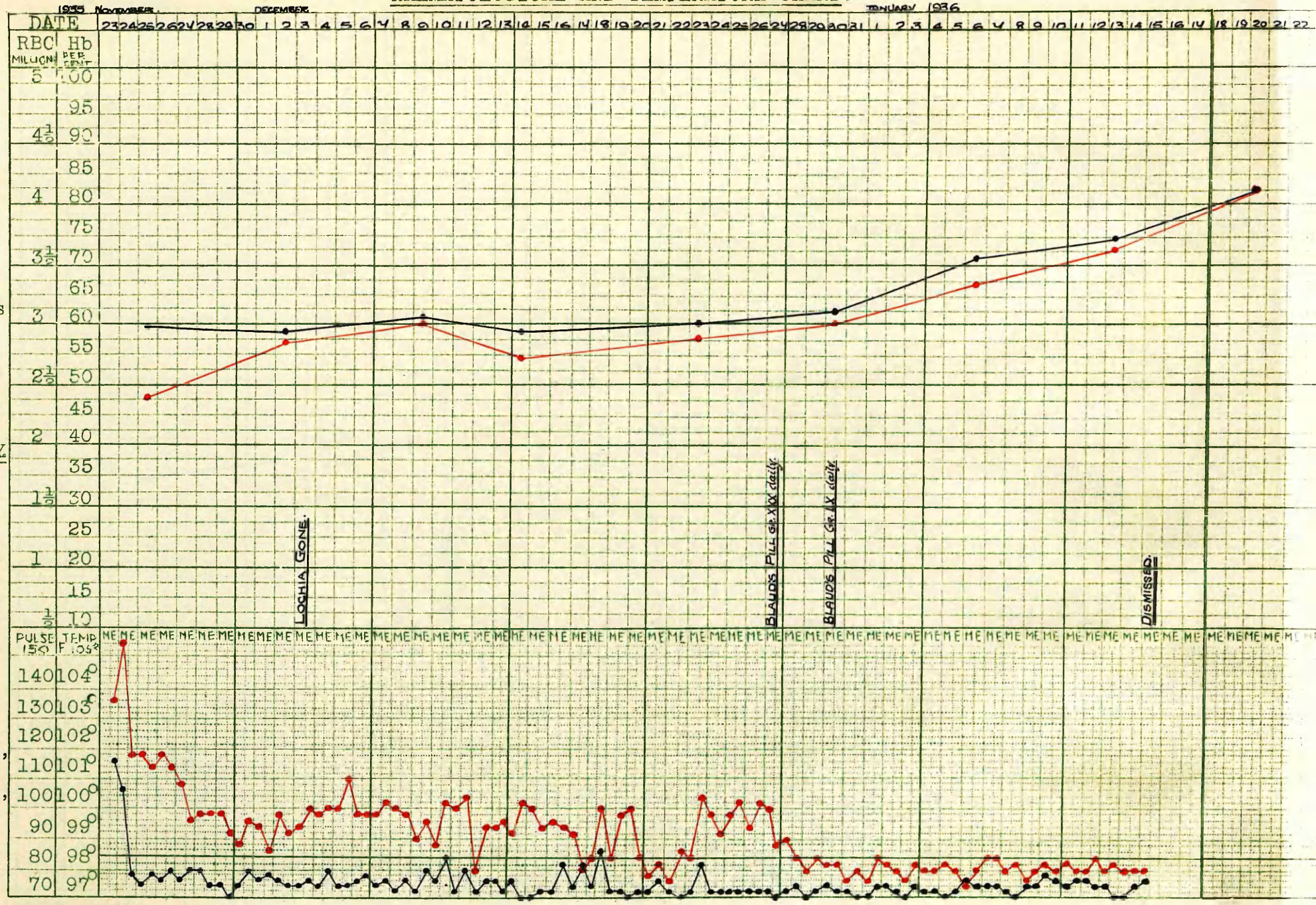
Forceps.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

27/12 Blaud's Pill, gr.xxx daily.
30/12 Blaud's Pill, gr. lx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 5th day of puerperium, with shivering.
Admitted: 1st day of illness.
Perineum: Intact.
Cervix: Soft and ulcerated.
Lochia: Profuse and purulent.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Sepsis quickly eradicated.

Note: No blood recovery till iron given. Rapid succession of pregnancies.

HAEMATOLOGICAL AND TEMPERATURE CHART. HART.

CASE NO.

CVII.

AGE.

27.

PARA.

1.

DISEASE.

Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY

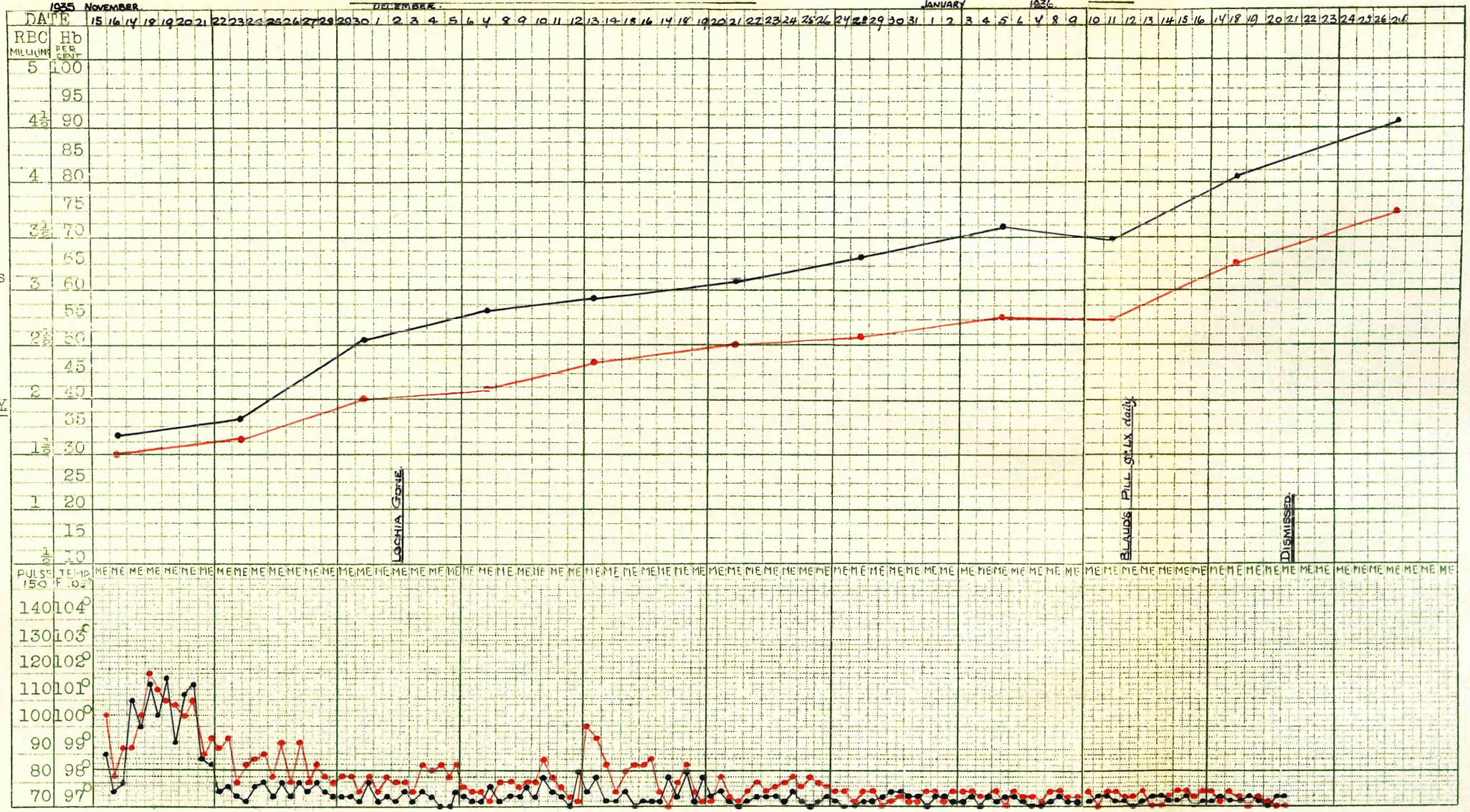
Forceps.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

12/1 Blaud's Pill, gr. lx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

LR CHART.
CK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 8th day of puerperium, with headache and shivering.
Admitted: 4th day of illness.
Perineum: 2nd degree tear.
Vagina: Slightly torn.
Cervix: Large, soft, ulcerated.
Lochia: Profuse, purulent.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Toxaemia persisted for one week.

Note: Case of pseudo-agglutination. Observe severe anaemia and falling colour index owing to inadequacy of iron. Note also prolonged convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CVIII.

AGE.

19.

PARA.

1.

DISEASE.

Puerperal Sepsis

TYPE.

Toxaemia.

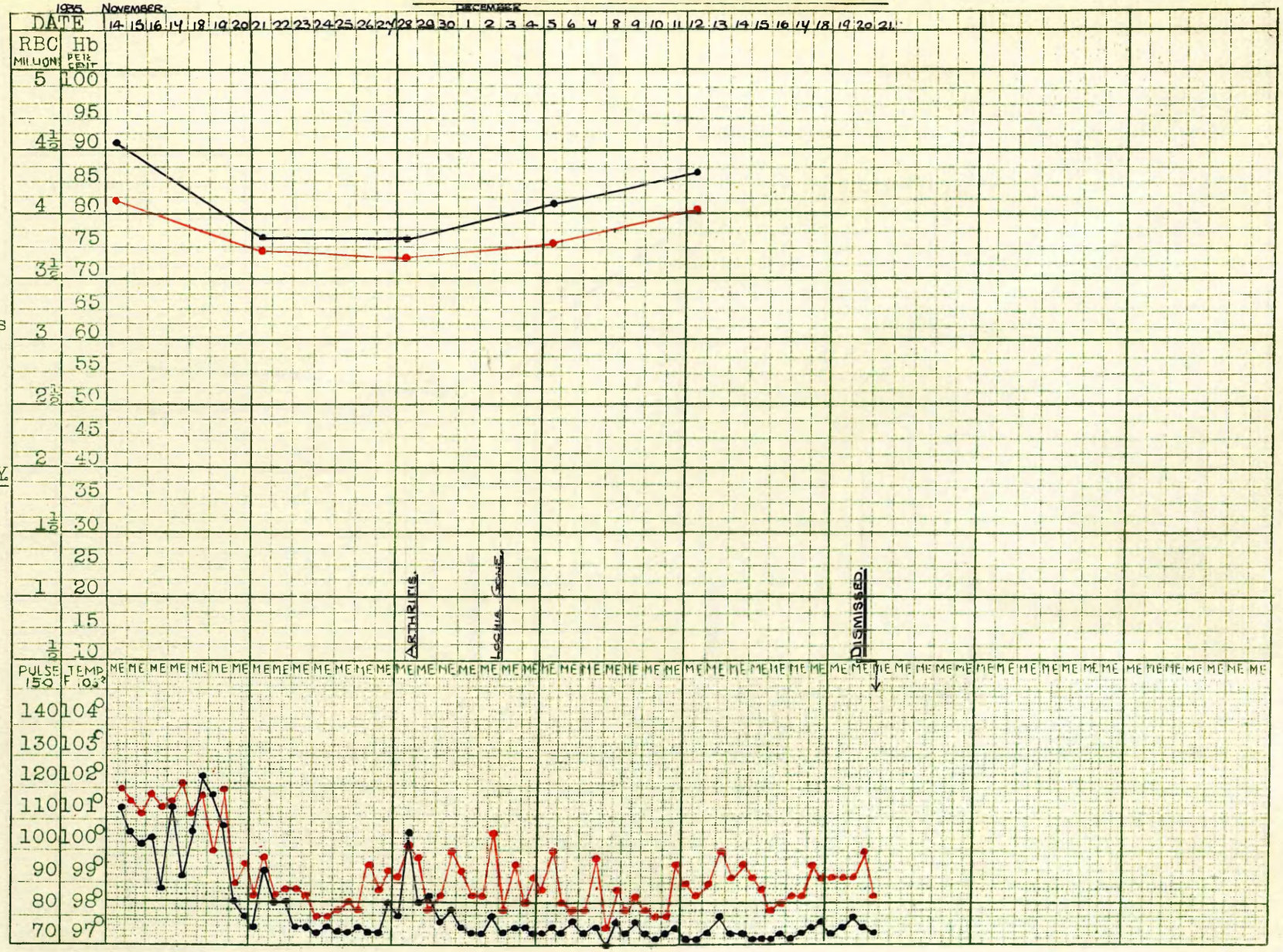
MODE OF DELIVERY.

Forceps.

TREATMENT.

Intra-uterine glycerine.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 7th day of puerperium, with sickness.
Admitted: 4th day of illness.
Perineum: Superficial laceration.
Cervix: Soft, ulcerated.
Lochia: Purulent.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Fairly profound toxaemia for over one week.
Transient arthritis in 3rd week.

Note: Fall in blood values during active sepsis and incomplete recovery.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CIX.

AGE.
17.

PARA.
1.

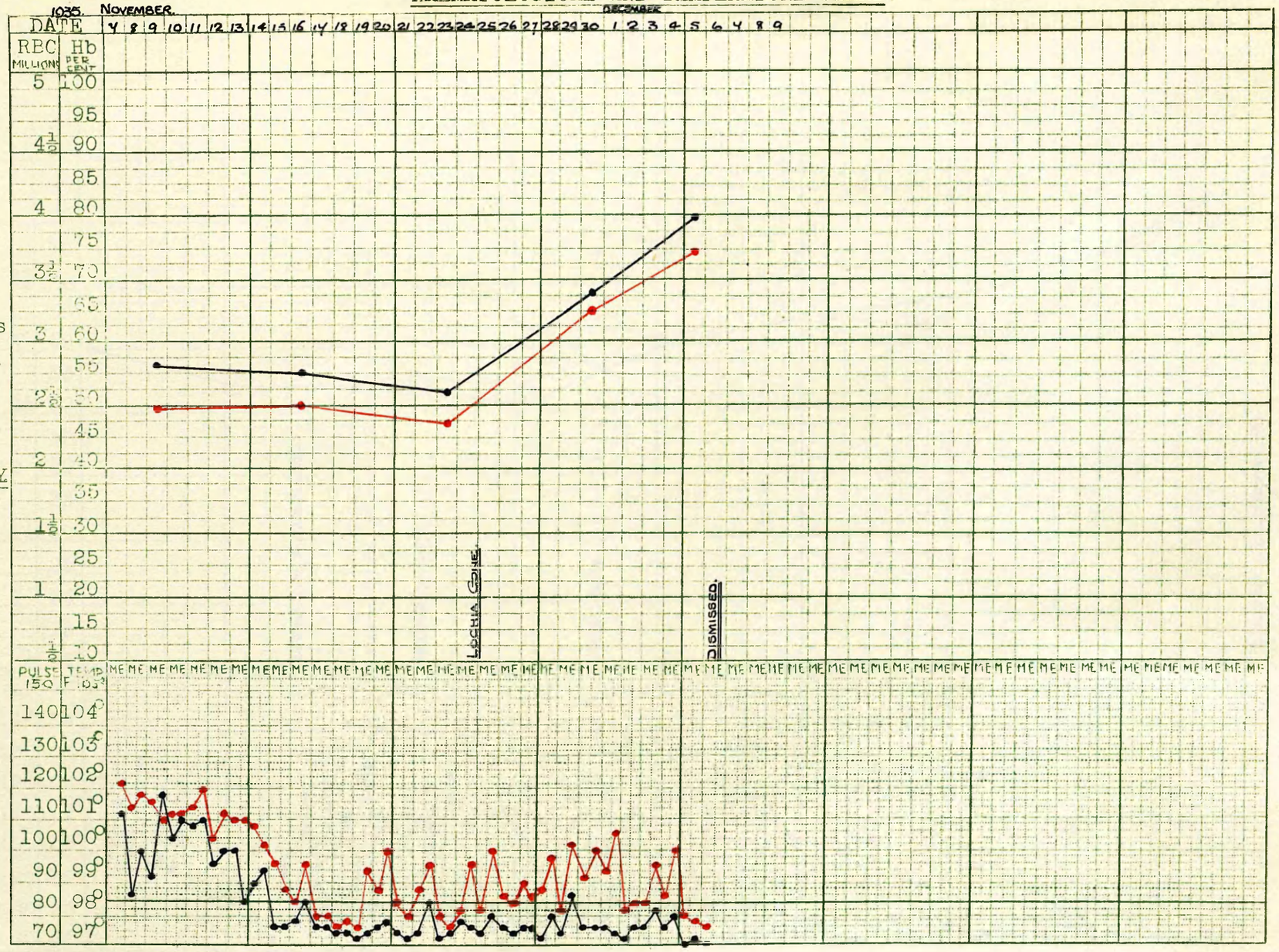
DISEASE.
Puerperal Sepsis

TYPE.
Toxaemic.

MODE OF DELIVERY
Normal.

TREATMENT.
Intra-uterine glycerine.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 2nd day of puerperium, with pyrexia.
Admitted: 2nd day of illness.
Perineum: Intact.
Vagina: Superficial laceration.
Cervix: Large and soft, ulcerated.
Lochia: Brownish, offensive.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Toxaemia sustained for one week.

Note: Fall in blood count persisted till lochia gone, after which good spontaneous recovery.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CX.

AGE.
20.

PARA.
1.

DISEASE.
Puerperal Sepsis

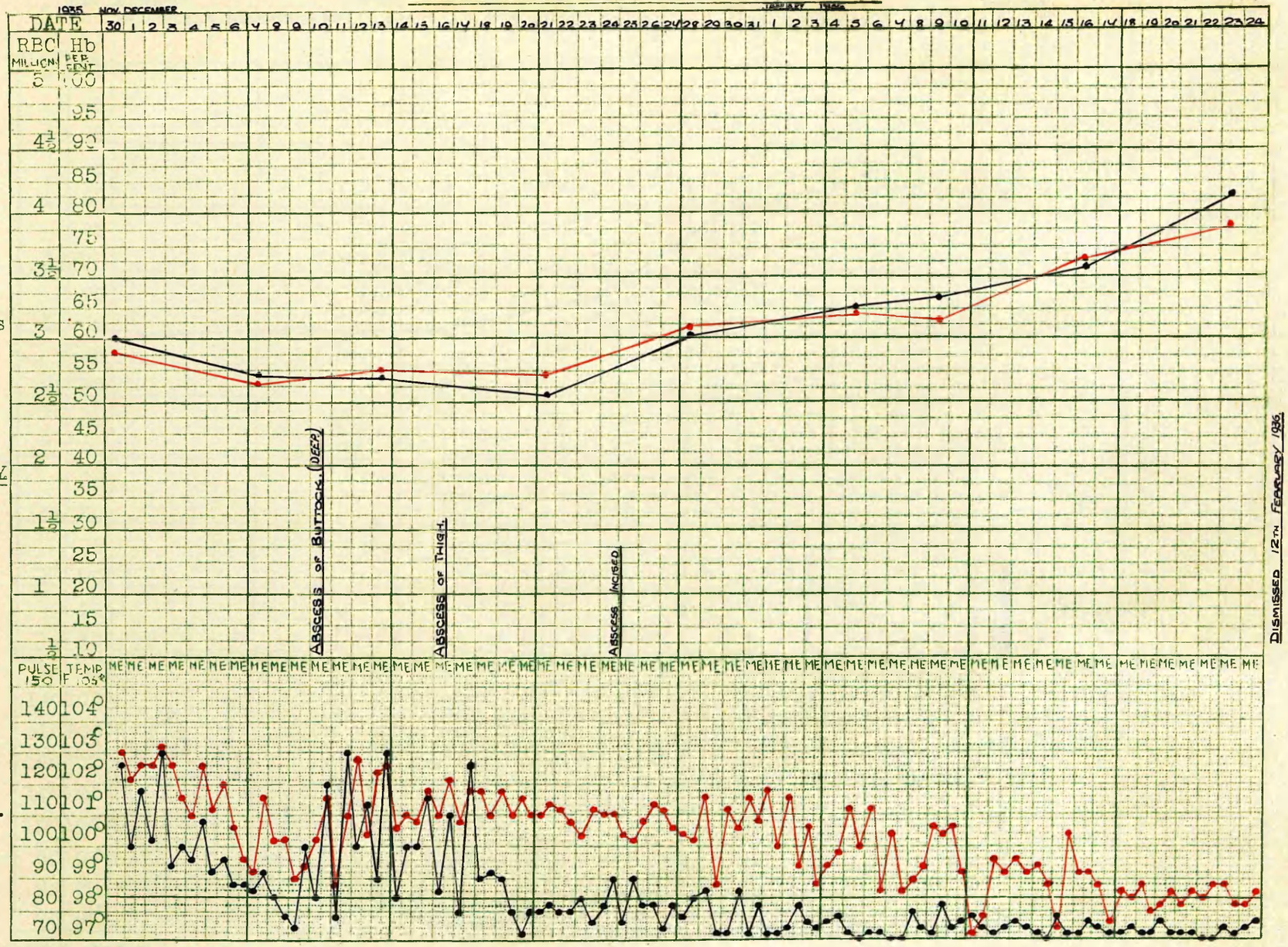
TYPE.
Toxaemic.

MODE OF DELIVERY
Normal.

TREATMENT.
Intra-uterine glycerine.

Abscesses incised.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 6th day of puerperium, with pyrexia.
Admitted: 1st day of illness.
Perineum: Septic 2nd degree tear.
Cervix: Large, soft, ulcerated.
Lochia: Profuse, brownish.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, negative.
Pus, haemolytic streptococci.

Progress: Original toxaemia gradually subsided over one week, followed by abscesses in thigh and buttock.

Note: Gradual fall in blood values until all sepsis eradicated.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXI.

AGE.
22.

PARA.
1.

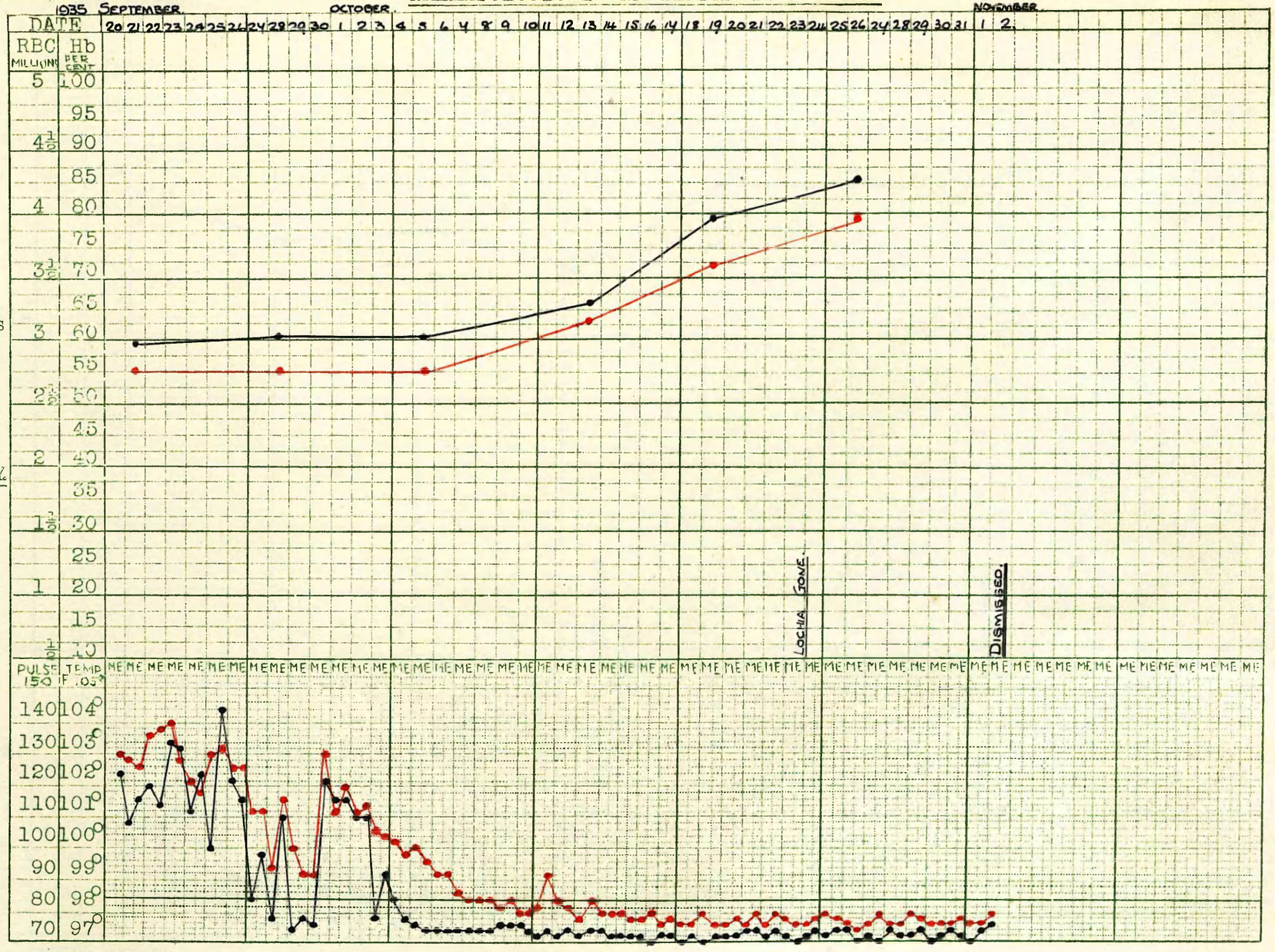
DISEASE.
Puerperal Sepsis

TYPE.
Toxaemic.

MODE OF DELIVERY.
Forceps.

TREATMENT.
Intra-uterine glycerine.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 6th day of puerperium with pyrexia.
Admitted: 1st day of illness.
Perineum: Extensive septic laceration.
Cervix: Soft, ulcerated, lacerated.
Lochia: Profuse, offensive.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Fairly severe toxaemia for 2 weeks, after which, good recovery.

Note: Stationary blood values till sepsis eradicated, also inadequacy of iron in convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXII.

AGE.
18.

PARA.
1.

DISEASE.
Puerperal Sepsis

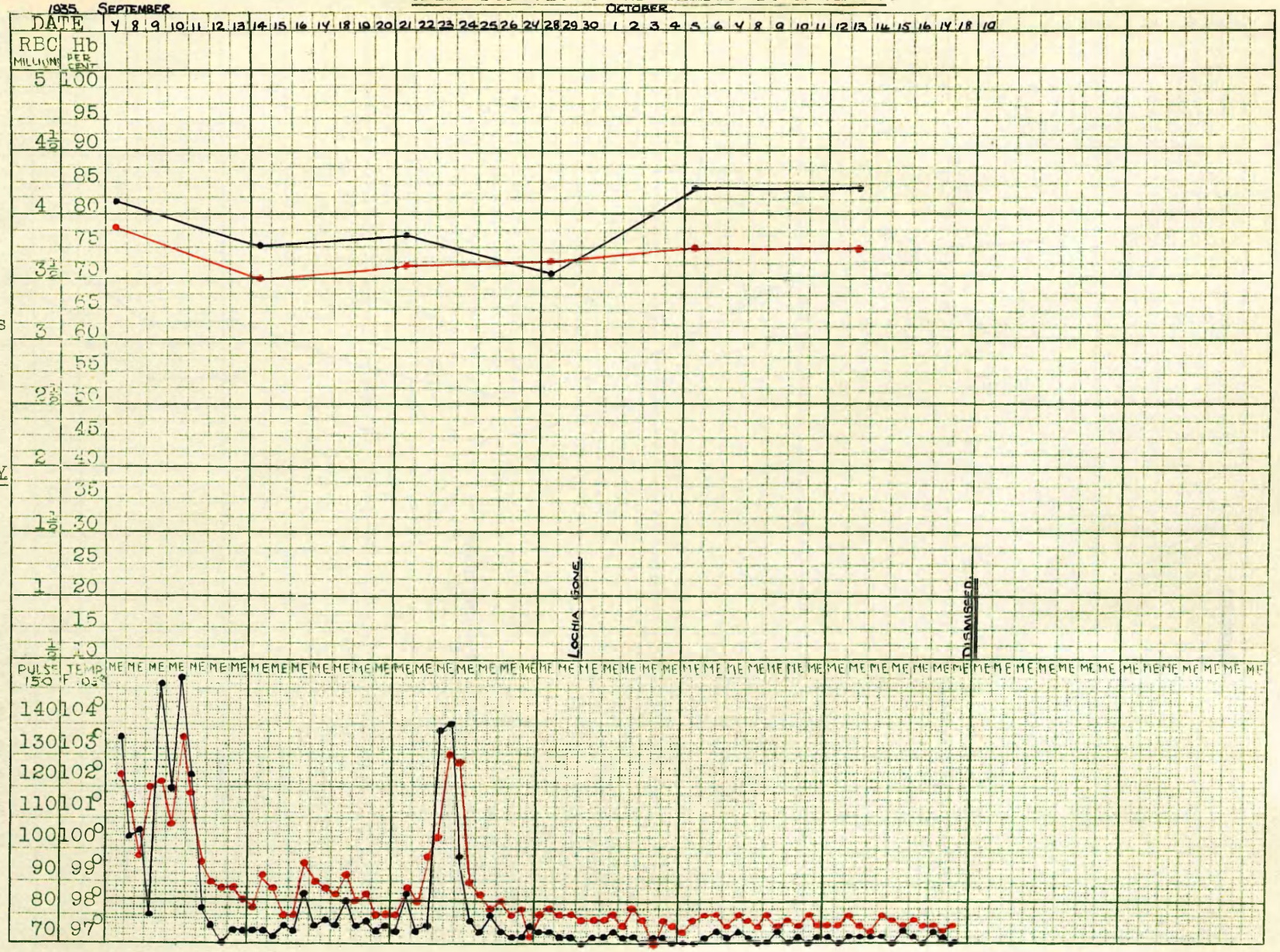
TYPE.
Septicaemia (streptococcal).

MODE OF DELIVERY
Normal.

Post partum haemorrhage.

TREATMENT.
Intra-uterine glycerine.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 3rd day of puerperium, with headache and abdominal pain.
Admitted: 7th day of illness.
Perineum: Intact.
Cervix: Large, soft.
Lochia: Haemorrhagic, fairly profuse.

Bacteriology: Cervical swab, negative. Blood culture, haemolytic streptococci.

Progress: Very toxic with high pyrexia for first few days, then sudden fall with no particular treatment. Good example of "post hoc" fallacy. Pulse rate slow.

Note: Fall in blood value till sepsis eradicated, and inadequacy of iron.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXIII.

AGE.
35.

PARA.
4.

DISEASE.
Puerperal Sepsis

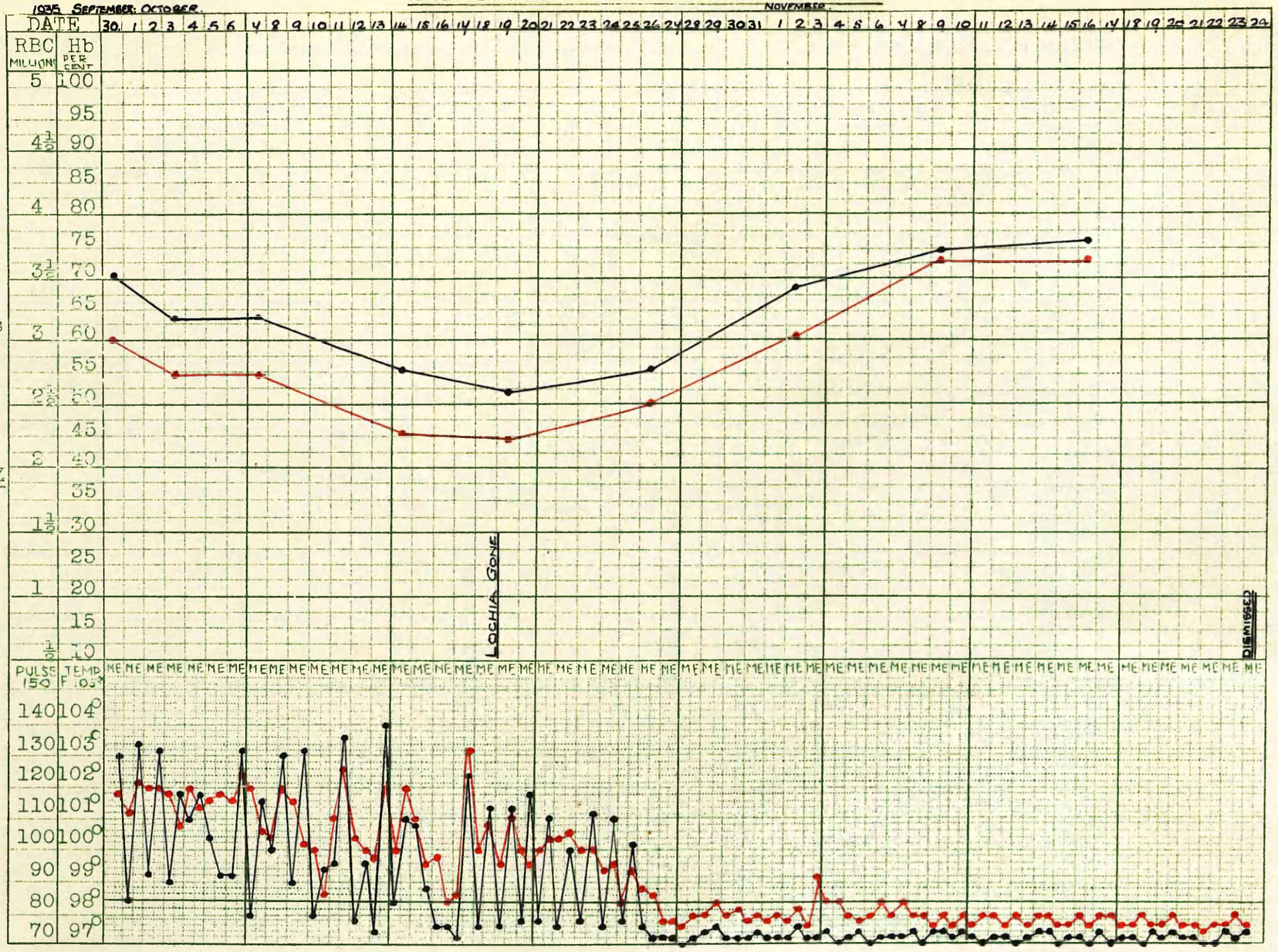
TYPE.
Septicaemia (clinical).

MODE OF DELIVERY.
Normal.

TREATMENT.
Intra-uterine glycerine.

21/10 Pituitrin 0.5 c.c. b.d.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 4th day of puerperium, with headache.
Admitted: 3rd day of illness.
Perineum: Slightly torn.
Cervix: Large, soft, ulcerated.
Lochia: Profuse, brownish, becoming scanty later.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, negative.

Progress: Clinical septicaemia, with swinging temperature for four weeks.
Subinvolution and tender uterus with scanty lochia after lst week.

Note: Fall in blood values corresponding with period of pyrexia.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXIV.

AGE.

30.

PARA.

2.

DISEASE.
Puerperal Sepsis

TYPE.

Septicaemia (streptococcal).

MODE OF DELIVERY

Normal.

Post partum haemorrhage.

TREATMENT.

Intra-uterine glycerine.

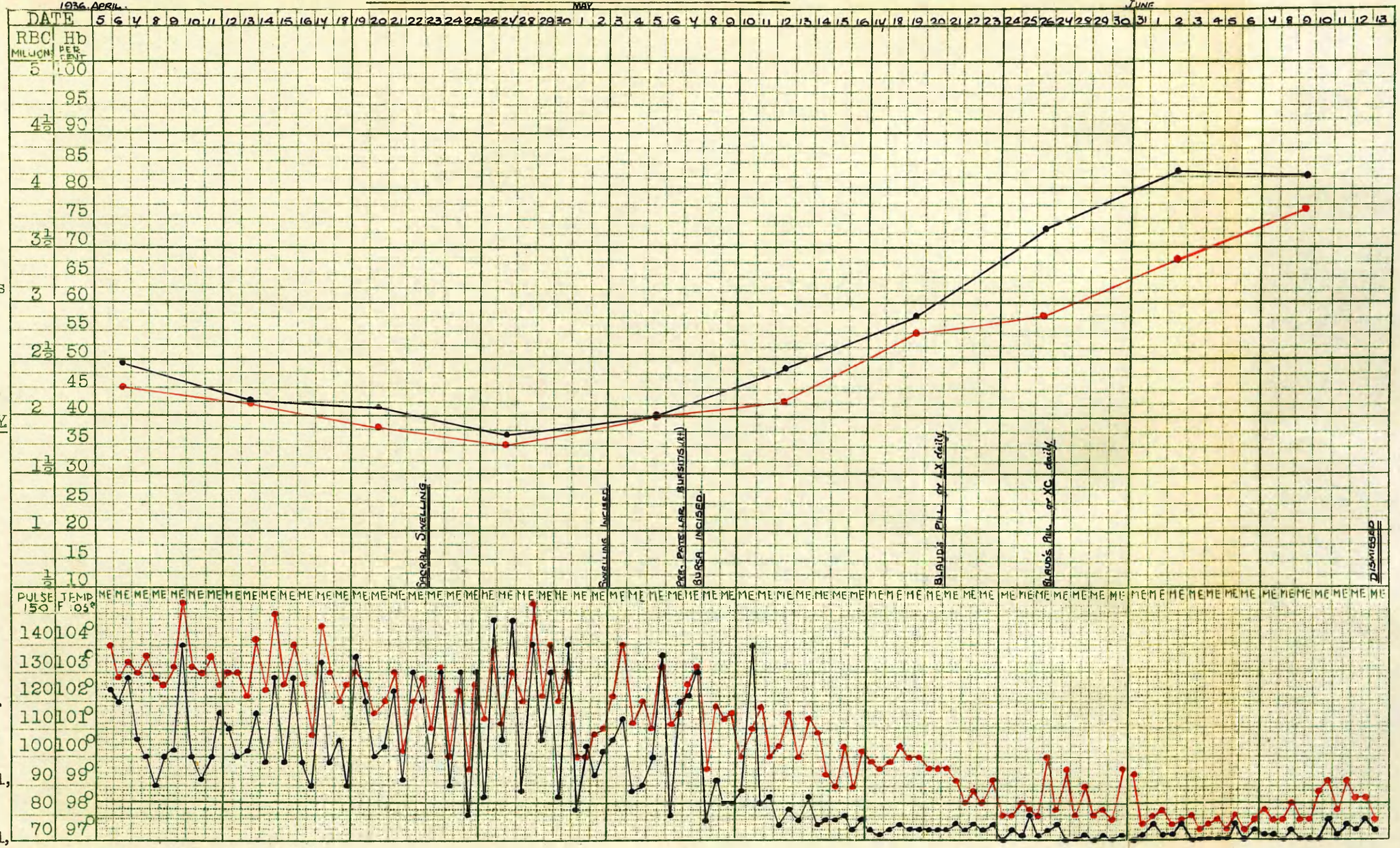
Intravenous glucose.

Abscesses incised.

For anaemia -

20/5 Blaud's Pill, gr. lx daily.

26/5 Plaud's Pill, gr. xc daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

ture; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 3rd day of puerperium, with headache and shivering.
Admitted: 2nd day of illness.
Perineum: Slightly torn.
Cervix: Large, soft, lacerated and sloughing.
Lochia: Scanty.

Bacteriology: Cervical swab, haemolytic streptococci isolated.
Blood culture, repeated negative.
Pus, haemolytic streptococci.

Progress: Clinical septicaemia with swinging temperature for 5 weeks.
Abscess over sacrum and prepatellar bursitis, incised.

Note: Severe anaemia on admission, gradually becoming more marked until abscesses incised, followed by very incomplete recovery due to inadequacy of iron.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXV.

AGE.
32.

PARA.
4.

DISEASE.
Puerperal Sepsis

TYPE.
Septicaemia (streptococcal).

MODE OF DELIVERY
Forceps.

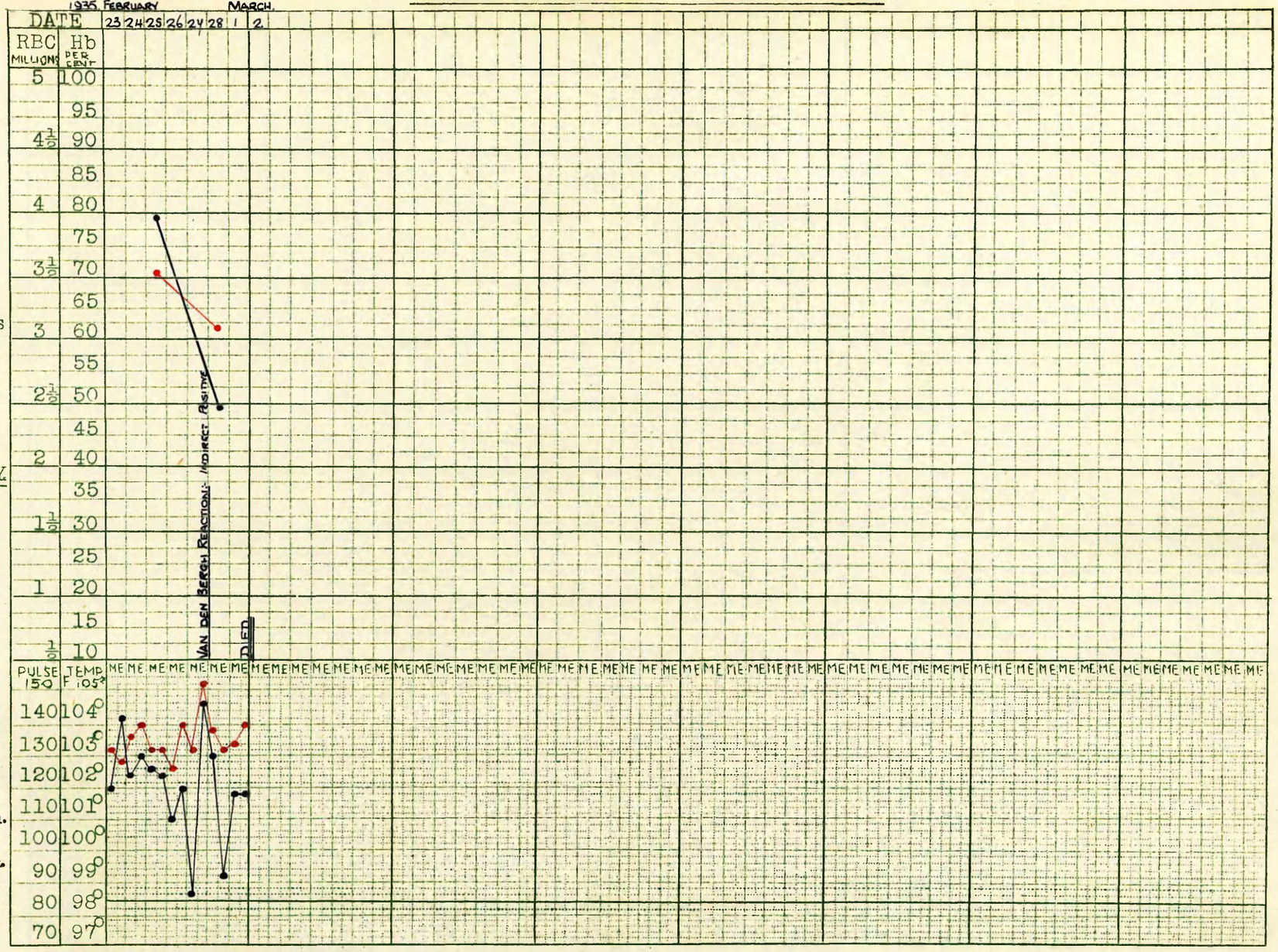
TREATMENT.

Intra-uterine glycerine.

Intravenous Euflavine.

27/2 Strophanthin gr.1/500 q.h.
Strychnine gr.1/60 q.h.

For anaemia -
25/2 Ferrous Sulphate gr.vi daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 14th day of puerperium, with shivering.
Admitted: 3rd day of illness.
Perineum: Slightly torn.
Cervix: Small and firm.
Lochia: Pure pus, retained, offensive.

Bacteriology:
Cervical swab, negative.
Blood culture, repeated negative.

Post Mortem:
Uterus large and soft with small pieces of placenta.
Haemolytic streptococci in uterine wall.

Progress: Rapidly advancing septicaemia.

Note: Acute haemolytic anaemia with massive blood destruction.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXVI.

AGE.
22.

PARA.
1.

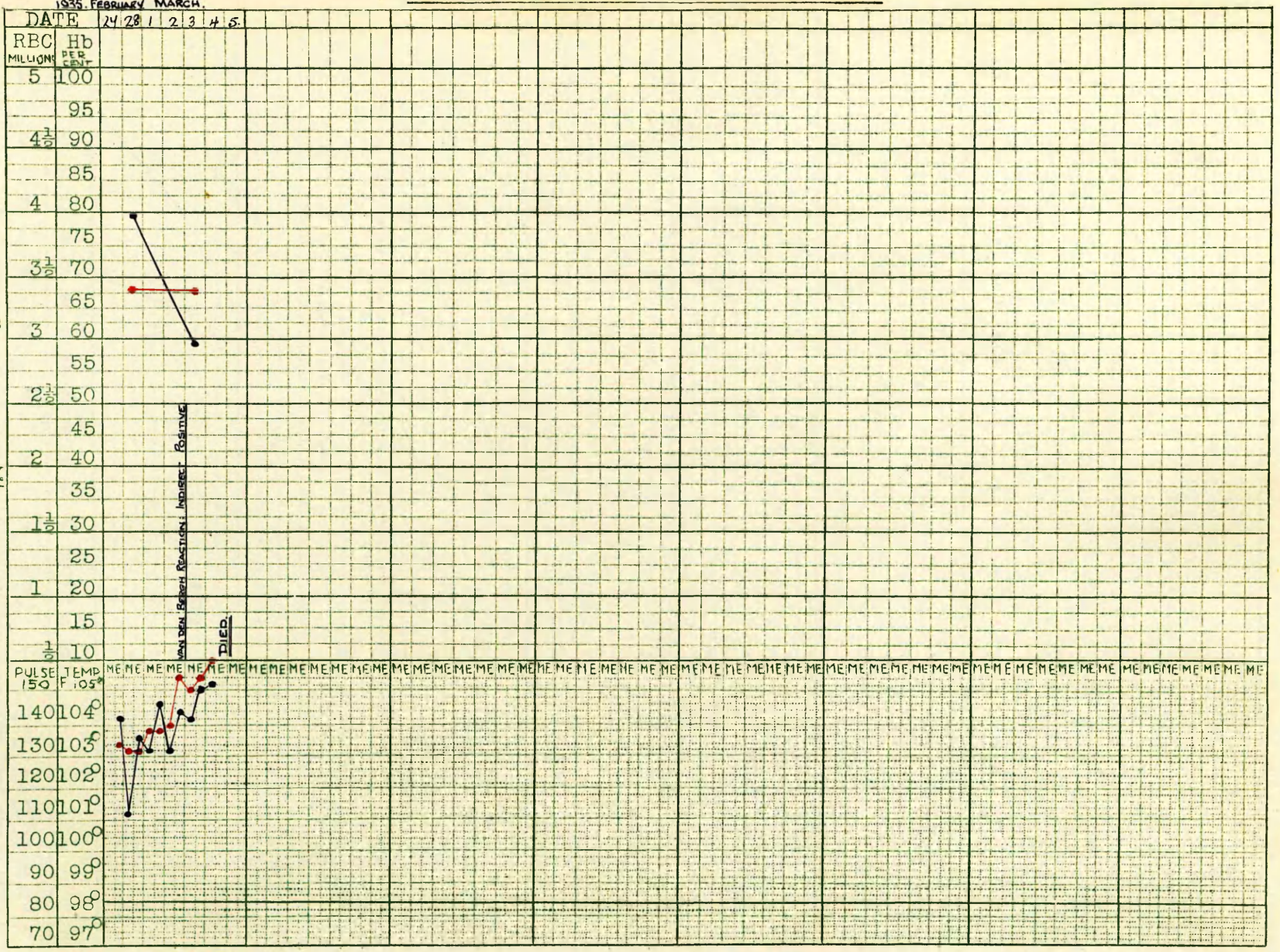
DISEASE.
Puerperal Sepsis

TYPE.
Septicaemia (streptococcal).

MODE OF DELIVERY.
Normal.

TREATMENT.
Intra-uterine glycerine.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 2nd day of puerperium, with delirium.
Admitted: 6th day of illness.
Perineum: Extensive septic laceration.
Cervix: Lacerated.
Lochia: Haemorrhagic, scanty.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Post Mortem: Uterus enlarged but fairly clean. Haemolytic streptococci in uterine wall.

Progress: Rapidly advancing septicaemia.

Note: Massive blood destruction.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXVII.

AGE.

31.

PARA.

4.

DISEASE.

Puerperal Sepsis

TYPE.

Septicaemia (streptococcal).

MODE OF DELIVERY.

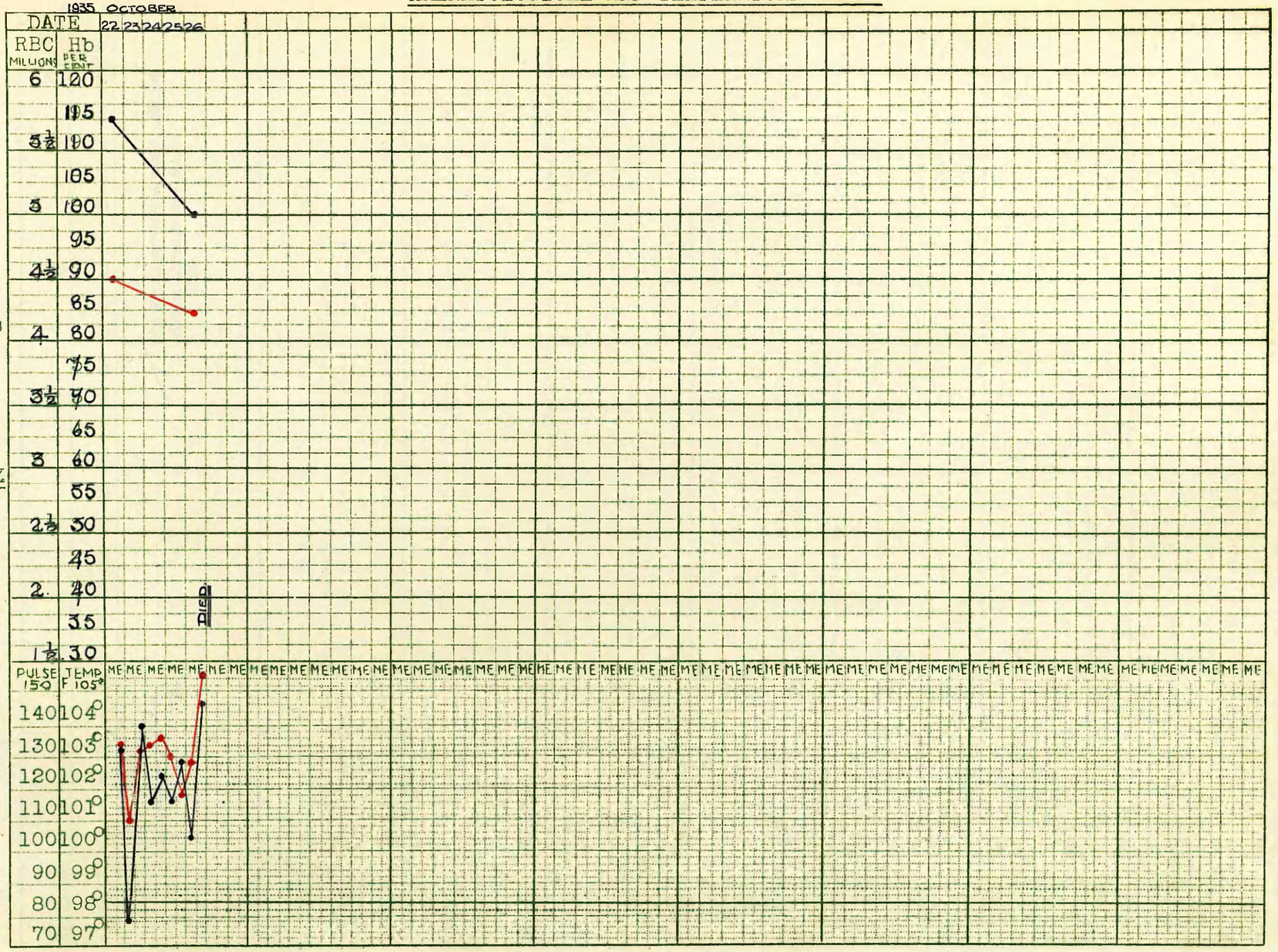
Breech (manual).

TREATMENT.

Intra-uterine glycerine.

Scarlet Fever Antitoxin, 9000 units.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 2nd day of puerperium, with abdominal pain.
Admitted: 4th day of illness.
Perineum: Intact.
Cervix: Swollen, oedematous, sloughing, necrosed.
Lochia: Profuse, becoming rapidly scanty.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, negative.

Post Mortem: Uterus large and soft, sloughing at placental site. Toxic nephritis; myocardial degeneration; slight pericardial and peritoneal effusions. Haemolytic streptococci in uterine wall and spleen.

Progress: Rapidly advancing septicaemia. No response to serum.
Note: Acute haemolysis.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXVIII.

AGE.
20.

PARA.
2.

DISEASE.
Puerperal Sepsis

TYPE.
Septicaemia (streptococcal).

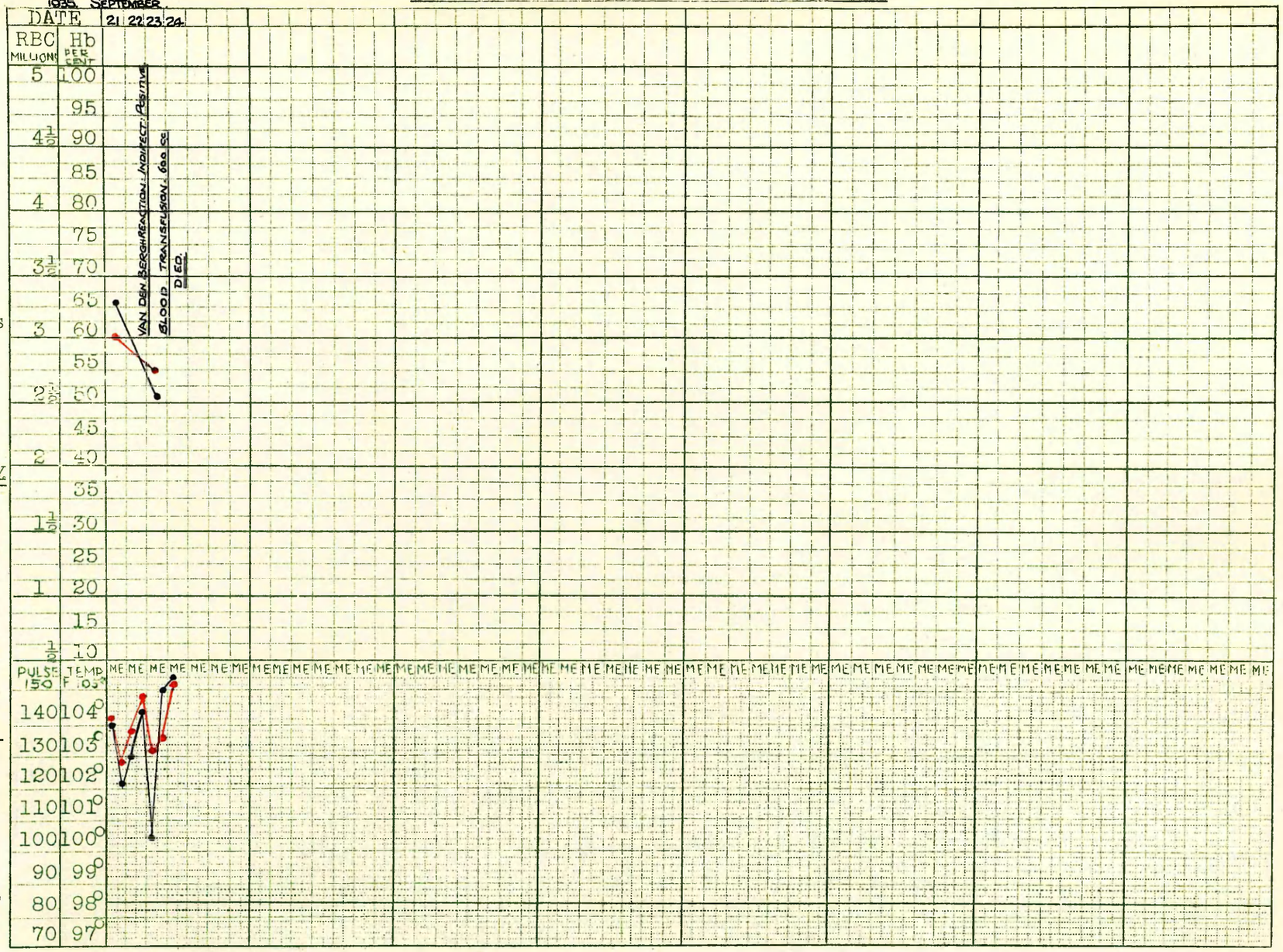
MODE OF DELIVERY
Normal.

TREATMENT.
Intra-uterine glycerine.

22/9 Anti-streptococcal serum 9,000 units.

23/9 Strychnine gr. 1/60 q.h.

Blood Transfusion, 600 c.c.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 1st day of puerperium, with headache and shivering.
Admitted: 5th day of illness.
Perineum: Slightly torn.
Cervix: Large, soft, ulcerated.
Lochia: Scanty.

Bacteriology: Cervical swab, negative. Blood culture, haemolytic streptococci.

Post Mortem: Uterus enlarged with necrotic mucous membrane, and haemolytic streptococci in walls, and in spleen. Toxic nephritis.

Progress: Rapidly advancing septicaemia with no response to serum.
Note: Haemolytic anaemia.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXIX.

AGE.
30.

PARA.
1.

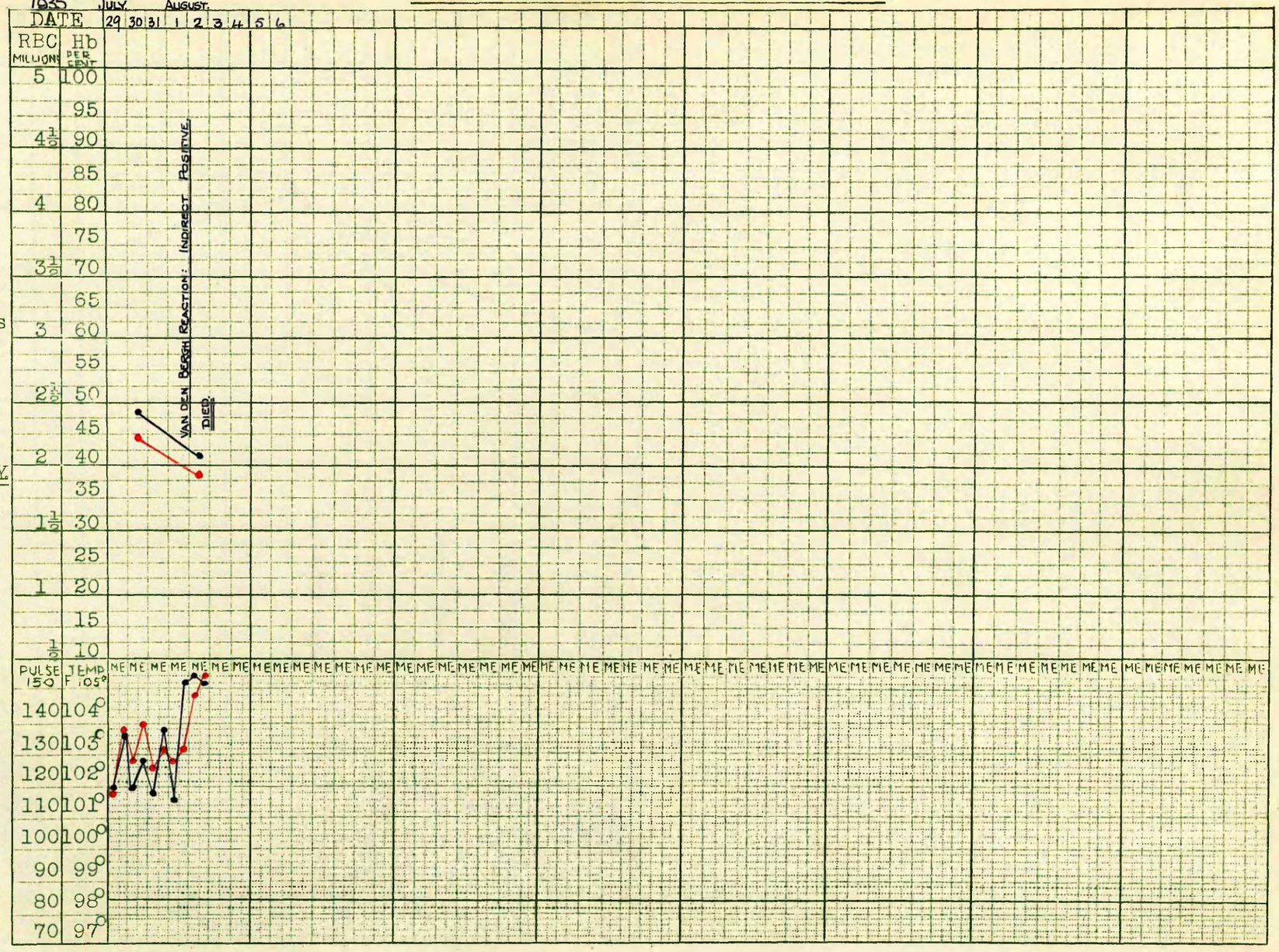
DISEASE.
Puerperal Sepsis

TYPE.
Septicaemia (streptococcal).

MODE OF DELIVERY.
Forceps.

TREATMENT.
Intra-uterine glycerine.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 5th day in puerperium, with pyrexia.
Admitted: 13th day of the illness.
Perineum: Extensive, septic laceration.
Vagina: Paravaginal abscess.
Cervix: Large and soft.
Lochia: Retained, profuse, haemorrhagic.

Bacteriology: Haemolytic streptococci. Blood culture, haemolytic streptococci.

Post Mortem: Uterus enlarged, with sloughing mucous membrane. Myocardial degeneration. Toxic nephritis.

Progress: Very late admission. Rapidly advancing septicaemia.

Note: Acute haemolysis.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXX.

AGE.
25.

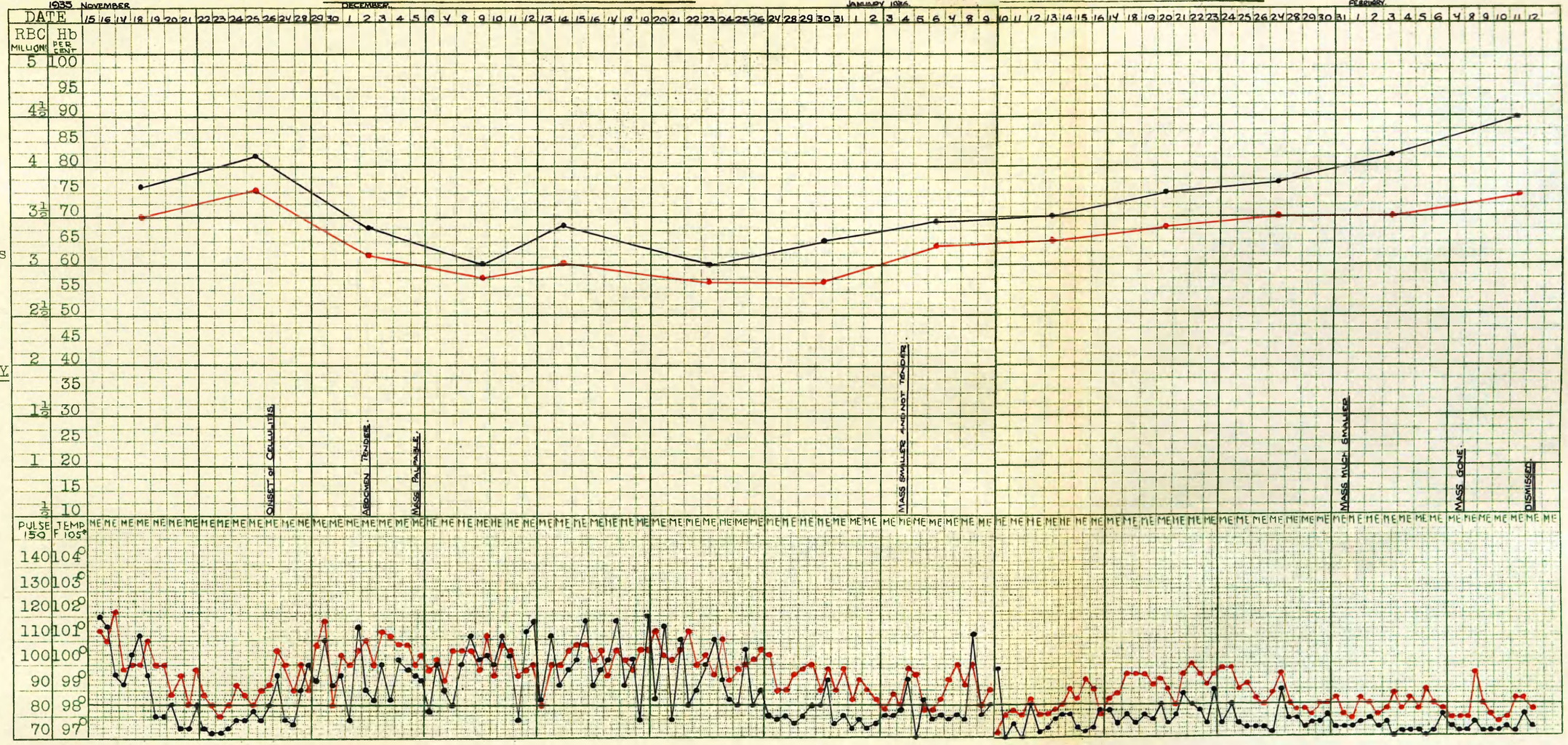
PARA.
2.

DISEASE.
Puerperal Sepsis

TYPE.
Parametritis.

MODE OF DELIVERY
Normal.

TREATMENT.
Intra-uterine glycerine.
Hot vaginal douching.
For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

ICAL AND TEMPERATURE CHART.
oglobin.
LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 4th day of puerperium, with headache and shivering.
Admitted: 2nd day of illness.
Perineum: Slightly torn.
Vagina: Superficial laceration.
Cervix: Large and soft.
Lochia: Fairly profuse and haemorrhagic.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Original sepsis mild in degree. Onset of cellulitis in middle of 2nd week, and persisted till end of 8th week. Subsided without abscess formation.

Note: Rise in blood value after original sepsis, followed by fall with onset of cellulitis. Falling colour index in convalescence from inadequacy of iron.

CAL NOTES.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXXI.

AGE.
23.

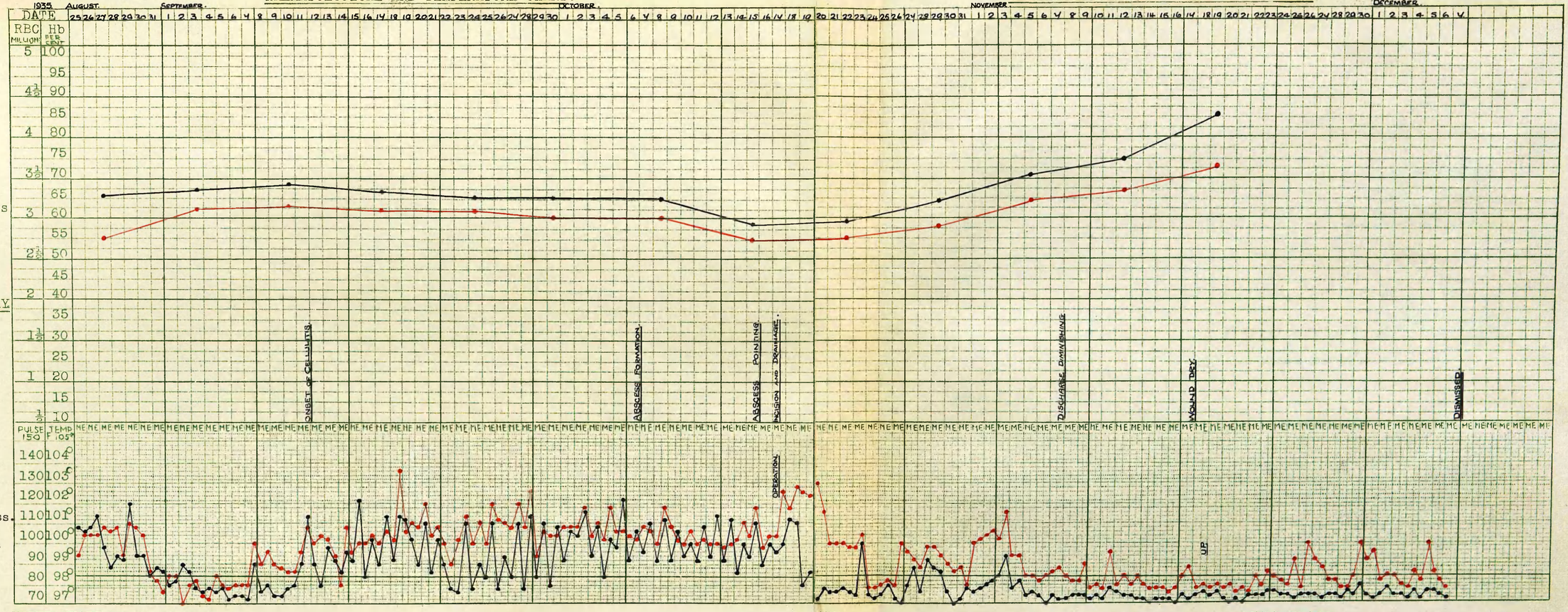
PARA.
4.

DISEASE.
Puerperal Sepsis

TYPE.
Parametritis.

MODE OF DELIVERY
Normal.

TREATMENT.
Intra-uterine glycerine.
Hot vaginal douching.
Incision of abscess.
For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 5th day of the puerperium, with headache and shivering.
Admitted: 4th day of illness.
Perineum: Intact.
Cervix: Large and soft.
Lochia: Retained, profuse, haemorrhagic.

Bacteriology: Cervical swab, negative.
Blood culture, negative.
Pus: haemolytic streptococci.

Progress: Original sepsis subsided gradually over one week. Cellulitis occurred in the 3rd week with abscess formation in the 7th week. Drained, and made good recovery.

HAEMATOLOGICAL AND TEMPERATURE CHART.

ART.
Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Note: Gradual fall in the blood values while sepsis active, accelerated on occurrence of abscess. Recovery after drainage established, but with falling colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXII.

AGE.

27.

PARA.

1.

DISEASE.

Puerperal Sepsis

TYPE.

Phlegmasia.

MODE OF DELIVERY

Forceps.

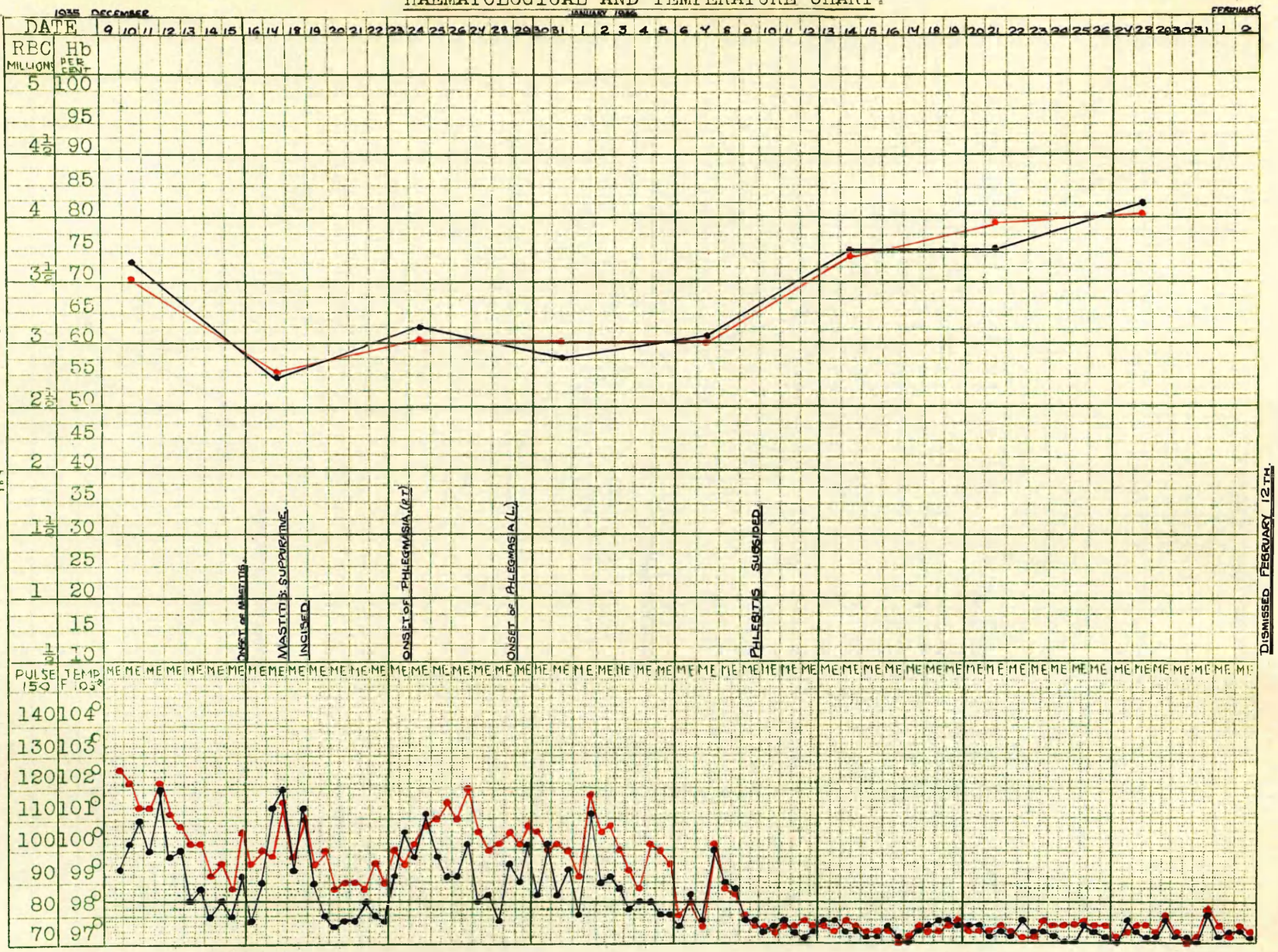
TREATMENT.

Intra-uterine glycerine.

Breast incised.

Glycerine Ichthyol to legs.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 6th day of the puerperium, with pyrexia and abdominal pain.
Admitted: 2nd day of the illness.
Perienum: 2nd degree tear.
Cervix: Large, soft, lacerated.
Lochia: Retained, profuse.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Suppurative mastitis following original sepsis. In 3rd week, first right, then left phlegmasia.

Note: Rise in blood value after original sepsis, with fall on occurrence of phlegmasia, and no further rise till completely subsided.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXIII.

AGE.

28.

PARA.

2.

DISEASE.

Puerperal Sepsis

TYPE.

Phlegmasia.

MODE OF DELIVERY

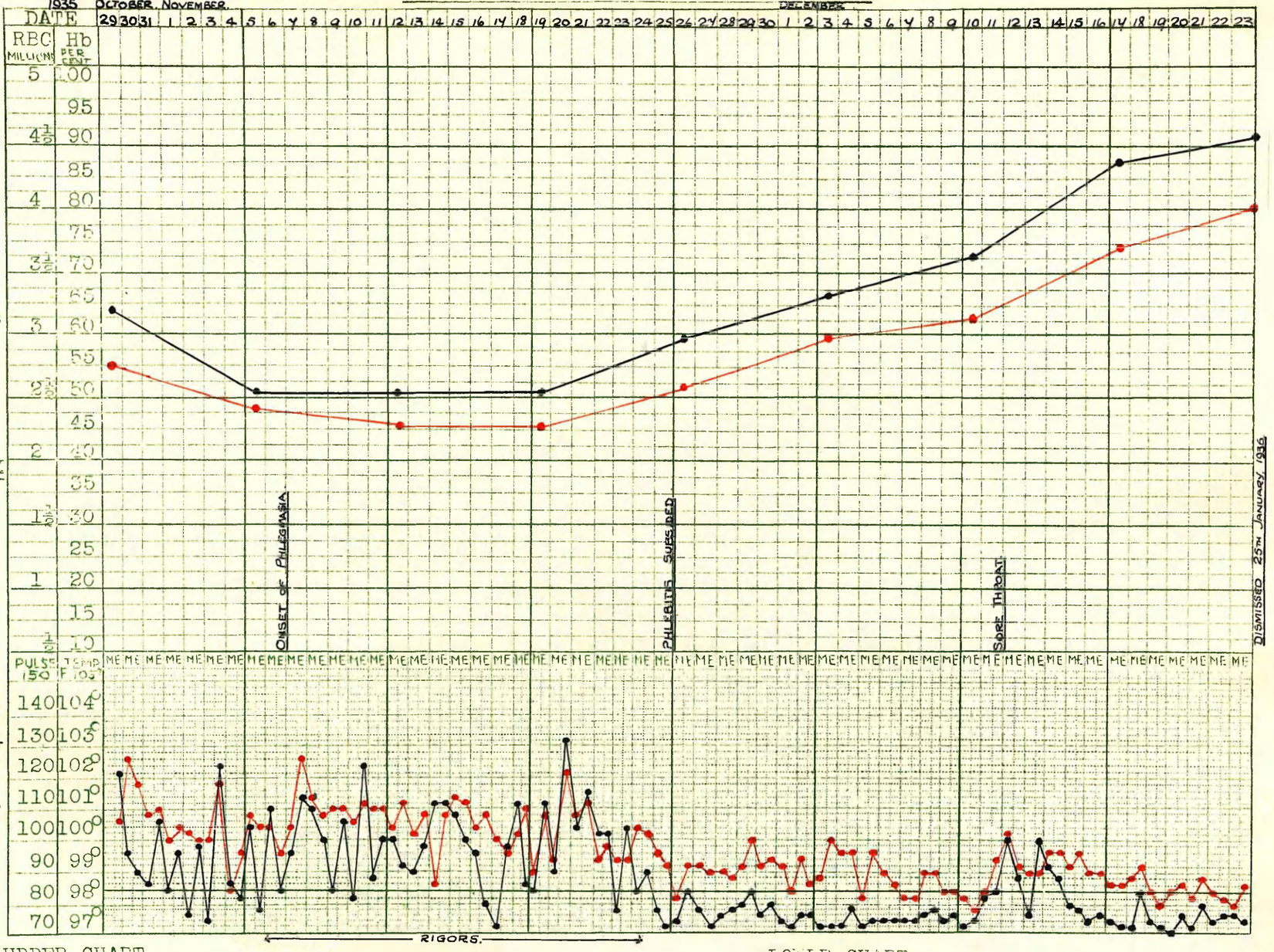
Forceps.

TREATMENT.

Intra-uterine glycerine.

Glycerine Ichthyol to legs.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 2nd day of puerperium, with shivering and headache.
Admitted: 13th day of illness.
Perineum: Slightly torn.
Cervix: Slightly ulcerated.
Lochia: Retained, profuse.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Fairly severe localised sepsis. Phlegmasia occurred in 2nd week, and accompanied by rigors for 3 weeks.

Note: Fall with original sepsis, and recovery after phlegmasia subsided, but with falling colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXIV.

AGE.

23.

PARA.

1.

DISEASE.

Puerperal Sepsis

TYPE.

Phlegmasia.

MODE OF DELIVERY.

Normal.

TREATMENT.

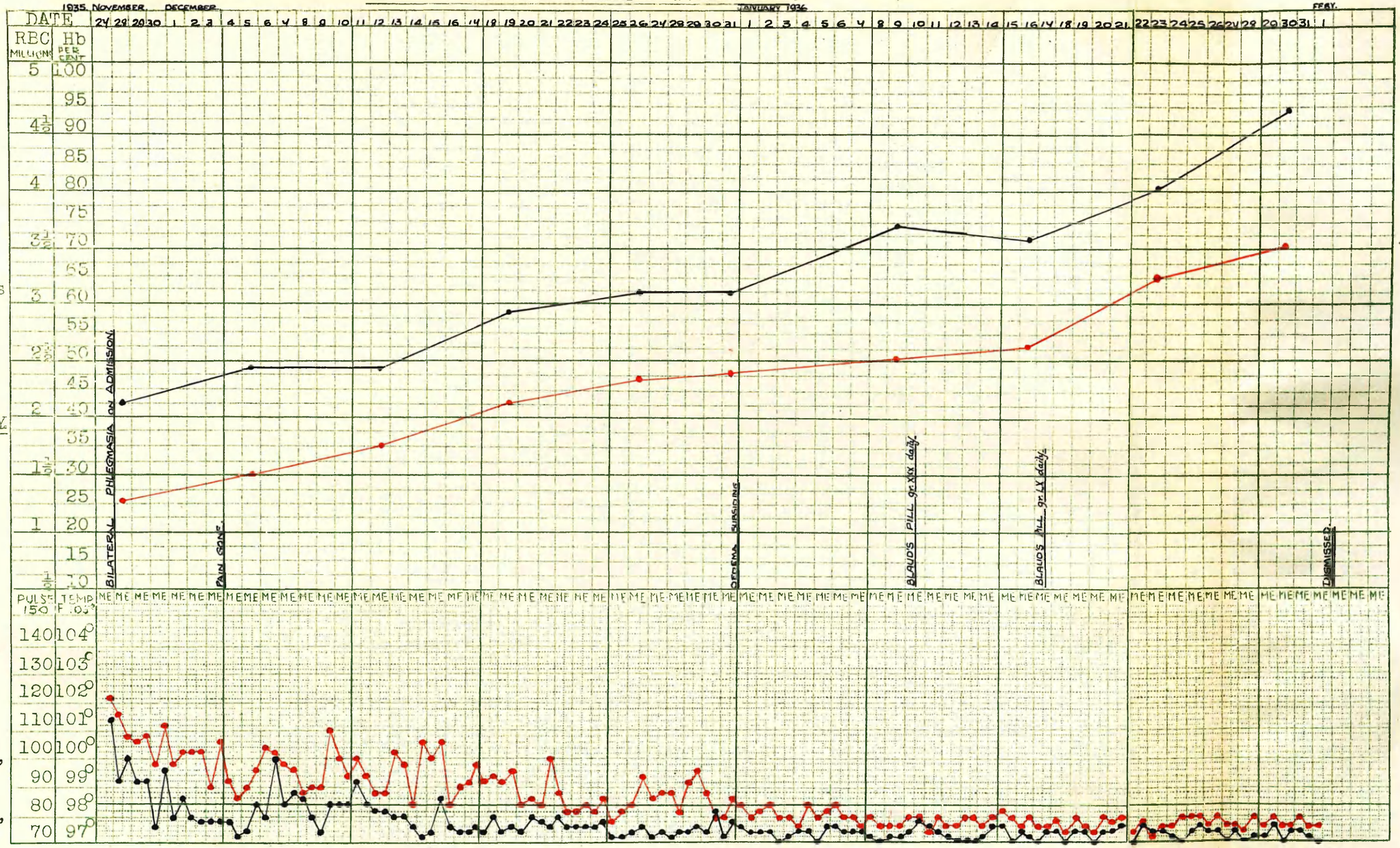
Intra-uterine glycerine.

Glycerine Ichthyol to legs.

For anaemia -

10/1 Blaud's Pill, gr. xxx daily.

17/1 Blaud's Pill, gr. lx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 12th day of the puerperium, with shivering.
Admitted: 15th day of the illness.
Perineum: Intact.
Cervix: Closed.
Lochia: Slight.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Phlegmasia present on admission, left subsiding, right active. Subsided in 3rd week after admission.

Note: Low colour index throughout, with very slow rise in haemoglobin even after completely subsided.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXXV.

AGE.
32.

PARA.
7.

DISEASE.
Puerperal Sepsis

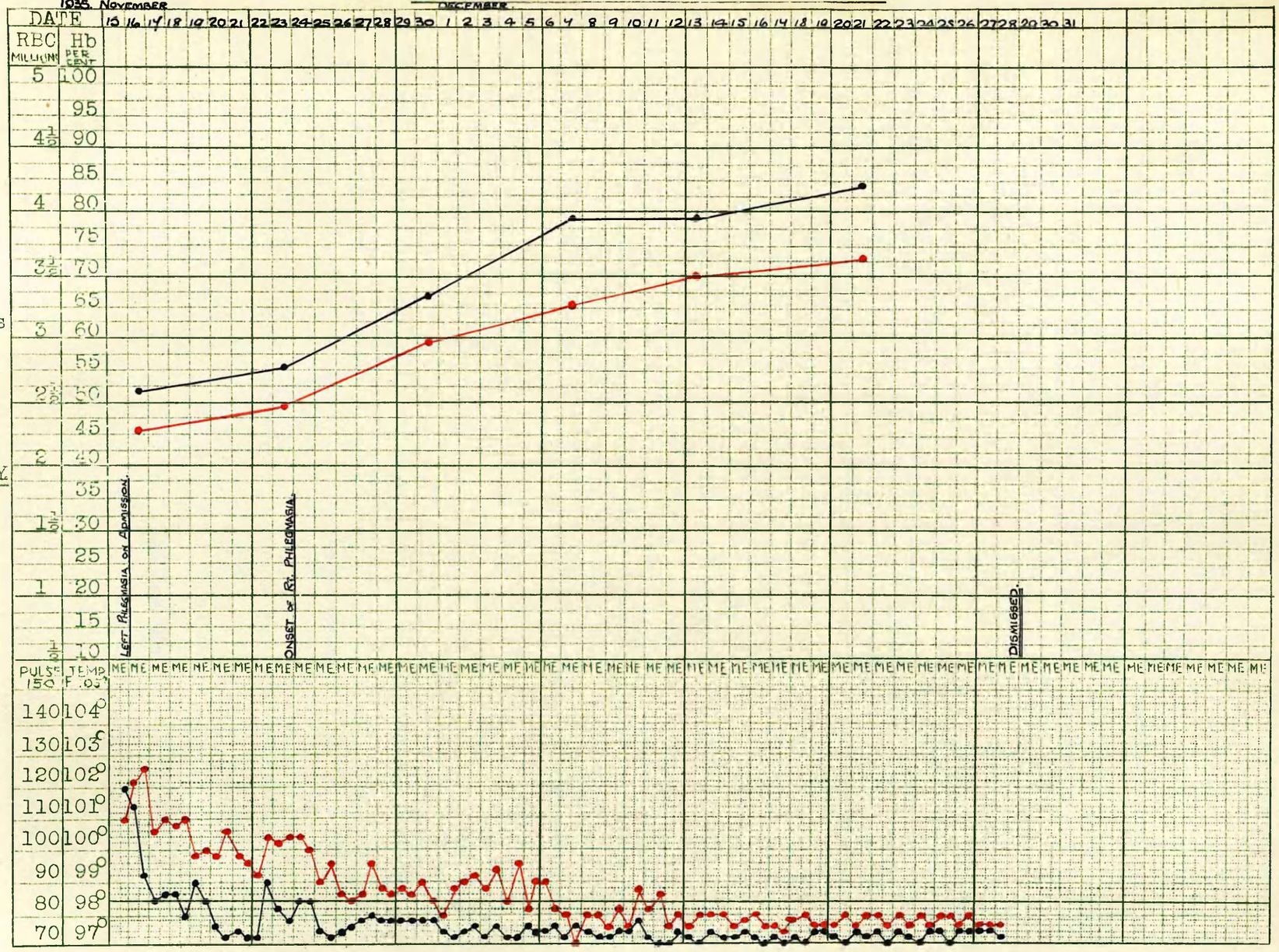
TYPE.
Phlegmasia.

MODE OF DELIVERY
Forceps.

TREATMENT.
Intra-uterine glycerine.

Glycerine Ichthyol to legs.

For anaemia - nil.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 26th day of the puerperium, with headache and shivering.
Admitted: 5th day of the illness.
Perineum: Intact.
Cervix: Small and firm.
Lochia: Slight, haemorrhagic.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Mild, localised sepsis, with left phlegmasia on admission. Right occurred 9 days afterwards.

Note: Fairly steady rise in the blood values, but with falling colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXVI.

AGE.

27.

PARA.

4.

DISEASE.

Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY

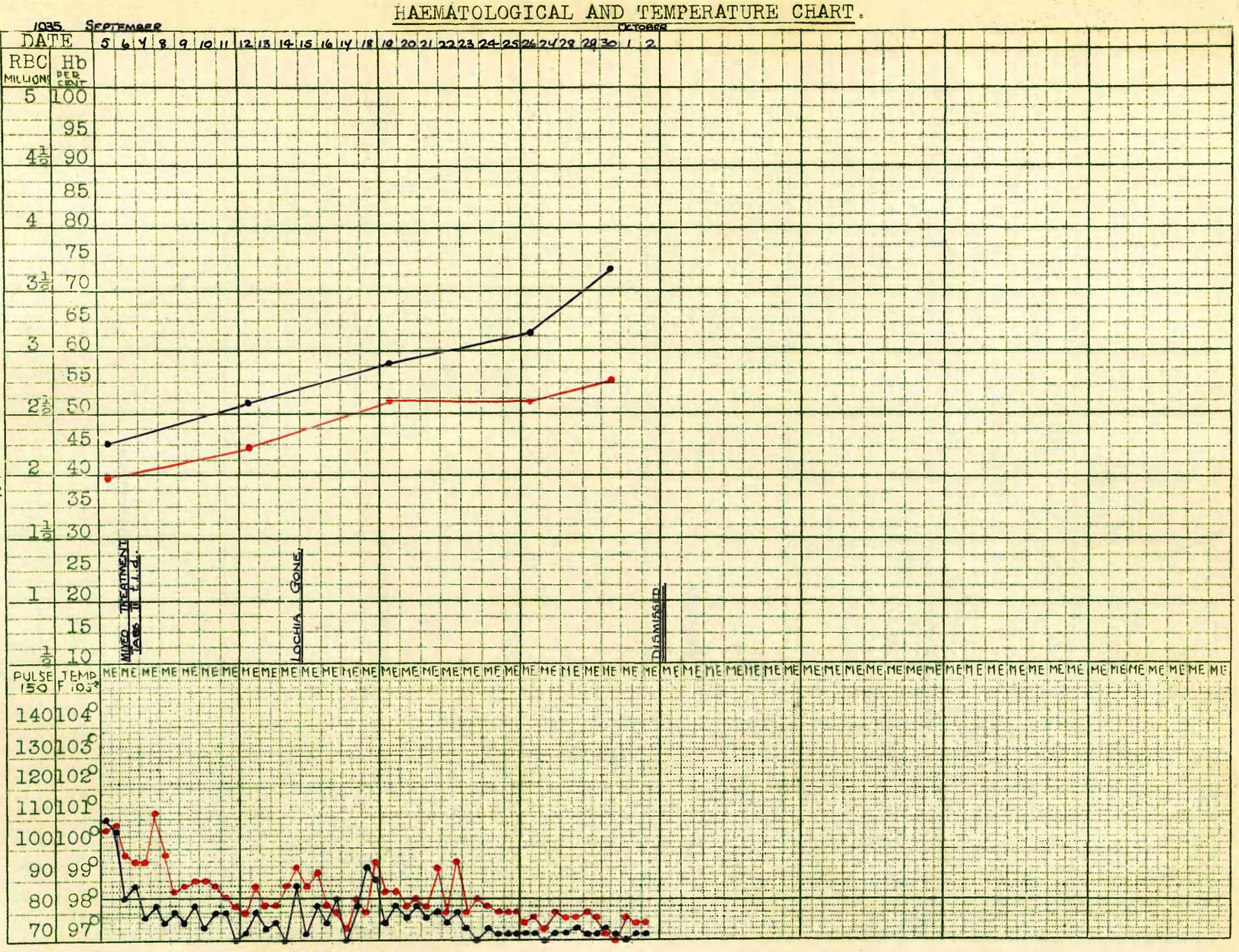
Abortion.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

6/9 Mixed Treatment tablets ii t.i.d.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Stage of Pregnancy: 3 months.
Uterus: Enlarged.
Cervix: Patent.
Lochia: Offensive with chorionic debris.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Subsided quickly on local treatment.

Note: Iron given inadequate, producing falling colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXXVII.

AGE.
27.

PARA.
1.

DISEASE.
Puerperal Sepsis

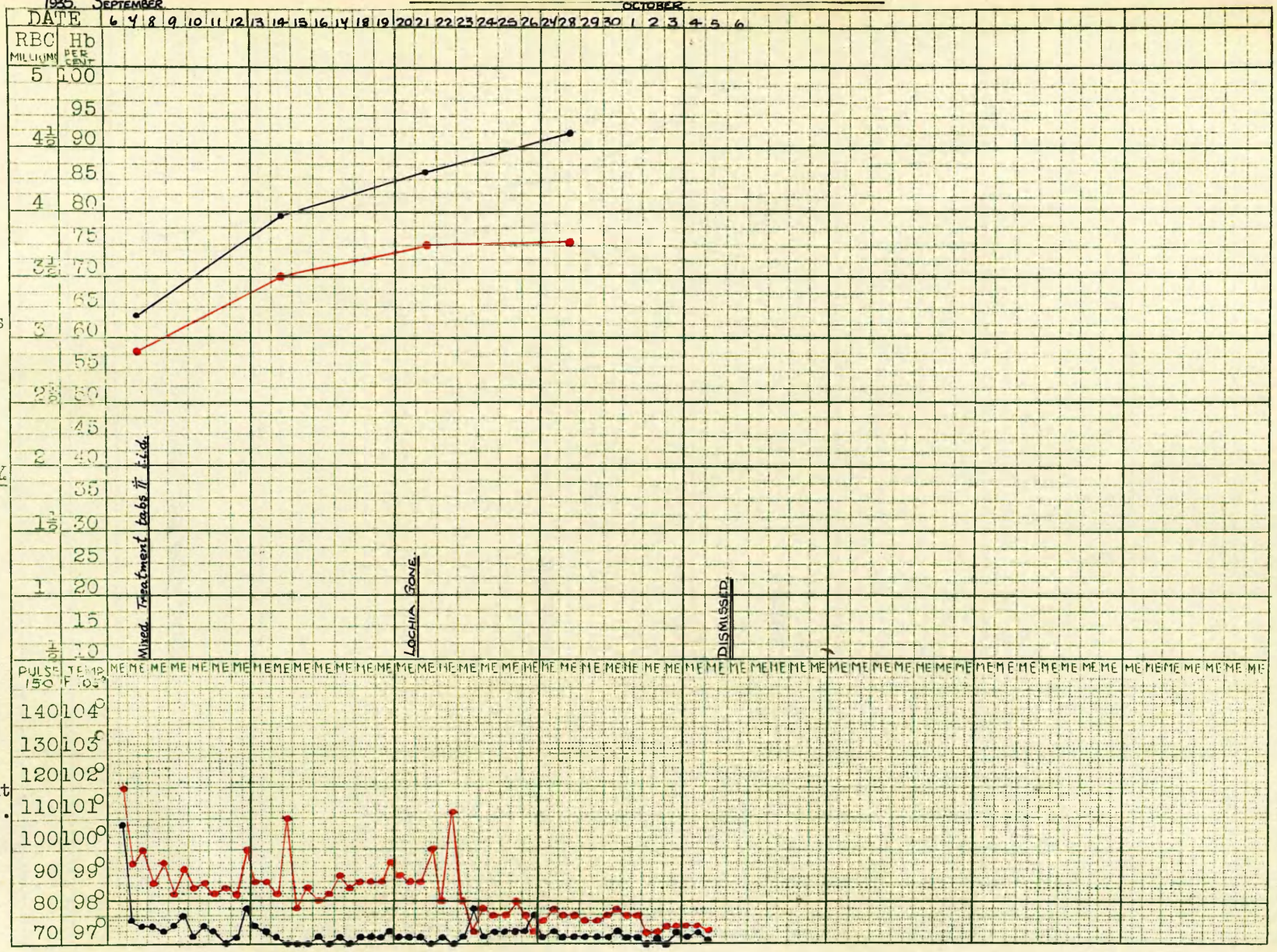
TYPE.
Localised.

MODE OF DELIVERY.
Forceps.

TREATMENT.
Intra-uterine glycerine.

For anaemia -

7/9 Mixed Treatment tablets ii t.i.d.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 9th day of puerperium, with shivering.

Admitted: 2nd day of illness.

Perineum: 2nd degree tear.

Cervix: Large and soft.

Lochia: Profuse and offensive.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Inefficient drainage and subinvolution.
Immediate response to local treatment.

Note: Iron given inadequate, producing falling colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXVIII.

AGE.

40.

PARA.

6.

DISEASE.

Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY

Normal.

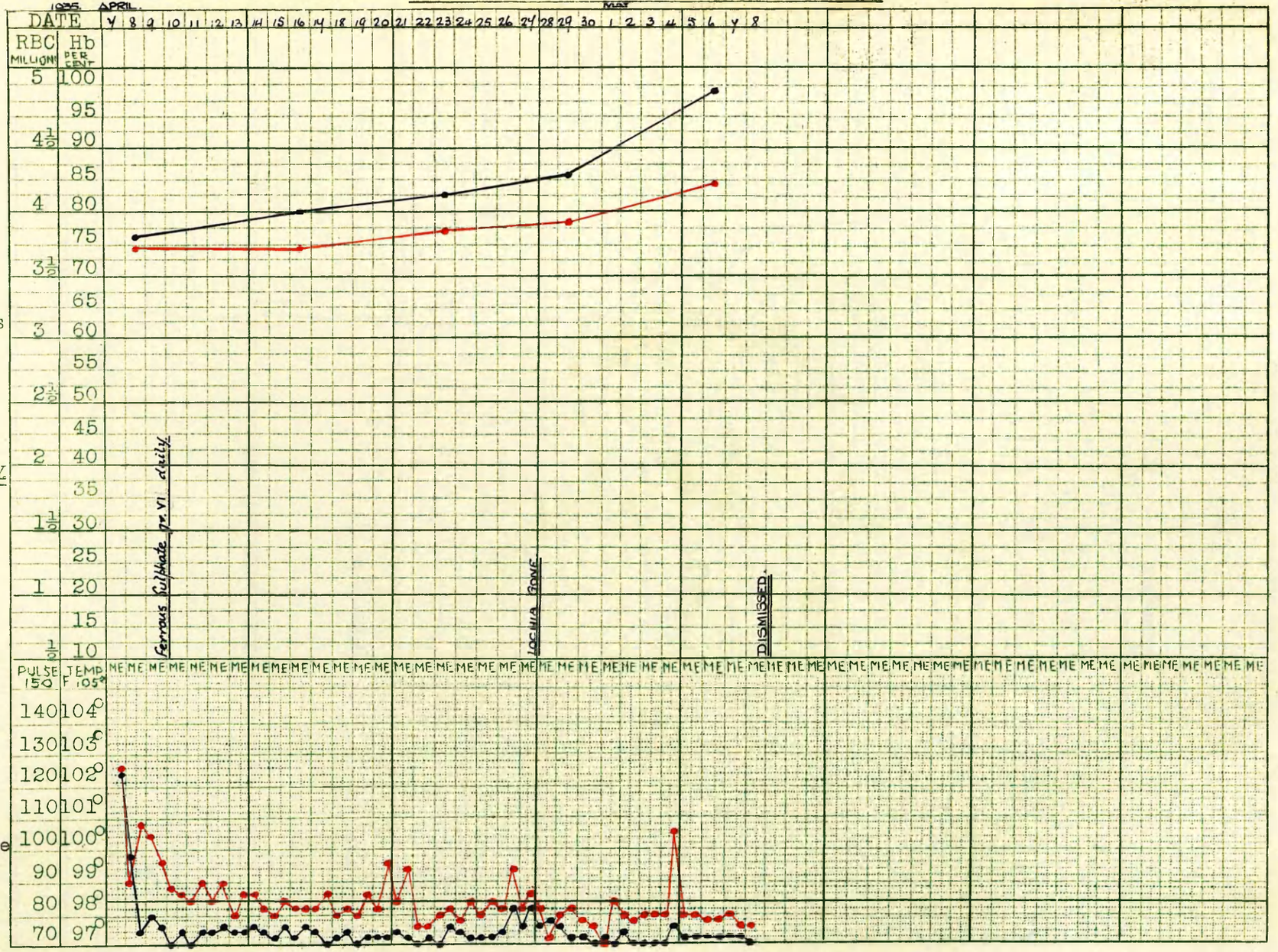
TREATMENT.

Intra-uterine glycerine.

Pituitrin 0.5 c.c. b.d.

For anaemia -

9/4 Ferrous Sulphate gr. vi daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 5th day of puerperium, with headache and shivering.

Admitted: 2nd day of illness.

Perineum: Intact.

Cervix: Large and soft.

Lochia: Fairly profuse, brownish.

Bacteriology: Cervical swab, haemolytic streptococci. Blood culture, negative.

Progress: Sepsis subsided immediately on local treatment.

Note: Inadequacy of iron given.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXIX.

AGE.

29.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY.

Breech (Manual).

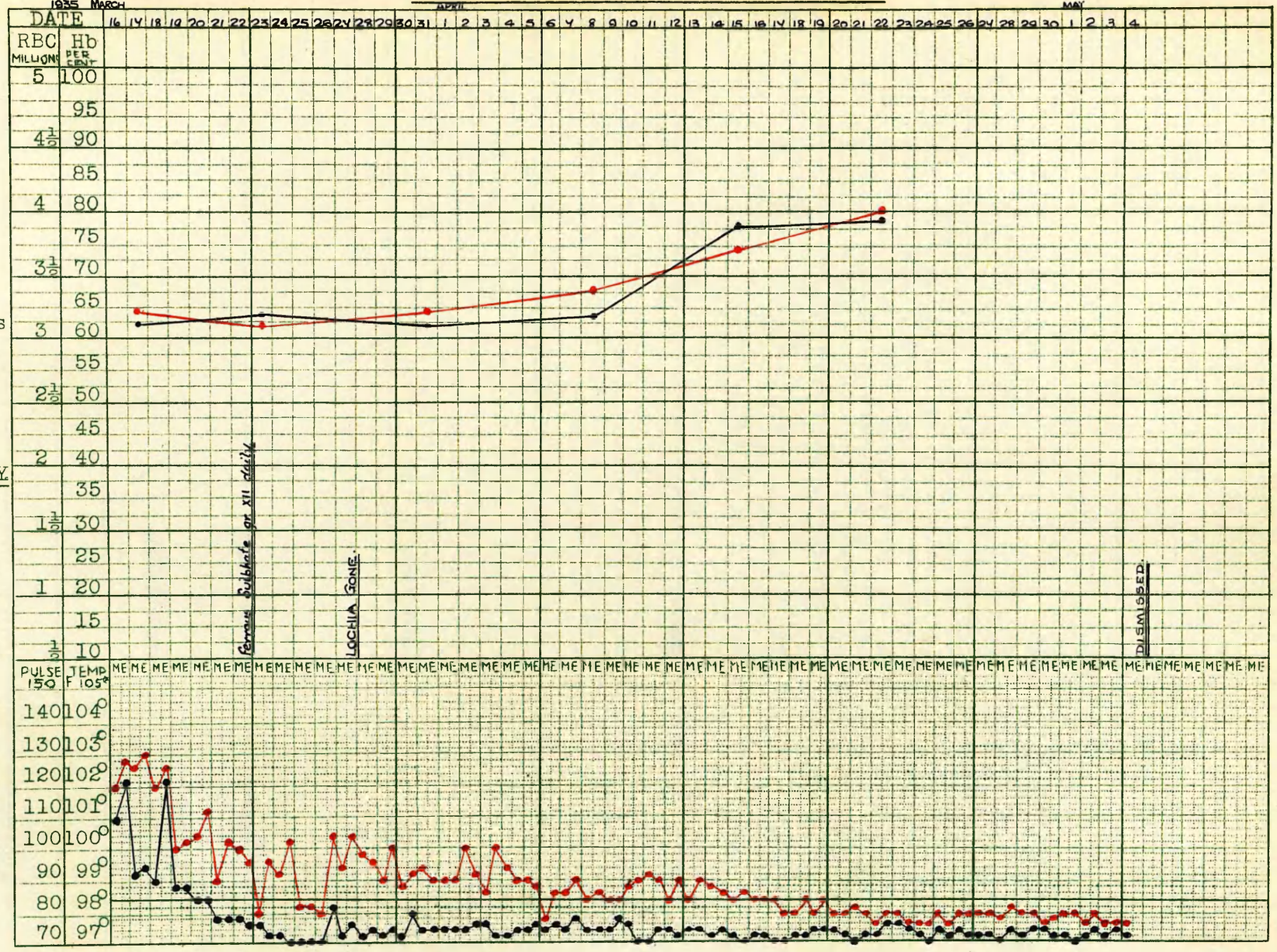
Extensive laceration.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

22/3 Ferrous Sulphate, gr.xii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 6th day of puerperium, with pyrexia.
Admitted: 3rd day of illness.
Perineum: Septic complete tear.
Cervix: Large, soft.
Lochia: Profuse, brownish.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Sepsis subsided fairly quickly.

Note: Very slow blood recovery.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXXX.

AGE.
22.

PARA.
3.

DISEASE.
Puerperal Sepsis

TYPE.
Localised.

MODE OF DELIVERY
Twins. Breech and Forceps.

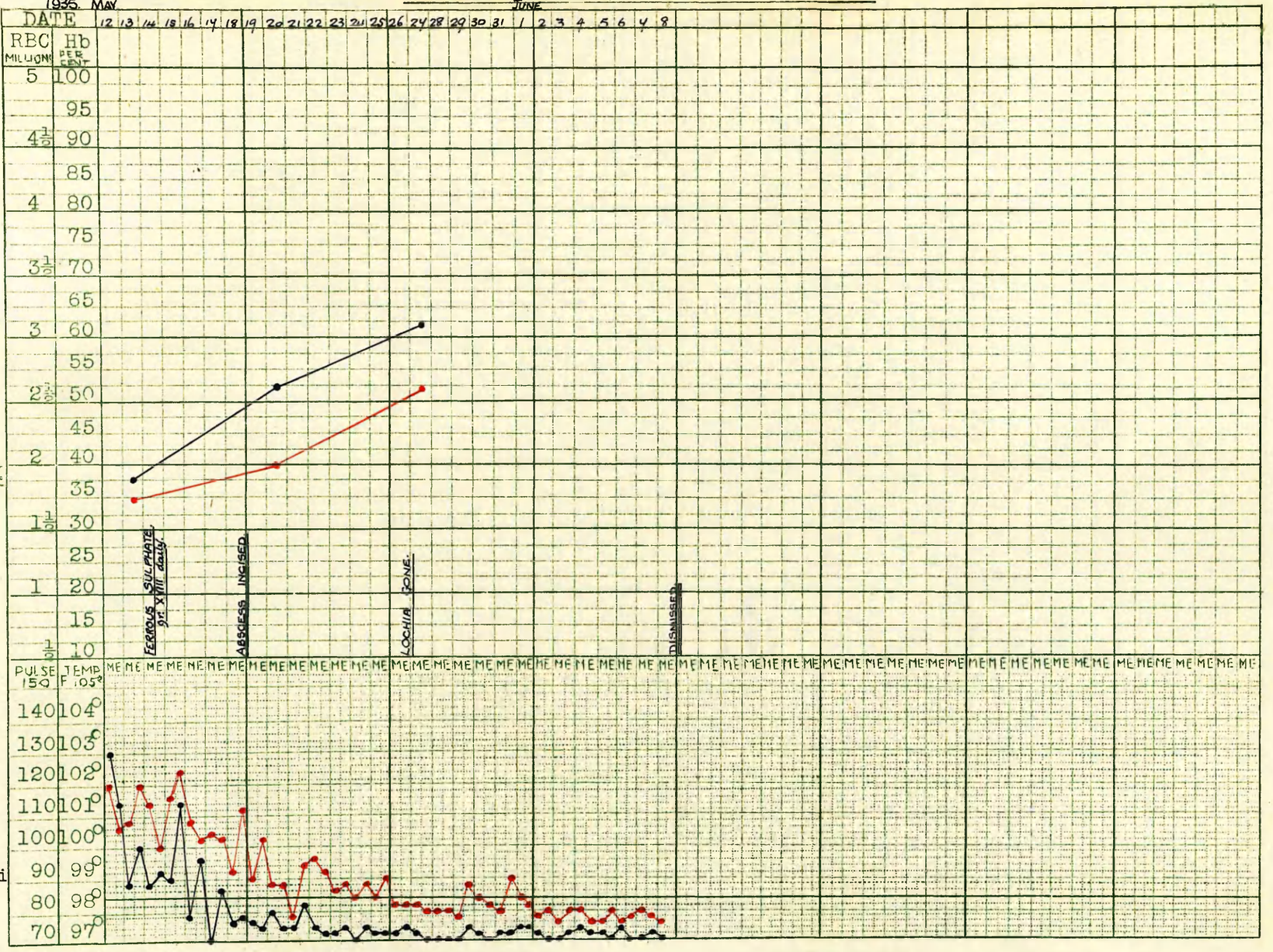
Post partum haemorrhage.

TREATMENT.
Intra-uterine glycerine.

Incision of abscess.

For anaemia -

14/5 Ferrous Sulphate, gr.xviii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 1st day of puerperium, with abdominal pain.
Admitted: 5th day of illness.
Perineum: Slightly torn.
Cervix: Split.
Lochia: Profuse, brownish.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Sepsis gradually subsided in one week.

Note: Sharp blood recovery, but falling colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXXI.

AGE.

42.

PARA.

8.

DISEASE.

Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY

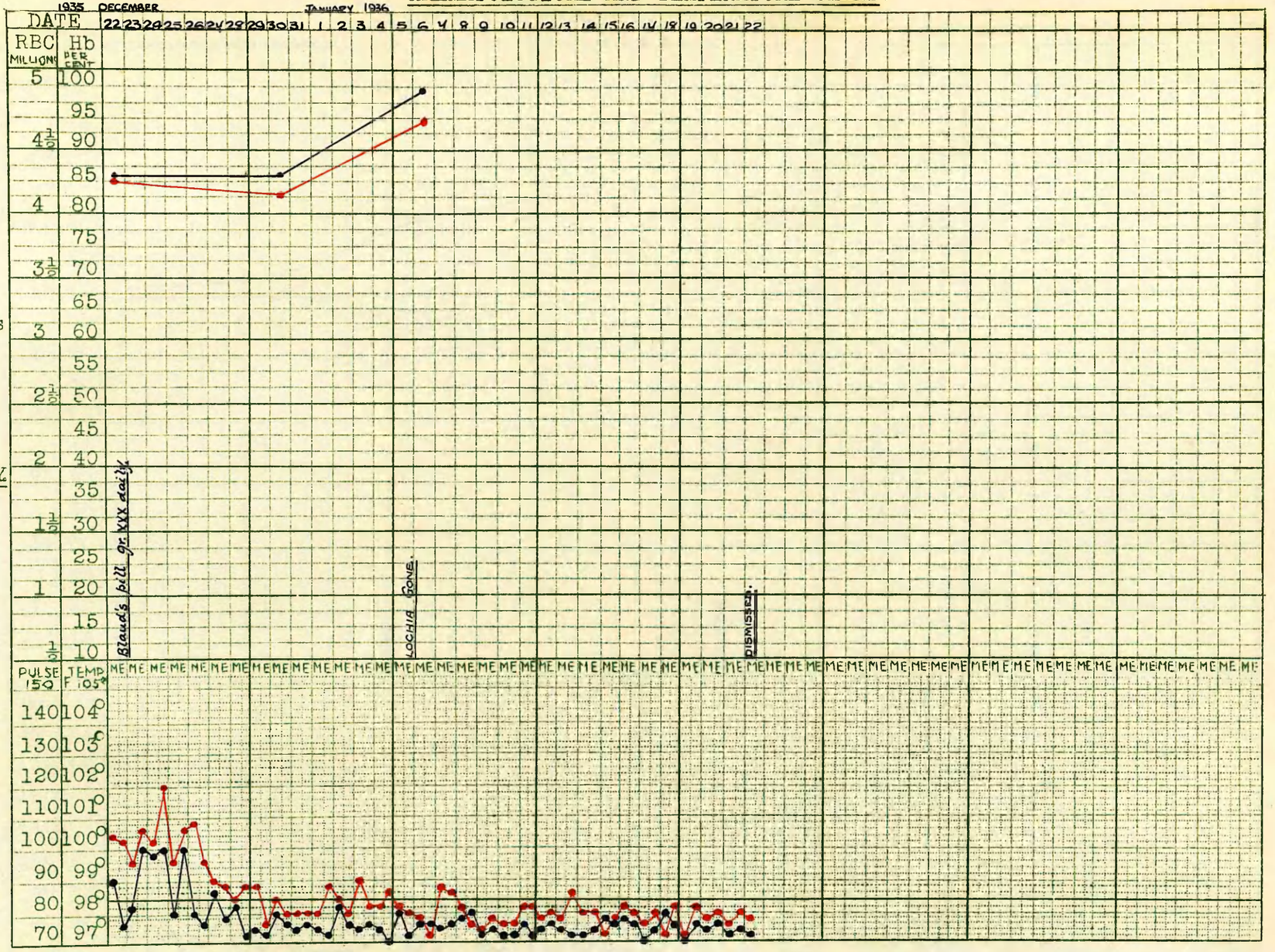
Normal.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

22/12 Blaud's Pill, gr. xxx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 2nd day of puerperium, with shivering.
Admitted: 7th day of illness.
Perineum: Intact.
Cervix: Large, soft.
Lochia: Fairly profuse, brownish.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, negative.

Progress: Sepsis subsided quickly, in a few days.

Note: Little anaemia.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXXII.

AGE.

34.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY.

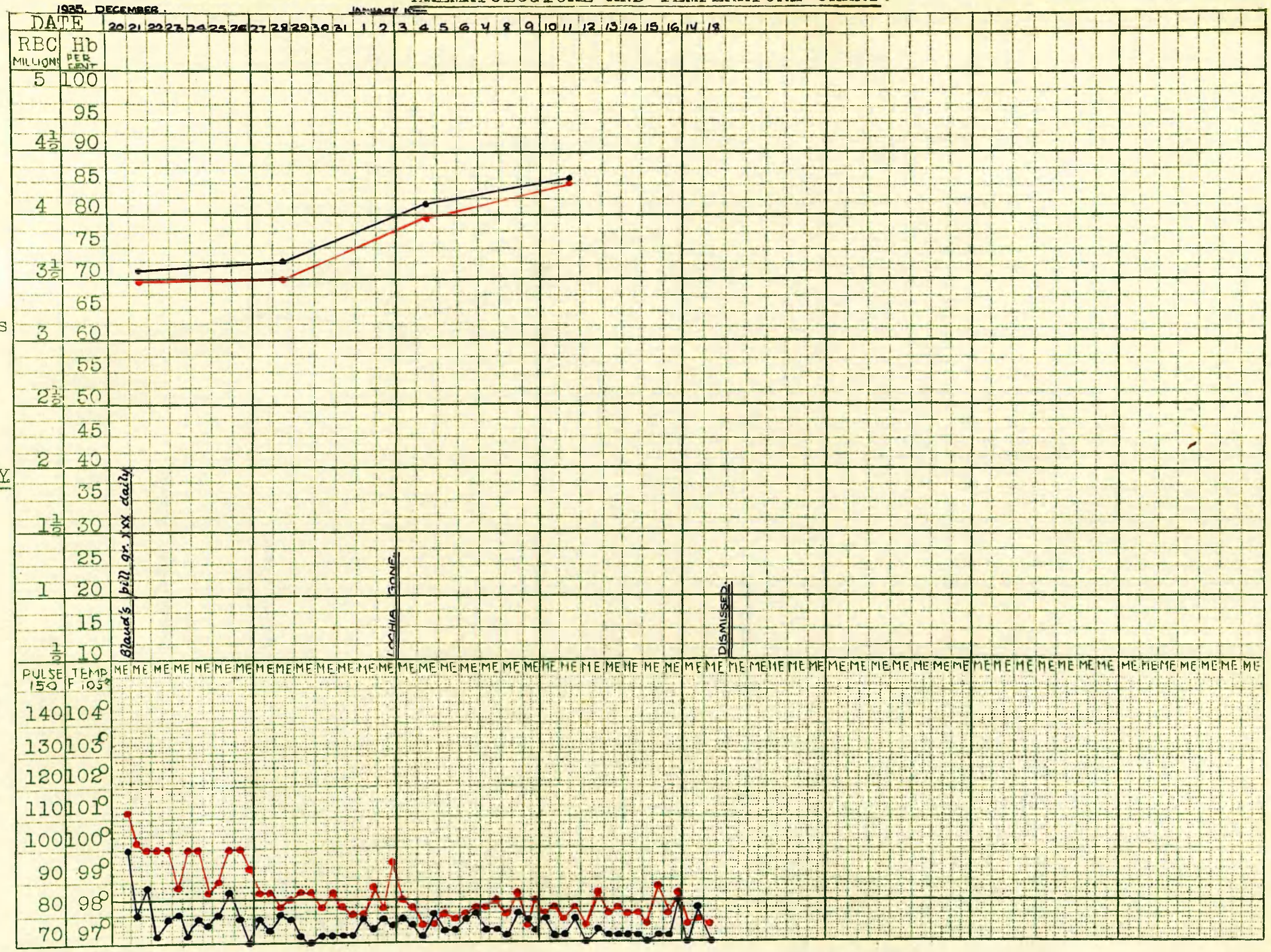
Forceps.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

20/12 Blaud's Pill, gr. xxx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 2nd day of the puerperium, with abdominal pain.
Admitted: 2nd day of illness.
Perineum: Septic 2nd degree tear.
Cervix: Large and soft.
Lochia: Fairly profuse, haemorrhagic.

Bacteriology: Cervical swab, streptococcus viridans.
Blood culture, negative.

Progress: Blood clot and membranes at os on admission.
Settled quickly.

Note: Fairly complete blood recovery.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXXIII.

AGE.

35.

PARA.

8.

DISEASE.

Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY.

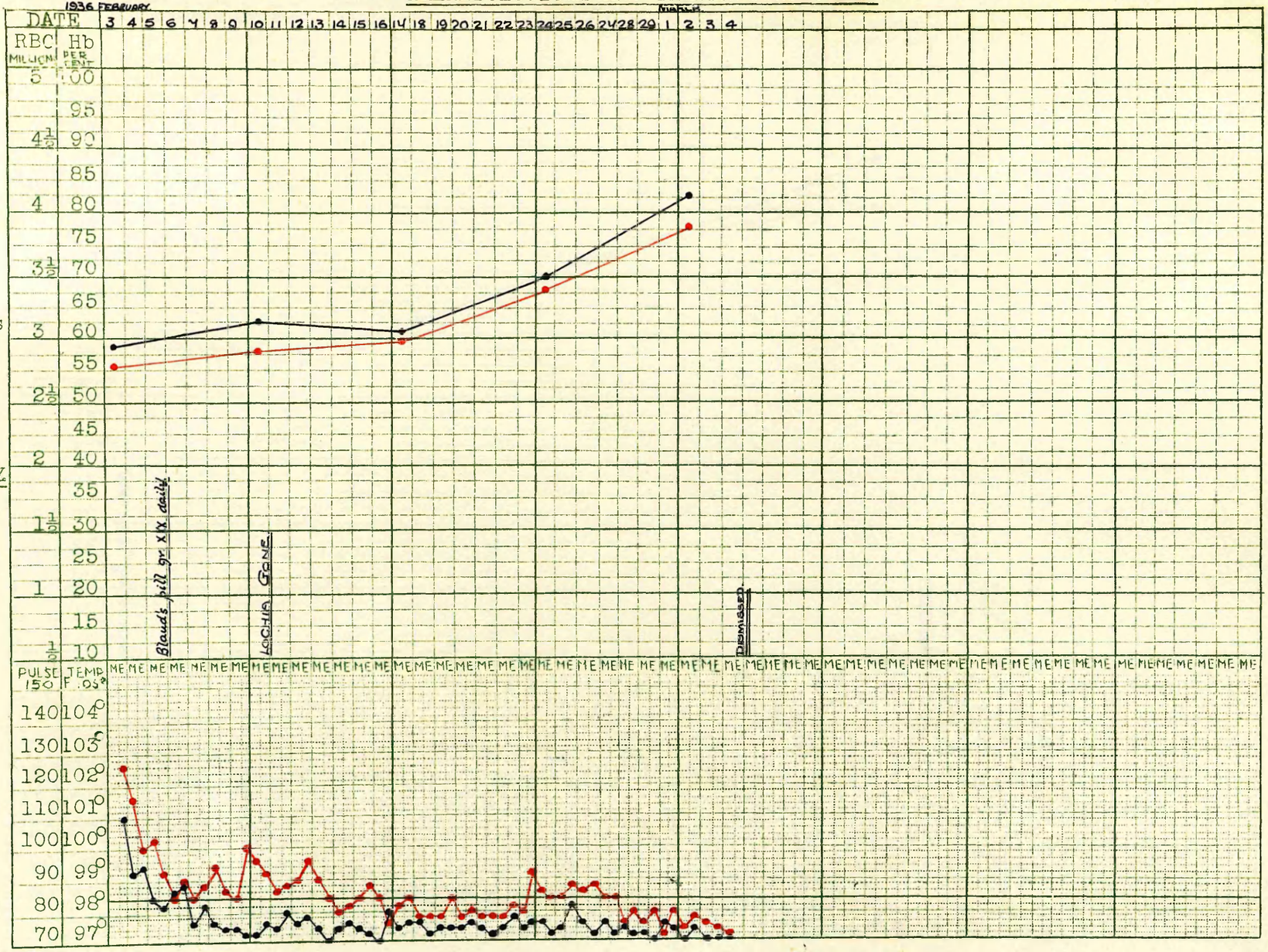
Normal.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

5/2 Blaud's Pill, gr. xxx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 1st day of puerperium, with shivering.
Admitted: 4th day of illness.
Perineum: Intact.
Cervix: Large and ulcerated.
Lochia: Haemorrhagic with blood clots.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, negative.

Progress: Sepsis subsided almost at once.

Note: Blood recovery slow at first, fairly complete later.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXXXIV.

AGE.
29.

PARA.
1.

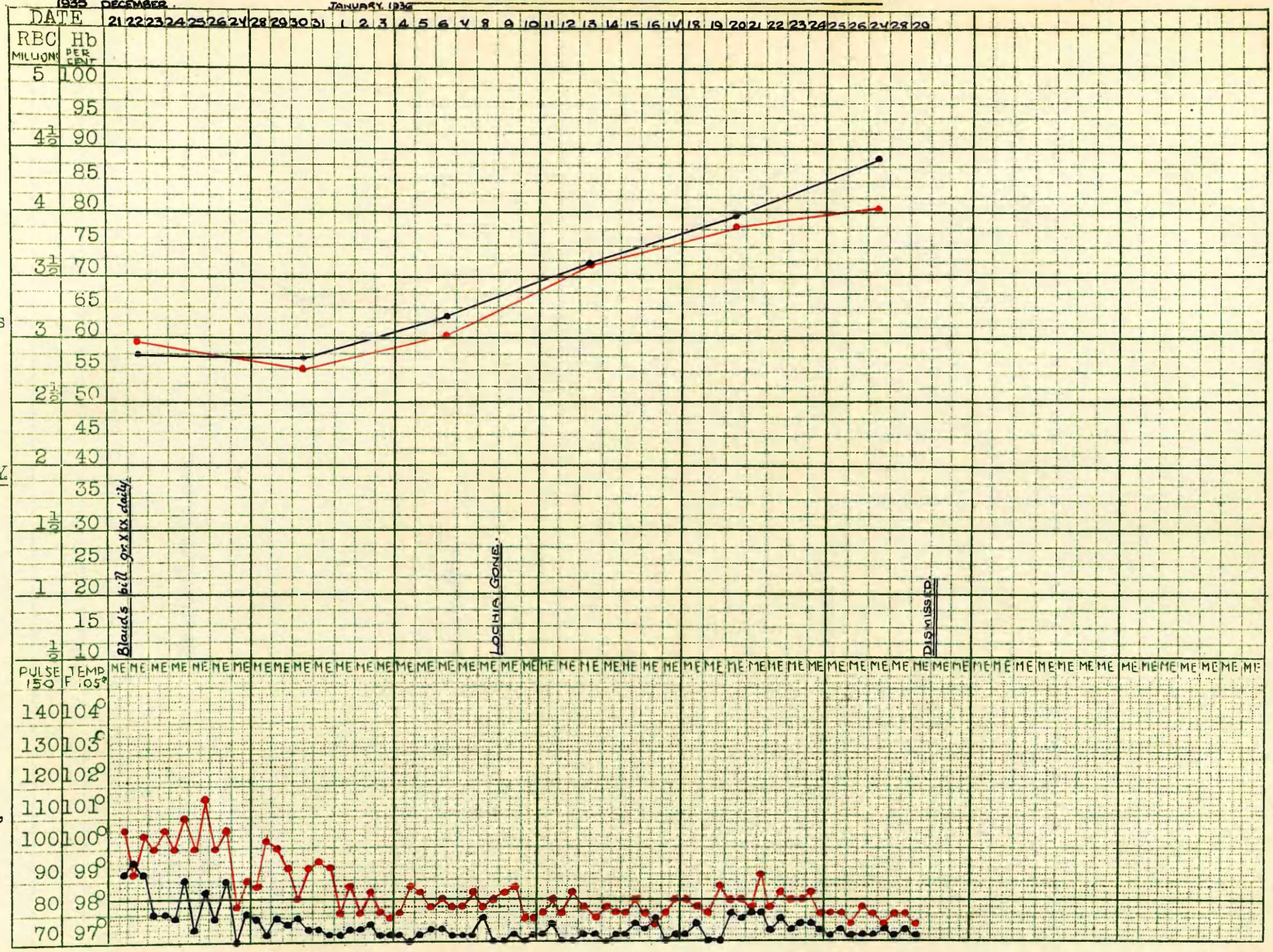
DISEASE.
Puerperal Sepsis

TYPE.
Localised.

MODE OF DELIVERY
Forceps.

TREATMENT.
Intra-uterine glycerine.

For anaemia -
21/12 Blaud's Pill, gr. xxx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 4th day of puerperium, with headache and shivering.

Admitted: 3rd day of illness.

Perineum: 2nd degree tear.

Cervix: Large, soft, ulcerated.

Lochia: Profuse, haemorrhagic with debris.

Bacteriology: Cervical swab, haemolytic streptococci. Blood culture, negative.

Progress: Sepsis subsided fairly quickly.

Note: Good blood recovery, but colour index falling last week.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXXV.

AGE.

19.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY

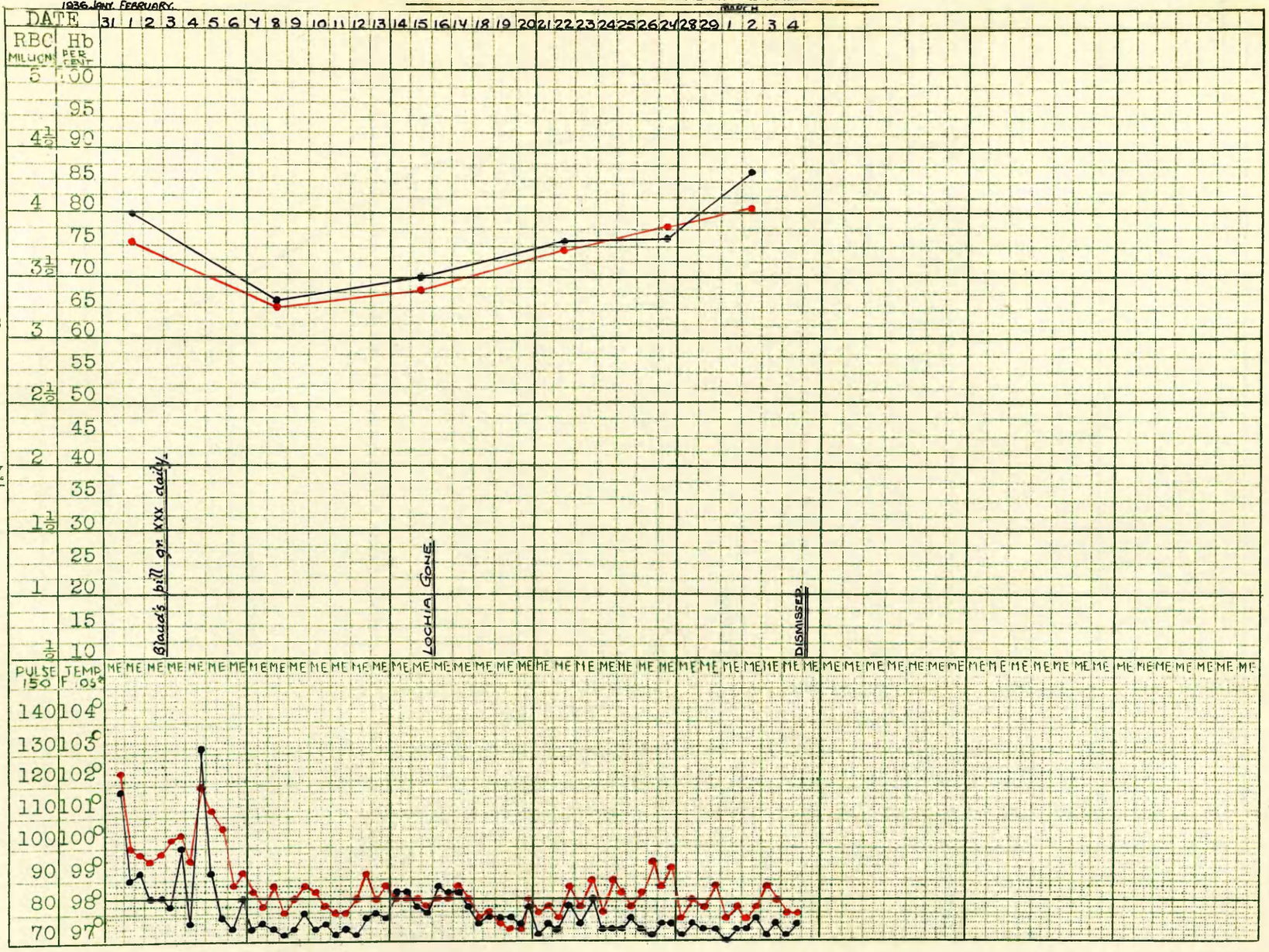
Forceps.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

2/2 Blaud's Pill, gr. xxx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 7th day of puerperium, with abdominal pain.
Admitted: 1st day of illness.
Perineum: Intact.
Cervix: Large, soft, lacerated.
Lochia: Profuse, purulent.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Toxaemia for 5 days, after which, good recovery.

Note: Preliminary fall, followed by good blood recovery.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXXVI.

AGE.

27.

PARA.

1.

DISEASE.

Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY.

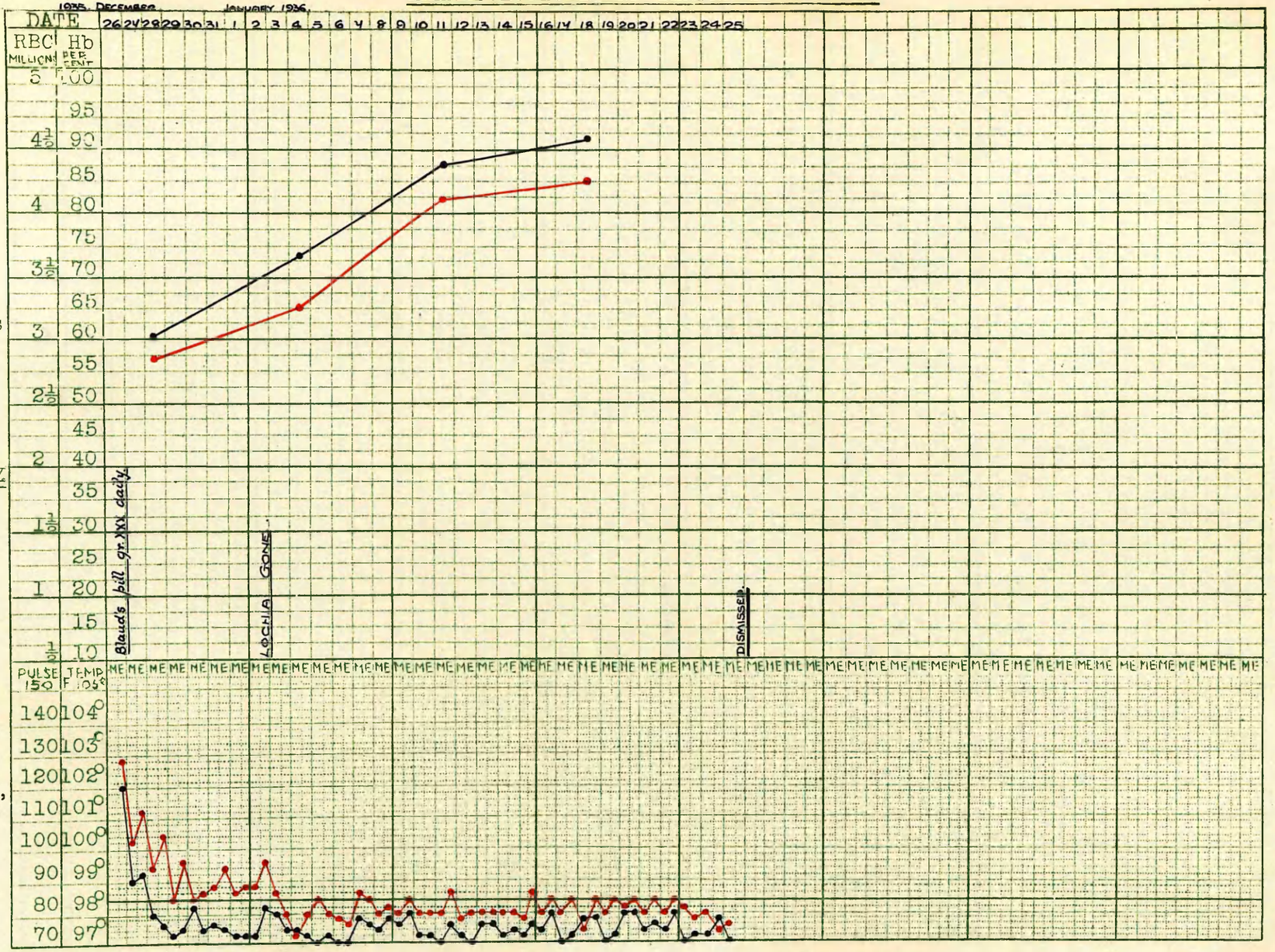
Forceps.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

26/12 Blaud's Pill, gr. xxx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 8th day of puerperium, with headache and shivering.

Admitted: 2nd day of illness.

Perineum: Slightly torn.

Cervix: Small, soft.

Lochia: Fairly profuse, brownish.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Sepsis subsided immediately.

Note: Good blood recovery, but low colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXXVII.

AGE.

35.

PARA.

3.

DISEASE.

Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY.

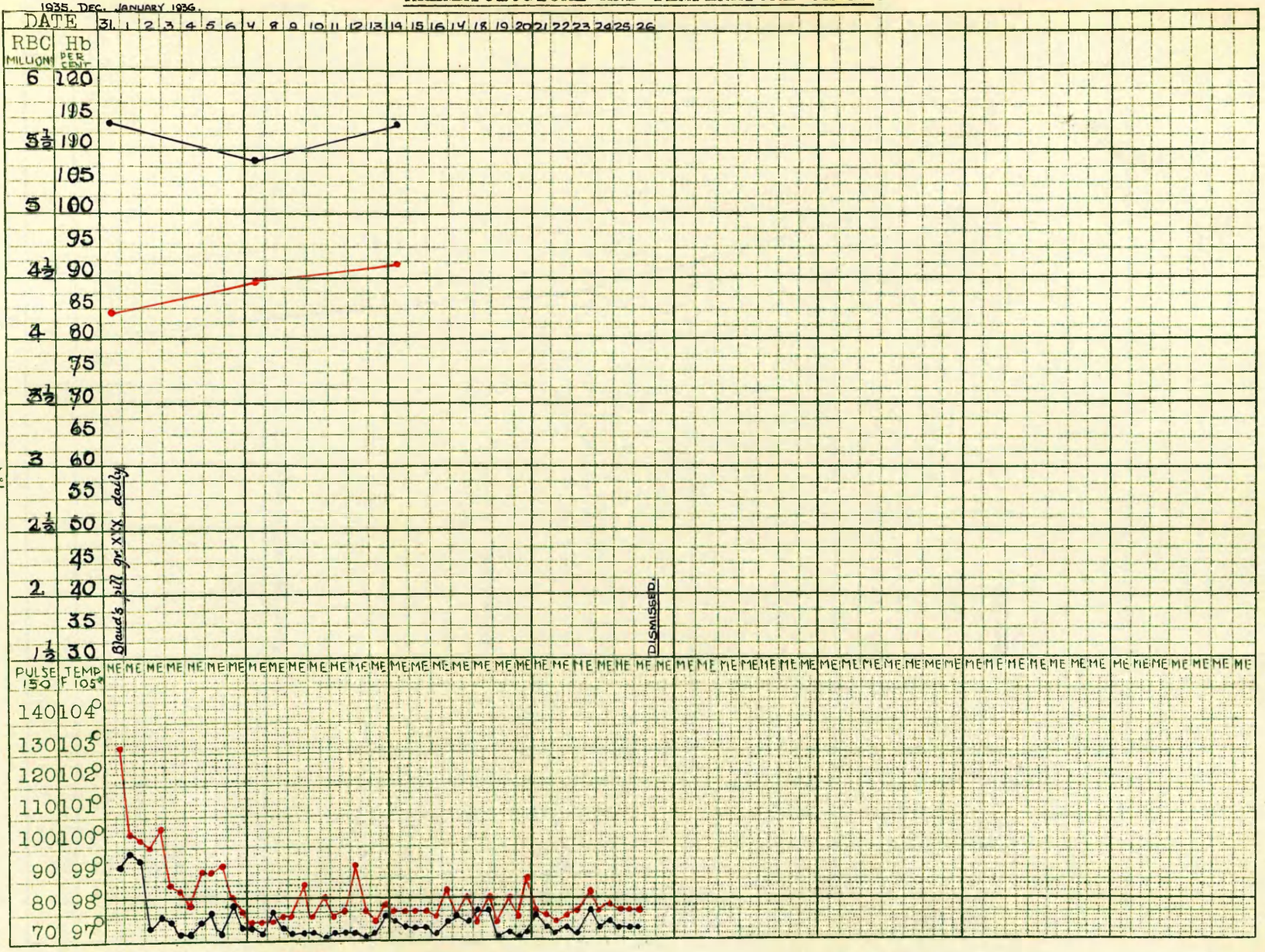
Abortion.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

31/12 Blaud's Pill, gr. xxx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Stage of pregnancy: 4½ months.
Uterus: Enlarged.
Cervix: Patent.
Lochia: Profuse with chorionic debris.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Subsided quickly.

Note: Little anaemia, but low colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXXVIII.

AGE.

32.

PARA.

4.

DISEASE.

Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY.

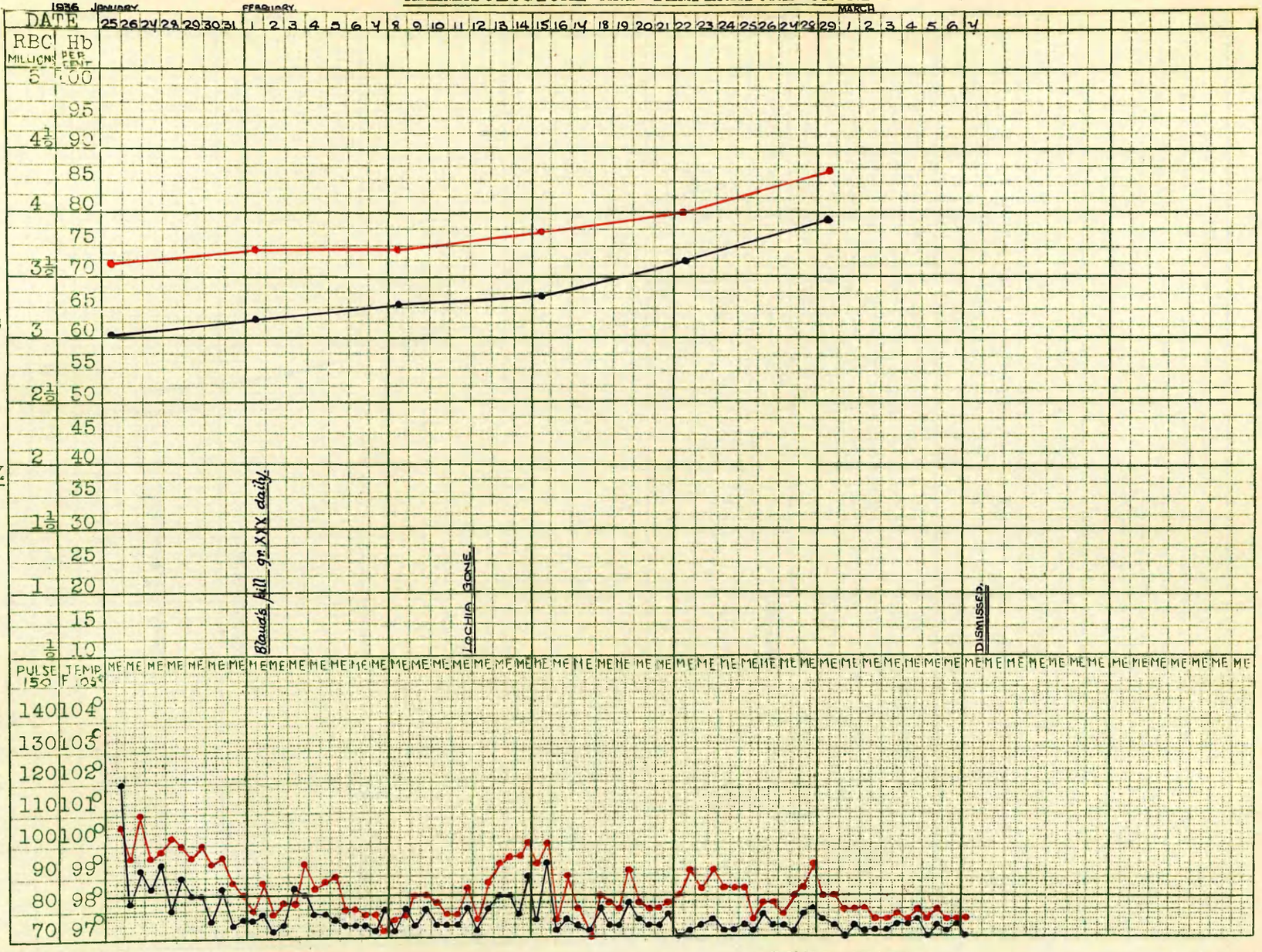
Normal.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

1/2 Blaud's Pill, gr. xxx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 4th day of puerperium, with shivering.
Admitted: 2nd day of illness.
Perineum: Slightly torn.
Cervix: Large, soft, ulcerated.
Lochia: Profuse, purulent, offensive.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Sepsis subsided gradually over one week.

Note: Persistent high colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXXXIX.

AGE.

23.

PARA.

1.

DISEASE.

Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY.

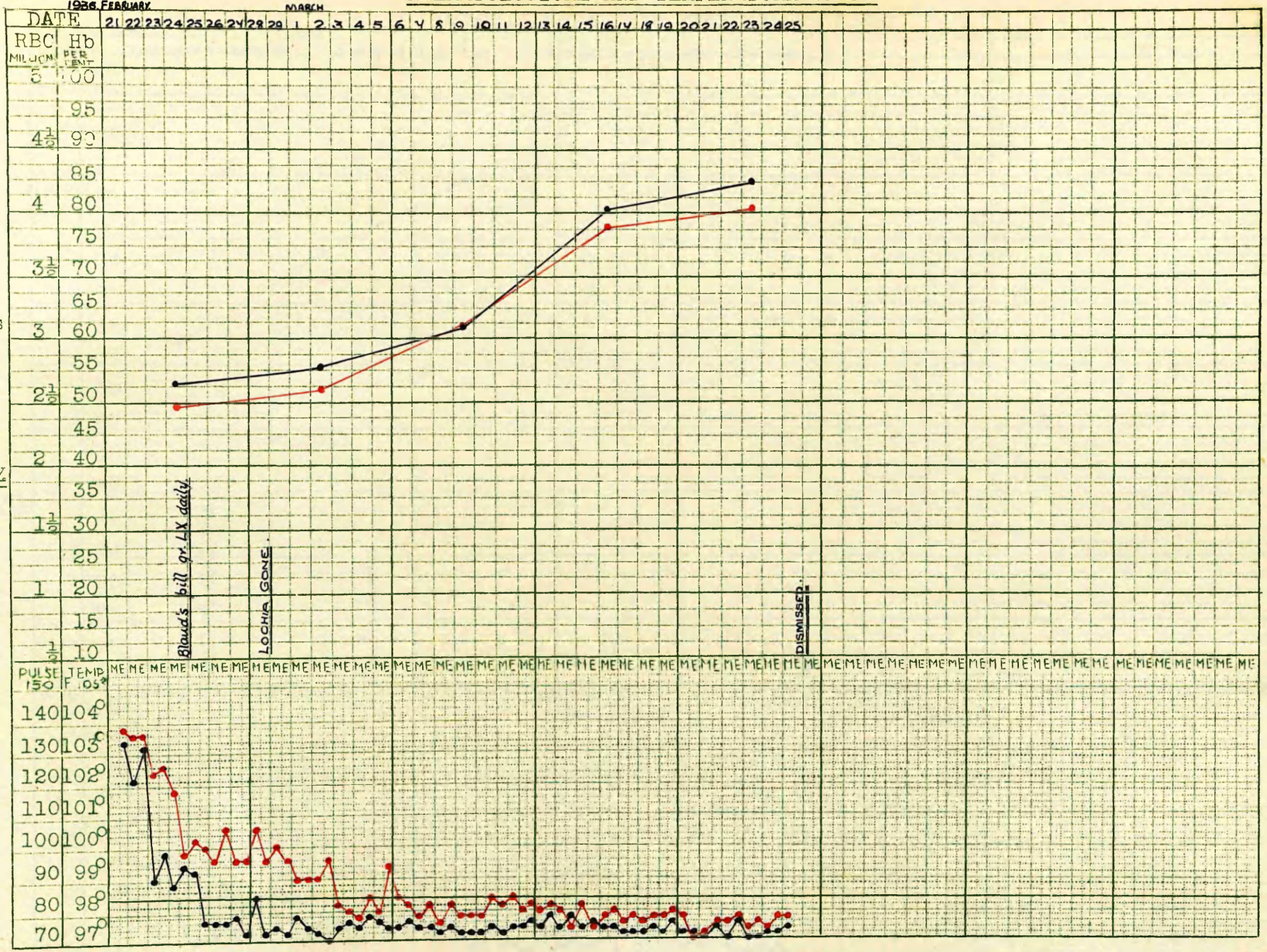
Forceps.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

24/2 Blaud's Pill, gr. lx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 18th day of puerperium, with shivering.
Admitted: 2nd day of illness.
Perineum: Intact.
Cervix: Large, soft.
Lochia: Fairly profuse, haemorrhagic.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Very toxic first few days, then sepsis quickly eradicated.

Note: Good blood recovery.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXL.

AGE.

41.

PARA.

4.

DISEASE.

Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY.

Placenta Praevia.

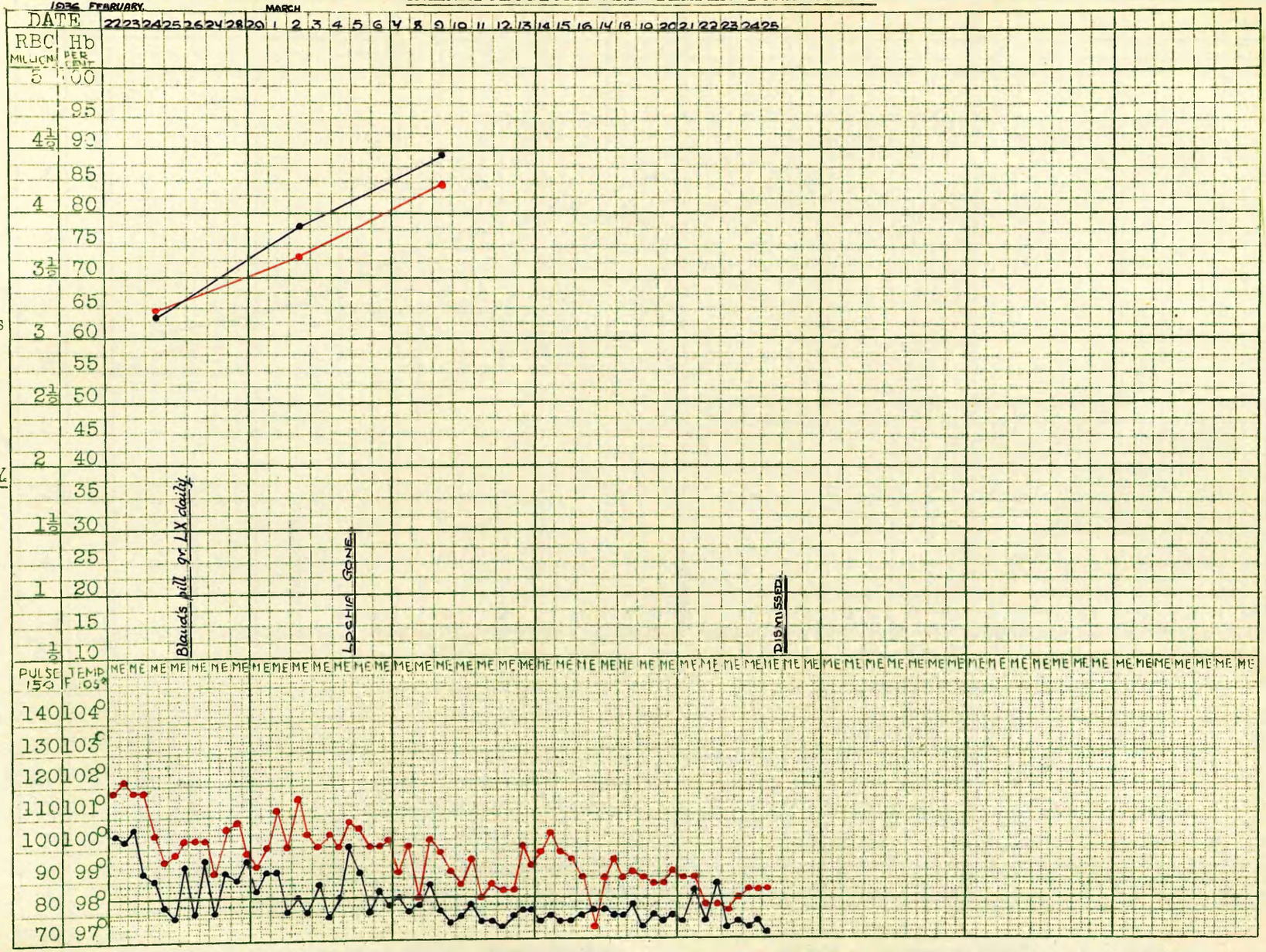
Internal Version.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

25/2 Blaud's Pill - gr. lx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 4th day of puerperium, with a "fit."
Admitted: 4th day of illness.
Perineum: Intact.
Cervix: Large, ulcerated.
Lochia: Profuse, offensive.

Bacteriology: Cervical swab, negative.
Blood culture, negative.
Blood urea, normal.

Progress: Mild puerperal insanity in localised infection.

Note: Very good blood recovery.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXLI.

AGE.

23.

PARA.

3.

DISEASE.

Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY

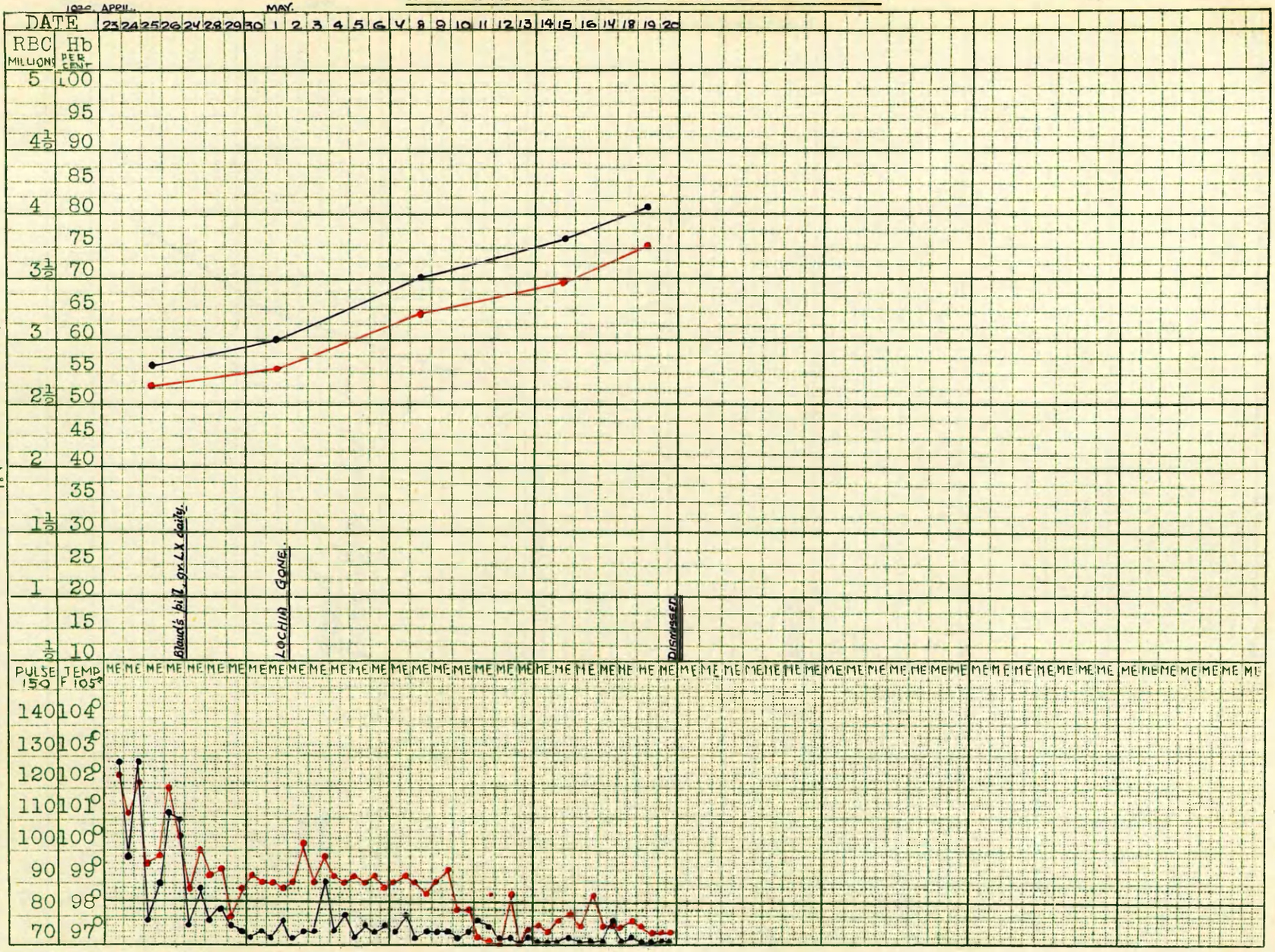
Normal.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

26/4 Blaud's Pill, gr. lx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 7th day of puerperium, with headache and shivering.
Admitted: 10th day of illness.
Perineum: Intact.
Cervix: Small, slightly ulcerated.
Lochia: Fairly profuse, purulent.

Bacteriology: Cervical swab, haemolytic streptococci. Blood culture, negative.

Progress: Fairly toxic for the first 4 days. Good response to local treatment.

Note: Good blood recovery.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXIII.

AGE.
24.

PARA.
1.

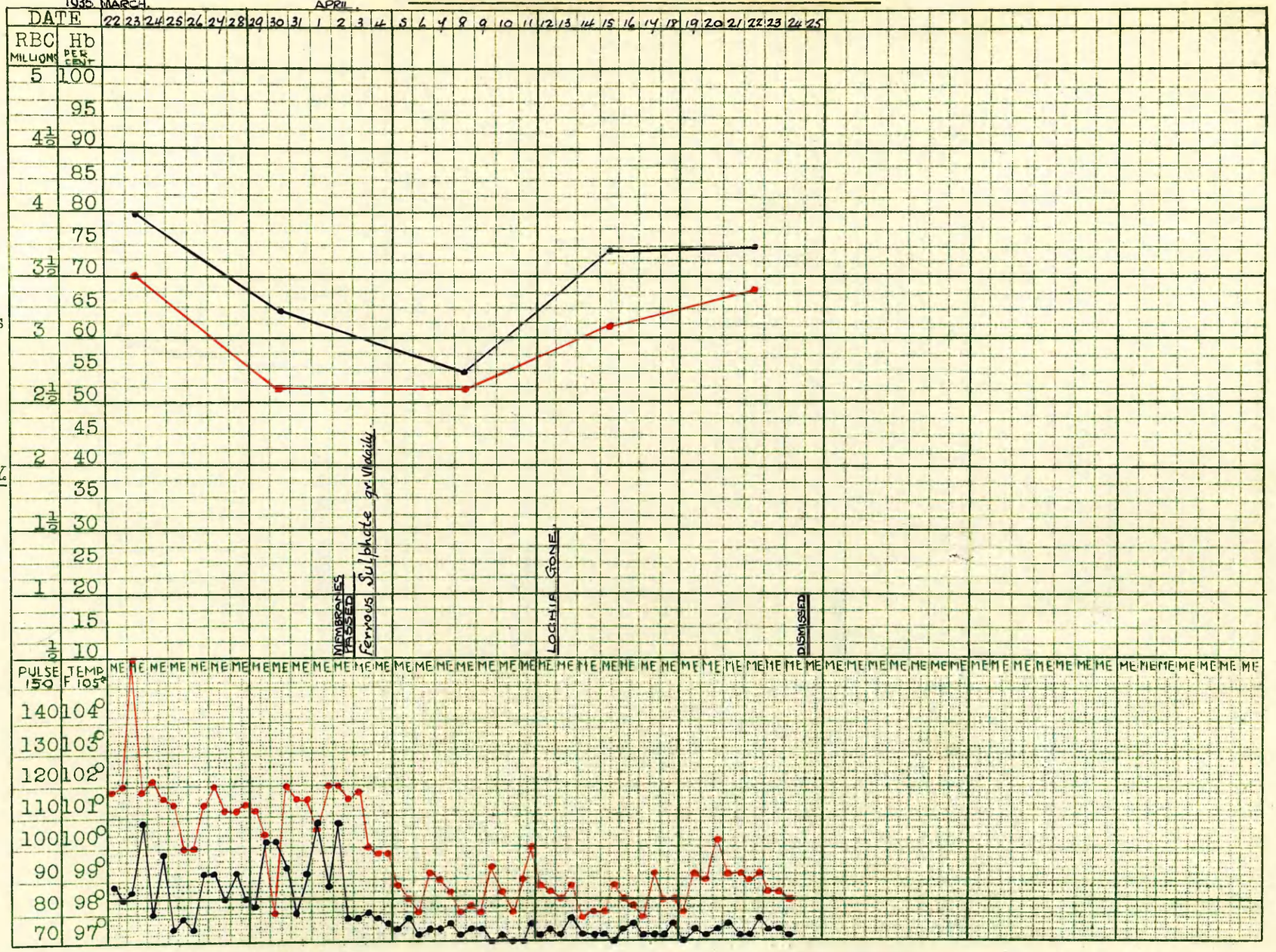
DISEASE.
Puerperal Sepsis

TYPE.
Toxaemic.

MODE OF DELIVERY
Forceps.

TREATMENT.
Intra-uterine glycerine.

For anaemia -
3/4 Ferrous Sulphate, gr. vi daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 4th day of puerperium, with diarrhoea.
Admitted: 10th day of illness.
Perineum: 2nd degree tear.
Cervix: Soft and ulcerated.
Lochia: Purulent.

Bacteriology: Cervical swab, haemolytic streptococci. Blood culture, negative.

Progress: Toxic for 13 days after admission. Lochia pure pus. Retained membranes, passed on 13th day, after which, subsided quickly.

Note: Sharp fall in blood value during active sepsis, and inadequacy of iron in convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXLIII.

AGE.

23.

PARA.

3.

DISEASE.
Puerperal Sepsis

TYPE.

Toxaemic.

MODE OF DELIVERY

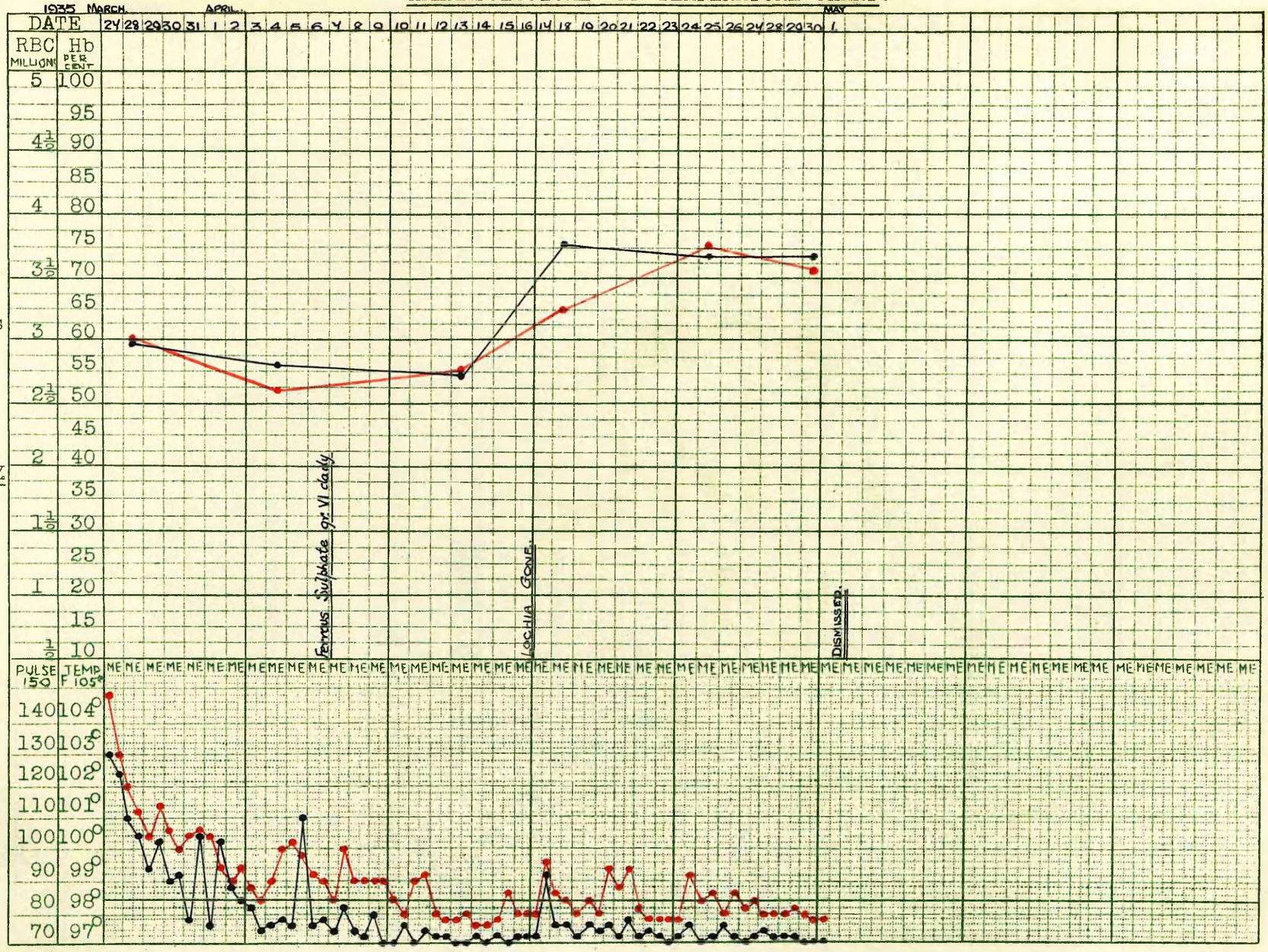
Forceps.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

6/4 Ferrous Sulphate gr.vi daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 3rd day of puerperium, with shivering.
Admitted: 2nd day of illness.
Perineum: Intact.
Cervix: Large, soft, ulcerated.
Lochia: Profuse, brownish.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, negative.

Progress: Toxaemia sustained for nearly 2 weeks.

Note: Fall in blood value till sepsis eradicated, and incomplete recovery in convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXLIV.

AGE.

27.

PARA.

3.

DISEASE.
Puerperal Sepsis

TYPE.

Toxaemic.

MODE OF DELIVERY

Normal.

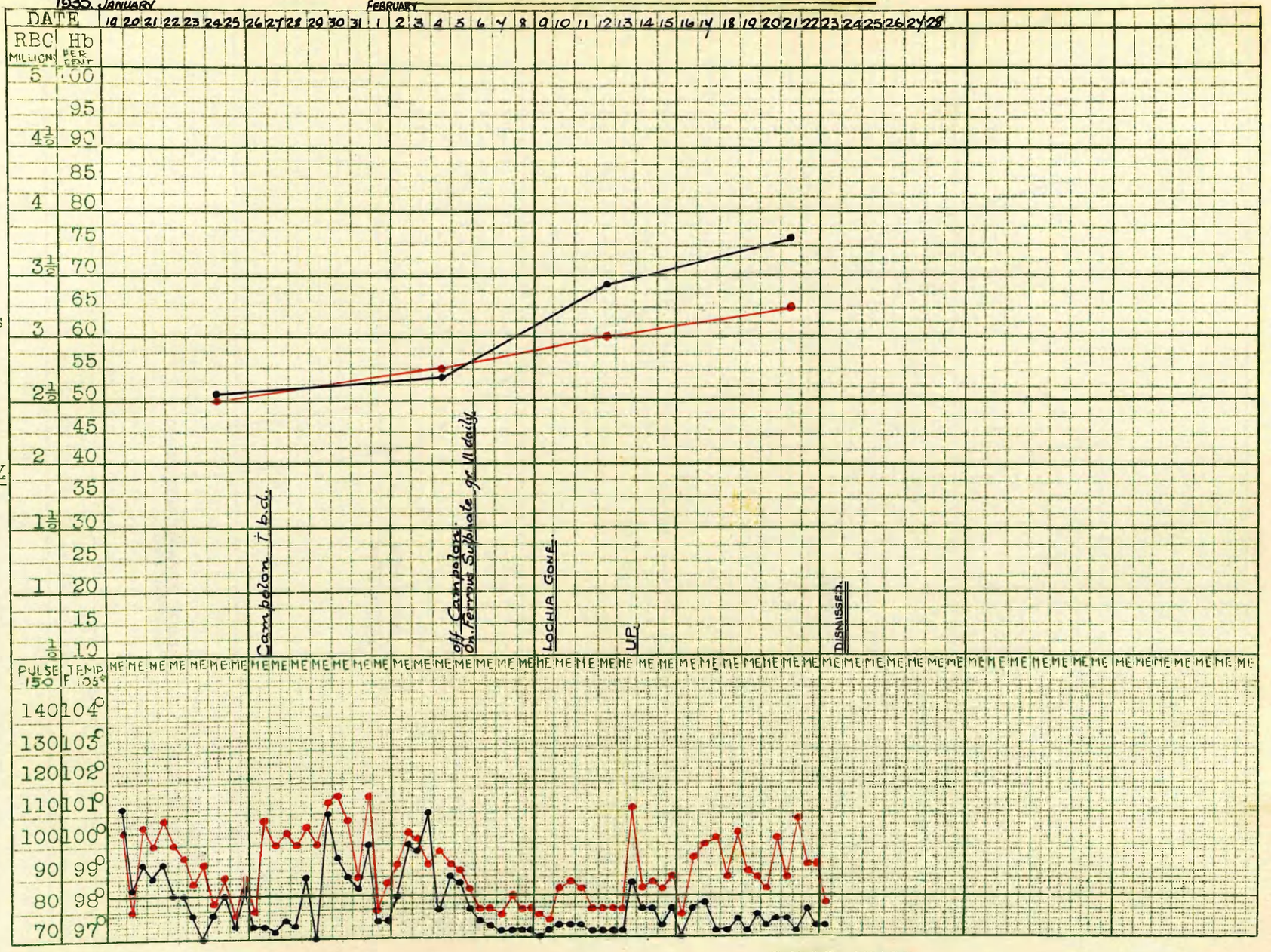
TREATMENT.

Intra-uterine glycerine.

For anaemia -

26/1 Campolon i b.d.

5/2 Ferrous Sulphate gr. vi daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 3rd day of puerperium, with shivering and headache.
Admitted: 3rd day of illness.
Perineum: Slight tear.
Cervix: Large and ulcerated.
Lochia: Retained, profuse, offensive.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Toxaemia sustained for over 2 weeks.

Note: Slight rise in blood value during sepsis, and inadequacy of iron in convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXLV.

AGE.

25.

PARA.

3.

DISEASE.

Puerperal Sepsis

TYPE.

Toxaemic.

MODE OF DELIVERY.

Abortion.

TREATMENT.

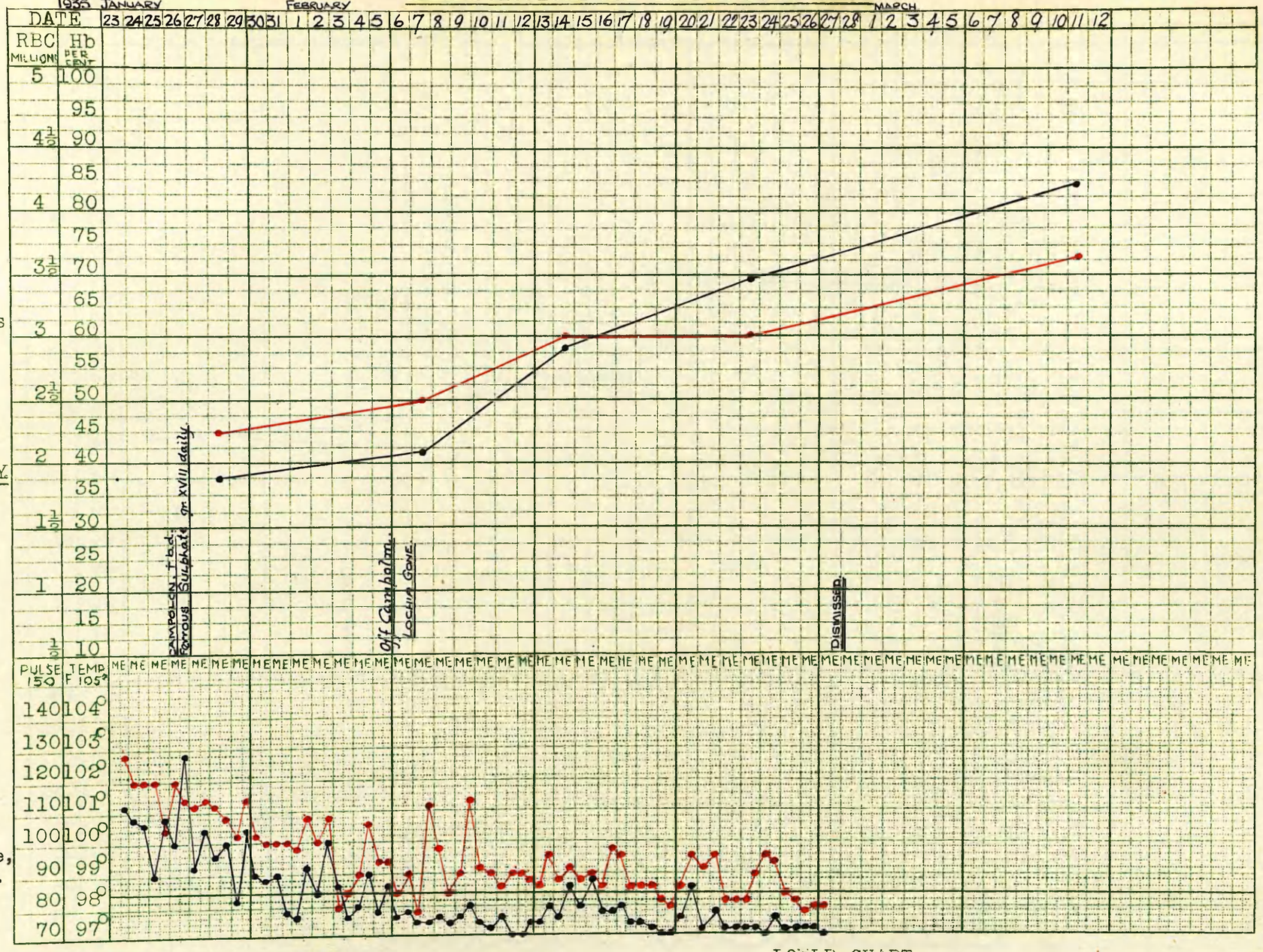
Intra-uterine glycerine.

For anaemia -

26/1 Campolon i b.d.

Ferrous Sulphate, gr.xviii daily.

5/2 Off Campolon.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Stage of pregnancy: 2 months.
Uterus: Enlarged, empty.
Cervix: Patent.
Lochia: Profuse, brownish.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Fairly toxic for 2 weeks.

Note: High colour index on admission, falling in convalescence from inadequacy of iron.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CXLVI.

AGE.
28.

PARA.
3.

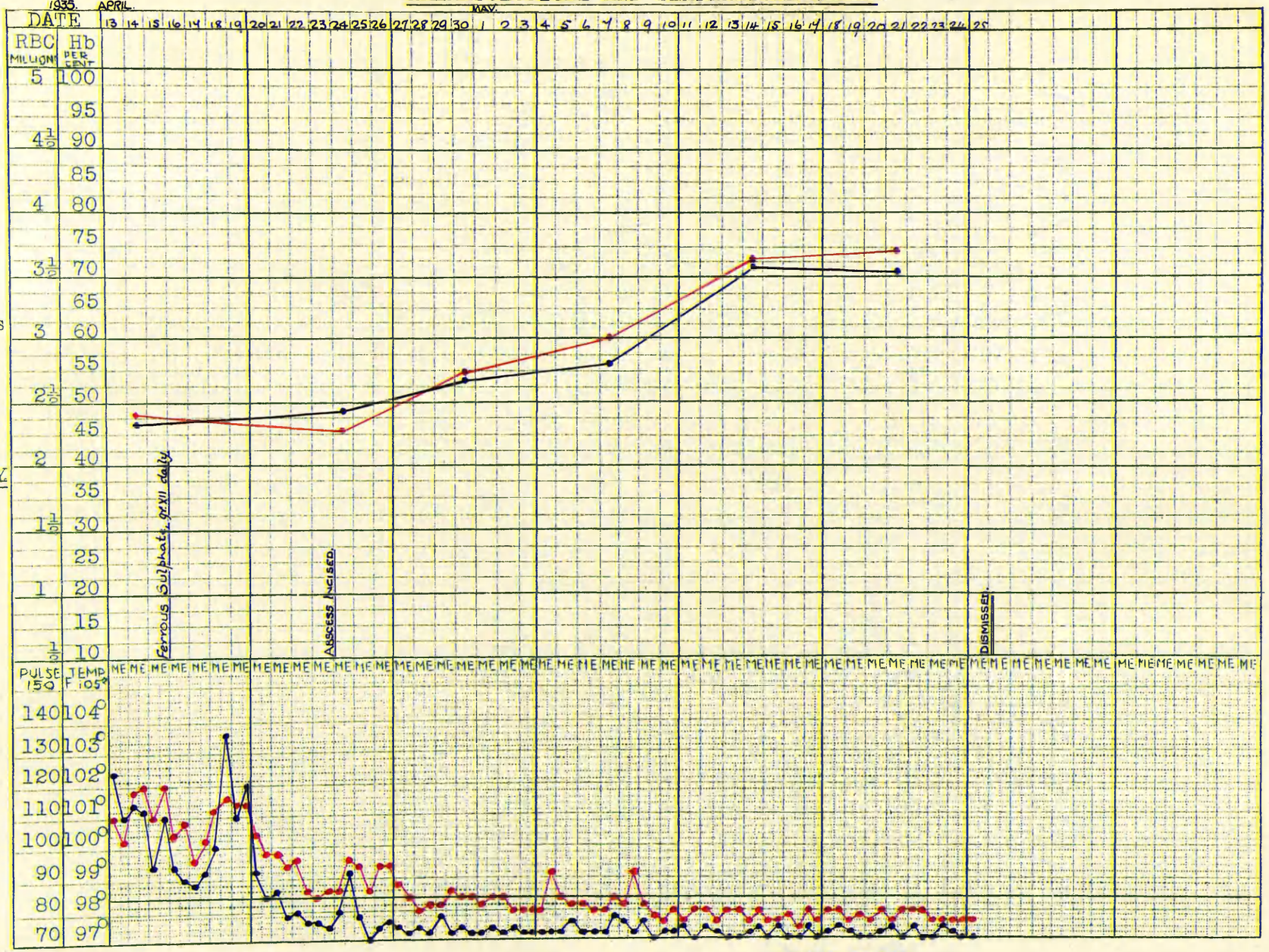
DISEASE.
Puerperal Sepsis

TYPE.
Toxaemic.

MODE OF DELIVERY
Abortion.

TREATMENT.
Intra-uterine glycerine.

For anaemia -
Ferrous Sulphate gr. xii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Stage of pregnancy: 6 weeks.
Uterus: Enlarged, retroverted.
Cervix: Patent.
Lochia: Profuse, offensive.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, negative.

Progress: Fair degree of toxaemia. Abscess of buttock at end of 1st week.

Note: Incomplete blood recovery.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXLVII.

AGE.

27.

PARA.

2.

DISEASE.

Puerperal Sepsis

TYPE.

Toxaemic.

MODE OF DELIVERY

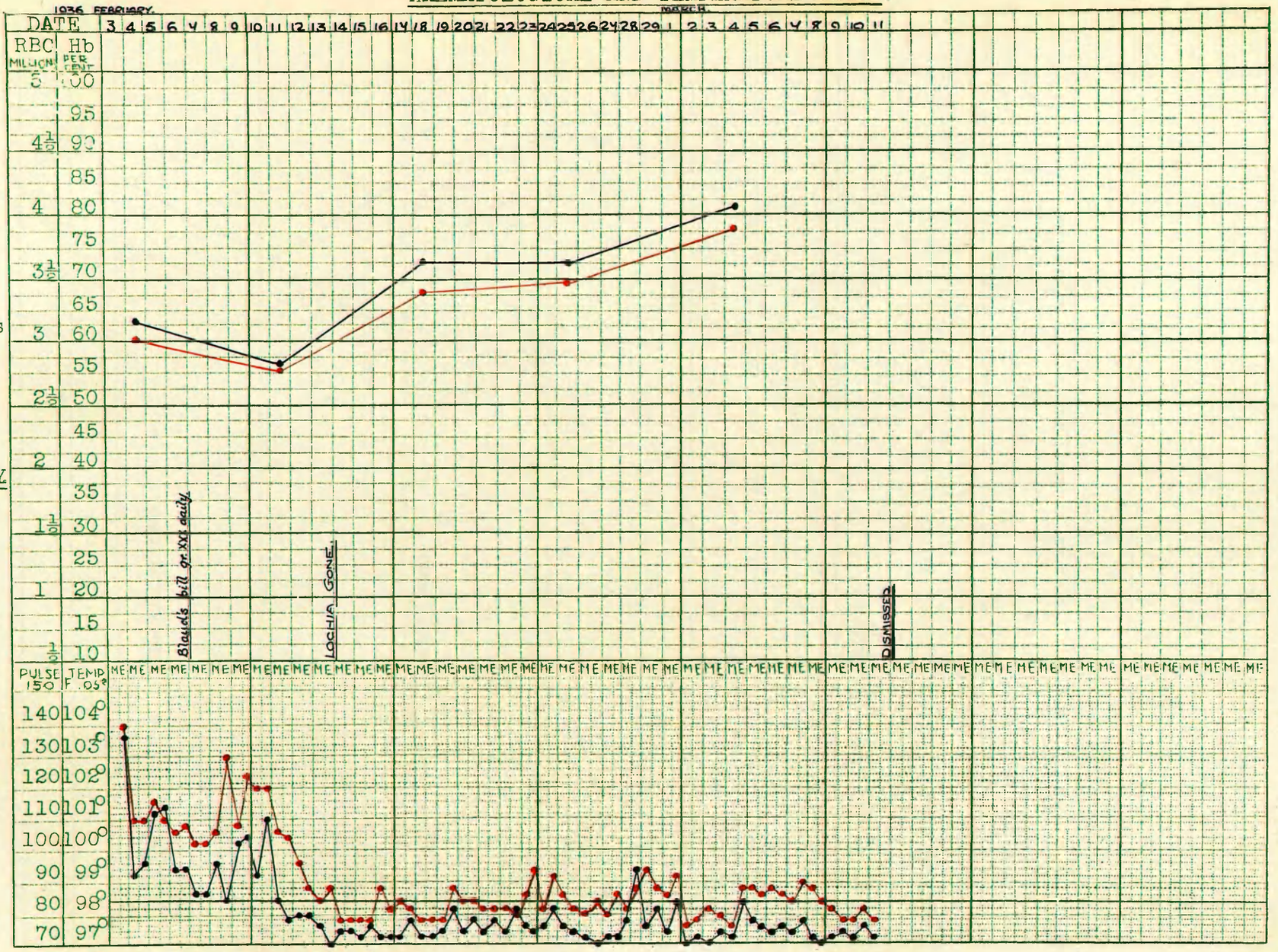
Normal.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

6/2 Blaud's Pill, gr. xxx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 4th day of puerperium, with shivering and headache.
Admitted: 1st day of illness.
Perineum: Septic 2nd degree tear.
Cervix: Large, soft, ulcerated.
Lochia: Profuse, brownish.

Bacteriology: Cervical swab, haemolytic streptococci. Blood culture, negative.

Progress: Severe toxaemia for more than one week.

Note: Fall in blood value until apyrexial. Fairly good recovery in convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXLVIII.

AGE.

33.

PARA.

1.

DISEASE.

Puerperal Sepsis

TYPE.

Toxaemic.

MODE OF DELIVERY

Forceps.

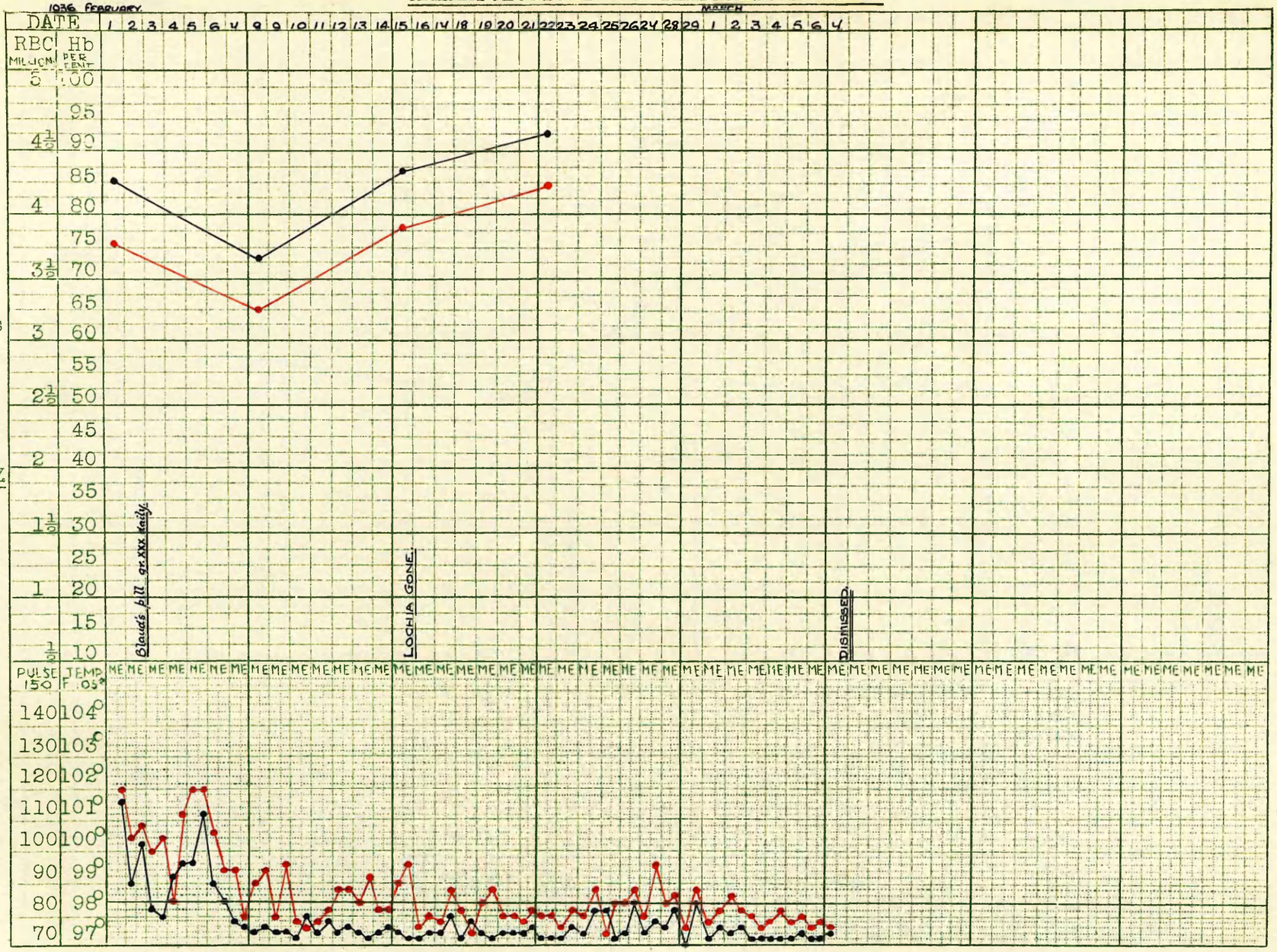
Extensive laceration.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

2/2 Blaud's Pill, gr. xxx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 4th day of puerperium, with abdominal pain.
Admitted: 2nd day of illness.
Perineum: Extensive laceration.
Vagina: Lacerated.
Cervix: Large, soft and ulcerated.
Lochia: Profuse, with debris.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, negative.

Progress: Toxaemia sustained for one week.

Note: Fall in blood value with toxaemia. Good blood recovery, but low colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CXLIX.

AGE.

29.

PARA.

2.

DISEASE.

Puerperal Sepsis

TYPE.

Septicaemia (coliform).

MODE OF DELIVERY.

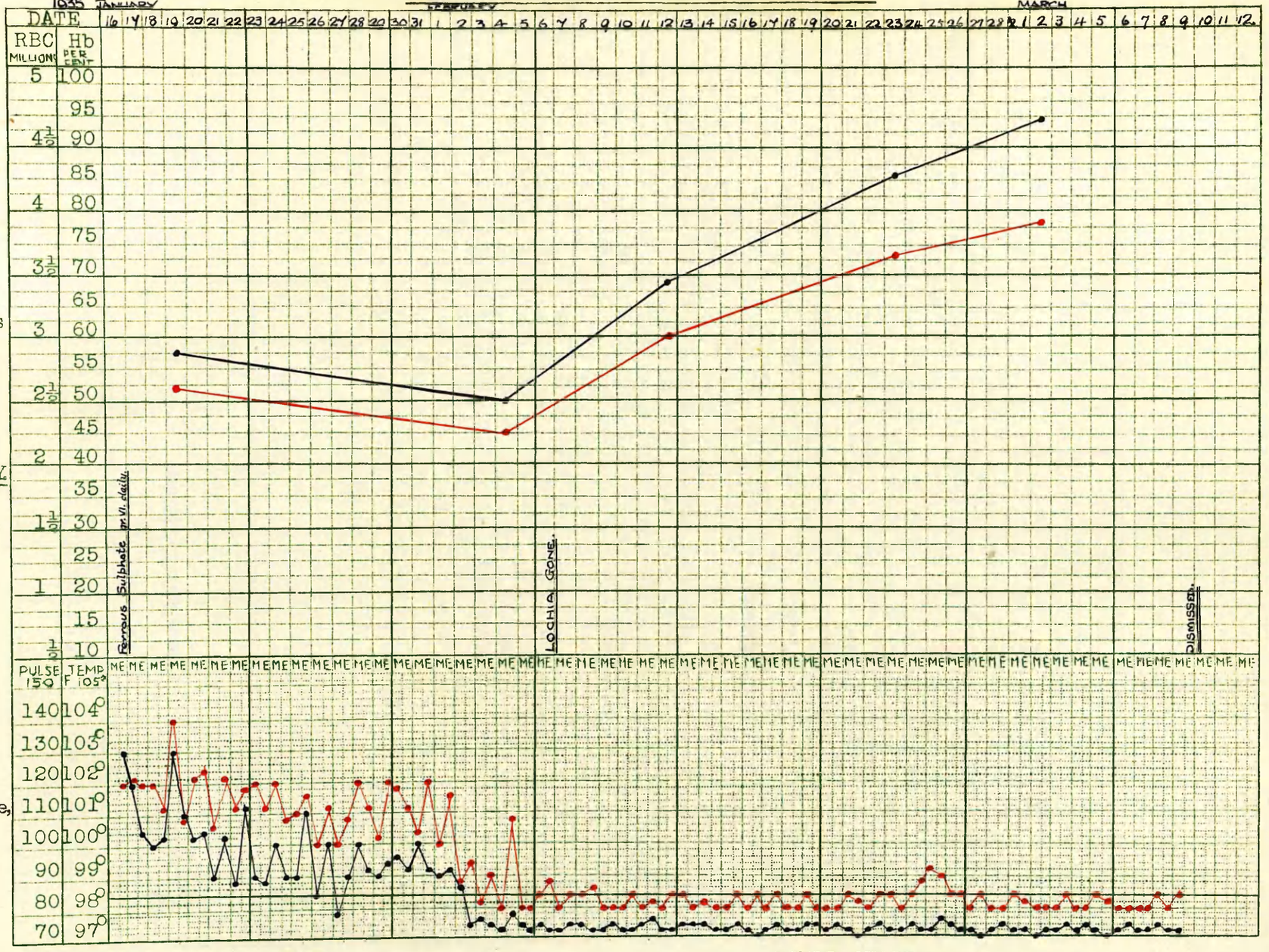
Forceps.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

16/1 Ferrous Sulphate, gr. vi. daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 5th day of puerperium, with sickness and headache.
Admitted: 2nd day of illness.
Perineum: Intact.
Cervix: Large and soft.
Lochia: Profuse.

Bacteriology: Cervical swab, negative.
Blood culture, coliform bacilli.

Progress: Very toxic for 18 days, with profuse lochia.

Note: Sharp fall in blood value corresponding accurately with duration of toxaemia. Falling colour index in convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CL.

AGE.

30.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.

Septicaemia (coliform).

MODE OF DELIVERY

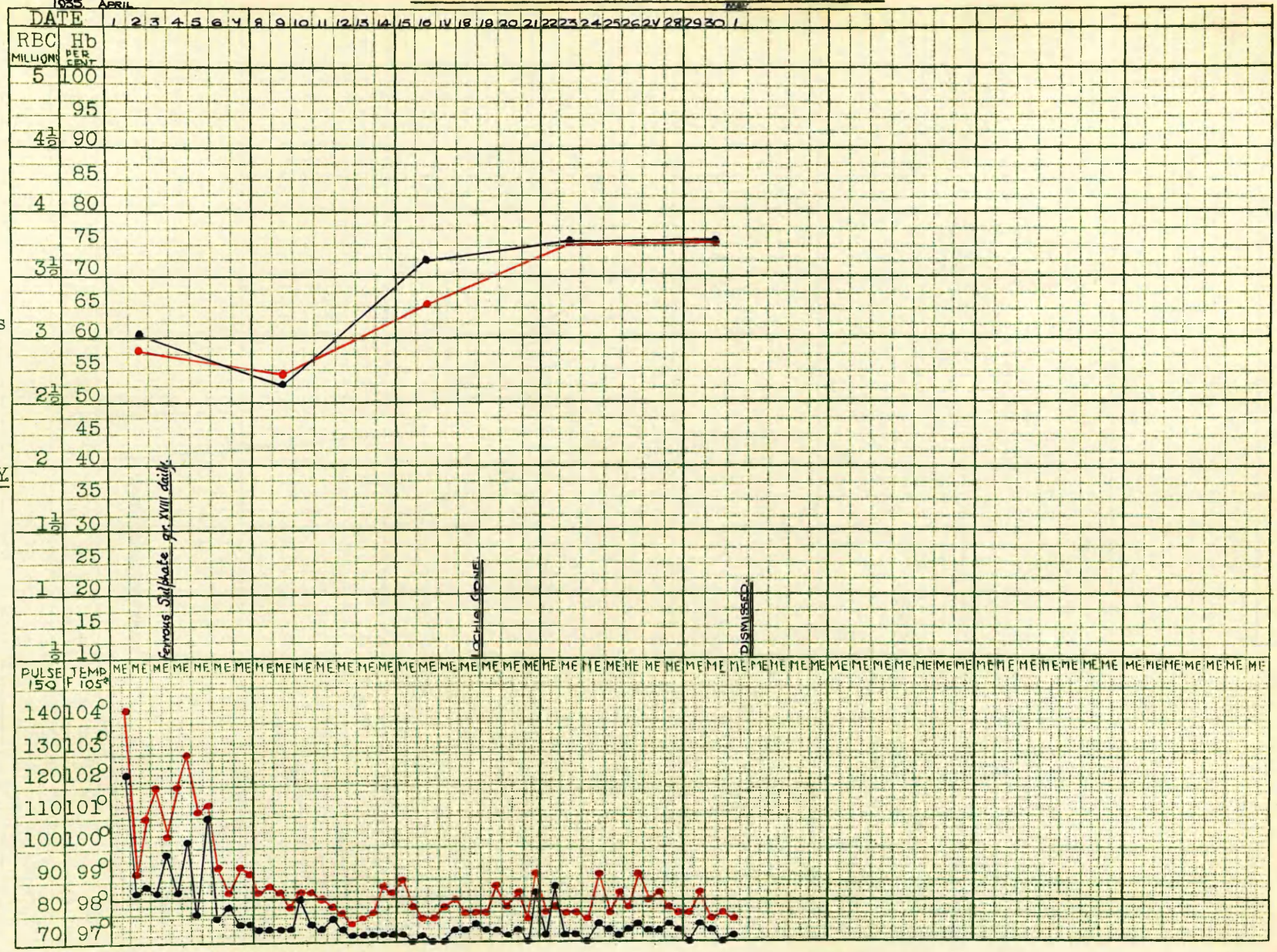
Forceps.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

Ferrous Sulphate gr. xviii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 1st day of puerperium, with headache and shivering.
Admitted: 8th day of illness.
Perineum: Intact.
Cervix: Soft and ulcerated.
Lochia: Profuse, purulent.

Bacteriology: Cervical swab, negative.
Blood culture, coliform bacilli.

Progress: Toxaemia sustained for one week.

Note: Fall in blood value while toxaemic, with incomplete recovery in convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLI.

AGE.

20.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.

Septicaemia (coliform).

MODE OF DELIVERY

Normal.

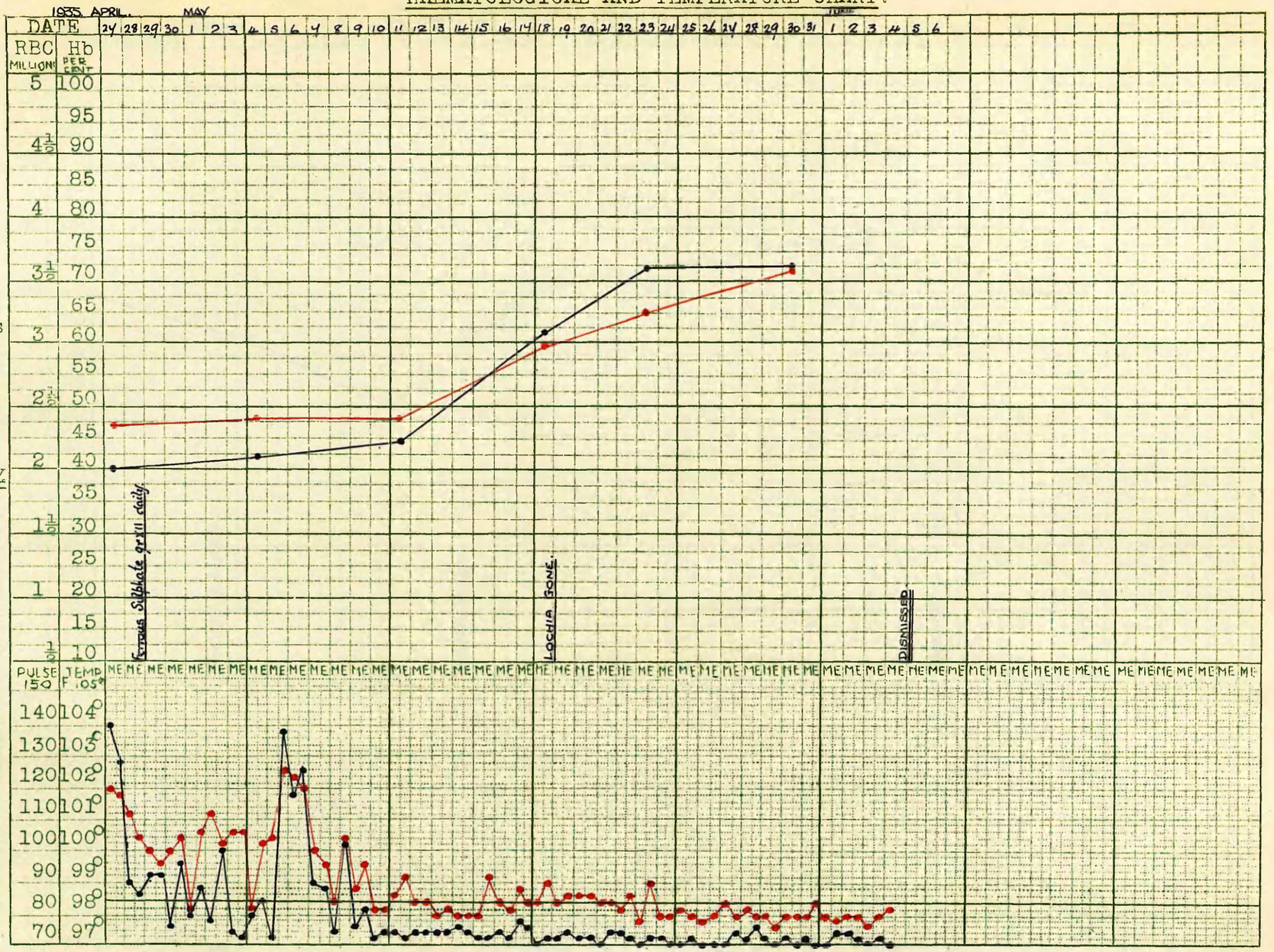
Post partum haemorrhage.

TREATMENT.

Intra-uterine haemorrhage.

For anaemia -

28/4 Ferrous Sulphate, gr. xii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 2nd day of puerperium, with abdominal pain.
Admitted: 5th day of illness.
Perineum: 2nd degree tear.
Cervix: Large, soft, ulcerated.
Lochia: Profuse, offensive.

Bacteriology: Cervical swab, negative.
Blood culture, coliform bacilli.

Progress: Severe toxaemia for 2 weeks.

Note: Severe anaemia after haemorrhage, with high colour index. Slow improvement while sepsis active, more rapid in convalescence, but incomplete.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLII.

AGE.

27.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.

Septicaemia (streptococcal).

MODE OF DELIVERY.

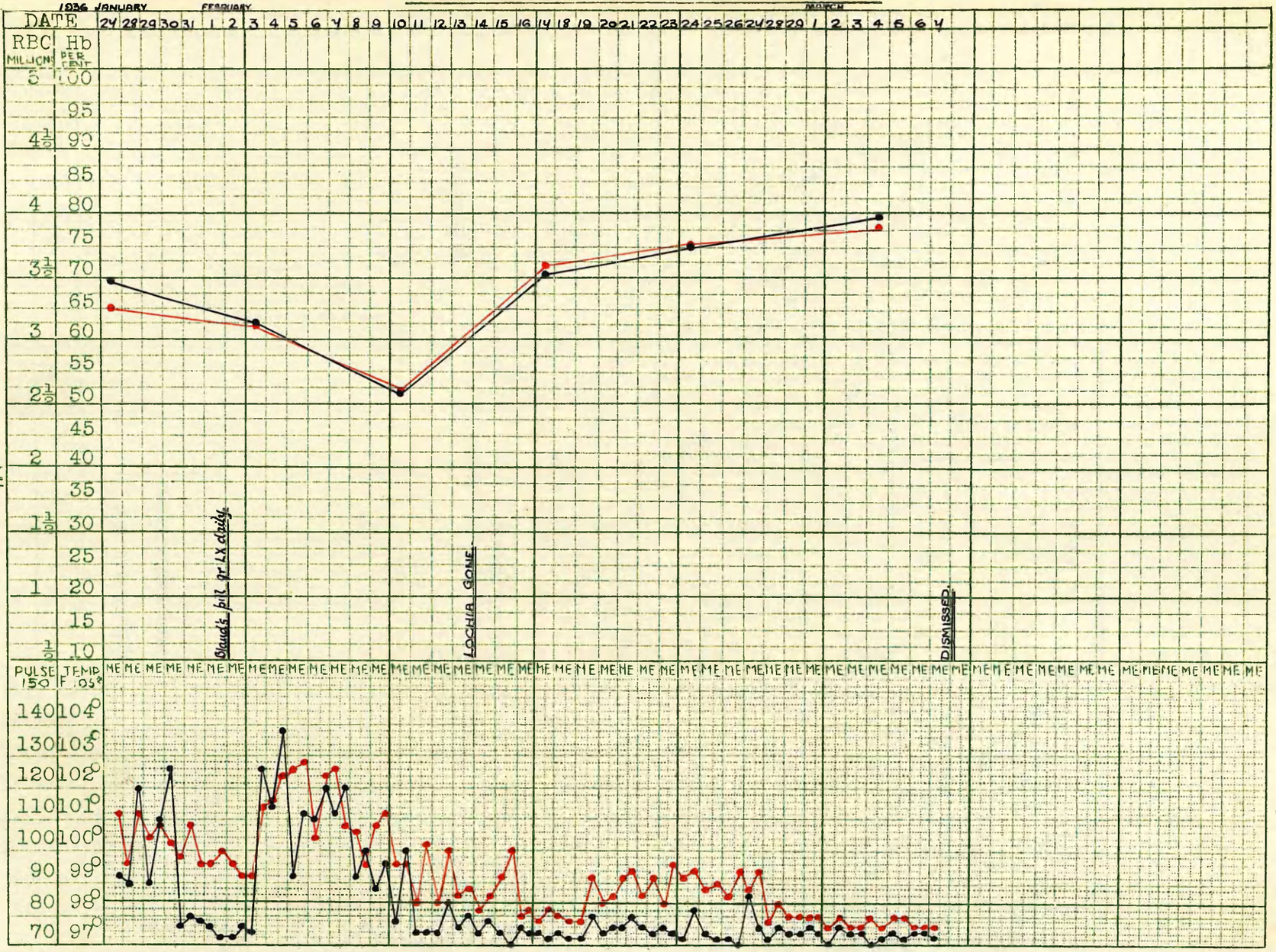
Forceps.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

1/2 Blaud's Pill, gr. 1x daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 4th day of puerperium, with shivering.
Admitted: 3rd day of illness.
Perineum: Slightly torn.
Cervix: Large, soft, ulcerated.
Lochia: Profuse, brownish.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, haemolytic streptococci.

Progress: High temperature for 2 weeks.

Note: Fall in blood value corresponds exactly with period of pyrexia.
Good blood recovery on massive dosage of iron.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLIII.

AGE.
37.

PARA.
12.

DISEASE.
Puerperal Sepsis

TYPE.
Septicaemia (coliform).

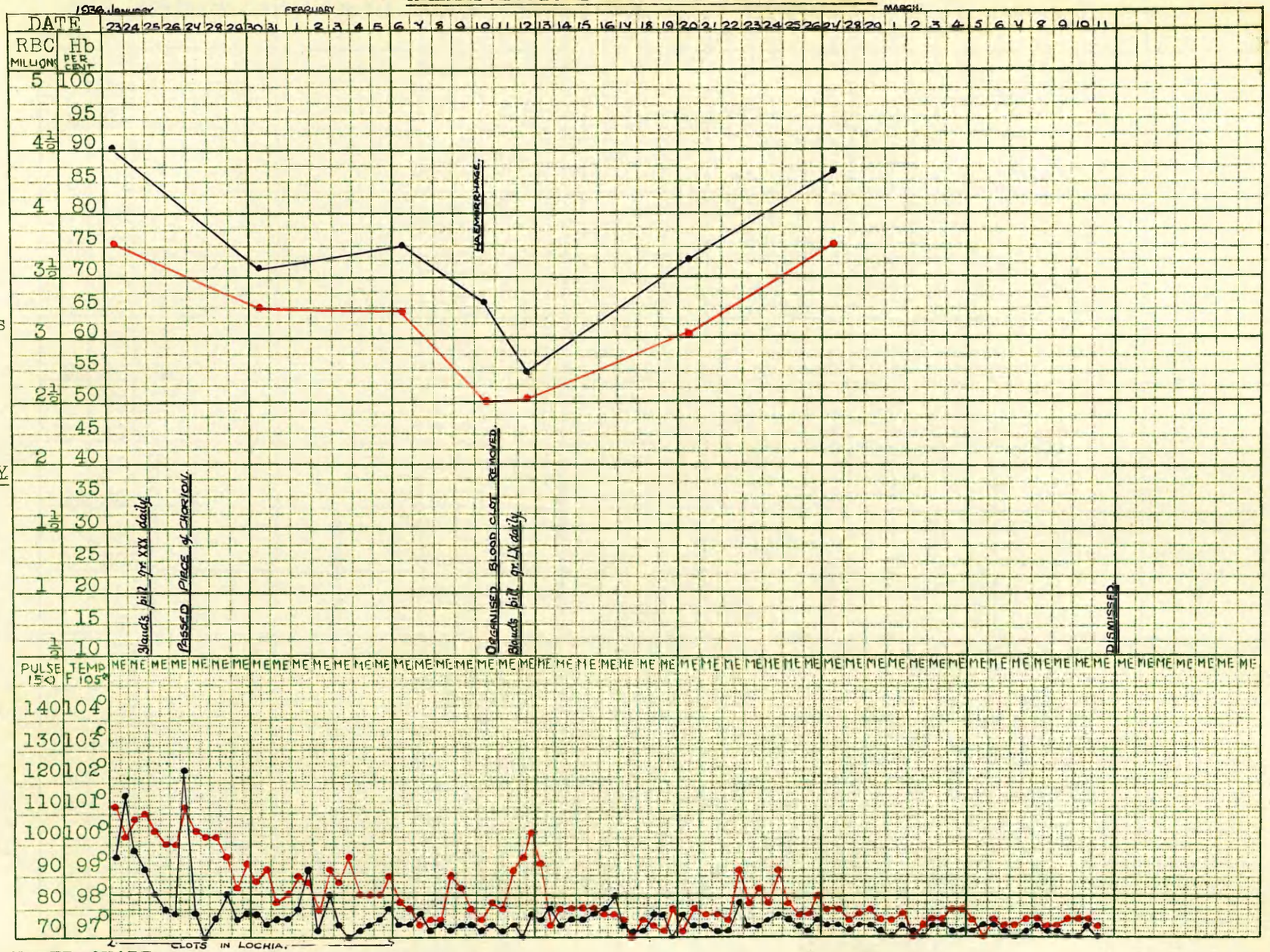
MODE OF DELIVERY
Abortion.

TREATMENT.
Intra-uterine glycerine.

For anaemia -

24/1 Blaud's Pill, gr. xxx daily.

11/2 Blaud's Pill, gr. lx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Stage of pregnancy: 3 months.
Uterus: Enlarged.
Cervix: Large, patent.
Lochia: Profuse, haemorrhagic.

Bacteriology: Cervical swab, negative.
Blood culture, coliform bacilli.

Progress: Organised blood clot and chorionic debris passed 4 days after admission. Sharp haemorrhage 19th day. Piece of organised blood clot removed from uterus, and no further haemorrhage.

Note: Fall in blood value with sepsis, accentuated by haemorrhage. Sharp recovery, but falling colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLIV.

AGE.
28.

PARA.
3.

DISEASE.
Puerperal Sepsis

TYPE.
Parametritis.

MODE OF DELIVERY.
Normal.

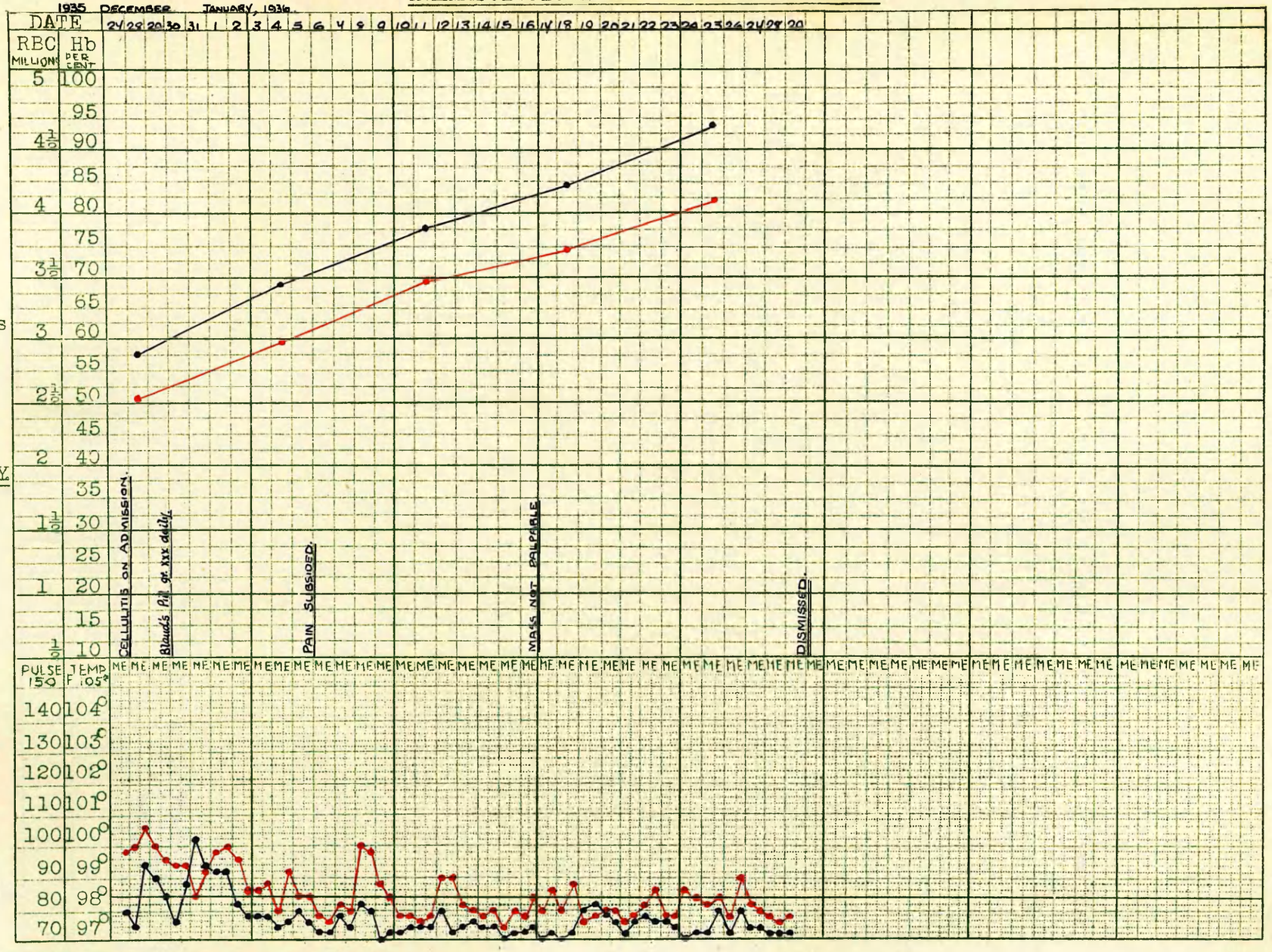
TREATMENT.

Intra-uterine glycerine.

Hot vaginal douching.

For anaemia -

29/12 Blaud's Pill, gr. xxx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 7th day of puerperium, with abdominal pain.
Admitted: 6th week of illness.
Perineum: Intact.
Cervix: Small and firm.
Lochia: Slight.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Tender swelling in left broad ligament on admission, subsiding quickly.

Note: Steady rise in blood value, but with falling colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLV.

AGE.
36.

PARA.
9.

DISEASE.
Puerperal Sepsis

TYPE.
Parametritis.

MODE OF DELIVERY
Abortion.

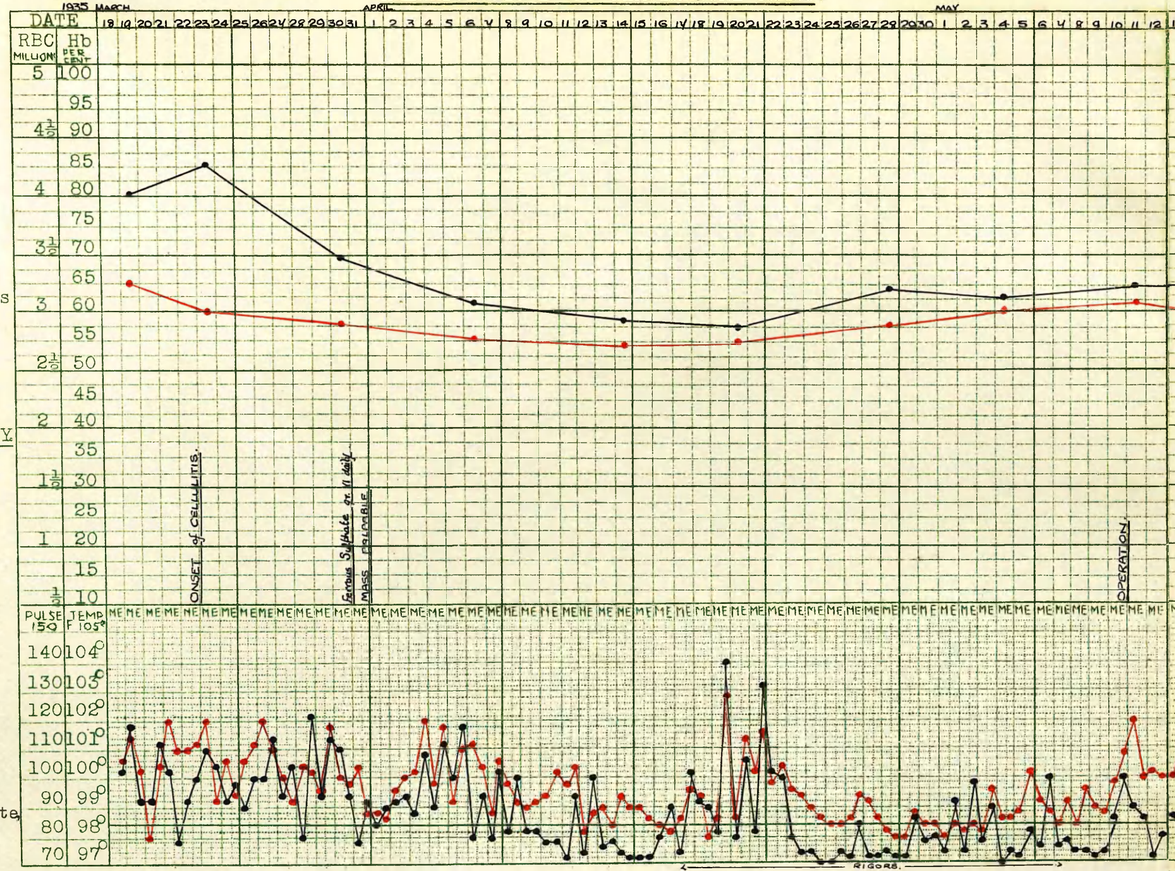
TREATMENT.

Intra-uterine glycerine.

Incision and drainage.

For anaemia -

30/3 Ferrous Sulphate, gr. vi daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

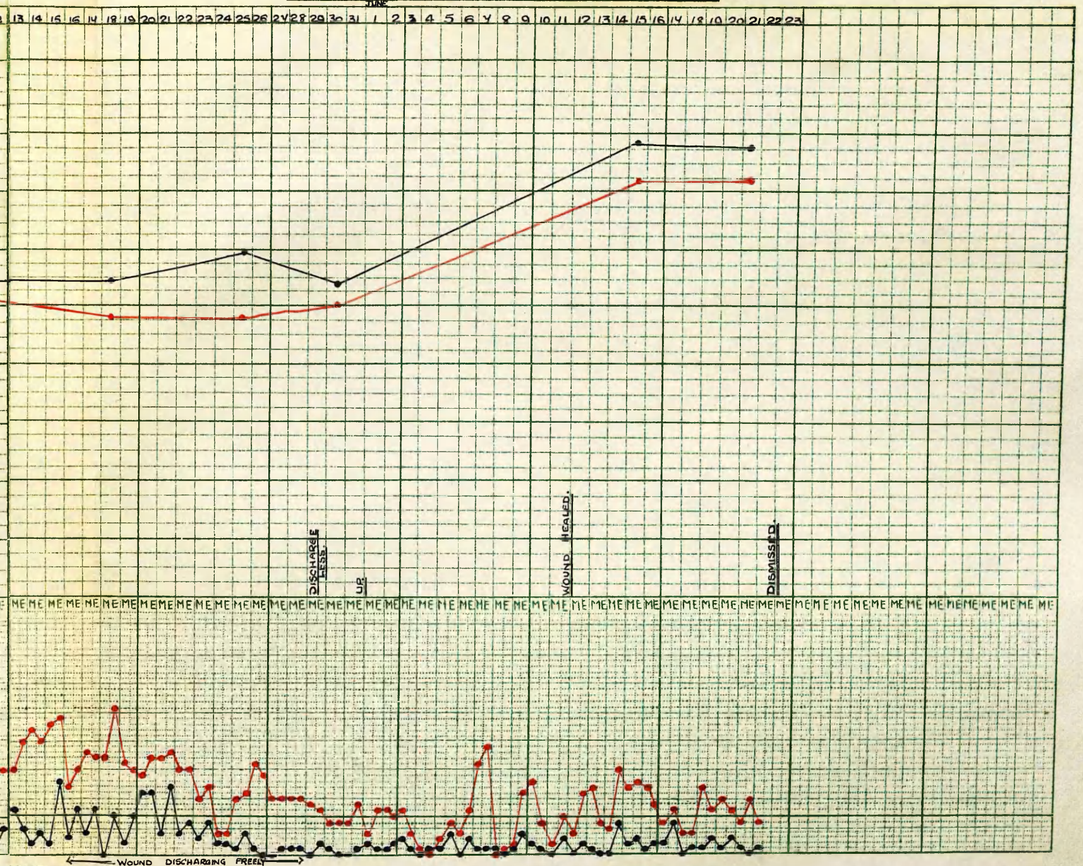
CLINICAL NOTES.

Stage of Pregnancy: 7 weeks.
Uterus: Enlarged, not empty.
Cervix: Slightly torn.
Lochia: Profuse, offensive.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Chorionic tissue and foreign body at cervix uteri on admission. Cellulitis occurred at end of 1st week, mass palpable 10 days later. Accompanied by colitis. Rigors in 5th week. Incision in 8th week, but little pus obtained. Subsided 2 weeks later.

HAEMATOLOGICAL AND TEMPERATURE CHART.



ART.
Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Note: Fall in blood value most pronounced at onset of cellulitis. No effort at recovery until sepsis completely eradicated. Slight fall in colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLVI.

AGE.
40.

PARA.
12.

DISEASE.
Puerperal Sepsis

TYPE.
Phlegmasia.

MODE OF DELIVERY.
Abortion.

TREATMENT.
Intra-uterine glycerine.

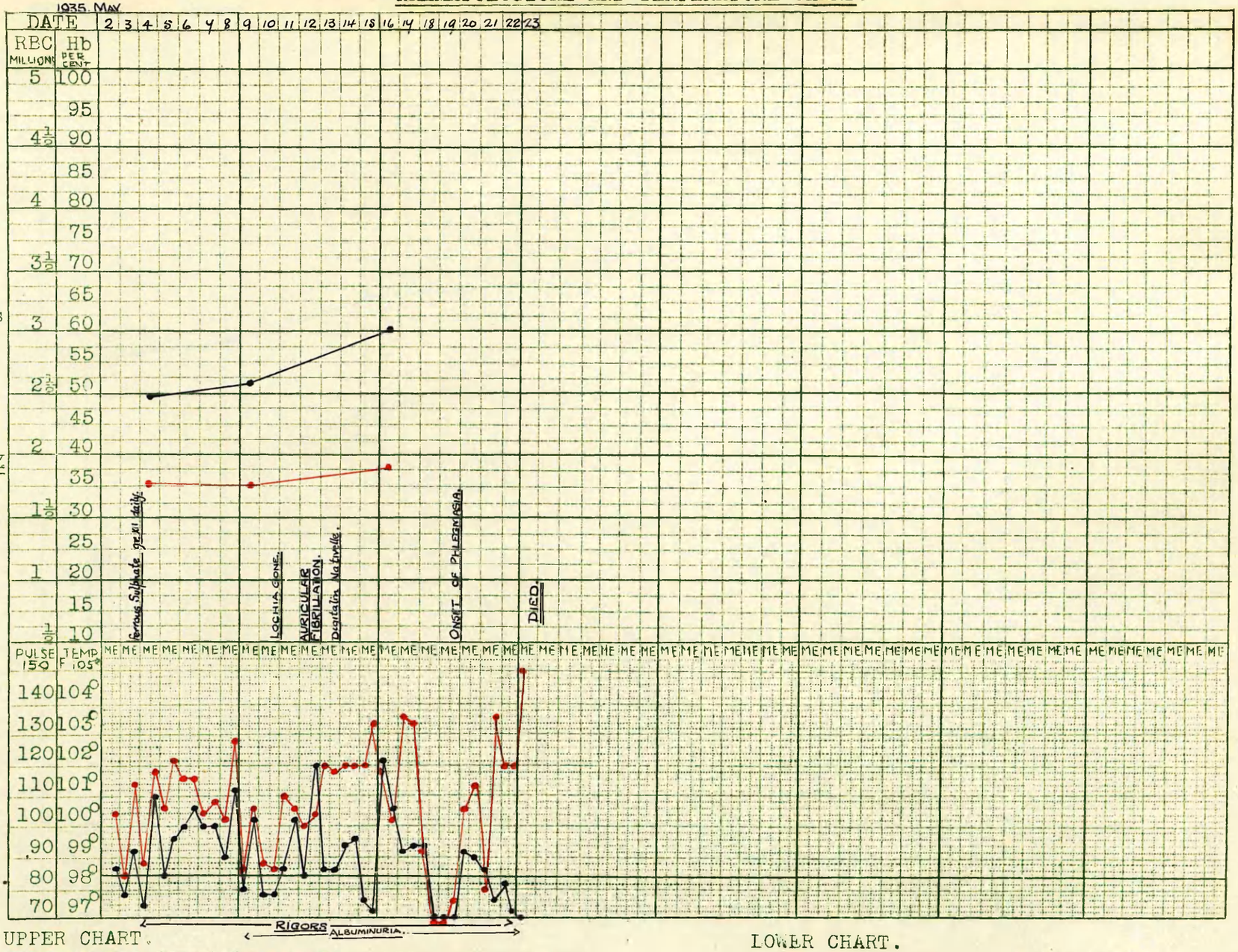
12/5 Strophanthin, gr. 1/100.

13/5 Digitalin (Nativelle) gr.1/600 q.h.

18/5 Digitalin (Nativelle) gr.1/600 t.i.d.

For anaemia -

3/5 Ferrous Sulphate gr.xii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Stage of pregnancy: 3 months.
Uterus: Empty.
Cervix: Patulous.
Lochia: Haemorrhagic.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Auricular fibrillation, and renal inefficiency. Phlegmasia occurred a few days before death, while heart failing.

Note: Very low colour index.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLVII.

AGE.
31.

PARA.
4.

DISEASE.
Puerperal Sepsis

TYPE.
Phlegmasia.

MODE OF DELIVERY
Normal.

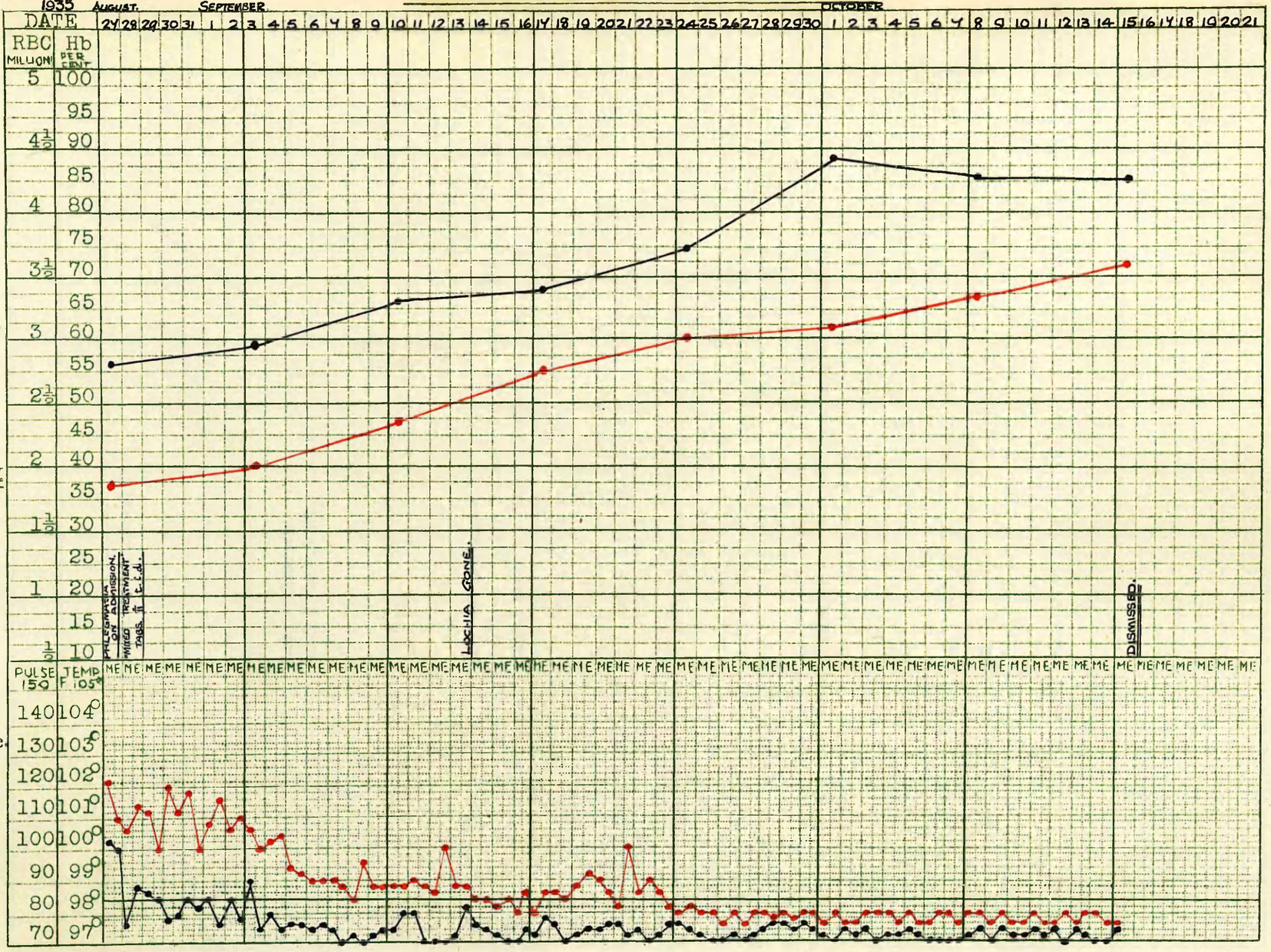
Post partum haemorrhage.

TREATMENT.
Intra-uterine glycerine.

27/8 Pituitrin, 0.5 c.c. b.d.

For anaemia -

28/8 "Mixed Treatment" tablets ii t.i.d.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 10 day of puerperium, with pain in leg.
Admitted: 5th day of illness.
Perineum: Intact.
Cervix: Large and soft.
Lochia: Profuse, offensive.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Phlegmasia present on admission, accompanying localised sepsis.

Note: Very low colour index, and prolonged convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLVIII.

AGE.

38.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.

Phlegmasia.

MODE OF DELIVERY

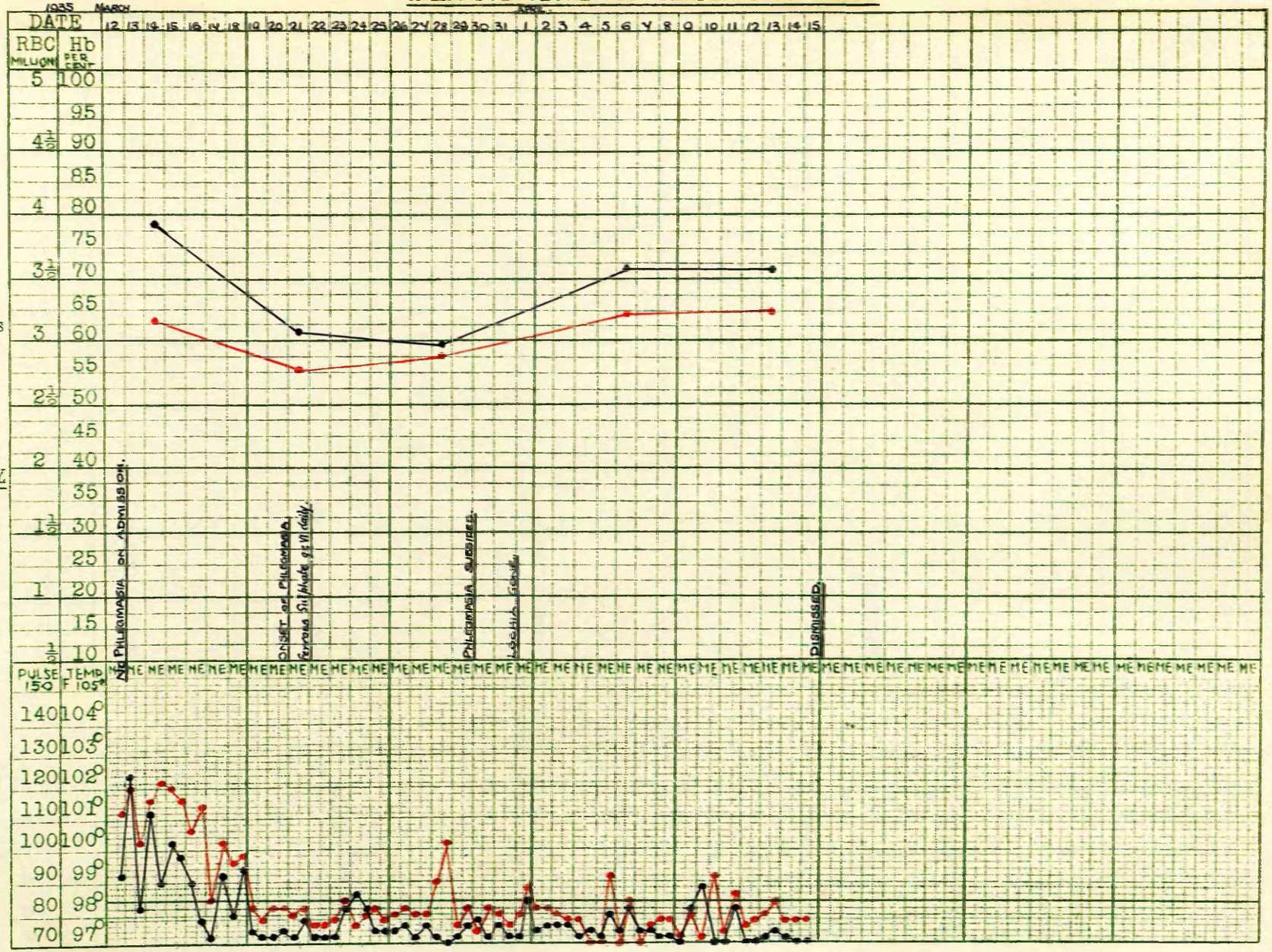
Normal.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

22/3 Ferrous Sulphate, gr. vi daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 2nd day of puerperium, with shivering.
Admitted: 2nd day of illness.
Perineum: Slight tear.
Cervix: Large and soft.
Lochia: Profuse, haemorrhagic.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Fairly toxic for lst week, with mild phlegmasia.

Note: Fall in blood value with sepsis, and incomplete recovery in convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLIX.

AGE.

25.

PARA.

2.

DISEASE.
Puerperal Sepsis

TYPE.

Phlegmasia.

MODE OF DELIVERY

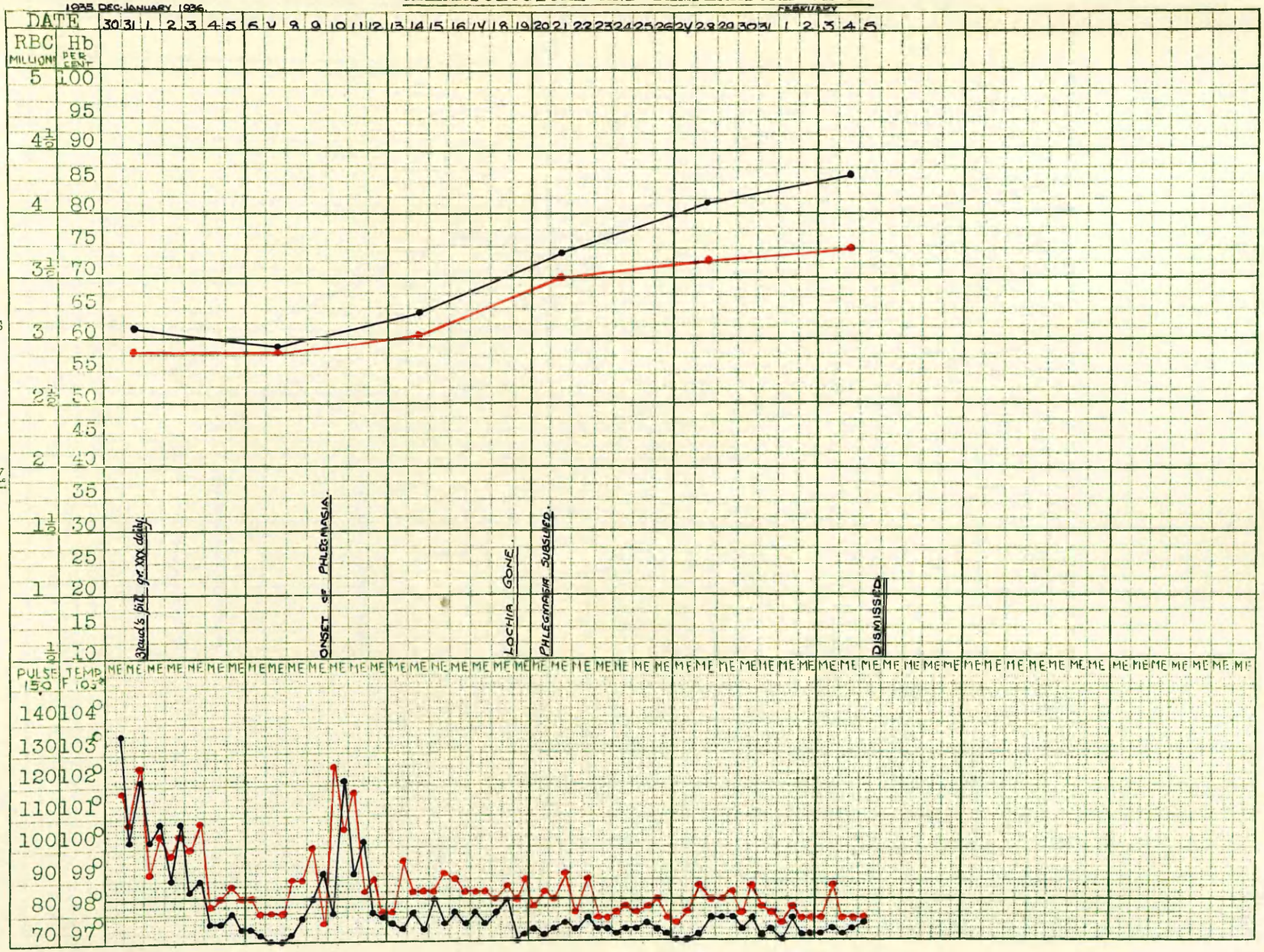
Normal.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

31/12 Blaud's Pill, gr. xxx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 13th day of puerperium, with shivering.
Admitted: 7th day of illness.
Perineum: Intact.
Cervix: Small, but soft.
Lochia: Profuse with debris.

Bacteriology: Cervical swab, haemolytic streptococci. Blood culture, negative.

Progress: Very toxic on admission, with gradual improvement in one week. Phlegmasia occurred on 11th day and subsided at end of 3rd week.

Note: Slight fall in blood value with original sepsis. Falling colour index in convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLX.

AGE.
30.

PARA.
7.

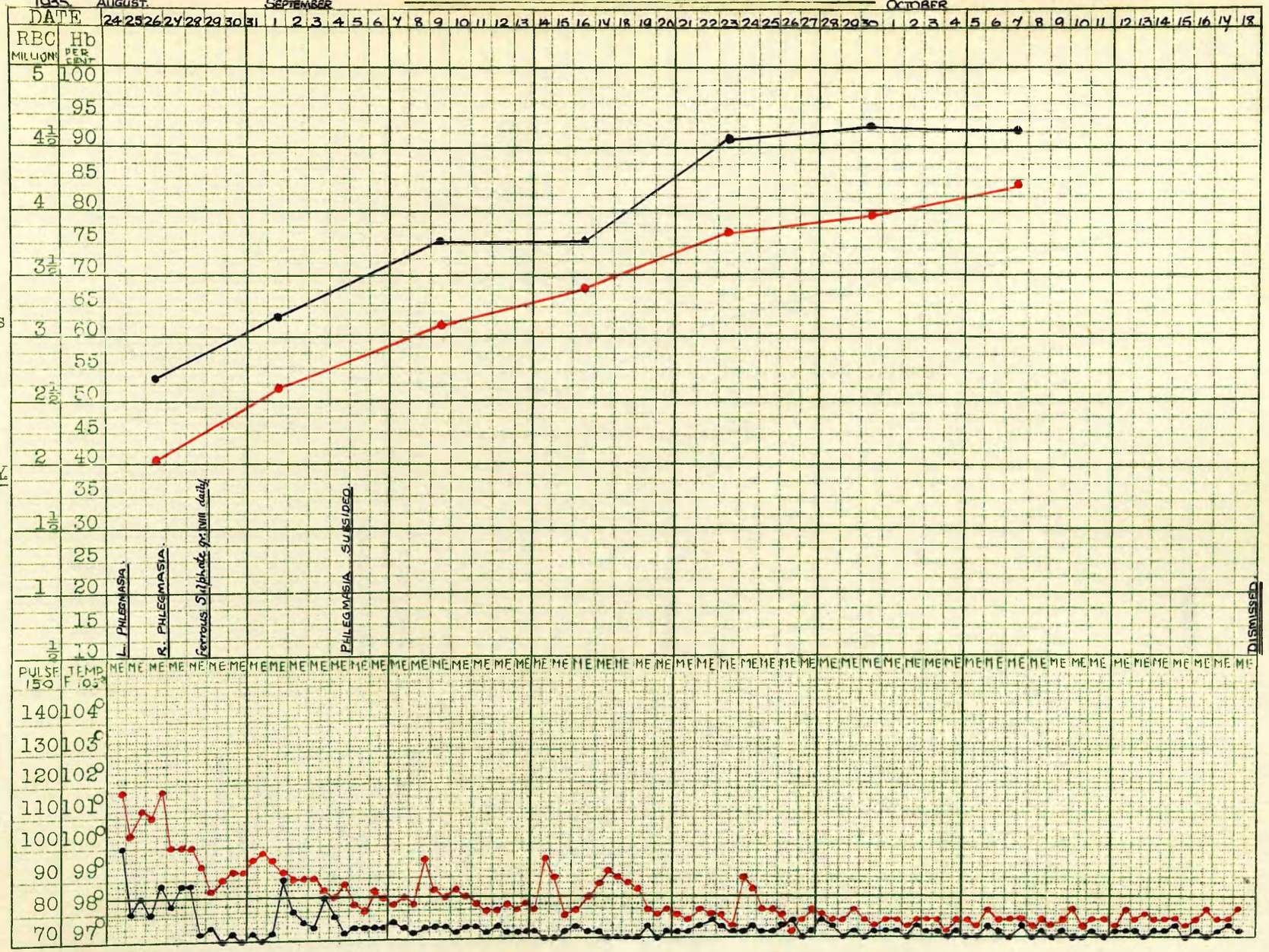
DISEASE.
Puerperal Sepsis

TYPE.
Phlegmasia.

MODE OF DELIVERY
Normal.

TREATMENT.
Intra-uterine glycerine.

For anaemia -
28/8 Ferrous Sulphate, gr. xviii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 9th day of puerperium, with headache and shivering.
Admitted: 24th day of illness.
Perineum: Intact.
Cervix: Small and firm.
Lochia: Very slight.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Left phlegmasia present on admission; right occurred 3 days after admitted. Subsided after 10 days.

Note: Very low colour index, and prolonged convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXI.

AGE.

29.

PARA.

6.

DISEASE.

Puerperal Sepsis

TYPE.

Phlegmasia.

MODE OF DELIVERY

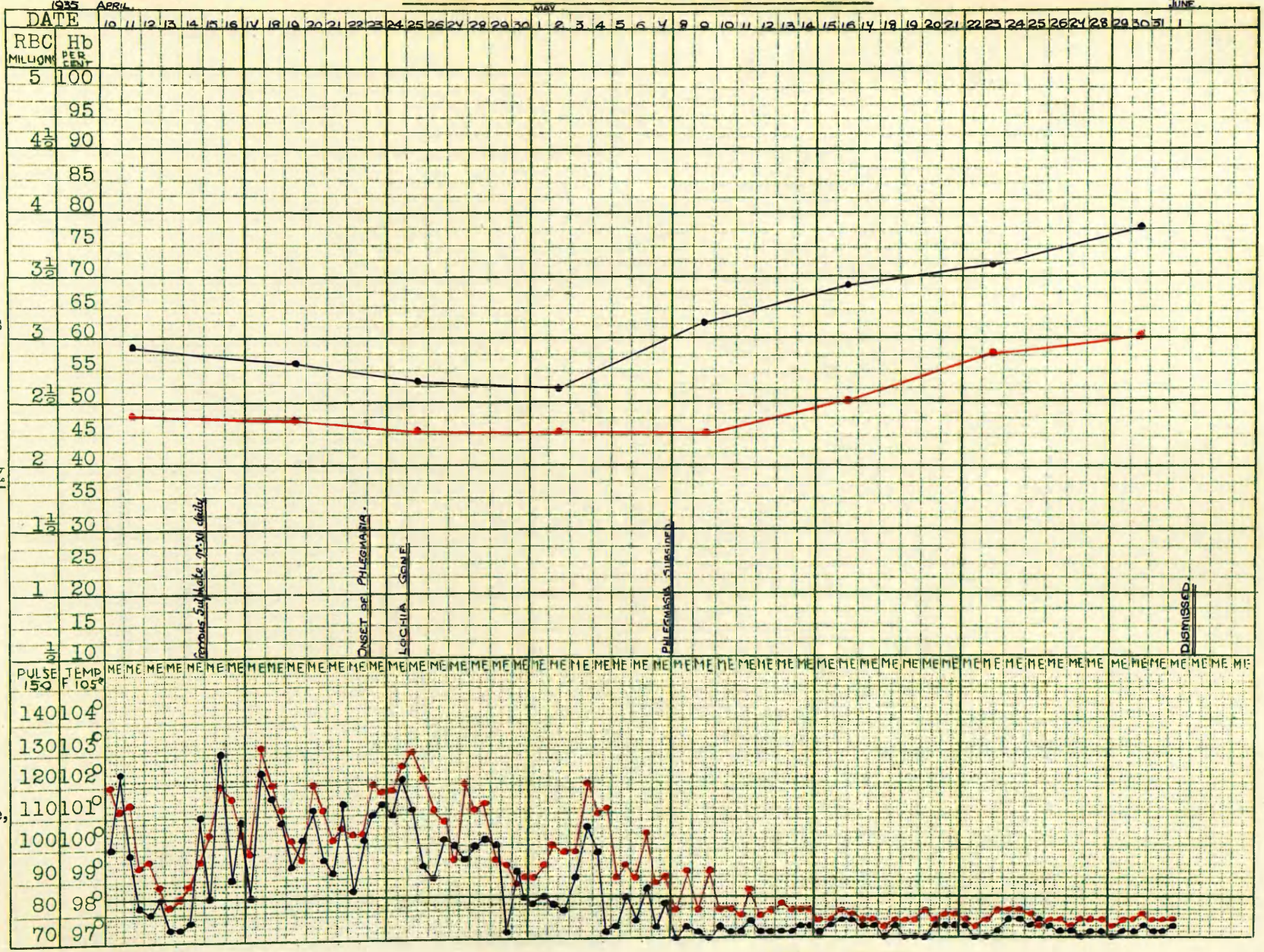
Breech.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

14/4 Ferrous Sulphate, gr. xii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 5th day of puerperium, with pyrexia.
Admitted: 6th day of illness.
Perineum: Intact.
Cervix: Swollen.
Lochia: Profuse, brownish.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Phlegmasia occurred 14 days after admission, with high temperature. Pain in lumbar region.

Note: Gradual fall in blood value till temperature settled, and falling colour index in convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXII.

AGE.

39.

PARA.

6.

DISEASE.

Puerperal Sepsis

TYPE.

Phlegmasia.

MODE OF DELIVERY.

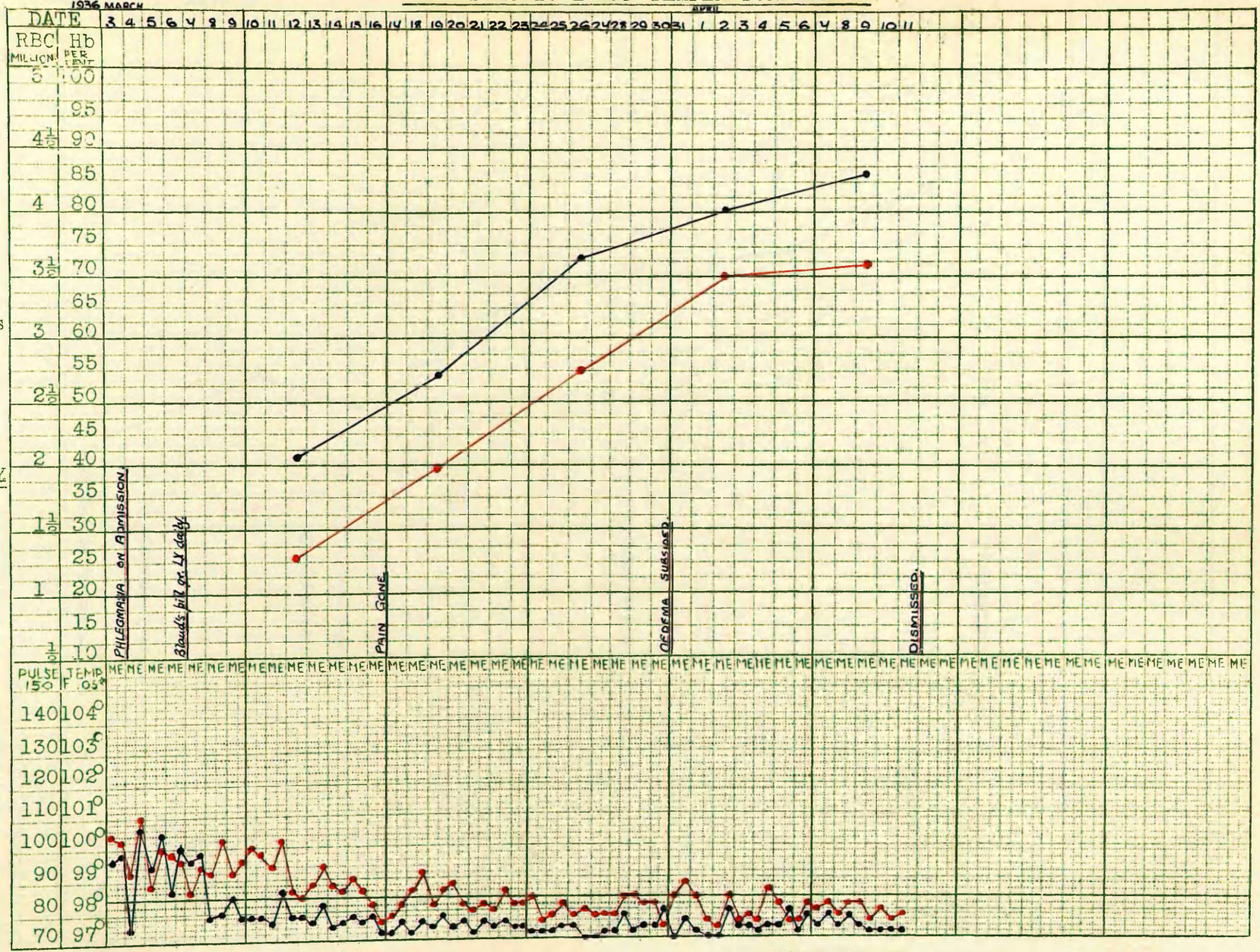
Abortion.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

6/3 Blaud's Pill, gr. lx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Stage of pregnancy: 3 months.
Uterus: Empty, small.
Cervix: Closed.
Lochia: Nil.

Bacteriology: Cervical swab and blood culture, negative.

Progress: Left phlegmasia present on admission. Subsided in 2 weeks.

Note: Very low colour index, and severe anaemia.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXIII.

AGE.

31.

PARA.

7.

DISEASE.

Puerperal Sepsis

TYPE.

Phlegmasia.

MODE OF DELIVERY.

Forceps.

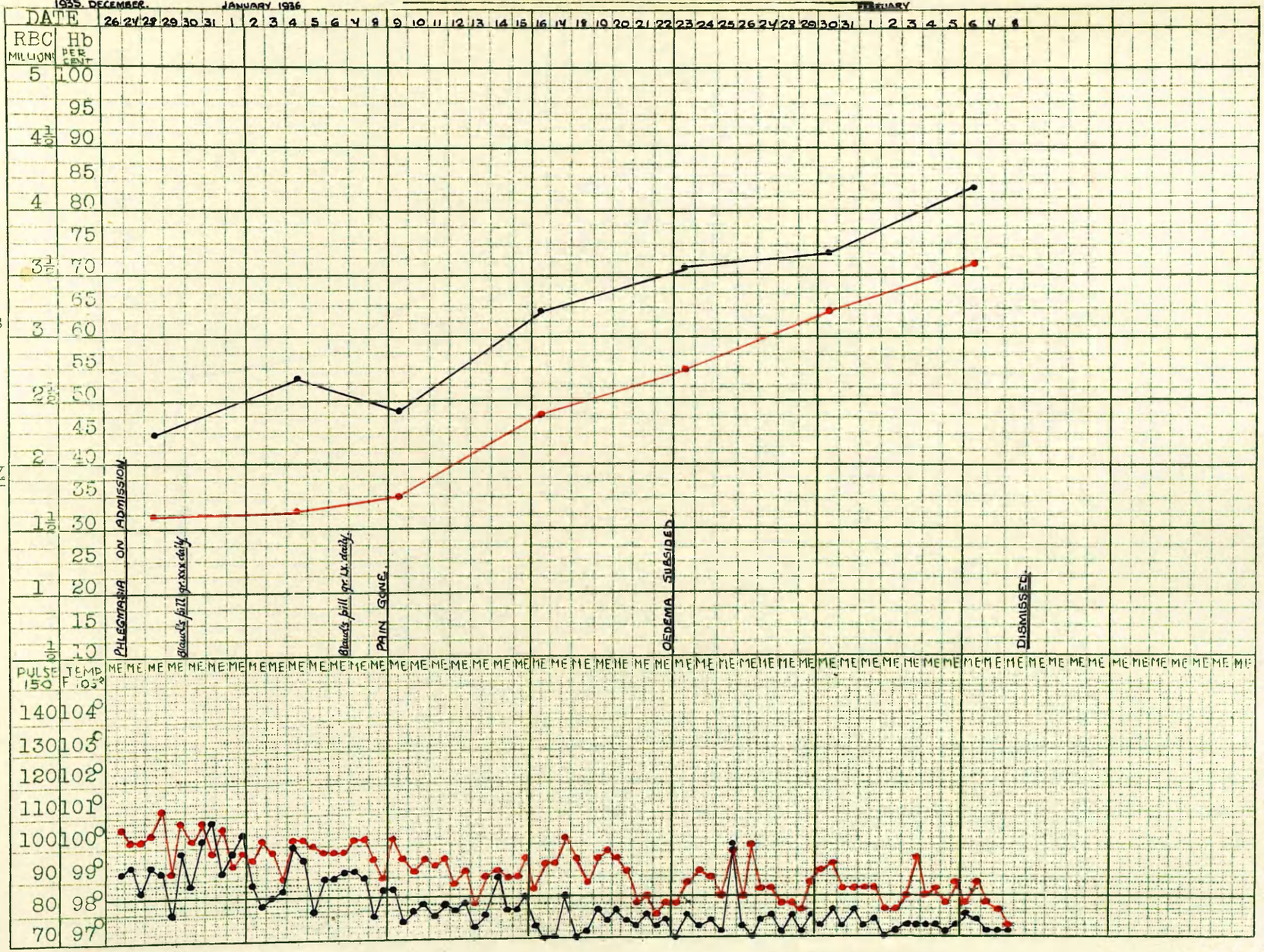
TREATMENT.

Intra-uterine glycerine.

For anaemia -

29/12 Blaud's Pill, gr. xxx daily.

6/1 Blaud's Pill, gr. lx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 6th week of puerperium, with swelling of leg.
Admitted: 3rd day of illness.
Perineum: Intact.
Cervix: Small, firm and closed.
Lochia: Slight.

Bacteriology: Cervical swab and blood culture, negative.

Progress: Right phlegmasia present on admission, subsiding in 3rd week.

Note: Very low colour index, little changed by massive dosage of iron.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLXIV.

AGE.
21.

PARA.
1.

DISEASE.
Puerperal Sepsis

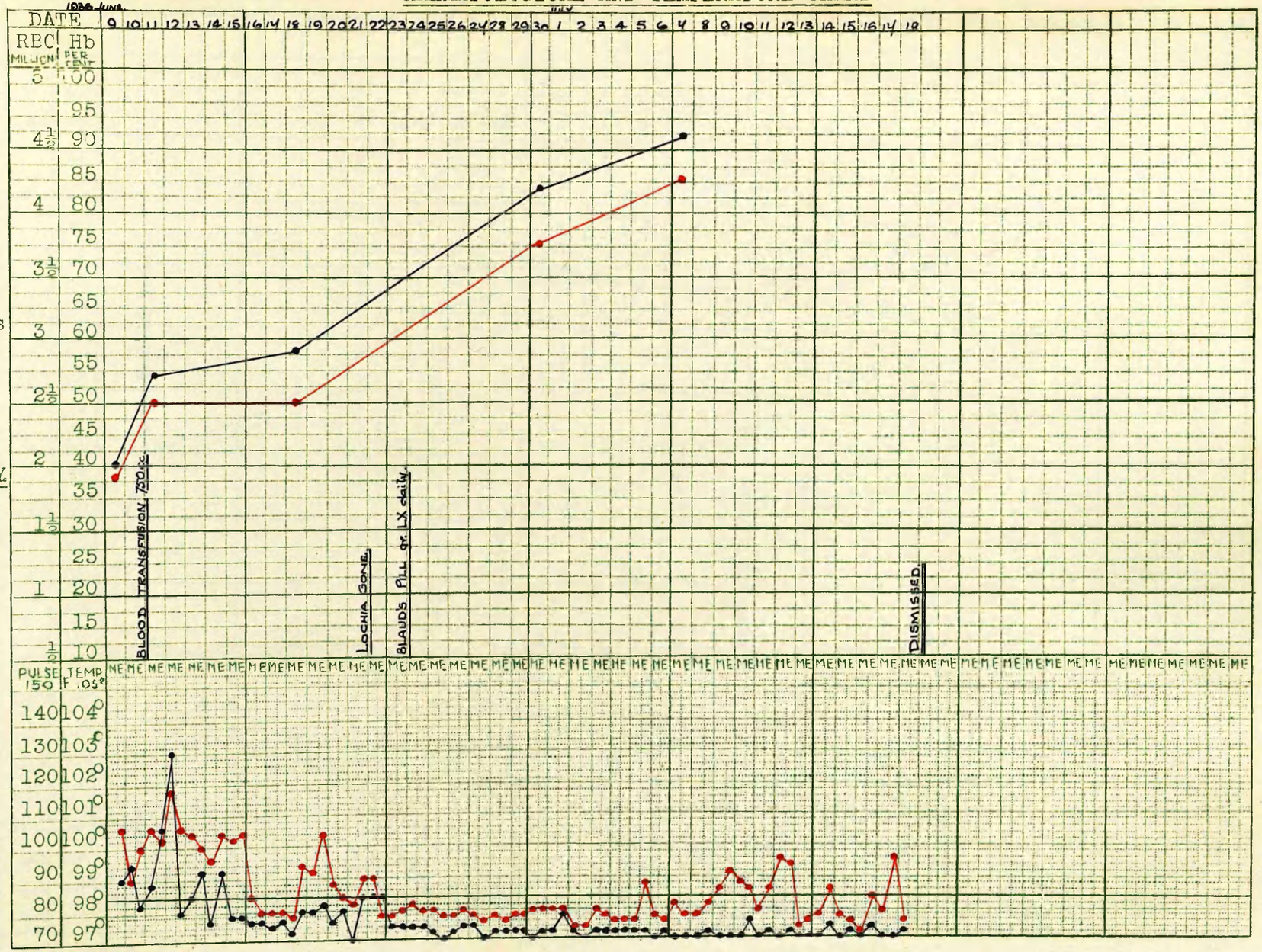
TYPE.
Localised.

MODE OF DELIVERY
Forceps.

Post partum haemorrhage.

TREATMENT.
Intra-uterine glycerine.
For anaemia -
Blood Transfusion 750 c.c.

Blaud's Pill, gr. lx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 3rd day of puerperium, with headache and shivering.
Admitted: 4th day of illness.
Perineum: 2nd degree tear.
Cervix: Large, soft, ulcerated.
Lochia: Profuse and offensive.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Three large pieces of placental tissue presenting at the external os on admission. Removed, and sepsis subsided quickly.

Note: Severe anaemia on admission, and rapid and complete recovery in 4 weeks after blood transfusion supplemented with iron.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLXV.

AGE.
35.

PARA.
3.

DISEASE.
Puerperal Sepsis

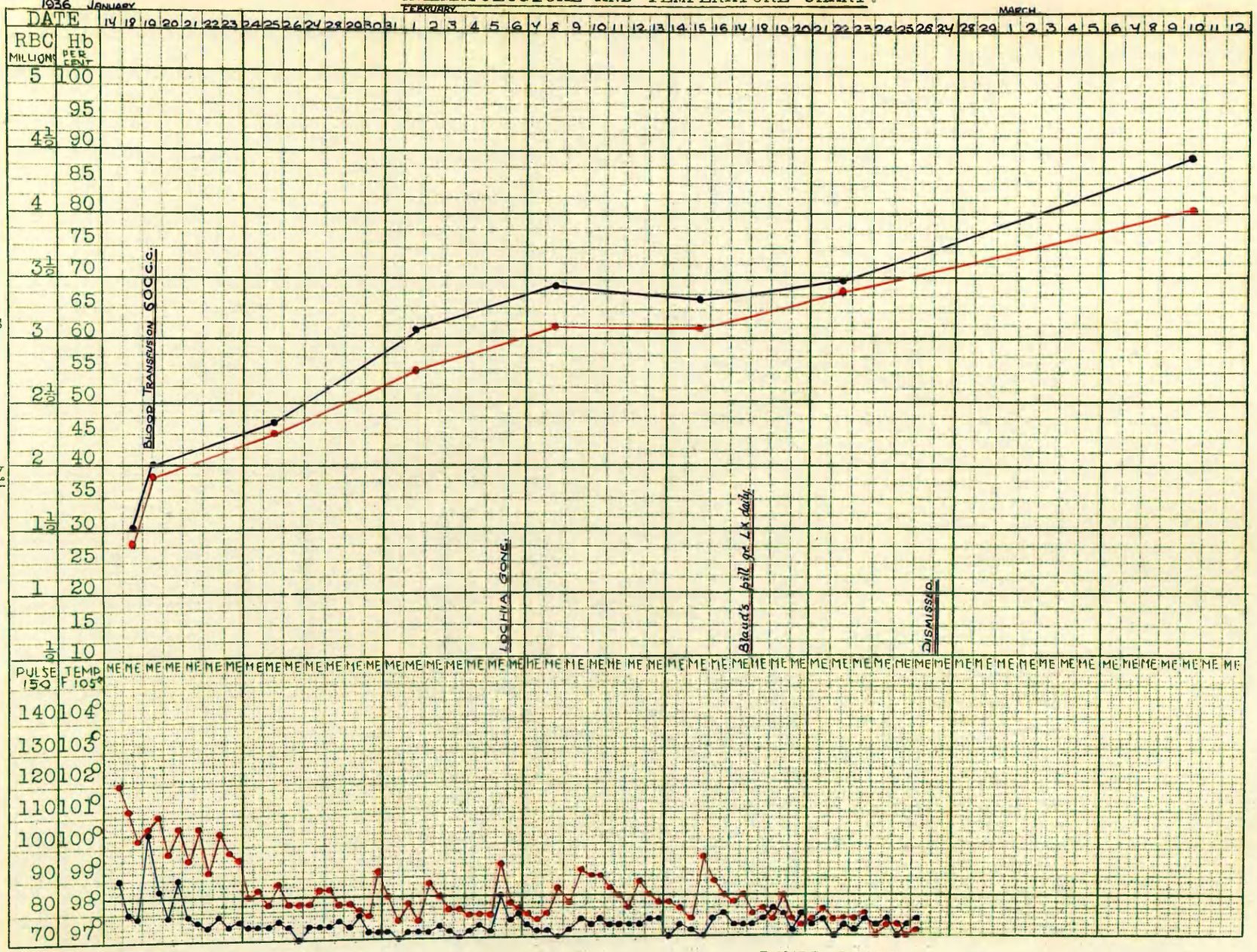
TYPE.
Localised.

MODE OF DELIVERY
Abortion.

TREATMENT.
Intra-uterine glycerine.

For anaemia -
Blood Transfusion, 600 c.c.

Blaud's Pill, gr. lx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Stage of pregnancy: 2 months.
Uterus: Enlarged.
Cervix: Patent.
Lochia: Offensive.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Chorionic tissue removed on admission, followed by rapid elimination of sepsis.

Note: Severe anaemia, with rapid response of blood after transfusion, but incomplete recovery until iron administered.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXVI.

AGE.

34.

PARA.

4.

DISEASE.
Puerperal Sepsis

TYPE.

Localised.

MODE OF DELIVERY

Forceps.

TREATMENT.

Intra-uterine glycerine.

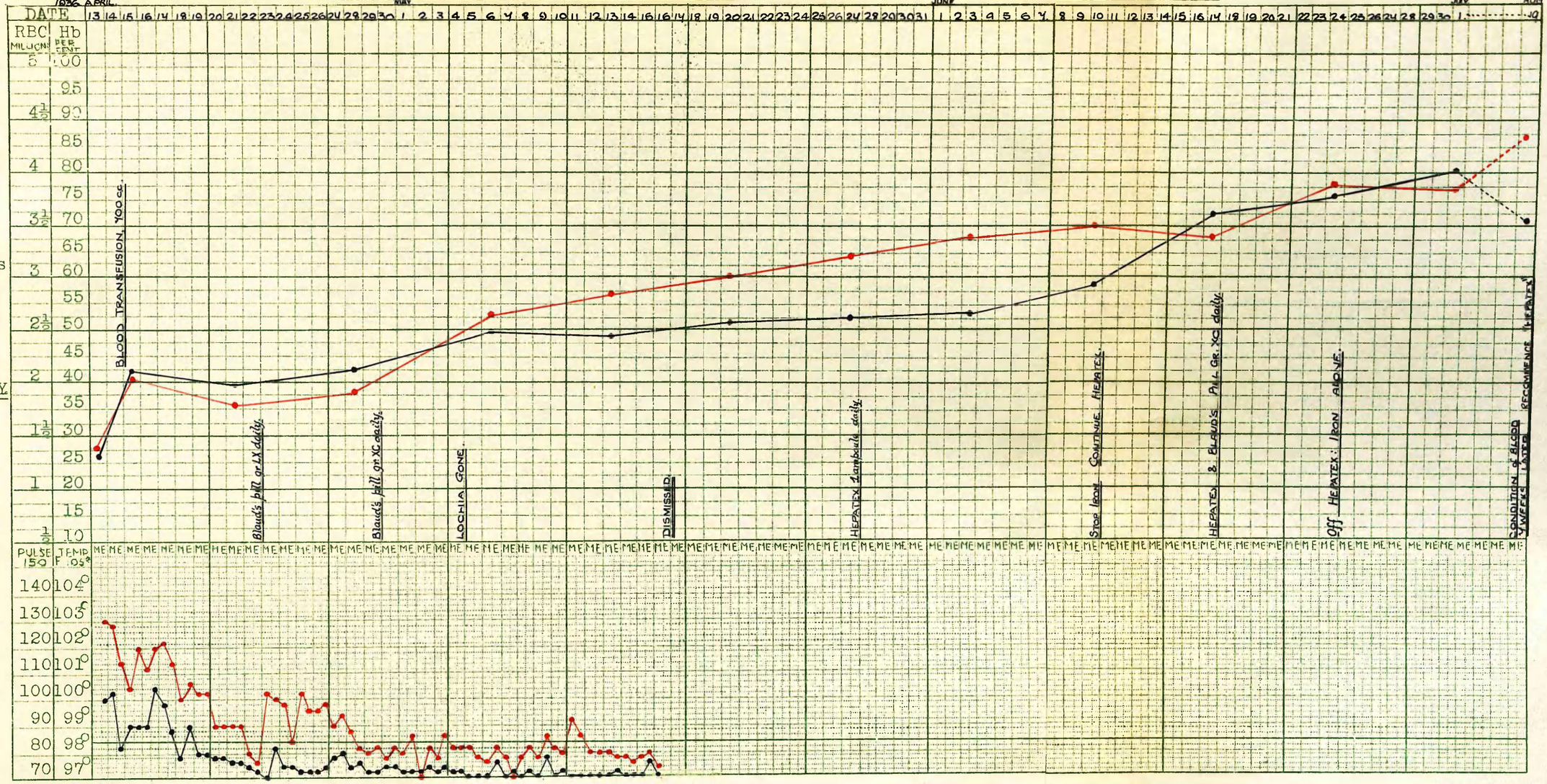
For anaemia -

Blood Transfusion, 700 c.c.

Blaud's Pill, gr. lx daily.

Blaud's Pill, gr. xc daily.

Hepatex.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 1st day of puerperium, with 'weakness'.
Admitted: 6th day of illness.
Perineum: Slightly torn.
Cervix: Small, ulcerated.
Lochia: Profuse and offensive.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Sepsis quickly eradicated by local treatment.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

NOTES.

Note: Severe anaemia on admission, only temporarily improved by transfusion. Massive dosage of iron produced rise in haemoglobin, but not in cell count. Hepatex produced satisfactory result, but relapse occurred on cessation of treatment. Apparently a case of Addison's anaemia.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXVII.

AGE.

36.

PARA.

10.

DISEASE.

Puerperal Sepsis

TYPE.

Phlegmasia.

MODE OF DELIVERY

Normal.

Post partum haemorrhage.

TREATMENT.

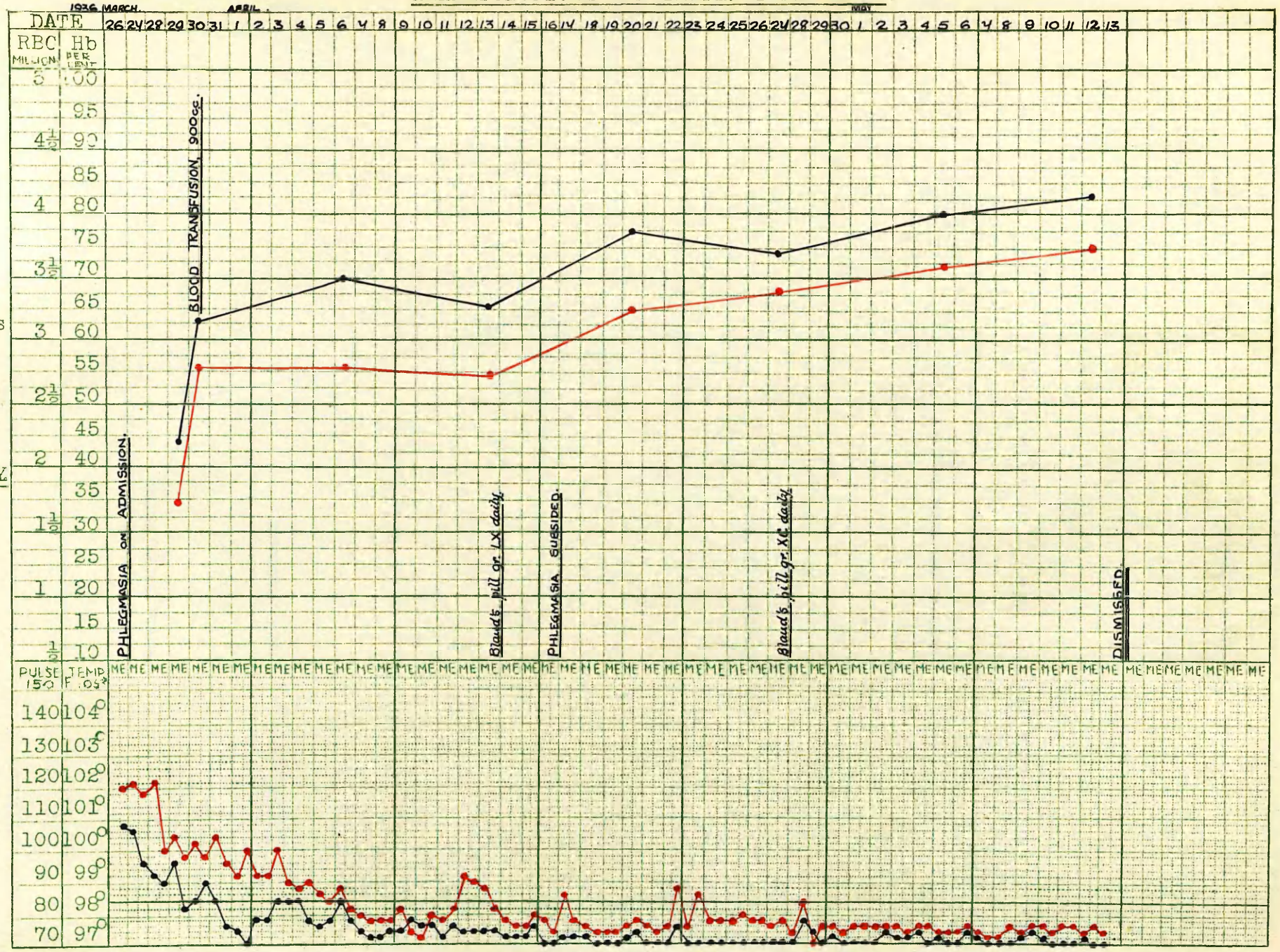
Intra-uterine glycerine.

For anaemia -

Blood Transfusion, 900 c.c.

Blaud's Pill, gr. lx daily.

Blaud's Pill, gr. xc daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 28th day of puerperium, with pain in left leg.
Admitted: 17th day of illness.
Perineum: Intact.
Cervix: Small and firm.
Lochia: Nil.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Phlegmasia subsided after 3 weeks.

Note: Severe anaemia improved by transfusion, but no further rise in haemoglobin value till iron given.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLXVIII.

AGE.
24.

PARA.
1.

DISEASE.
Puerperal Sepsis

TYPE.
Phlegmasia.

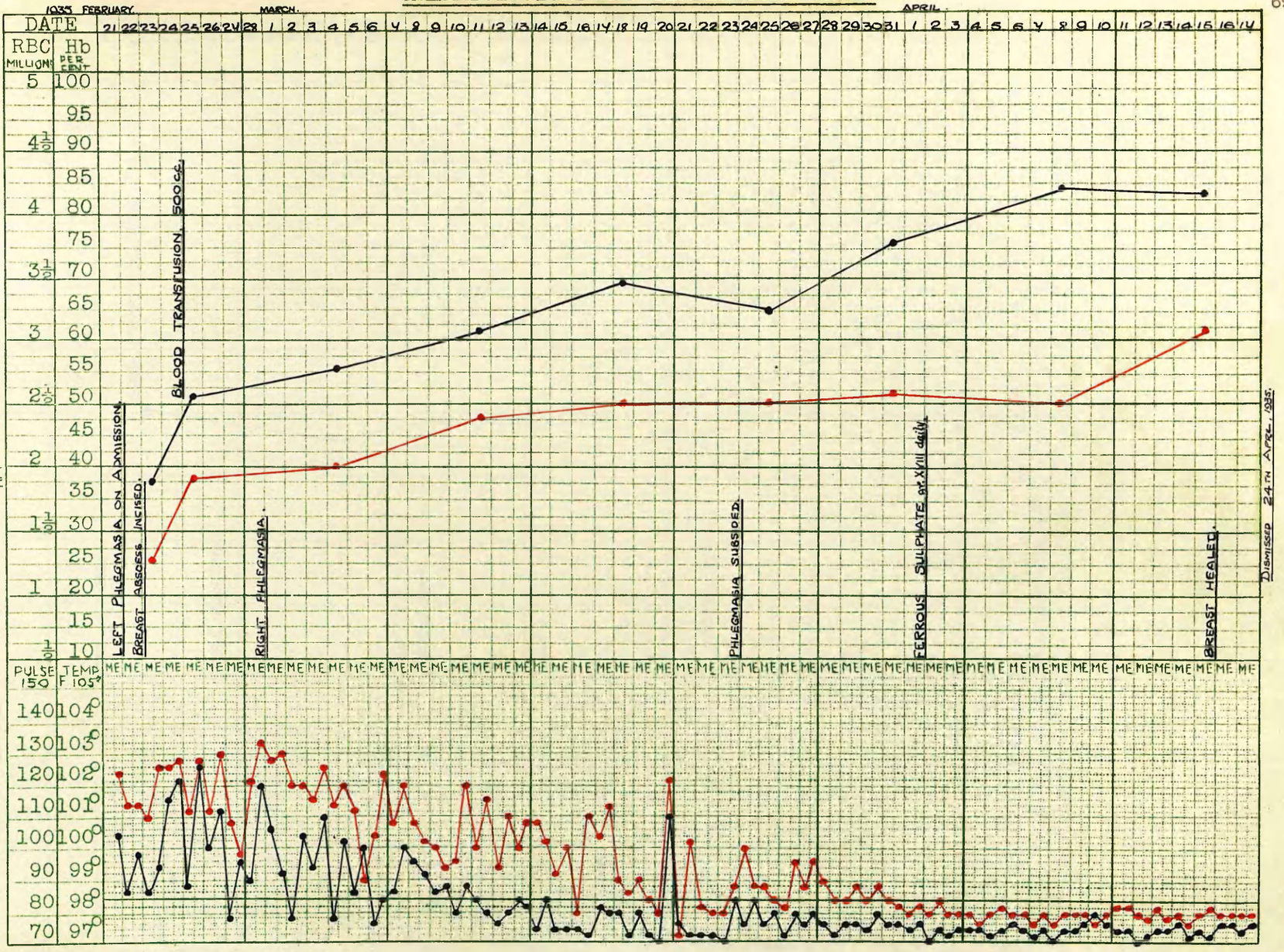
MODE OF DELIVERY.
Normal.

TREATMENT.
Intra-uterine glycerine.

For anaemia -

Blood Transfusion, 500 c.c.

Ferrous Sulphate, gr. xviii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 23rd day of puerperium, with shivering.
Admitted: 6th day of illness.
Perineum: Intact.
Cervix: Small and closed.
Lochia: Nil.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Phlegmasia and mastitis on admission. Phlegmasia active for over 4 weeks.

Note: Severe anaemia, temporarily improved by transfusion, but no improvement in haemoglobin level till iron given.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLXIX.

AGE.
33.

PARA.
5.

DISEASE.
Puerperal Sepsis

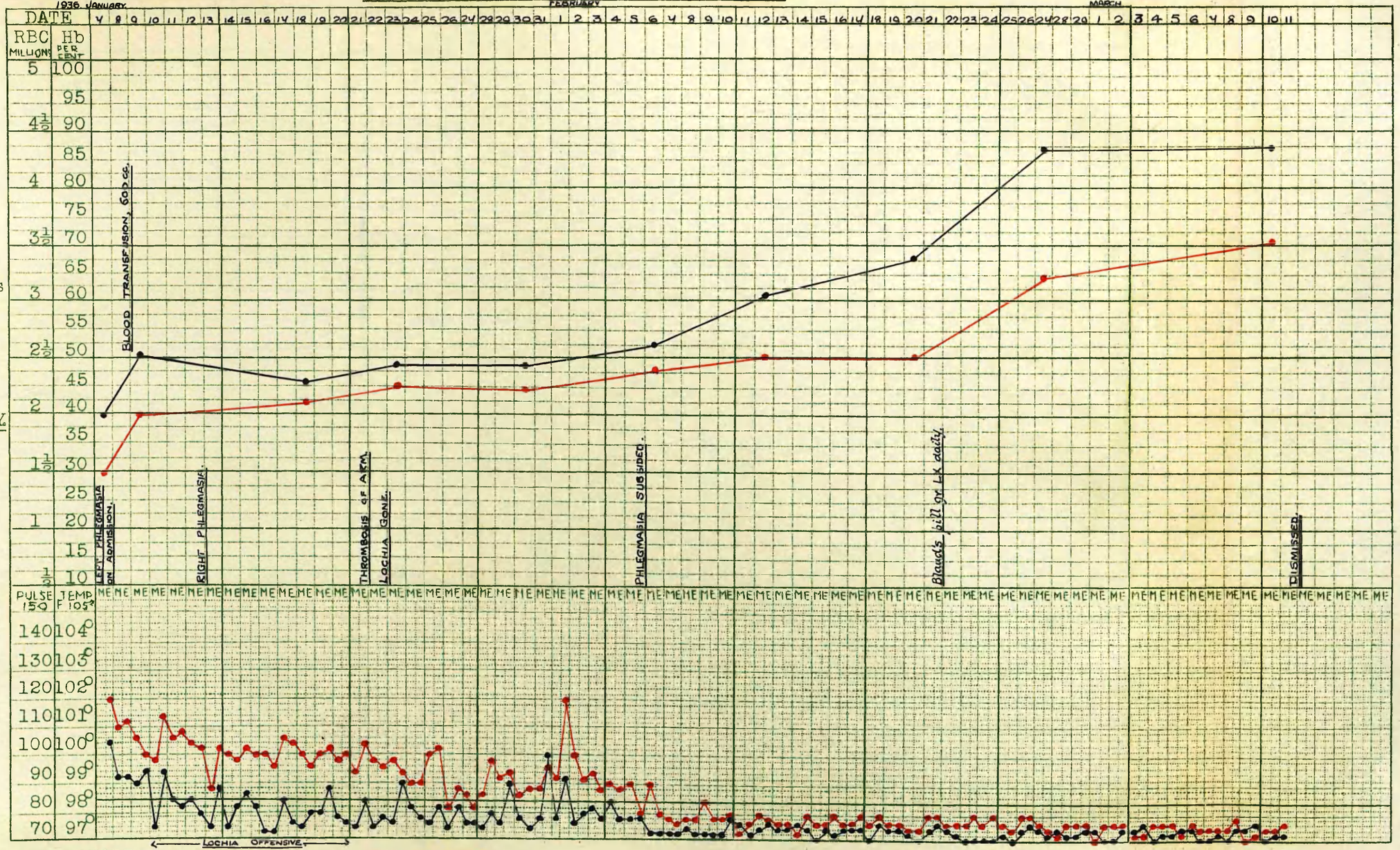
TYPE.
Phlegmasia.

MODE OF DELIVERY.
Normal.

TREATMENT.
Intra-uterine glycerine.

For anaemia -
Blood Transfusion, 600 c.c.

Blaud's Pill; gr. lx daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 9th day of puerperium, with headache.
Admitted: 6th day of illness.
Perineum: Intact.
Cervix: Small, ulcerated.
Lochia: Retained, profuse, offensive.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Phlegmasia complicating localised sepsis, with slightly irregular temperature only, but thrombosis very severe.

Note: Severe anaemia, improved temporarily by transfusion, but no rise in haemoglobin level till iron given.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXX.

AGE.

40.

PARA.

2.

DISEASE.
Puerperal Sepsis

TYPE.

Toxaemia.

MODE OF DELIVERY.

Normal.

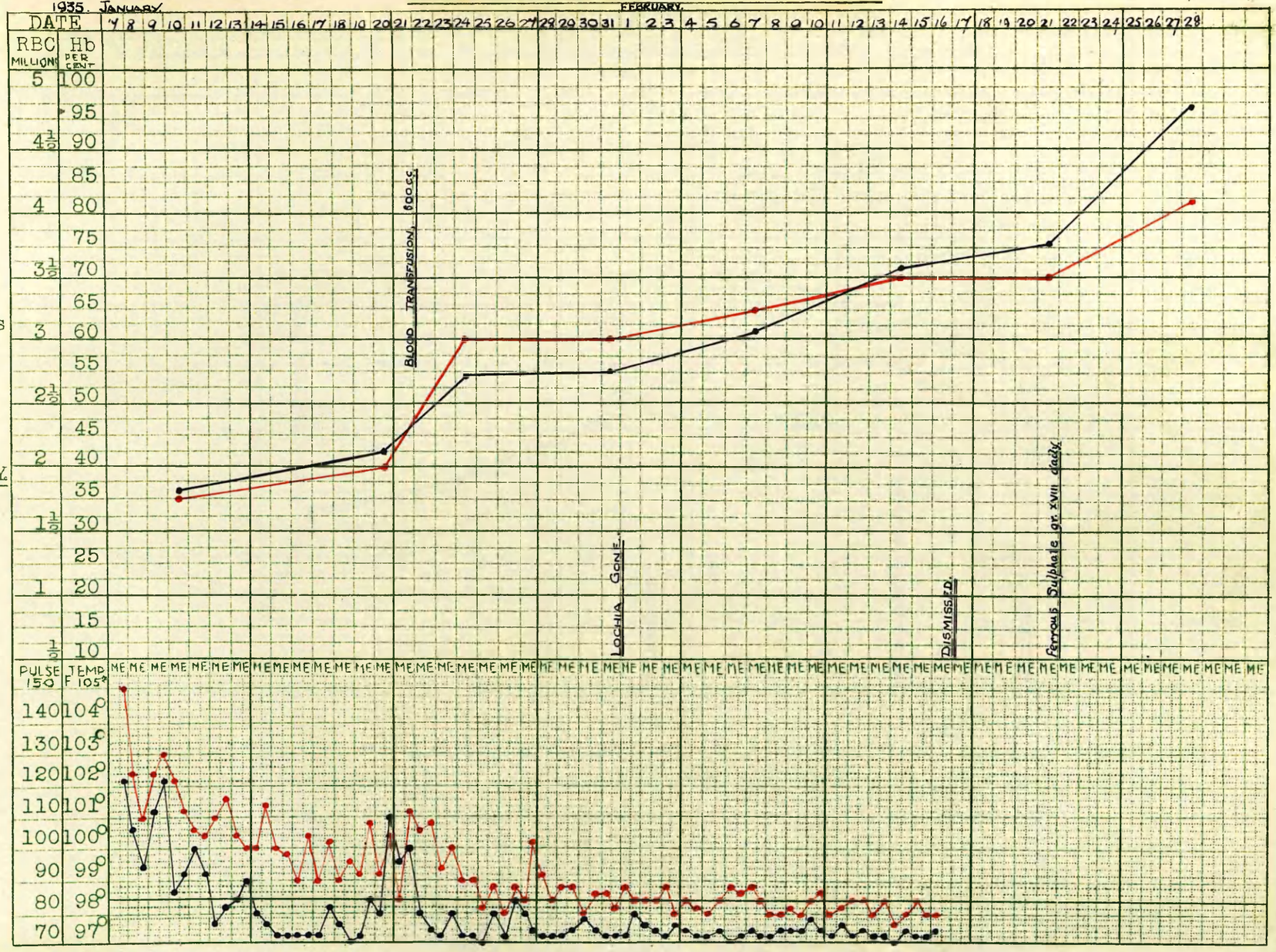
TREATMENT.

Intra-uterine glycerine.

For anaemia -

Blood Transfusion, 600 c.c.

Ferrous Sulphate, gr. xviii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 2nd day of puerperium, with a rigor.
Admitted: 4th day of illness.
Perineum: Slightly torn.
Cervix: Soft and ulcerated.
Lochia: Profuse, blood-stained.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, negative.

Progress: Fairly profound toxaemia for one week.

Note: Good blood recovery after transfusion, but inadequacy of iron.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXI.

AGE.

25.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.

Septicaemia (coliform).

MODE OF DELIVERY

Forceps.

Complete tear.

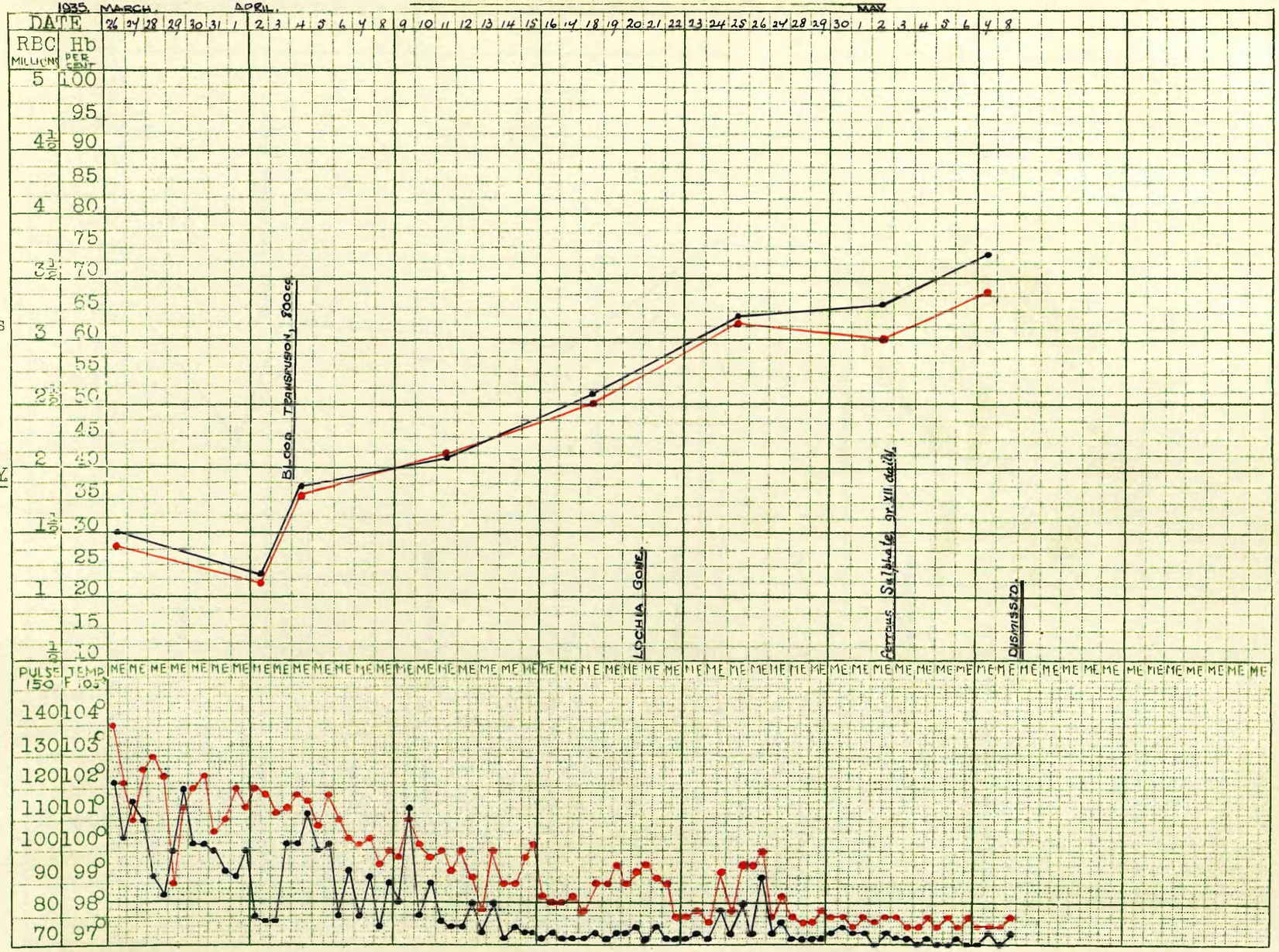
TREATMENT.

Intra-uterine glycerine.

For anaemia -

Blood Transfusion, 800 c.c.

Ferrous Sulphate, gr. xii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 10th day of puerperium, with a rigor.
Admitted: 2nd day of illness.
Perineum: Complete tear.
Cervix: Soft.
Lochia: Profuse and offensive.

Bacteriology: Cervical swab, negative.
Blood culture, coliform bacilli.

Progress: Toxaemia sustained for 3 weeks.

Note: Severe anaemia on admission, accentuated in the 1st week. Blood transfusion followed by steady rise in blood values in spite of continued toxaemia. Iron required to complete blood recovery.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXII.

AGE.

26.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.

Septicaemia (diphtheroid).

MODE OF DELIVERY.

Breech.

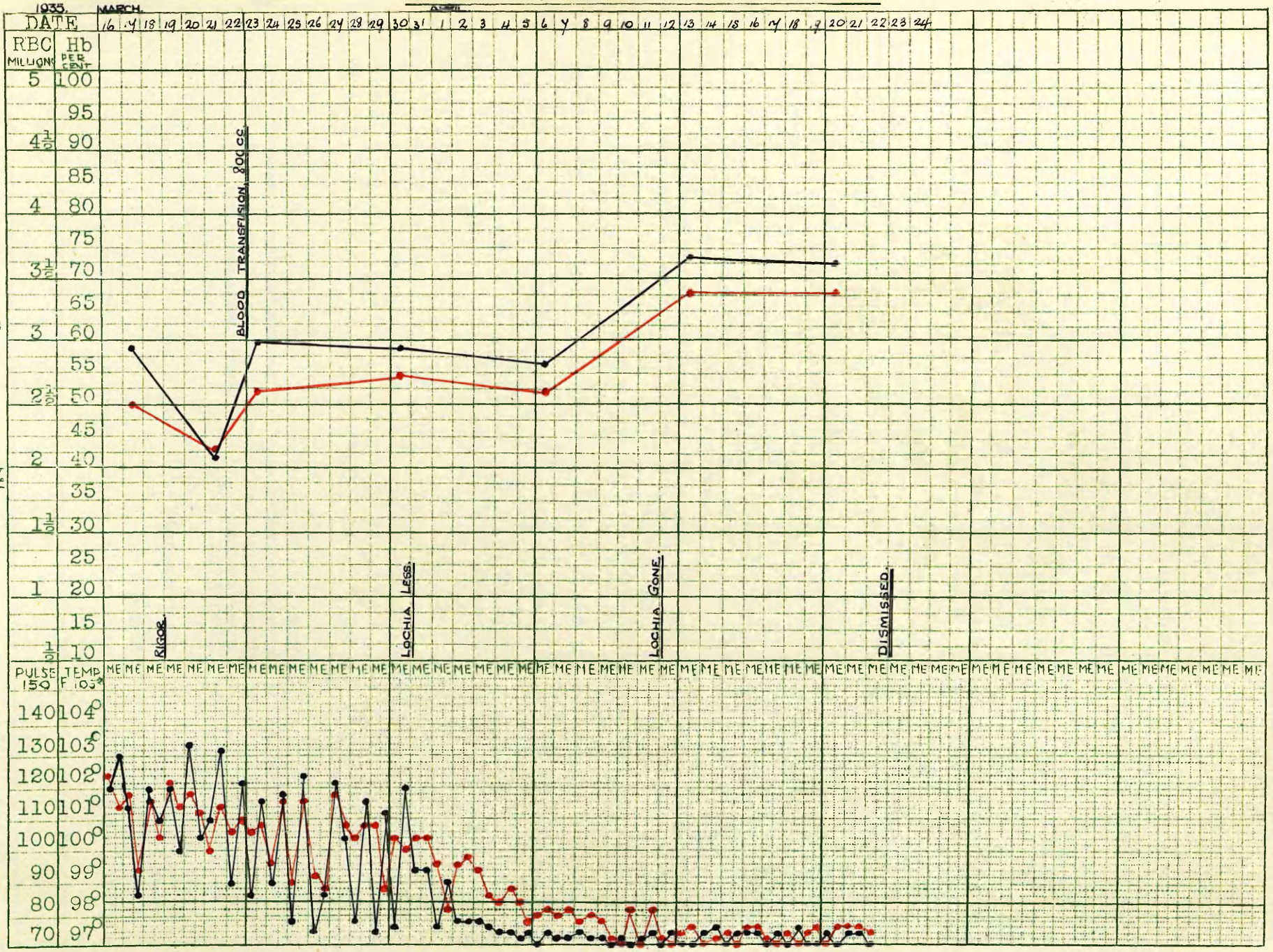
Extensive laceration.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

Blood Transfusion, 800 c.c.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 2nd day of puerperium, with rigor.
Admitted: 4th day of illness.
Perineum: Extensive laceration.
Cervix: Large, lacerated.
Lochia: Profuse.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, diphtheroid bacilli.

Progress: Severe toxaemia for over 2 weeks.

Note: Fall in blood value immediately arrested by transfusion, in spite of continued toxaemia. Blood recovery incomplete from inadequacy of iron.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXIII.

AGE.

24.

PARA.

1.

DISEASE.

Puerperal Sepsis

TYPE.

Septicaemia (streptococcal).

MODE OF DELIVERY

Abortion.

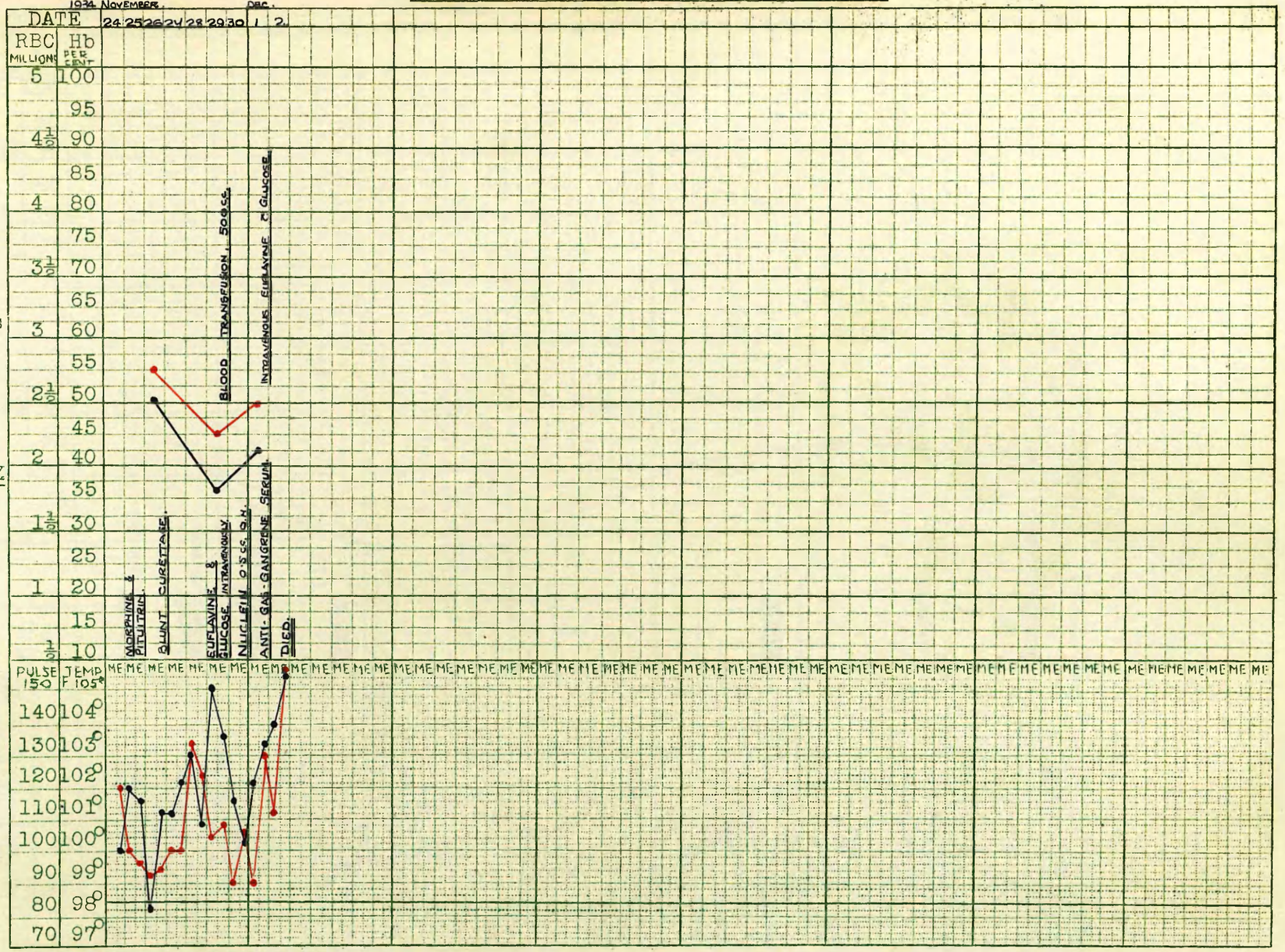
TREATMENT.

Curettage.

Euflavine and glucose intravenously.

For anaemia -

Blood Transfusion, 500 c.c.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Stage of pregnancy: 3 months.
Uterus: Enlarged.
Cervix: Patent.
Lochia: Offensive.

Bacteriology: Cervical swab, negative. Blood culture, coliform bacilli.

Progress: Rigors before and after admission. Debris removed from uterus by blunt curette. Blood transfusion without effect.

Note: Falling blood count, temporarily improved.

Post Mortem Examination: Abscesses in uterine wall, from which haemolytic streptococci isolated.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXIV.

AGE.

31.

PARA.

1.

DISEASE.

Puerperal Sepsis

TYPE.

Septicaemia (coliform and streptococcal).

MODE OF DELIVERY

Craniotomy.

Eclampsia.

TREATMENT.

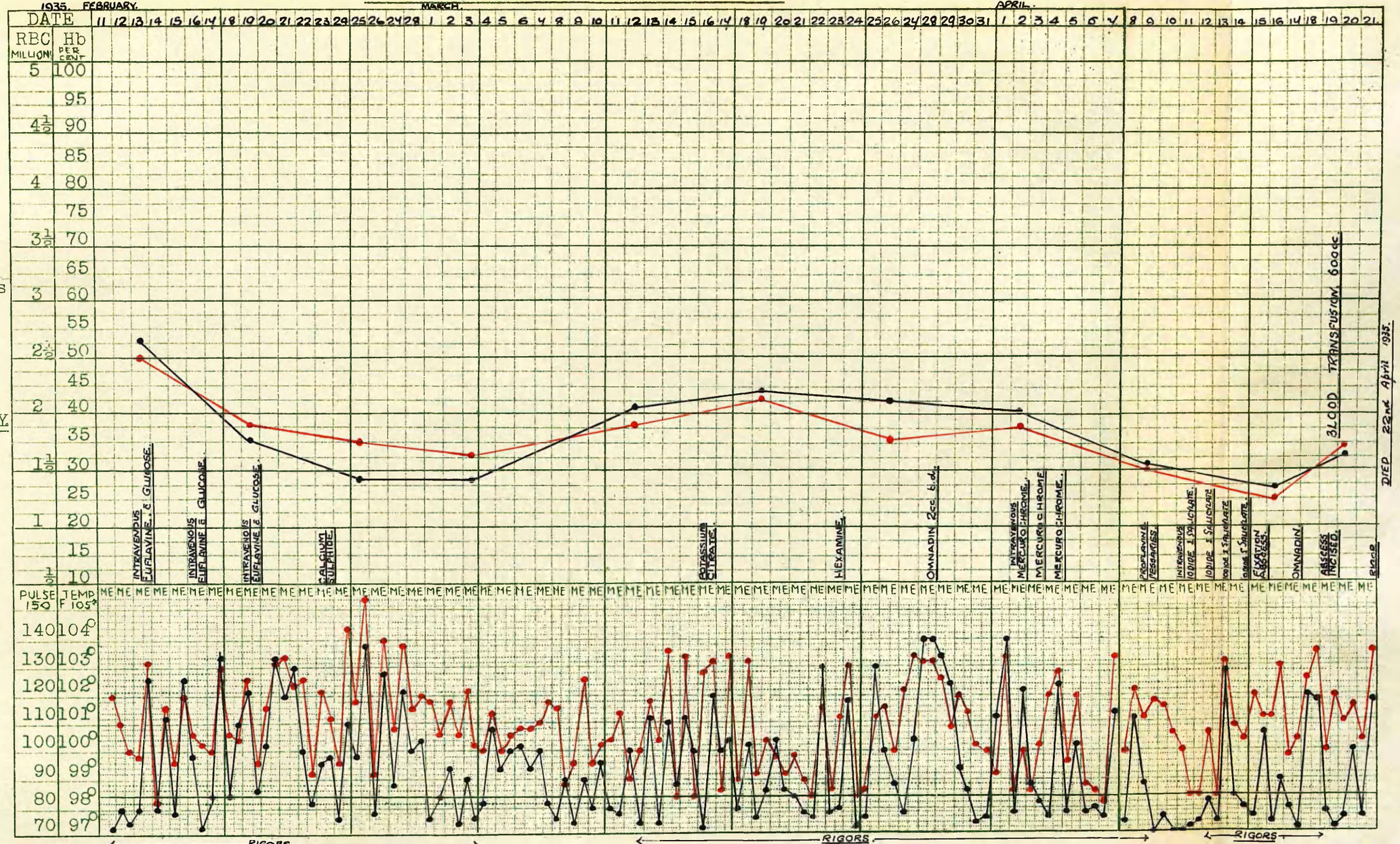
Intra-uterine glycerine.

Intravenous anti-septics.

Fixation abscess.

For anaemia -

Blood Transfusion.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 1st day of puerperium, with shivering.
Admitted: 9th day of illness.
Perineum: Complete tear, septic.
Vagina: Lacerated.
Cervix: Large and soft.
Lochia: Profuse, brownish.

Bacteriology: Cervical swab, negative.
Blood culture, bacillus coli.
Urine, bacillus coli.

Progress: Frequent rigors after admission, uninfluenced by intravenous anti-septics. Ascending renal infection also occurred.

Note: Fall in blood values gradual, and temporarily improved till renal infection occurred. Cessation of rigors for a few days after transfusion, but died suddenly after a rigor 3 days later.

Post-mortem Examination:-

Uterus fairly clean. Haemolytic streptococci and bacillus coli communis in uterus, and haemolytic streptococci in spleen.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXV.

AGE.

18.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.
Septicaemia (coliform and streptococcal).

MODE OF DELIVERY

Abortion.

TREATMENT.

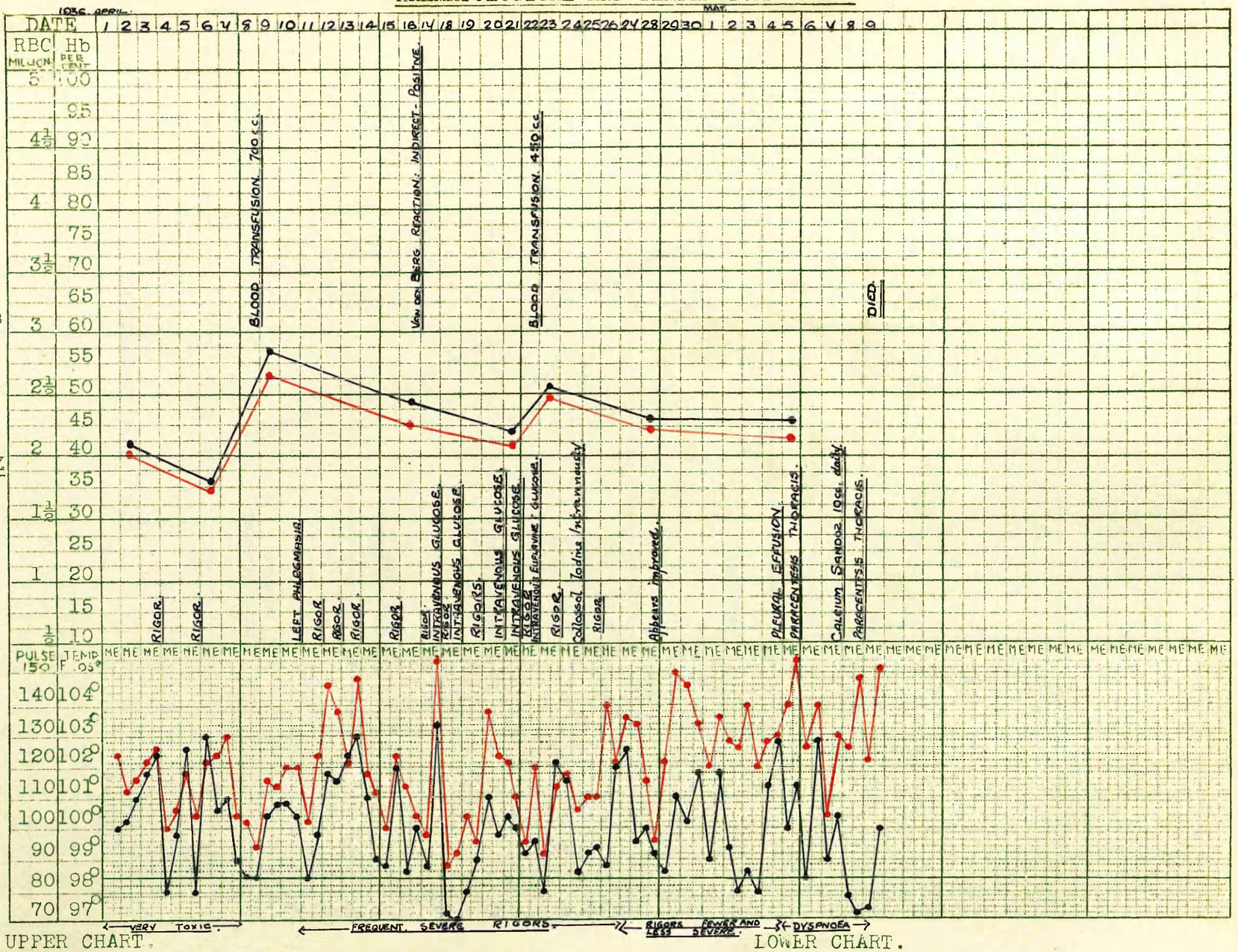
Intra-uterine glycerine.

Intravenous antiseptics.

Paracentesis thoracis.

For anaemia -

Blood Transfusions.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Stage of pregnancy: 4th month.
Uterus: Slightly enlarged.
Cervix: Soft and open.
Lochia: Purulent, with debris.

Bacteriology: Cervical swab, negative. Blood culture, coliform bacilli.

Progress: Rigors after admission. Phlegmasia occurred in 2nd week. Appeared to be improving in 5th week, when pleural effusion developed, aspiration of which gave temporary relief only.

Note: Fall in blood values continued at the same rate after the transfusion as before, indicating an unsuccessful result. Second transfusion followed by slowing down of the blood destruction.

Post Mortem Examination: Uterus small, but walls unhealthy and contained haemolytic streptococci. Cavities in lung, section of which showed small round cell infiltration.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXVI.

AGE.

22.

PARA.

2.

DISEASE.
Puerperal Sepsis

TYPE.

Septicaemia
(coliform).

MODE OF DELIVERY.

Normal.

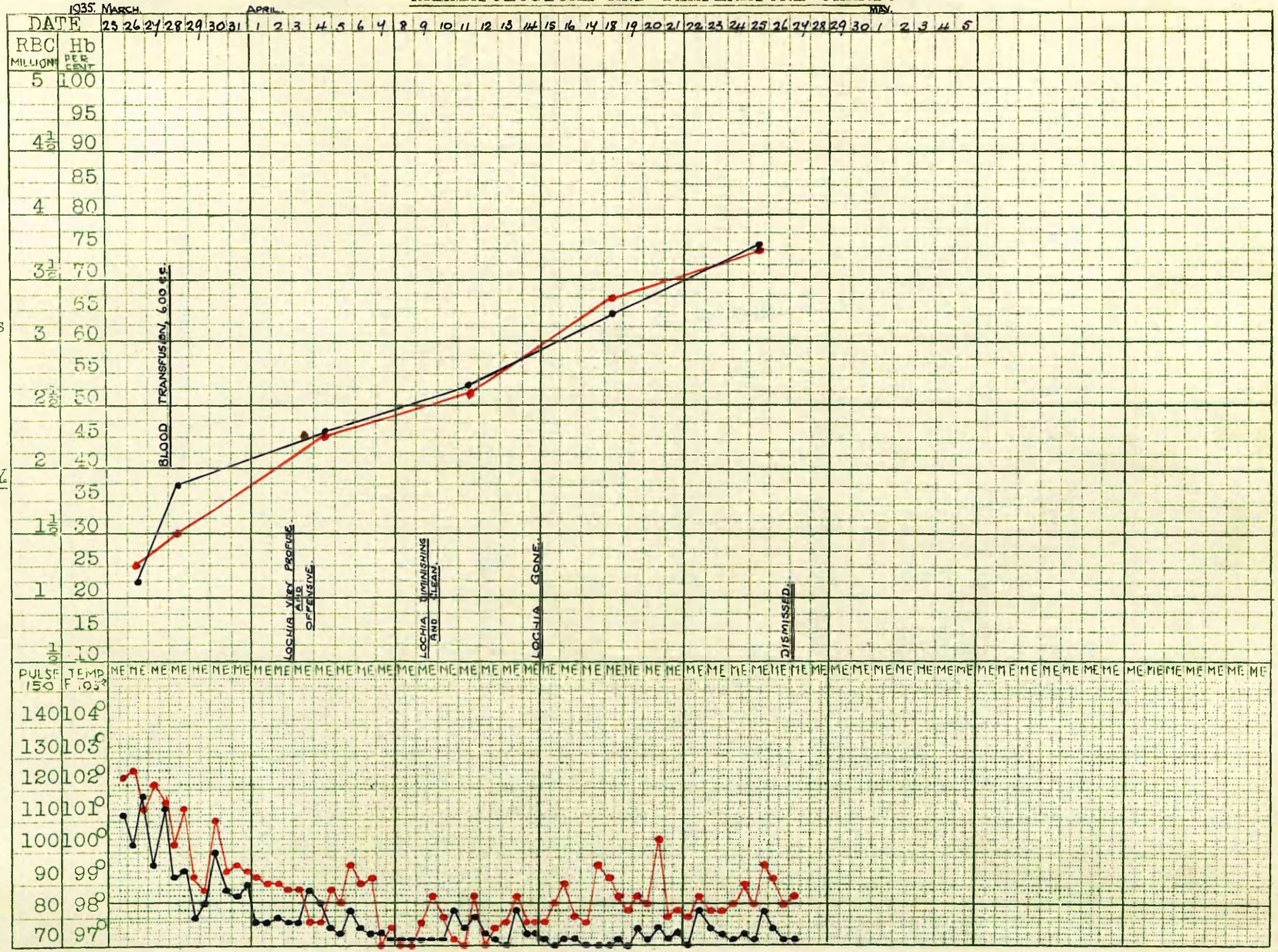
Post partum
haemorrhage.

TREATMENT.

Intra-uterine
glycerine.

For anaemia -

Blood Transfusion,
600 c.c.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 4th day of puerperium, with pyrexia.
Admitted: 3rd day of illness.
Perineum: Slightly torn.
Cervix: Large and ulcerated.
Lochia: Profuse, offensive.

Bacteriology: Cervical swab, negative.
Blood culture, coliform bacilli.

Progress: Gradual fall in temperature over 2 weeks.

Note: Severe anaemia on admission, with very good recovery after transfusion, while sepsis still active.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXVII.

AGE.

20.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.

Toxaemic.

MODE OF DELIVERY

Normal.

(Accidental haemorrhage).

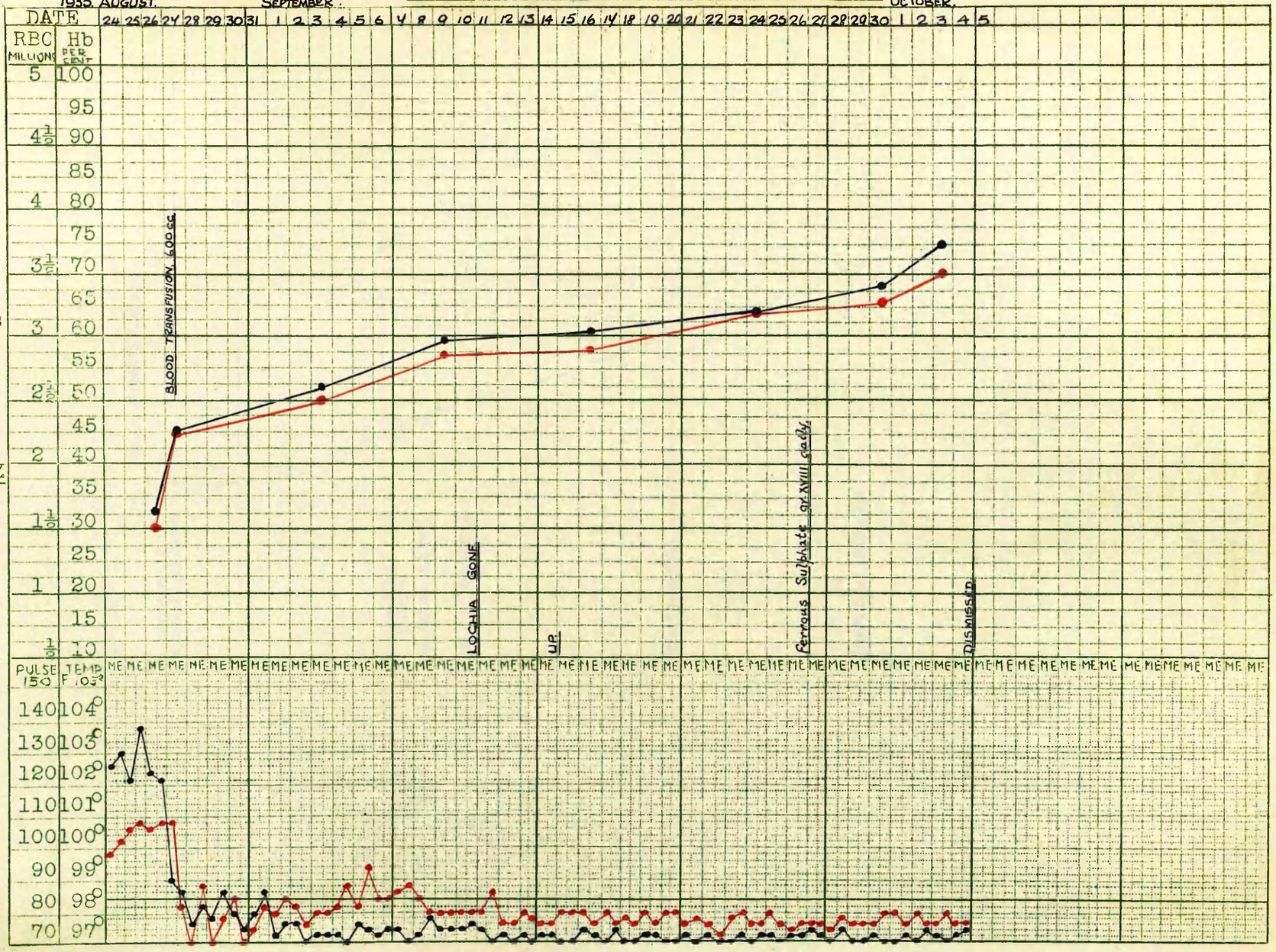
TREATMENT.

Intra-uterine glycerine.

For anaemia -

Blood Transfusion, 600 c.c.

Ferrous Sulphate, gr. xviii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 4th day of puerperium, with pyrexia.
Admitted: 1st day of illness.
Perineum: Slightly torn.
Cervix: Large, soft, ulcerated, with surface necrosis.
Lochia: Haemorrhagic.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Profound toxaemia for first few days, but temperature fell before transfusion given.

Note: Severe anaemia, with rapid blood recovery, later becoming slow until iron given.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLXXVIII.

AGE.
41.

PARA.
5.

DISEASE.
Puerperal Sepsis

TYPE.
Toxaemic with Phlegmasia.

MODE OF DELIVERY.
Forceps.

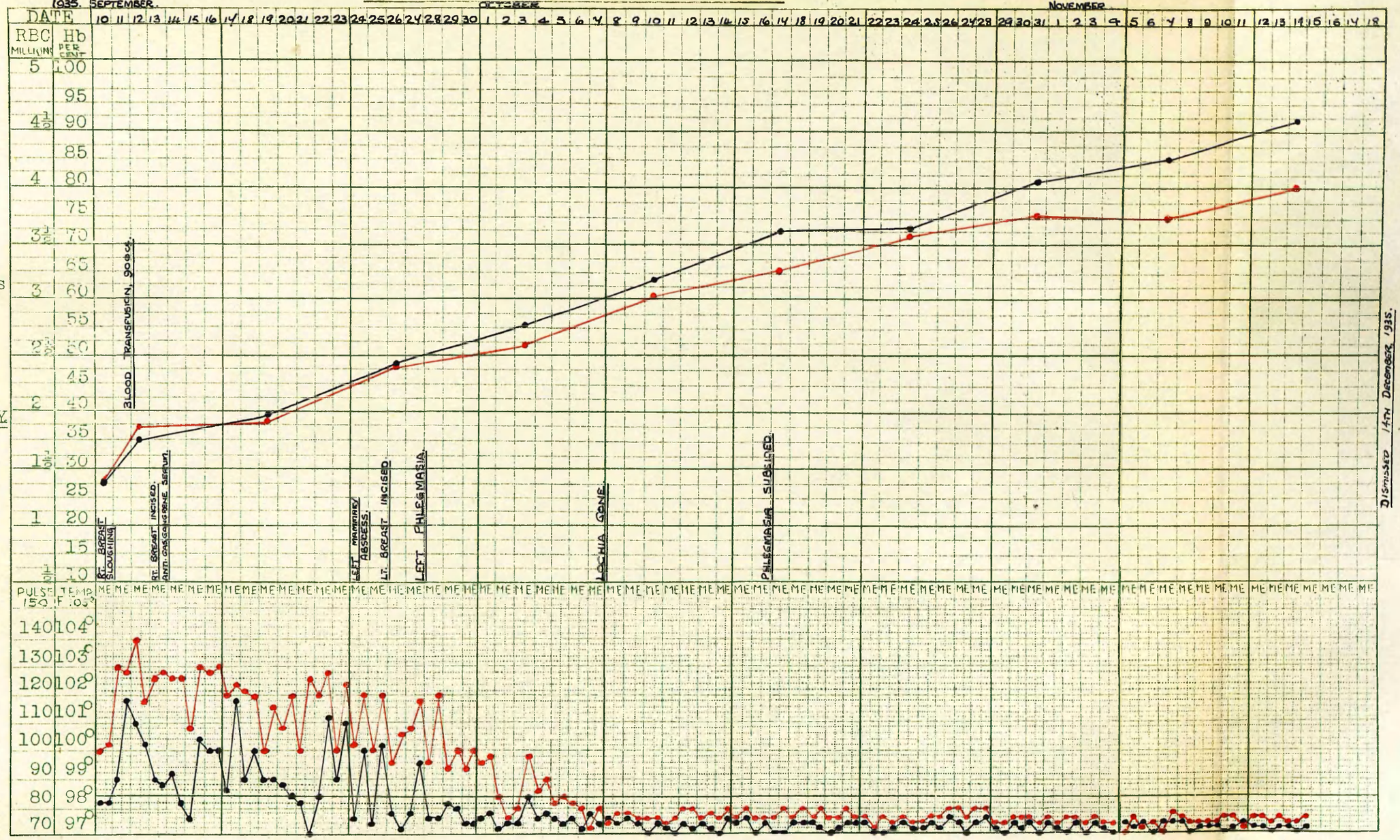
Placenta Praevia.

TREATMENT.
Intra-uterine glycerine.

Anti-gas-gangrene serum.

For anaemia -

Blood Transfusion, 900 c.c.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 1st day of puerperium, with collapse.
Admitted: 4th day of illness.
Perineum: Slightly torn.
Cervix: Large, soft, ulcerated.
Lochia: Profuse, offensive.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Cellulitis right breast following subcutaneous saline given for collapse after post partum haemorrhage. Intra-uterine sepsis also present, with fair degree of toxaemia. Phlegmasia occurred in 3rd week.

Note: Steady rise in blood values after transfusion, in spite of continued toxaemia. Slight fall in colour index from inadequacy of iron.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXIX.

AGE.

35.

PARA.

6.

DISEASE.

Puerperal Sepsis

TYPE.

Toxaemic.

MODE OF DELIVERY

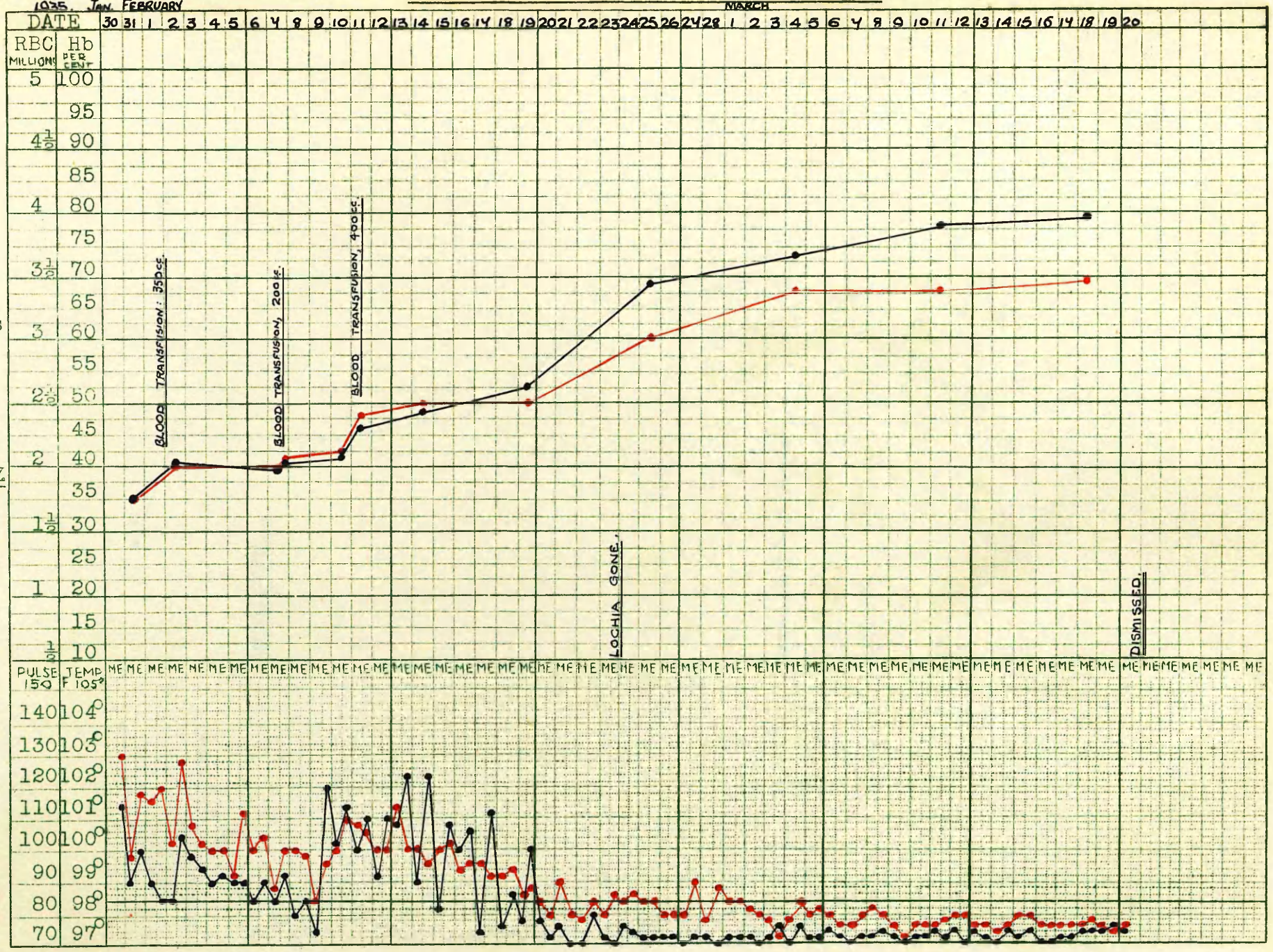
Breech.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

Repeated transfusions.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 4th day of puerperium, with pyrexia.
Admitted: 2nd day of illness.
Perineum: Intact.
Cervix: Large, soft, ulcerated.
Lochia: Profuse.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, negative.

Progress: Fairly severe toxaemia for 3 weeks.

Note: Severe anaemia. Repeated small transfusions produced a steady rise in the blood values during active sepsis. Inadequacy of iron apparent in convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXX.

AGE.

30.

PARA.

1.

DISEASE.

Puerperal Sepsis

TYPE.

Septicaemia (coliform).

MODE OF DELIVERY

Forceps.

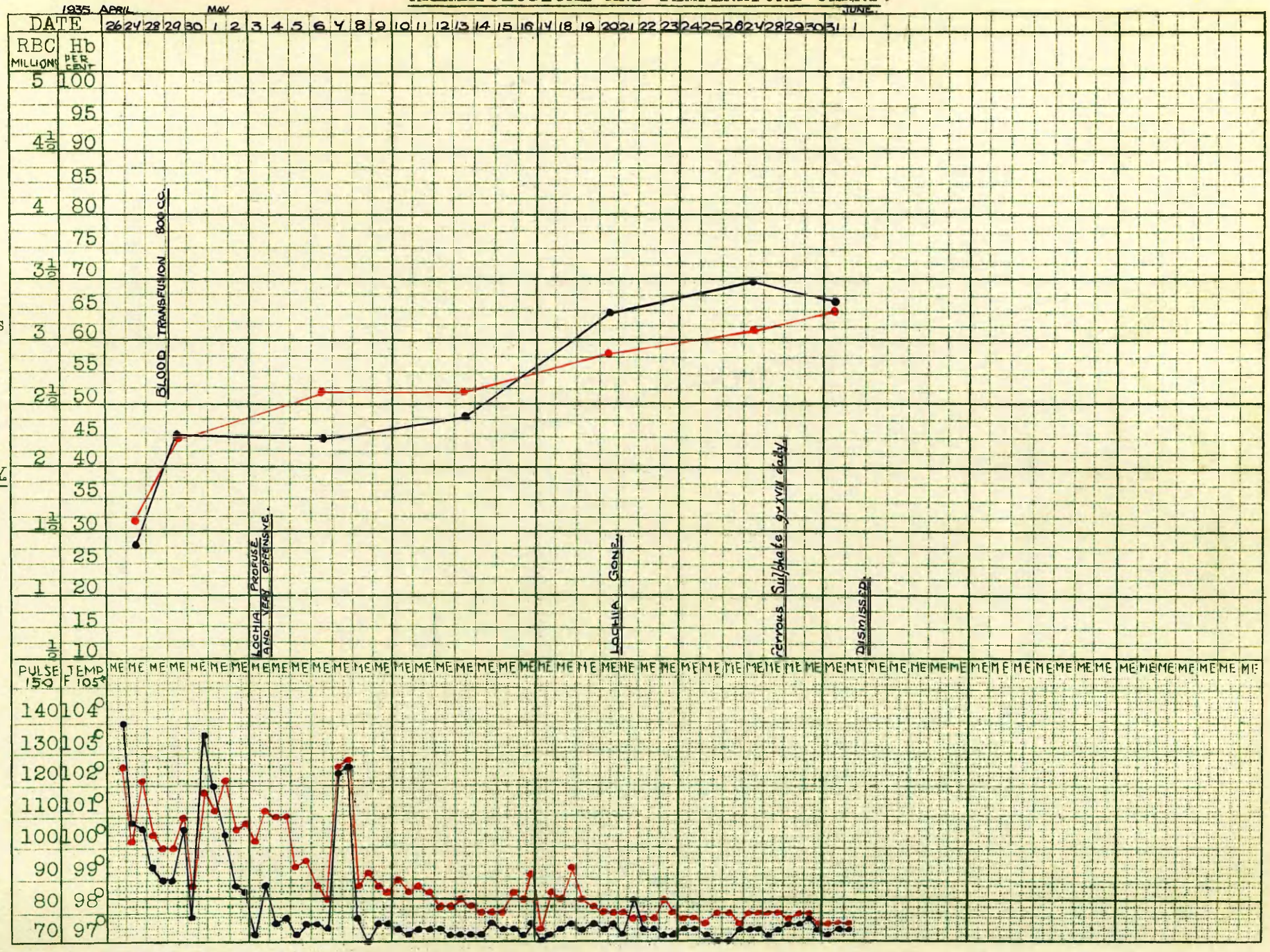
TREATMENT.

Intra-uterine glycerine.

For anaemia -

Blood Transfusion, 800 c.c.

Ferrous Sulphate, gr. xviii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 1st day of puerperium, with headache.
Admitted: 4th day of illness.
Perineum: Intact.
Vagina & Vulva: Lacerated.
Cervix: Soft, septic, ulcerated.
Lochia: Profuse, offensive.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, coliform bacilli.

Progress: Toxaemia sustained for 2 weeks.

Note: No fall in blood values after transfusion, in spite of severe toxaemia. Inadequacy of iron in convalescence.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLXXXI.

AGE.
32.

PARA.
6.

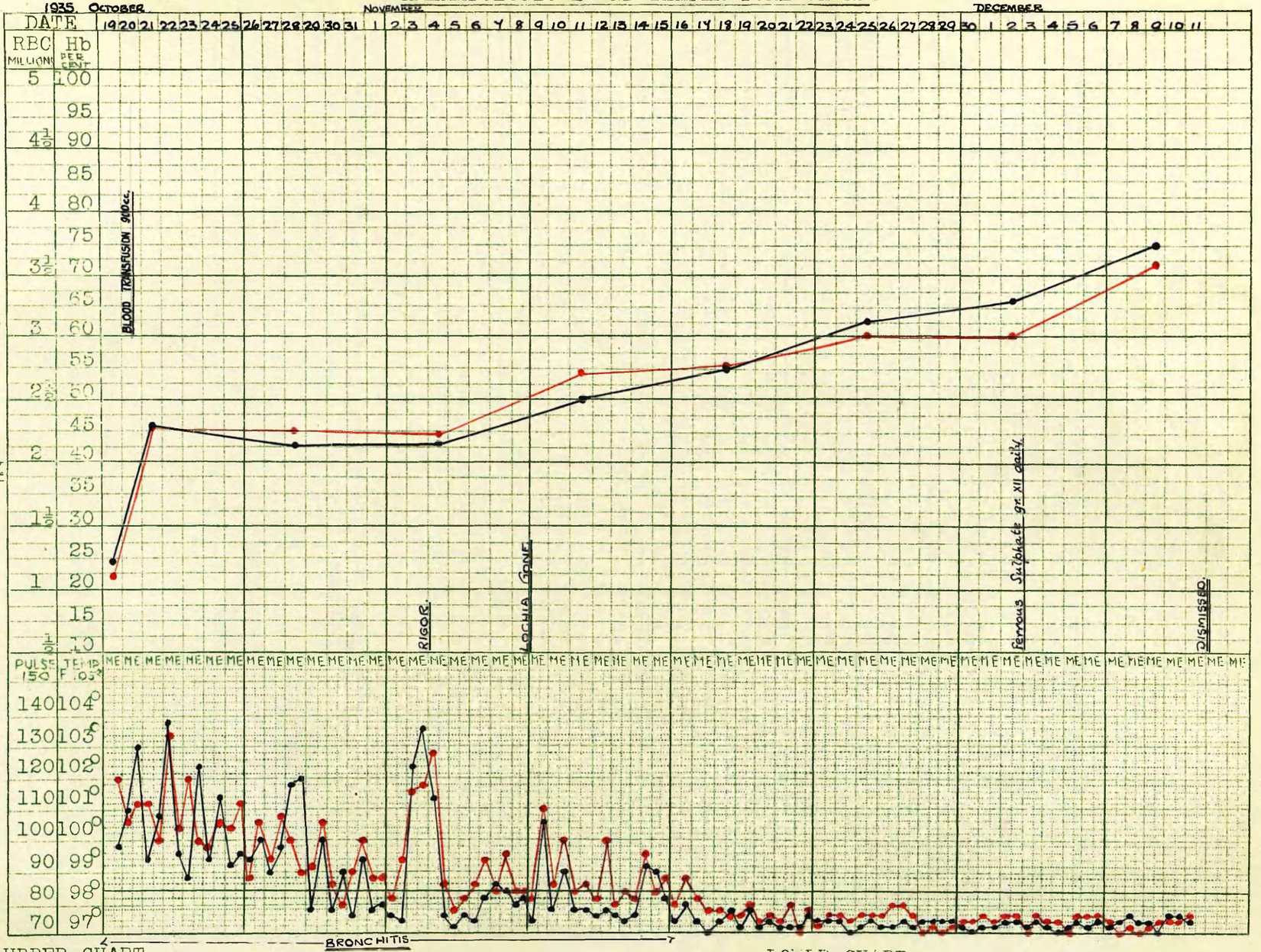
DISEASE.
Puerperal Sepsis

TYPE.
Toxaemic.

MODE OF DELIVERY
Abortion.
Haemorrhage.

TREATMENT.
Intra-uterine glycerine.

For anaemia -
Blood Transfusion, 900 c.c.
Ferrous Sulphate, gr. xii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Stage of pregnancy: 9 weeks.
Uterus: Enlarged.
Cervix: Patent.
Lochia: Haemorrhagic, with debris.

Bacteriology: Cervical swab, negative.
Blood culture, negative.

Progress: Toxaemia persisted for 4 weeks.

Note: Severe anaemia, very considerably improved by transfusion, and followed by no fall in blood value in spite of severe sustained toxaemia.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXXII.

AGE.

26.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.

Septicaemia (coliform).

MODE OF DELIVERY

Forceps.

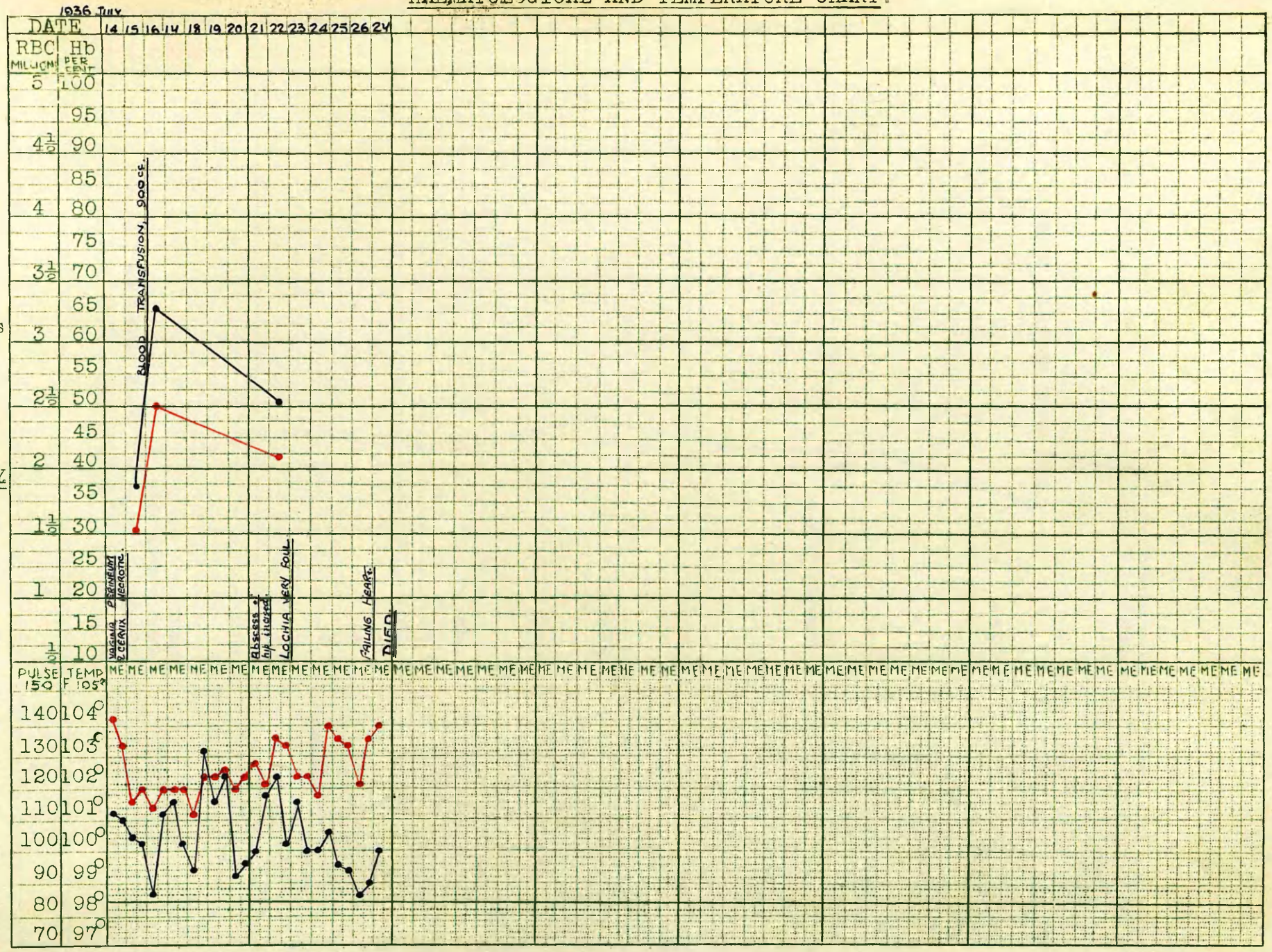
Extreme tearing.

TREATMENT.

Vaginal tampons.

For anaemia -

Blood Transfusion, 900 c.c.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 1st day of puerperium, with collapse.
Admitted: 7th day of illness.
Perineum: Posterior vaginal wall and perineum completely sloughed away, and anterior vaginal wall necrotic.
Cervix: Sloughing. External os not found.
Lochia: Offensive.

Bacteriology: Cervical swab, not obtained. Blood culture, bacillus coli faecalis alkaligenes.

Progress: Extreme tearing of genitalia due to repeated attempts at forceps delivery in a rachitic subject. Transfusion followed by temporary improvement in general condition, but gradually declined and died.

Note: Fall in blood value after transfusion.

Post Mortem Examination: Uterine mucosa necrotic, with abscesses in muscular layer. Coliform bacilli in swabs from uterus and spleen.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXXIII.

AGE.

19.

PARA.

1.

DISEASE.
Puerperal Sepsis

TYPE.

Septicaemia (clinical).

MODE OF DELIVERY

Forceps.

Post partum haemorrhage.

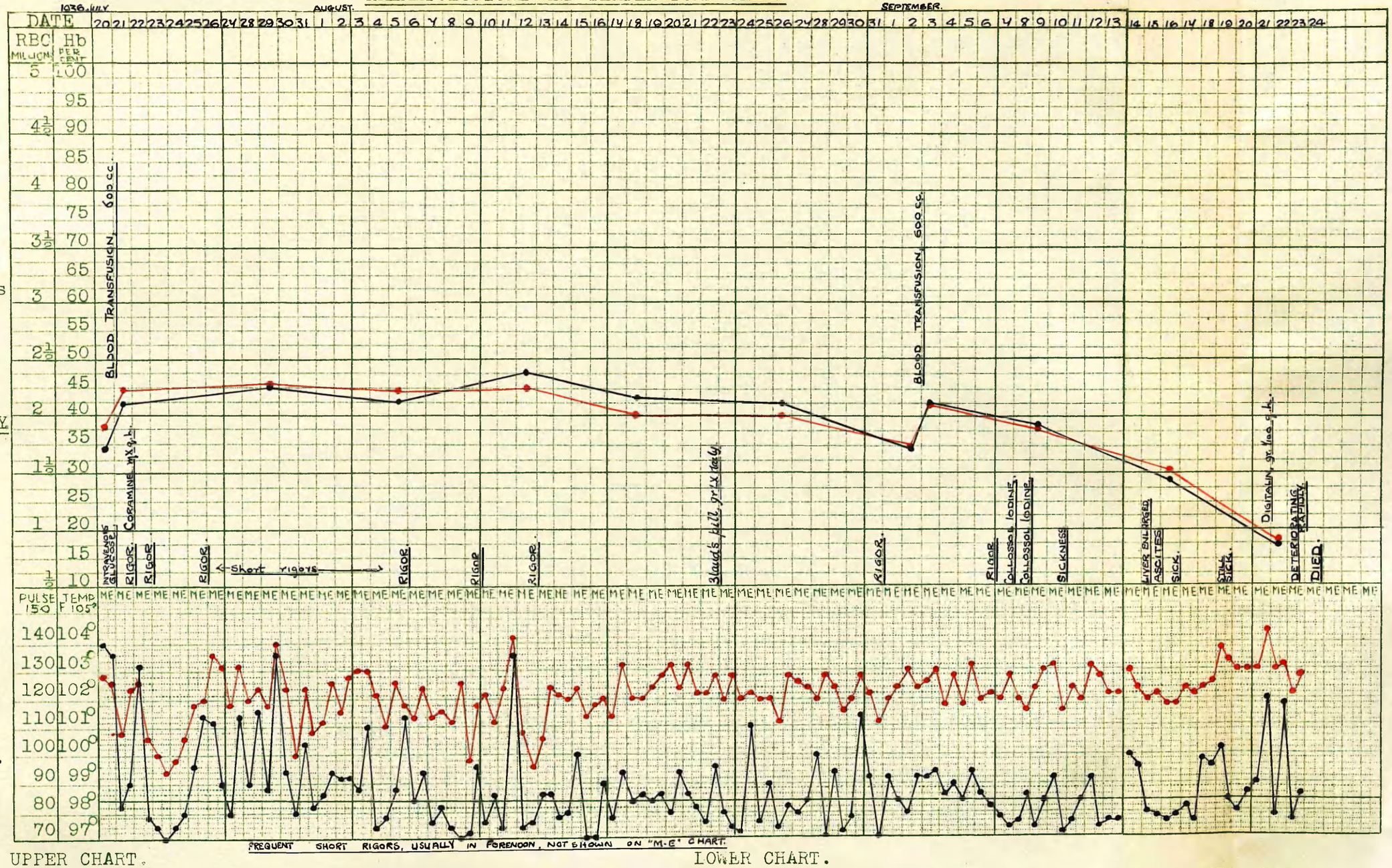
TREATMENT.

Intra-uterine glycerine.

Collossol Iodine.

For anaemia -

Blood Transfusions.



FREQUENT SHORT RIGORS, USUALLY IN FORENOON, NOT SHOWN ON "M-E" CHART.

UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

ture; RED:- Pulse.

CLINICAL NOTES.

Onset: 8th day of puerperium, with shivering.
Admitted: 5th day of illness.
Perineum: 2nd degree tear.
Cervix: Soft, lacerated.
Lochia: Haemorrhagic.

Bacteriology: Cervical swab, negative. Blood culture, negative.

Progress: Extremely ill on admission, with cardiac decompensation. Evidence of cardiac inefficiency throughout whole illness. Enlarged liver and ascites before death.

Note: Improvement in blood after first transfusion sustained for several weeks. Fall in blood values continued after 2nd transfusion.

Post Mortem Examination: Ascites, and nutmeg liver. Kidneys pale. Uterus small, but abscesses in muscular layer. Heart: myocarditis only.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXXIV.

AGE.

27.

PARA.

1.

DISEASE.

Puerperal Sepsis

TYPE.

Septicaemia (clinical).

MODE OF DELIVERY

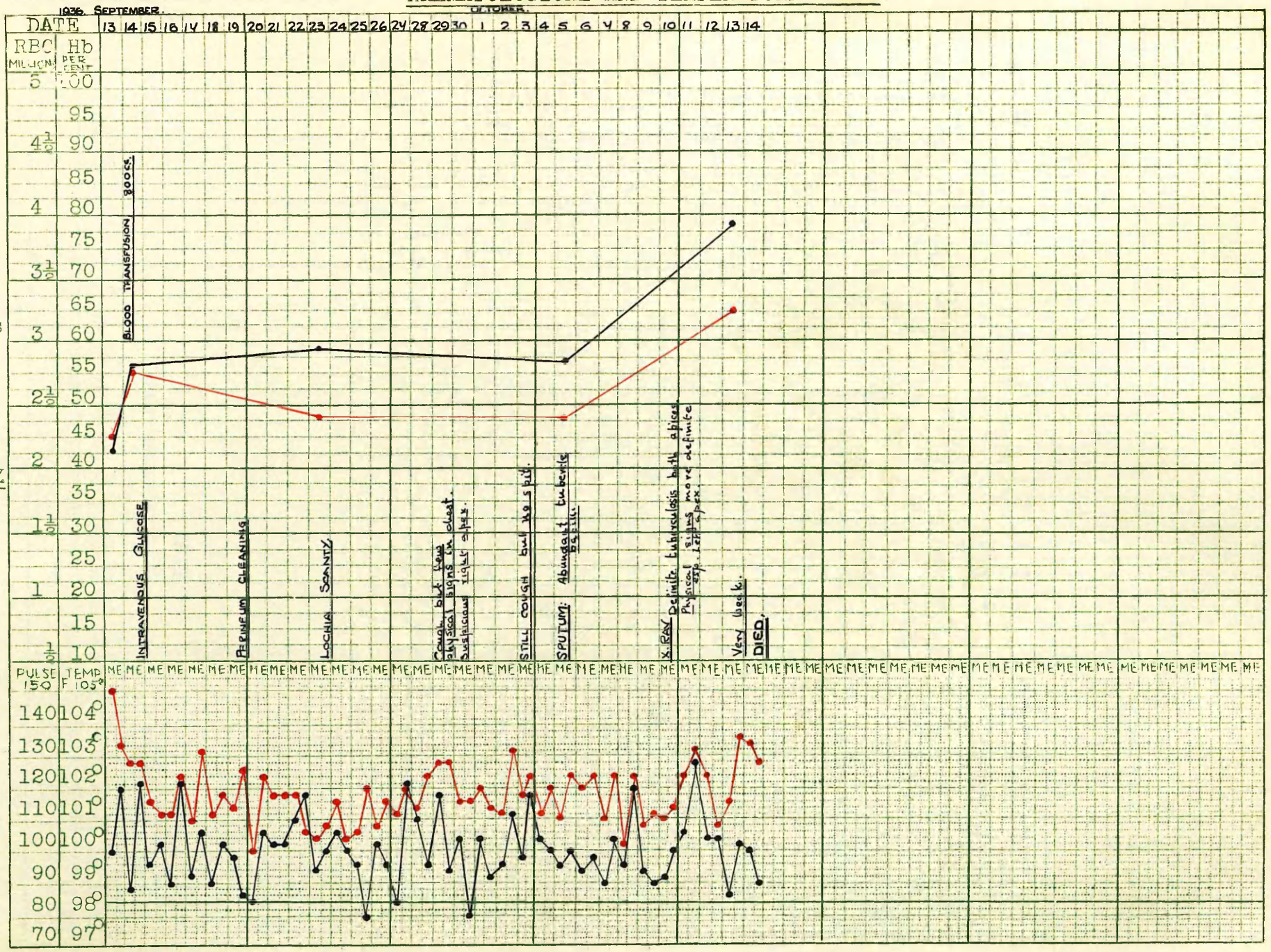
Forceps.
Post partum haemorrhage.
Extreme tearing.

TREATMENT.

Intra-uterine glycerine.

For anaemia -

Blood Transfusion.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

C L I N I C A L N O T E S.

Onset: 2nd day of puerperium, with pyrexia.
Admitted: 3rd day of illness.
Perineum: 2nd degree tear, septic.
Vagina: Lacerated, sloughing.
Cervix: Swollen and ulcerated.
Lochia: Profuse, brownish.

Bacteriology: Cervical swab, negative.
Blood culture, negative.
Sputum, abundant tubercle bacilli.

X-ray: Tuberculosis both upper lobes.

Progress: Sepsis eradicated fairly quickly, but pyrexia continued as a result of rapidly advancing pulmonary tuberculosis.

Note: Blood value rose after sepsis eradicated, in spite of tuberculosis.

Post Mortem Examination: Uterus small and well involuted, with no evidence of sepsis. Widespread tuberculosis both lungs.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXXV.

AGE

37.

PARA.

9.

DISEASE.

Puerperal Sepsis

TYPE.

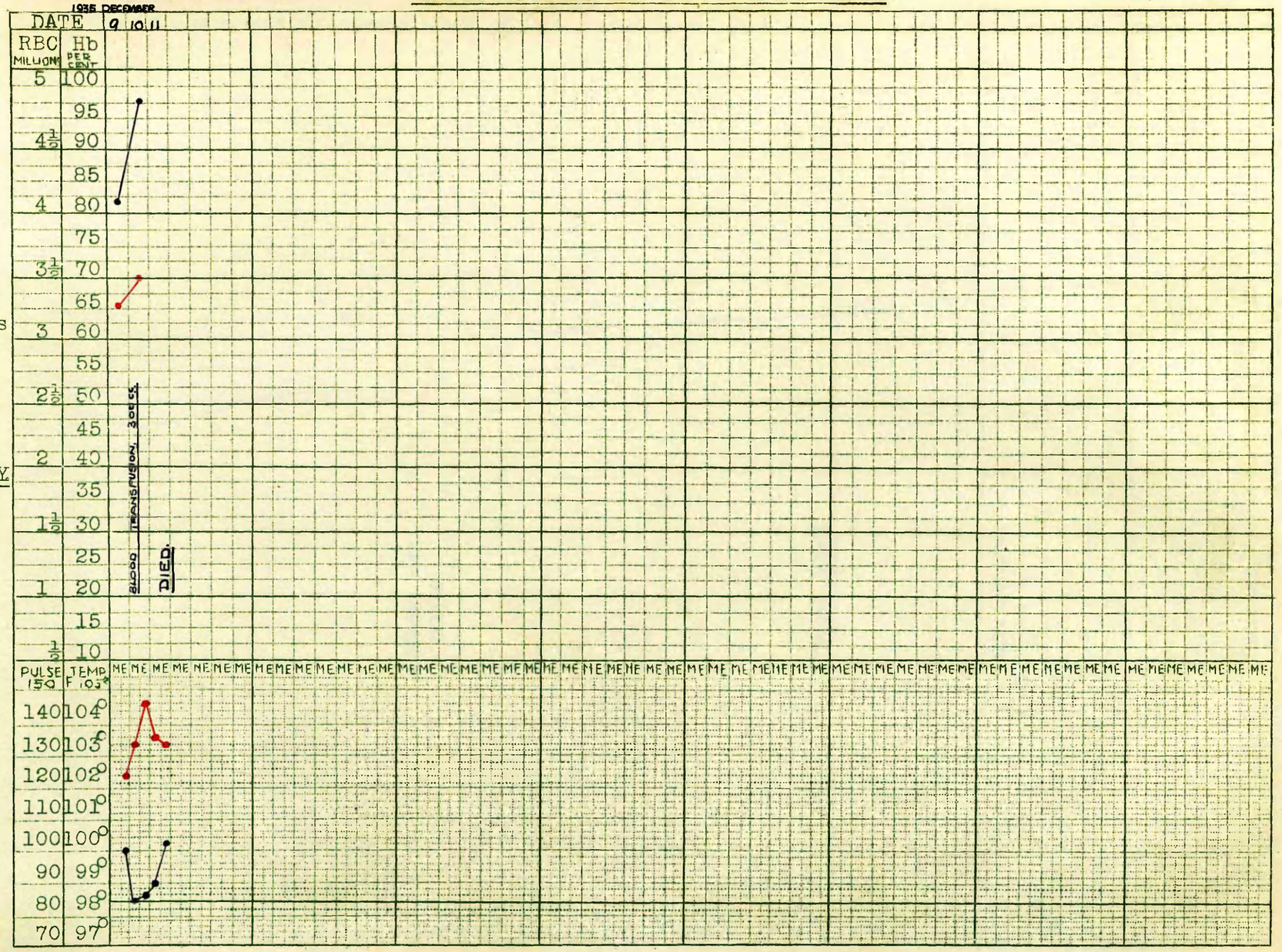
Septicaemia (streptococcal).

MODE OF DELIVERY

Normal.

TREATMENT.

Blood Transfusion, 300 c.c.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 6th day of puerperium, with sickness.

Admitted: 2nd day of illness.

Perineum: Intact.

Cervix: Not examined.

Lochia: Fairly profuse, haemorrhagic.

Bacteriology: Cervical swab, not taken. Blood culture, negative.

Progress: In extremis on admission, with scarlatiniform rash and jaundice. Died two days later.

Note: No benefit from transfusion.

Post Mortem Examination: Heart fatty. Calculus in gall-bladder. Haemolytic streptococci in uterine wall.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.
CLXXXVI.

AGE.
34.

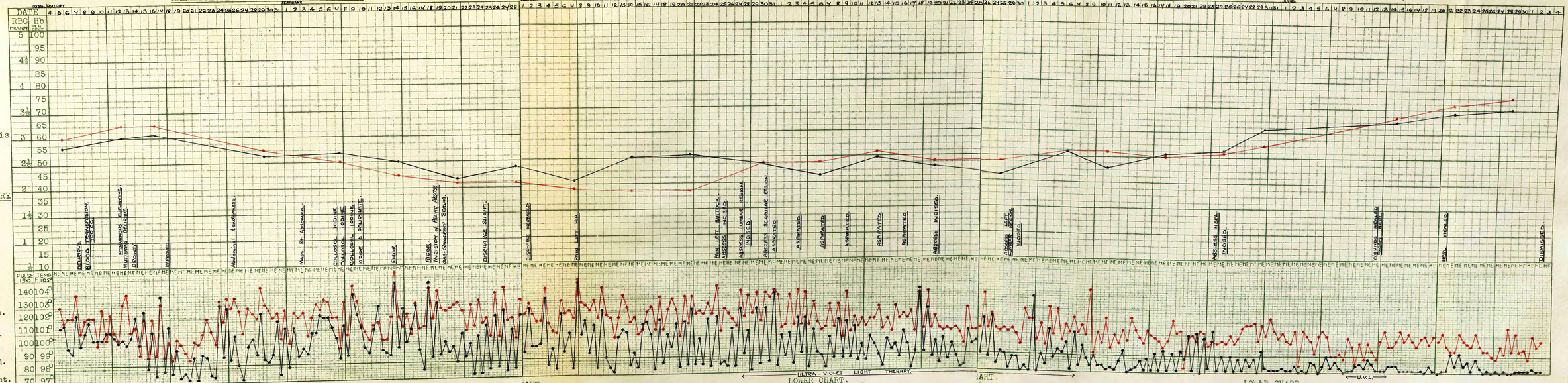
PARA.
4.

DISEASE.
Puerperal Sepsis

TYPE.
Pyaemia.

MODE OF DELIVERY
Normal.

TREATMENT.
Intra-uterine glycerine.
Blood Transfusion.
Intravenous anti-septics.
Abscesses incised.
Ultra-violet light.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

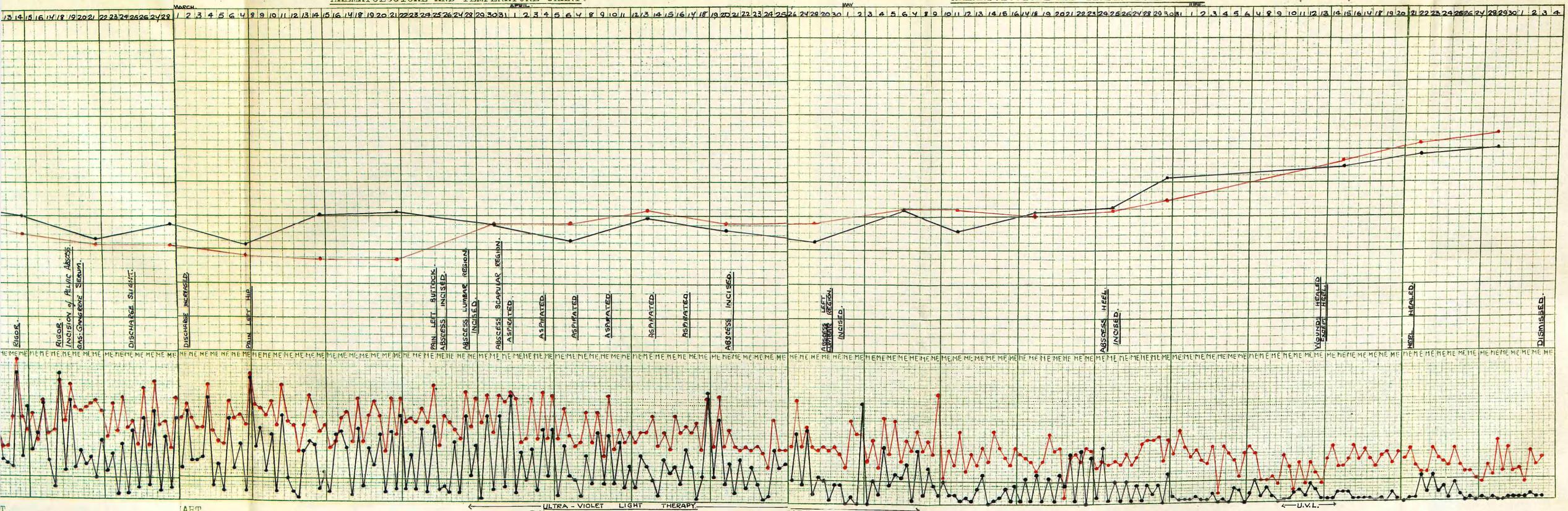
Onset: 3rd day of puerperium, with rigor.
Admitted: 3rd day of illness.
Perineum: Slightly torn.
Cervix: Large, soft.
Lochia: Profuse, offensive.

Bacteriology: Cervical swab, negative.
Blood culture, negative.
All specimens of pus, haemolytic streptococci.

Progress: Very toxic on admission, with delirium. Improvement in general condition after transfusion. Abdominal tenderness after 3 weeks, and mass palpable 10 days later. Incised 2 weeks later, but little pus obtained, though large slough removed. Followed by succession of pyaemic abscesses, with very irregular, swinging temperature. Finally subsided, and patient dismissed 26 weeks after admission.

Note: Improvement in blood value from transfusion not sustained after onset of pelvic cellulitis, and no blood improvement until all abscesses drained and healed.

HAEMATOLOGICAL AND TEMPERATURE CHART.



T.
mperature; RED:- Pulse.

vical swab, negative.
od culture, negative.
specimens of pus, haemolytic streptococci.

ART.
Red Blood Corpuscles; RED:- Haemoglobin.
LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Progress: Very toxic on admission, with delirium. Improvement in general condition after transfusion. Abdominal tenderness after 3 weeks, and mass palpable 10 days later. Incised 2 weeks later, but little pus obtained, though large slough removed. Followed by succession of pyaemic abscesses, with very irregular, swinging temperature. Finally subsided, and patient dismissed 26 weeks after admission.

HAEMATOLOGICAL AND TEMPERATURE CHART.

ART.
- Red Blood Corpuscles; RED:- Haemoglobin.
LOWER CHART.
BLACK:- Temperature; RED:- Pulse.
ture; RED:- Pulse.

CLINICAL NOTES.

Note: Improvement in blood value from transfusion not sustained after onset of pelvic cellulitis, and no blood improvement until all abscesses drained and healed.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXXVII.

AGE.

21.

PARA.

1.

DISEASE.

Puerperal Sepsis

TYPE.

Peritonitis.

MODE OF DELIVERY

Forceps.

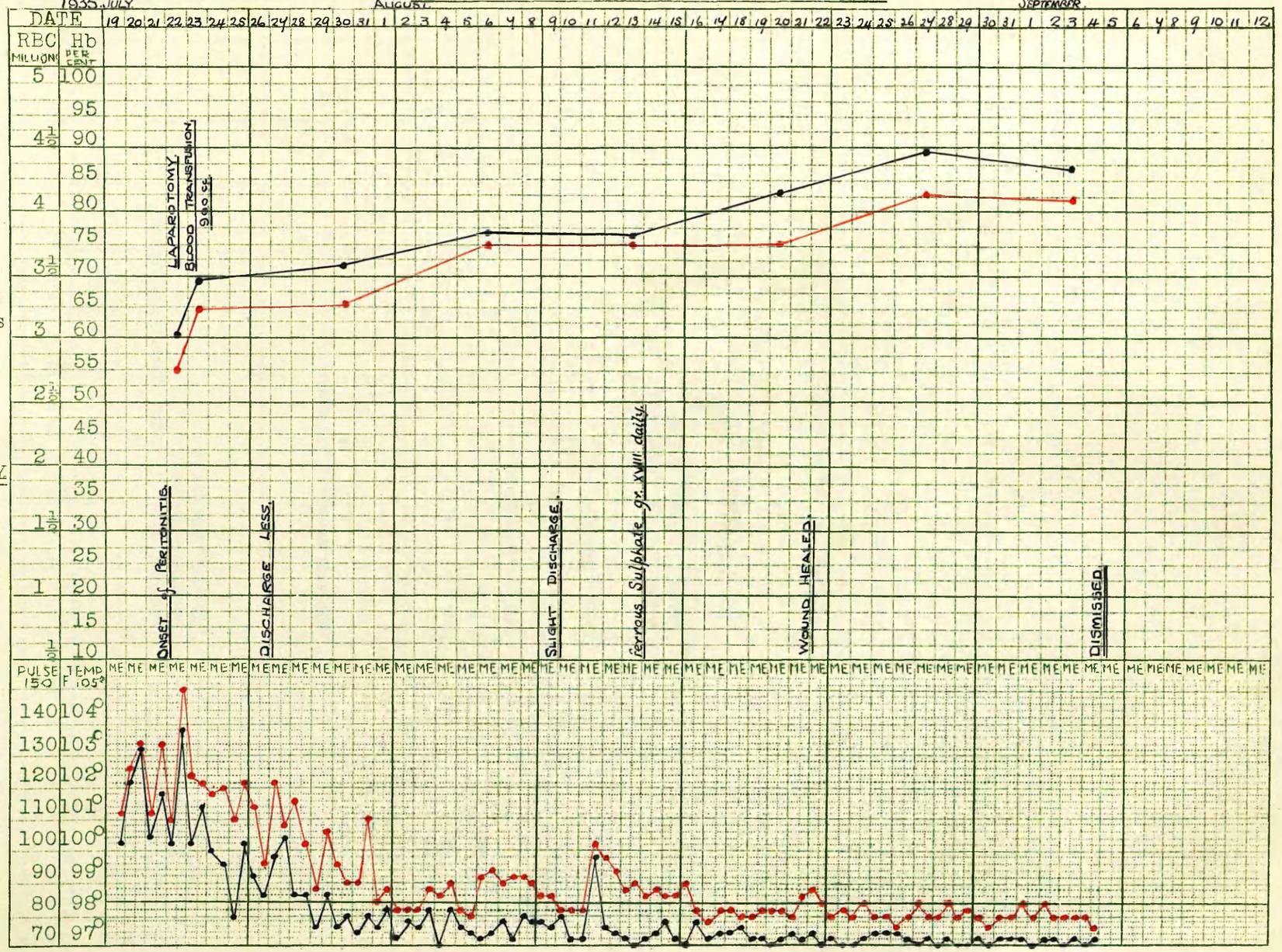
TREATMENT.

Intra-uterine glycerine.

Laparotomy.

Blood Transfusion.

Ferrous Sulphate, gr. xviii daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

CLINICAL NOTES.

Onset: 3rd day of puerperium, with pyrexia.
Admitted: 4th day of illness.
Perineum: Septic 2nd degree tear.
Cervix: Large, soft, ulcerated.
Lochia: Profuse, haemorrhagic.

Bacteriology: Cervical swab, negative.
Blood culture, negative.
Peritoneal exudate, haemolytic streptococci.

Progress: Peritonitis occurred 3 days after admission. Immediate laparotomy followed by transfusion gave a remarkable result.

Note: Steady rise in blood values after transfusion.

HAEMATOLOGICAL AND TEMPERATURE CHART.

CASE NO.

CLXXXVIII.

AGE.

25.

PARA.

2.

DISEASE.
Puerperal Sepsis

TYPE.

Peritonitis.

MODE OF DELIVERY

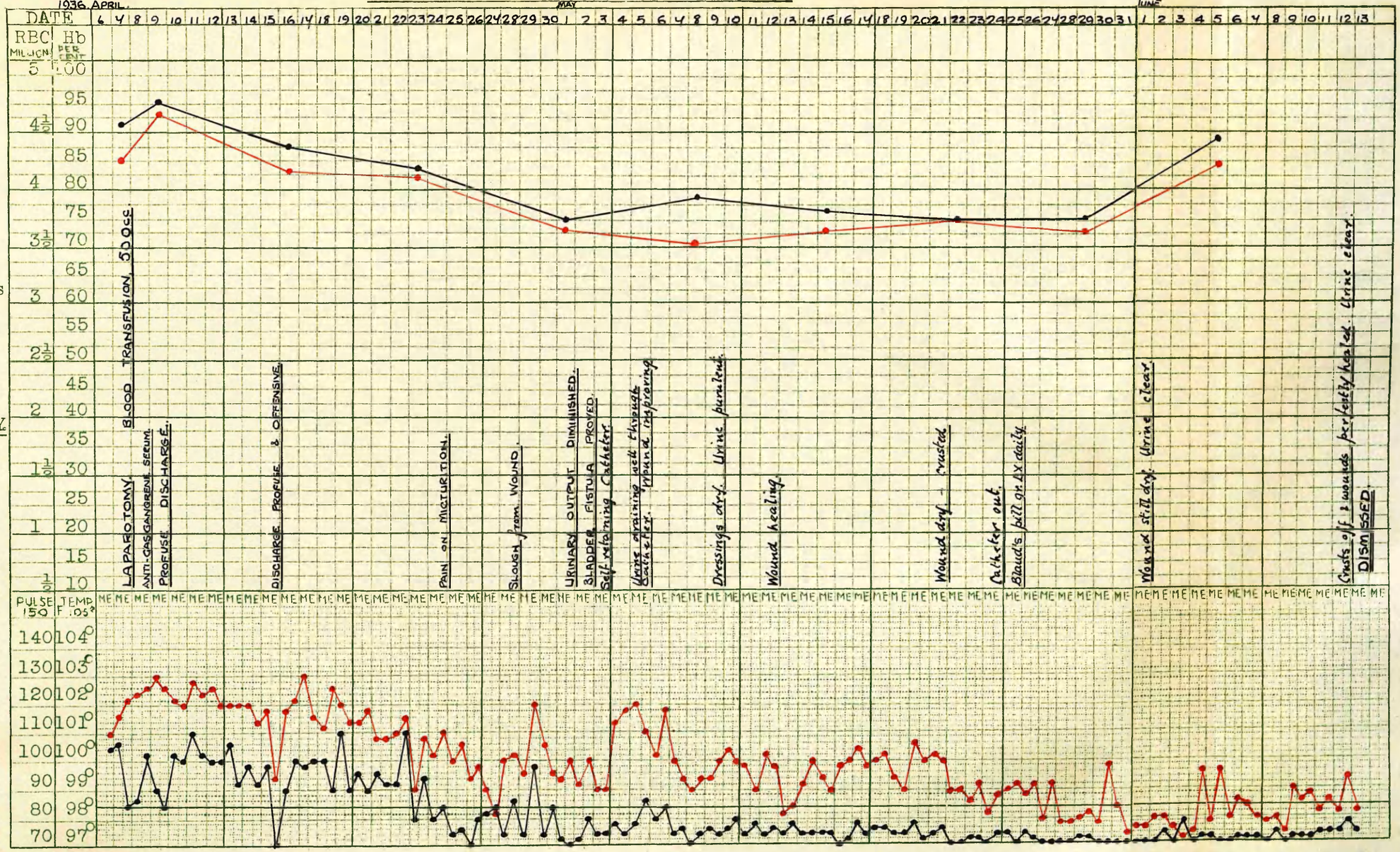
Abortion.

TREATMENT.

Laparotomy.

Blood Transfusion.

Blaud's Pill,
gr. 1x daily.



UPPER CHART.
BLACK:- Red Blood Corpuscles; RED:- Haemoglobin.

LOWER CHART.
BLACK:- Temperature; RED:- Pulse.

ture; RED:- Pulse.

CLINICAL NOTES.

Stage of pregnancy: 2 months.
Uterus: Lying forwards and fixed.
Cervix: Very high and fixed.
Lochia: Scanty.

Bacteriology: Cervical swab, haemolytic streptococci.
Blood culture, haemolytic streptococci.
Peritoneal exudate, haemolytic streptococci.

Progress: Generalised peritonitis resulting from large pelvic abscess. Good result from laparotomy and drainage of abscess followed by blood transfusion. Slough separated in 4th week, resulting in urinary fistula. Healed with continuous drainage of bladder.

Note: Little anaemia at first, but transfusion failed to prevent anaemia in face of prolonged suppuration.