THESIS FOR THE DEGREE OF M. D.

SUBMITTED BY

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AN ANALYSIS OF THE

CLINICAL NOTES

of

THREE HUNDRED & FIFTY CASES

of

PUERPERAL SEPSIS.

INTRODUCTION.

The existence of puerperal infection has been recognised from the earliest times, as Hippocrates in 410 B.C. gave a clear description of the symptoms thereof. Littke advance was made in oub knowledge of the subject until Semmelweis's work in 1847. Later in 1865 Meyerhofer was able to identify the Streptococcus in the lochiae of puerperal women, and in 1879 Pasteur completely established the relationship of these organisms to puerperal infection, finding them in the lochia, blood, and in the tissues after death.

Since this period, the multiplicity of remedies for this condition have testified to their relative inefficiency, and the condition knwon collectively as " puerperal sepsis" has always been one of the "Cinderellas" of the medical world, and up to recent times, it has not bulked largely in the field of preventive Medicine.

During the last few years, public attention has been drawn to this problem, and various administrative measures have been taken, but, at the same time, there has been no serious attempt to deal with the problem on a large scale.

In 1924, the interests of the laity was focussed on the subject by the publication of Dr. Janet Campbell's report (1). In 19 26 Dr. Remington Hobbs (2) addressing the Society of Medical Officers of Health, made the following remarks:- "It certainly does seem a pity that appeals are constantly being made for money to equip cancer or tuberculosis hospitals, yet no one seems to take any interest in the large number of invalids, who are left after puerperal sepsis. I am convinced at the present moment, there are enough cases of sepsis following labour and miscarriage to fill a large hospital in London alone, if that were provided, there would be a bigger saving in life and in money than will ever be obtained in the case of either cancer or tuberculosis." In 1927, Mr.Thomas G.Stevens, speaking at a function in Queen Charlotte's Hospital, said, " that at least one third of the gynaecological out-patients at general hospitals gave a previous history of puerperal sepsis.

Why has this problem not been tackled whole-heartedly ?

There are several reasons. No single problem in public health today requires the co-operation of so many different people - the midwife, the general practitioner, the gynaecologist, the bacteriologist, the public health official, the fever, or special

hospital, the gynaecological department of the general hospital. When there are so many authorities to co-ordinate progress is apt to be swamped in a sea of official forms and statistics. There are in addition what might be called an army of "vested interests", which are not present when cancer or tubercle are attacked.

The writer has considered that he might submit the results of his investigations in this subject. He has been fortunate enough to have had very exceptional facilities for the study of the clinical and laboratory aspect of this collection of diseases, and he has been engaged for over two years, working on this subject alone. He has the great advantage of having a well equipped theatre, and a laboratory with all the necessary equipment, and skilled labaratory assistance, the whole being housed in one self-contained block.

The writer thinks that with the exceptionally large number of cases which are reviewed, there is much less likelihood of erroneous conclusions being drawn as to the efficiency or otherwise of the therapeutic value of any particular line of treatment

It is proposed to discuss the question of prophylaxis separately, and to review the various lines of treatment adopted, to endeavour to explain why some are considered successful, and to make some

theoretical suggestions re lines of treatment for the future.

At this point, the writer wishes to express his great indebtedness to the authors of the only two books on the subject with which he is acquainted, e.g. Arnold Lea (Manchester) and, Rupert Koehler (Vienna).

STATISTICS.

At this point, the introduction of a few statistics will not be amiss, but it should be pointed out that they are often more fallacious and misleading than in any other branch of medicine. The conclusions drawn in this paper are based on the first three hundred and fifty cases of puerperal sepsis treated by the writer, two hundred and twenty s even being of the uterus post-partum, and the remainder of uterus posta-bortum, of these forty four died from various causes - a case mortality of 12%. The average duration of stay in hospital of those cases which recovered was about a month, and the average case has been showing some slight sign of sepsis for at least five days prior to admission.

Out of these three hundred cases, only slightly over 10% (38) were definitely septicaemic. This figure is probably unduly low, as blood cultures were not taken in all cases on admission during the first half of the series, but only, where there seemed to be a definite clinical indication for the proceedure.

The writer now assumes from past experience that any case which develops a Septicaemic condition after it comes under Hospital supervision, must probably have suffered from an error in judgment, which was, perhaps, unavoidable. Of the above Septicaemic cases, the case mortality was about 50% - eighteen recovering.

Some observations re causation.

The writer has not been in a position to study this as full as he would like, as all that has been available, has been the data supplied with the case on admission. There is often a history of previous ill health in the multiparae. The writer is very doubtful

as to whether any cases of endogenous origin occur at all; it is quite certain that a history of auto-infection can be elicited occasionaly from patients who have never been examined professionally, and who have become septic.

From the records of the cases here, it can be deduced, that the greater the laceration, and the more the operative interference, the greater the tendency to sepsis, but at the same time, it has also been found that the greater the laceration, the better the drainage, and the less the likelihood of the local sepsis becoming general. At this point, it may be mentioned, that cases far too frequently are admitted with a history of pyrexia for several days, and with the edges of perineal tear in good position, but, when the stitches are removed, two sloughing areas are laid bare.

From a series of sixty cases, it has been disproved that coitus late in pregnancy is a factor on the causation of puerperal sepsis.

One interesting factor has caused some speculation regarding the etilogy of puerperal sepsis. Infiltration of the parametrium on admission is twice as common on the left side as on the right side, and also, when the uterus is found to be bound down by adhesions when the patient is discharged from hospital, the organ is bound down to the left side in 78-80% of these cases.

Whether these facts are due to the relationship of the left parametrium to the large bowel, whether the , whether the left side of the uterus is more in relationship to less mobile tissues, or, whether it is due to the posture of the patient, it is open to conjecture. Repeated observation of this fact has given me much speculation.

As regards the etiology of puerperal septicaemia, the writer thinks that this condition as a rule develops gradually, and that if the sepsis were recognised early enough and treated by modern methods, to be described hereafter, there would be very few cases of septicaemia.

To grasp the fundamental methods of prophylactic treatment, one must grasp what is happening, always remembering that each case must be considered separately as various incalculable factors such as the general resistance of the patient, the degree of tissue lacerations, the virulence of the infecting organism etc., enter into play.

The uterus becomes infected and the inflammatory process spreads into the parametrium, and after a latent period of from two to six days the infection spreads to other organs, either by the venous or the lymphatic system. The writer thinks that a lympho-genic infection is often comparitively rare compared with the thrombo-genic type, as witness the relative incidence of the two types of phlegmasiae. With the thrombogenic type, if the inflammatory process is not being subdued by nature, there is a gradually spreading thrombosis via the uterine, hypogastric, and ovarian veins.

Thus one can explain why the commonest time for the appearance of a phlegmasia is the tenth day of the puerperium. By that time the thrombotic process has spread to the junction of the internal and the external iliac veins. Contrary to the views expressed by most pathologists, the writer is of the opinion that this clot may not all be septic. The original thrombotic progress certainly isdue to sepsis, but apparently "mechanical" clotting sets in in advance of the inflammatory process. No other view will explain the observations made by the writer at autopsies and in repeated blood culture work. Cases frequently occur in which we have repeated pulmonary infarction and repeated blood cultures, both aerobic, and anaerobic have proved sterile. These cases cannot be ascribed to faulty bacteriological technique, or to insufficient quantities of blood being taken. In this type of case the apparently septicaemic clinical picture disappears as quickly as it has come.

In addition, at autopsies, pulmonary infarctions, and also thrombosed vein have been found, which were apparently sterile. Septic clot in a vein is always more broken down, and the surrounding tissues are invaded, and this periphlebitis can usually easily be recognised. If some of this clot be released into the general circulation, we may get a septicaemia according to whether the released clot contains organisms or not. To differentiate between these two types is often a matter of extreme difficulty as will be shown later.

PREVENTION.

Thus it will be seen that the prevention of a septicaemia can be attempted along three main lines:-

(a) Early diagnosis of sepsis in the puerperium.

(b) Prevention of the spread of the inflammatory process into the surrounding tissues.

(c) Prevention of the entry of septic clot into the general circulation.

(a) Early diagnosis is not nearly so easy as it seems. Far too much attention is paid to pyrexia, and this has been accentuated by the new notification order. Many of the worst cases are quite apyrexial. If the septicaemia is very severe and has overwhelmed the whole defensive mechanism, the temperature is oftne little elevated in the late stages, when the patient is collapsed. A much more important warning sign is a slow but steady acceleration of the pulse rate. It is deplorable that the average day of duration of disease in admission to a hospital where it is generally known that special facilities exist for treating puerperal sepsis, should be the fifth. Of course in many, the midwife or nurse in attendance, has not recognised the significance of prodromal symptoms, such as "persistent headache".

The writer thinks that in view of the success of modern lines of treatment, it is as culpable to await the onset of rigors, as it is to await the bacteriological results before administering diphtheria antitoxin in a definite clinicle case of diphtheria. This conviction has been forced upon the writer by an intensive analysis of the deaths among his series of cases, and of the prolonged convalescence of these cases admitted later in the disease.

At the slightest warning of sepsis, all stitches should be removed, even if the tear is right through the sphincters, It has frequently been remarked how often very severely lacerated cases heal up with no complications, and this can only be ascribed to one factor - free drainage.

(b). Prevention of the spread of the inflammatory process in the surrounding tissues:- The method utilised is the lymph drainage one, first described by Hobbs (3). It has never been obvious to the writer why there should be a departure in the treatment of puerperal sepsis of the fundamental surgical dictum of "where there is pus, let it out". The policy of conservative treatment is in these cases, a confession of weakness, and the adoption of surgical procedure is too often fraught with disaster. For reasons which will be dealt with, more fully, later, previous attempts at drainage of the uterus, have occasioned so many disasters, that a school of thought had arisen, which says that the septic uterus should be left severely alone.

The technique of the Hobbs drainage system is as follows:-

For treatment the patient is prepared in the ward as for a major surgical operation, and is brought into the theatre, and placed in the lithotomy position, contenct with the surrounding parts being

protected by sterile towels. The external genitals are first cleansed with ethereal soap and water, and then with a dilute lysol solution, and then a vaginal douche of 1/100 Lysol is given, and a Sims speculum introduced, and a special anterior speculum designed by Hobbs, which is manipulated until the os is visible. These specula are then held by an assistant to bring the parts thoroughly into view. The cervix is then well cleansed, any lesions being swabbed, with a 10% solution of argyrol. The writer finds indirect illumination a great help. By means of a special pair of introducing forceps a soft rubber No.5. or 6 graduated terminal eyed catheter, graduated in half inches, is introduced into the uterus, and pushed up to the fundus. Volsellum forceps are avoided, or any instrument which may injure or bruise the parts. Ten. c.c. of glycerine is then injected slowly by means of a record syringe attached to the catheter, or a ten per cent clycerine-iodine solution may be substituted for glycerine, the object of the iodine being to stimulate the uterine contraction. It is injected until it appears at the sides of the catheter, or until the syringe is empty. The viscidity of the glycerine leads to its retention for a longer period than a watery solution, and leads to a considerable amount of osmotic drainage outwards from the lymph passages. The catheter is left in the uterus, the external end being bent back into the vaginal canal, and a small piece of ribbon gauze is left attached, by which, if not already expelled, the catheter is withdrawn at the end of four hours. By this method, intra-uterine drainage is established without any undue movement of the septic parts. This method of irrigation is repeated is repeated daily while there is any pyrexia or purulent discharge, and is only omitted when the discharge is very slight or the uterus completely involuted.

Contra indications for irrigation are those which suggest septicaemia

or thrombosis, and very careful clinical observation is necessary to ensure that a patient with pelvic thrombo-phlebitis is not disturbed.

The removal of cases to the theatre for treatment facilitates this routine proceedure. When the patients have been irrigated the toilet of the perineum can be attended to, stitches removed etc.

Vaginal and surgical,lesions are swabbed at the time of irrigation with a ten per cent argyrol solution in spirit, and if there is much sloughing, the vaginal cavity is packed, for four hours each day with gauze soaked in Eusol.

The early establishment of uterine drainage by this method exercises immediate control of toxaemia, and I am convinced prevents the development of septicaemia, and the incidence of septic complications. The rapid improvement of the average case associated with subsidence of temperature leads to a general atmosphere of hopefulness among the patients. Patients feel that they are having definite treatment and investigation, and this is increased by conversing with patients previously admitted.

In the first hundred cases treated under this system, the percentage mortality fell thirteen per cent (13%). The average number of treatments per patient was seven, and the stay in hospital of recovered cases was reduced to 26.2 days. The stay in hospital for recovered patients for several years past had not been below thirty eight days. Only twelve of these cases (13%) developed complications,

As regards this technique, Hobbs recommends that when 3' 9" are on the chart ($T^{o}99$. P.90.) it is time to drain the uterus. The writer does not go so far as that. The uterus is drained daily while there is any pyrexia, but with certain important reservations. It has been considered that if removal to the theatre is contra-indicated,

attempting the treatment in bed, which involves even more movement of the patient, is useless.

Contra indications are as follows:-

(1) Any signs suggesting a generalised blood infection.

(2) Severe gastro-enteritis, suggesting a Thrombo-phlebitis.

(3) Continued pyrexia, other than of urinary origin, also suggesting a Thrombo phlebitis, especially if initiated by a "staircase" rise, similar to that of typhoid fever.

(4) Any question of the appearance of a phlegmasia, or of thrombosed veins in the posterior fornix.

(5) When there is severe faecal contamination owing to torn sphincters.

(6) Any particularly late case.

Most French writers in reference to intra-uterine douching consider that the latter is only justified during the first few days when the infection is still limited to the uterus, but warn against it, after the eighth day, when the infection has spread to the surrounding tissues. The average number of glycerine-iodine irrigations carried out on the patients reported on was five, but then the average day of disease on admission was the nineth. Each case must be judged strictly on its own merits, but it is disheartening to have, as the writer did, before he learned from experience, an apparently mild case, which had been irrigated in the forenoon, die suddenly from pulmonary embolism in the evening. It was occurences like this, which gave rise to the dictum "never meddle with aseptic uterus" and it is only by a thorough analysis of these disasters, that the writer has gained his experience.

The question will be further dealt with when we come to the subject of vein ligation.

In favour of this particular treatment, the following points may be made:-

(1) In this treatment one gets a thorough idea of the vital extent of pelvic laceration.

(2) One also gets a good idea of what is coming from the Uterus, in contradistinction to the lochia as a whole.

(3) The length of the uterus and its cubic capacity can be roughly estimated.

(4) There is no forcible relative movement of the pelvic organs - e.g. pulling down the cervix with Volcellum forceps, which would cause a local infection to become a general one.

(5) The free drainage assists the uterus to involute properly.

(6) Little force is exerted owing to the viscosity of the Glycerine, and the resistance of the catheter.

(7) In carrying out this treatment it is easy to take a cervical culture, which is performed as a routine in every case on admission, prior to any douching or other treatment being performed.

(8) Twenty cases which had haemolytic streptococci in their cervical canal were subjected to this treatment, and a daily cervical culture made. It was found that these organisms disappeared from the Cervical canal on an average of 2-4 days after the commencement of the treatment. In a similar series of twenty, in which ordinary vaginal douching with lysol was performed instead of intra-uterine irrigation, haemolytic streptococci were found in the cervical canal at the end of seven days in 30% of the cases.

(9) This treatment has been found to be specially efficacious in cases of retained placenta or membranes, or with the uterus posta-bortum, when the drainage often causes the uterus to expel the contents without resort to more drastic procedures.

(10) The treatment is quite painless, and anaesthesia is not required.

(11) The most striking results were seen in these cases whose drainage was markedly impeded owing to mal-position of the uterus, probably due to parametric infiltration. Often at the first session, a large quantity of pus is evacuated and the toxaemia of the patient markedly diminished. The writer always persists in the treatment, where there is evidence of parmetric infiltration, without any suggestion of thrombo-phlebitis.

(12) According to the work of Philip (4) the complications rate judged on two analogous series of one hundred cases, fell from 29% - 13% after the adoption of this treatment. In practically all the cases which showed some degree of uterine fixation or discharge, it was found that the treatment had not been initiated early enough, or else there had been some contra-indication for its adoption.

In conclusion it may be stated that the writer is firmly convinced in agreement with Hobbs, Phillips, and others, that this treatment is the optimum method of treating the septic uterus, but that too slavish adherence to it, is going to lead to occasional disasters.

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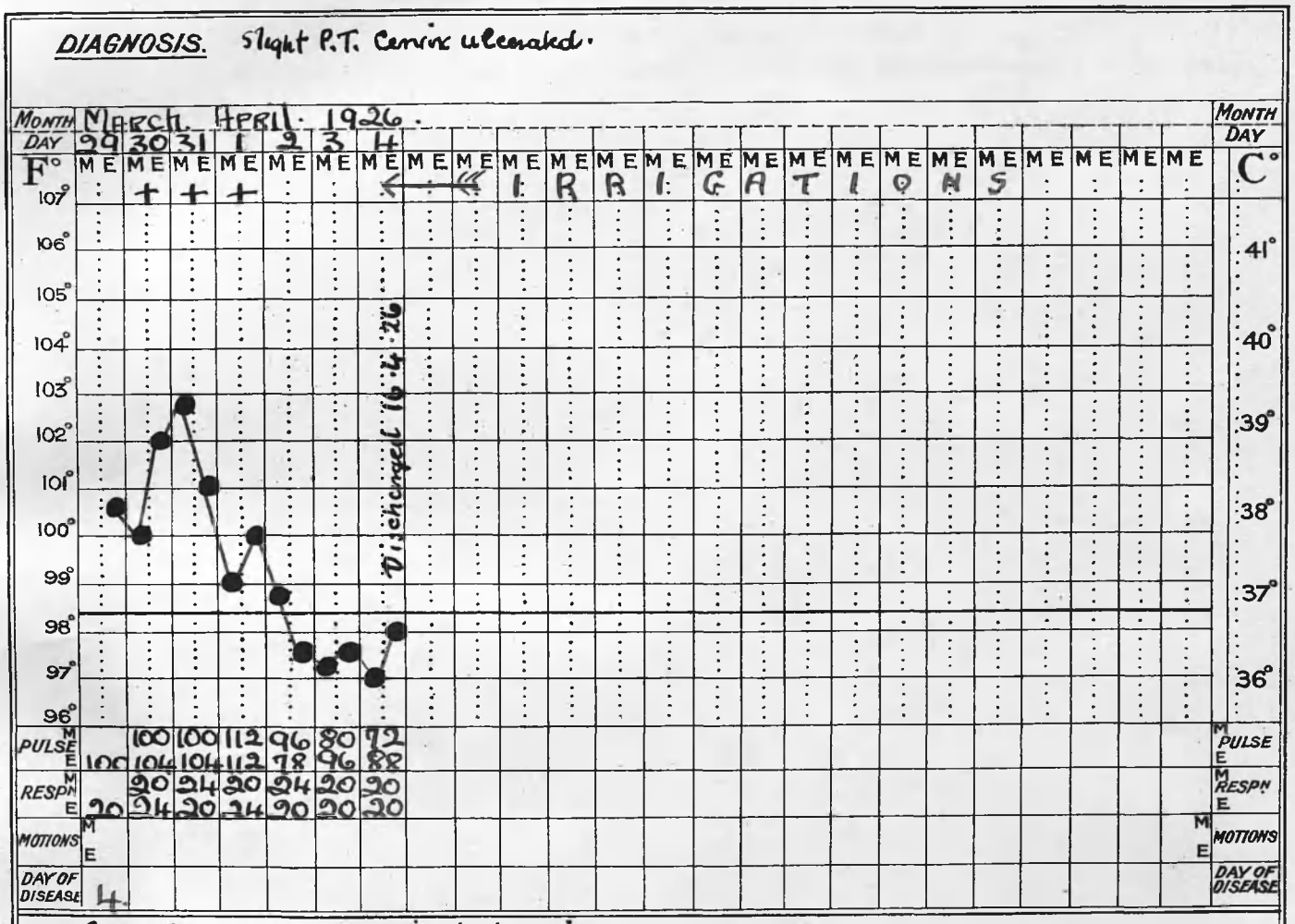
MONSALL HOSPITAL.

PATIENT'S NAME 84. AGE

CLINICAL CHART.

DIAGNOSIS. Slight P.T. Cervix ulcerated.



Cervical culture – haemolytic streptococci
Blood " – sterile.

URINE.

DATE																											
No of oz. in 24 hrs.																											
REACTION	NORMAL																										
SP. GR.																											
ALBUMEN																											
BLOOD																											
UREA																											
Microscop! Appearance Etc.																											
COUGH Simple																											
" Spasmodic																											
" Whoop																											

CORPORATION OF MANCHESTER.

MONSALL HOSPITAL.

PATIENT'S NAME 99 AGE

CLINICAL CHART.

DIAGNOSIS. Developed R. phlegmasia 14.5.27. L. phlegmasia 23.5.27.
Marked varicose veins in posterior fornix – 14 days after admission – 10th pregnancy

MONTH April. 1926.

DAY	16	17	18	19	20	21	22	23
PULSE M		128	112	100	100	96	88	88
PULSE E	134	112	120	100	90	104	96	96
RESPN M		24	24	24	24	20	24	20
RESPN E	20	24	24	24	24	20	20	20
MOTIONS M								
MOTIONS E								
DAY OF DISEASE	3.							

Cervical culture – staphylococci
Blood " – sterile

URINE.

DATE	
No of oz. in 24 hrs.	
REACTION	NORMAL
SP. GR.	
ALBUMEN	
BLOOD	
UREA	
Microscopic Appearance Etc.	
COUGH Simple	
" Spasmodic	
" Whoop	

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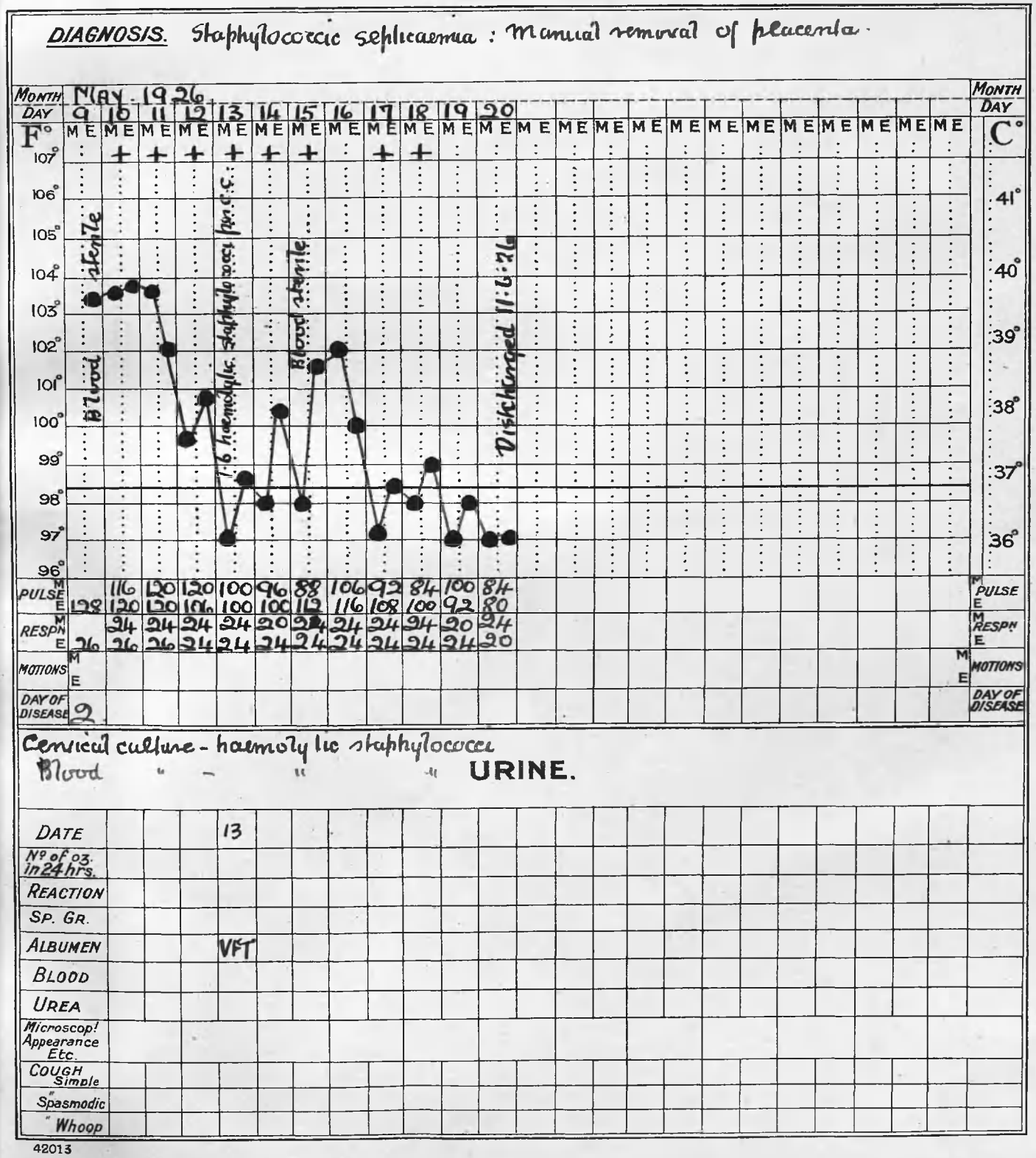
PATIENT'S NAME 107 AGE

CLINICAL CHART.



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PATIENT'S NAME 112. AGE

CLINICAL CHART.

DIAGNOSIS. Large sloughing P.T. – Cervix ulcerated.

MONTH	May. 1926.																														MONTH
DAY	19	20	21	22	23	24	25	26	27	28																					DAY
F°	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	C°
107°		+	+	+	+	+	+																								
106°																															41°
105°																															
104°																															40°
103°																															
102°																															39°
101°																															
100°																															38°
99°																															
98°																															37°
97°																															
96°																															36°
PULSE M		96	92	92	100	128	86	84	84	80																					PULSE M
PULSE E	100	100	100	100	132	96	92	RR	80	80																					PULSE E
RESPN M		20	24	24	24	28	20	24	24	20																					RESPN M
RESPN E	24	20	24	24	28	24	24	26	20	20																					RESPN E
MOTIONS M																														M	MOTIONS M
MOTIONS E																														E	MOTIONS E
DAY OF DISEASE	3.																														DAY OF DISEASE

Discharged 21.6.27

Cervical culture - haemolytic streptococci

Blood " - sterile

URINE.

May 1926

DATE	20	21	22	23
No of oz. in 24 hrs.				
REACTION				
SP. GR.				
ALBUMEN	VFT	VFT	VFT	VFT
BLOOD				
UREA				
Microscop! Appearance Etc.				
COUGH Simple				
" Spasmodic				
" Whoop				

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MONSALL HOSPITAL.

PATIENT'S NAME 128. AGE

CLINICAL CHART.

DIAGNOSIS.

MONTH JUNE. 1926.

DAY	7	8	9	10	11	12	13	14	15	16	17	18
PULSE M	96	112	120	104	120	104	90	120	100	104	92	90
PULSE E		104	104	118	120	100	100	94	96	100	92	80
RESPN M	20	20	20	20	20	20	20	20	20	20	20	20
RESPN E		20	20	20	20	20	20	20	20	20	20	20
MOTIONS M												
MOTIONS E												
DAY OF DISEASE	3											

Discharged 5.7.26

Cervical culture - haemolytic streptococci
Blood " - sterile

URINE.

DATE	8	9	10	11	12	13	14
No of oz. in 24 hrs.							
REACTION							
SP. GR.							
ALBUMEN	Trace	Trace	V.F.T.	V.F.T.	V.F.T.	V.F.T.	V.F.T.
BLOOD							
UREA							
Microscopic Appearance Etc.							
COUGH Simple							
" Spasmodic							
" Whoop							

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MONSALL HOSPITAL.

PATIENT'S NAME 129. AGE

CLINICAL CHART.

DIAGNOSIS. Severe P.P.H. following marginal placenta praevia

Month: June 1926.

Day	7	8	9	10	11	12	13	14	15	16.
Pulse M		116	120	118	120	120	100	104	96	80
Pulse E	124	118	112	124	108	104	118	100	80	92
Respn M		20	20	20	20	20	20	20	20	20
Respn E	20	20	20	20	20	20	20	20	20	20
Motions M										
Motions E										
Day of Disease	1									

Transferred 13.7.26

Cervical culture - haemolytic staphylococci
Blood " - ~~coli~~ sterile
Urine " - coliform bacilli

URINE.

Date	10	11	12	13	14	15
No of oz. in 24 hrs.						
Reaction						
Sp. Gr.	VFT.	Trace	VFT	VFT	VFT	VFT
Albumen		PUS	PUS	PUS	PUS	
Blood						
Urea						
Microscop! Appearance Etc.						
Cough Simple						
" Spasmodic						
" Whoop						

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MONSALL HOSPITAL.

PATIENT'S NAME 244 AGE

CLINICAL CHART.

DIAGNOSIS. Invasion of L. parametrium on admission only 6 hours after confinement.

MONTH	April 1927.									May.																	
DAY	22	23	24	25	26	27	28	29	30	1	2	3															
F° / C°	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E	M E
107° / 41°	+	+	+	+	+	+			+																		
106°																											
105°																											
104° / 40°																											
103°																											
102° / 39°																											
101°																											
100° / 38°																											
99°																											
98° / 37°																											
97°																											
96° / 36°																											
PULSE M	132	148	120	124	104	108	84	80	72	96	88	90															
PULSE E	144	132	126	112	112	96	106	90	78	88	88	90															
RESPN M	26	28	28	26	26	24	22	20	20	20	20	22															
RESPN E	28	32	26	26	26	24	24	22	20	20	20	20															
MOTIONS M																											
MOTIONS E																											
DAY OF DISEASE	2																										

Discharged 15.5.27

Cervical culture - haemolytic streptococci
Blood " - sterile

URINE.

DATE																											
No of oz. in 24 hrs.																											
REACTION	NORMAL																										
SP. GR.																											
ALBUMEN																											
BLOOD																											
UREA																											
Microscop! Appearance Etc.																											
COUGH Simple																											
" Spasmodic																											
" Whoop																											

CORPORATION OF MANCHESTER.

MONSALL HOSPITAL.

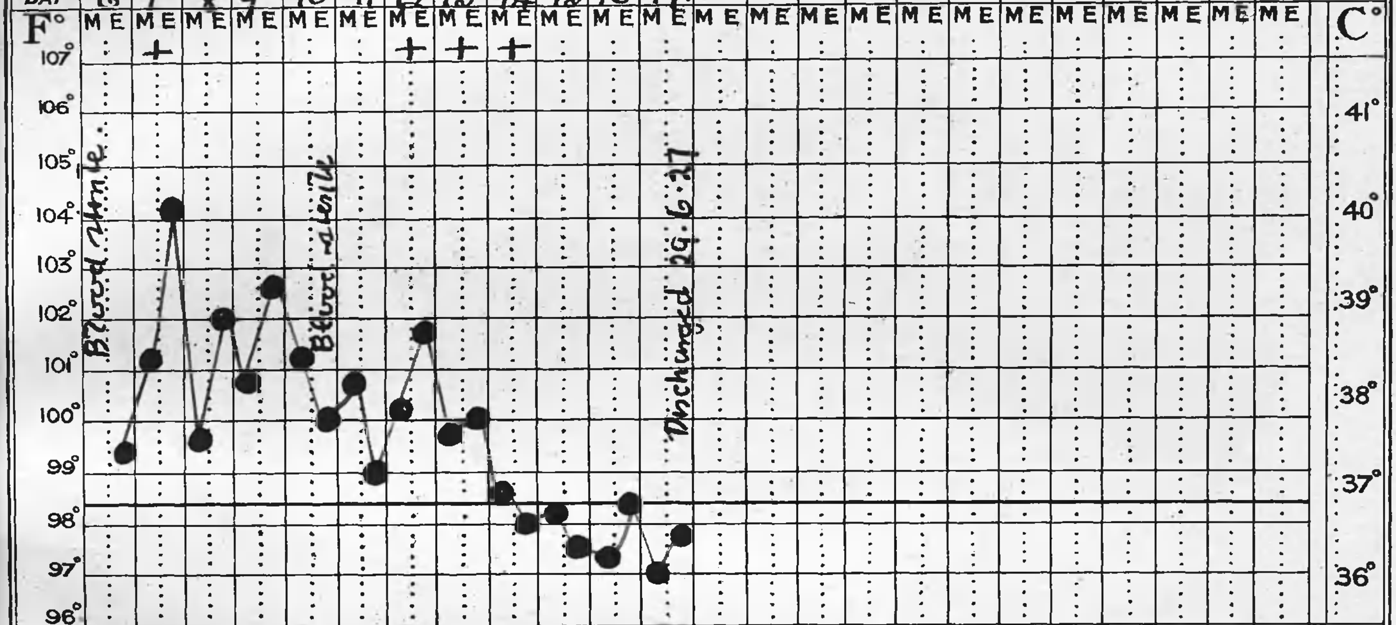
PATIENT'S NAME 262 AGE

CLINICAL CHART.

DIAGNOSIS. Breech + internal version: quinine induction: membranes ragged. Irrigation temporarily suspended, as septicaemia suspected.

MONTH June 1927.

DAY 6 7 8 9 10 11 12 13 14 15 16 17.



		6	7	8	9	10	11	12	13	14	15	16	17
PULSE	M		116	120	120	114	106	110	96	98	96	92	88
	E	92	156	124	124	112	100	108	104	100	100	96	92
RESPN	M		24	24	20	20	20	20	20	20	20	22	20
	E	26	26	20	24	22	20	20	22	20	20	22	20
MOTIONS	M												
	E												
DAY OF DISEASE		5.											

Cervical culture - coliform bacilli
Blood " - sterile.

URINE.

June 1927

DATE	6	7	8	9	10	11	12
No. of oz. in 24 hrs.							
REACTION	Acid	Acid	Acid	Acid	Acid	acid	acid
SP. GR.							
ALBUMEN	Trace of albumen present.						
BLOOD							
UREA	Slightly muddy urine						
Microscop! Appearance Etc.							
COUGH Simple							
" Spasmodic							
" Whoop							

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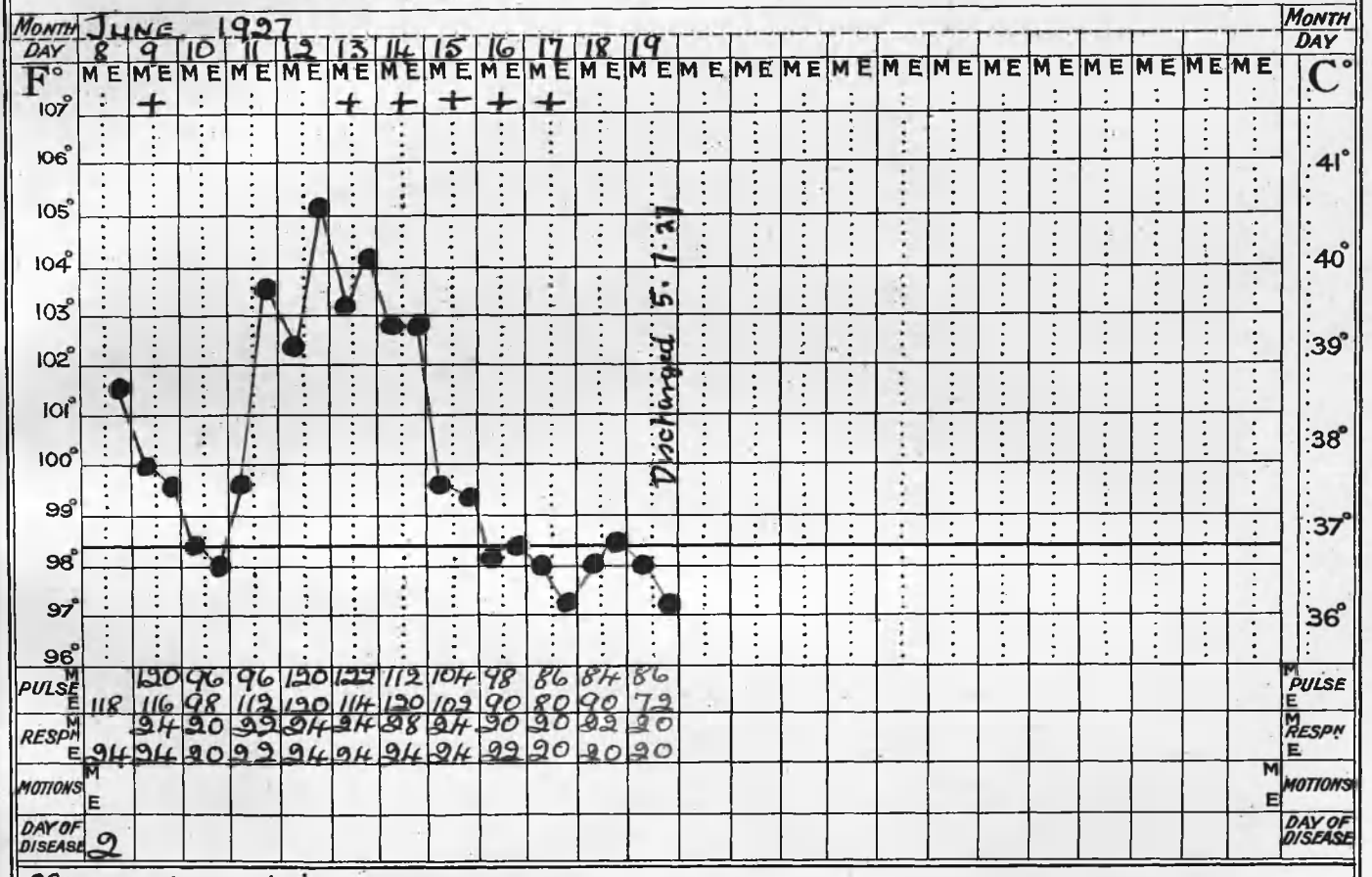
CORPORATION OF MANCHESTER.

MONSALL HOSPITAL.

PATIENT'S NAME 263. AGE

CLINICAL CHART.

DIAGNOSIS. Uterus pulled over to L. with exacerbation of temperature owing to cessation of lymph drainage.



Blood culture - sterile.

URINE.

June 1927

DATE	8	9	10	11	12	13	14
No of oz. in 24 hrs.							
REACTION			Acid	Acid	Acid	Acid	Acid
SP. GR.							
ALBUMEN			VFT	VFT	VFT	VFT	VFT
BLOOD							
UREA							
Microscop! Appearance Etc.							
COUGH Simple							
" Spasmodic							
" Whoop							

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PATIENT'S NAME 279. AGE

CLINICAL CHART.

DIAGNOSIS. Membranes ragged.

MONTH September. 1927.

DAY	8	9	10	11	12	13	14	16
PULSE M	104	104	96	116	84	76	84	84
PULSE E		104	80	88	90	80	80	76
RESPN M	22	24	22	24	20	20	20	20
RESPN E		24	20	20	20	20	20	20
MOTIONS M								
MOTIONS E								
DAY OF DISEASE	4							

Discharged 27.9.27

Cervical culture - haemolytic streptococci
Blood " - sterile.

URINE.

September.

	9
DATE	
No of oz. in 24 hrs.	
REACTION	
SP. GR.	
ALBUMEN	V-T.
BLOOD	
UREA	
Microscop! Appearance Etc.	
COUGH Simple	
" Spasmodic	
" Whoop	

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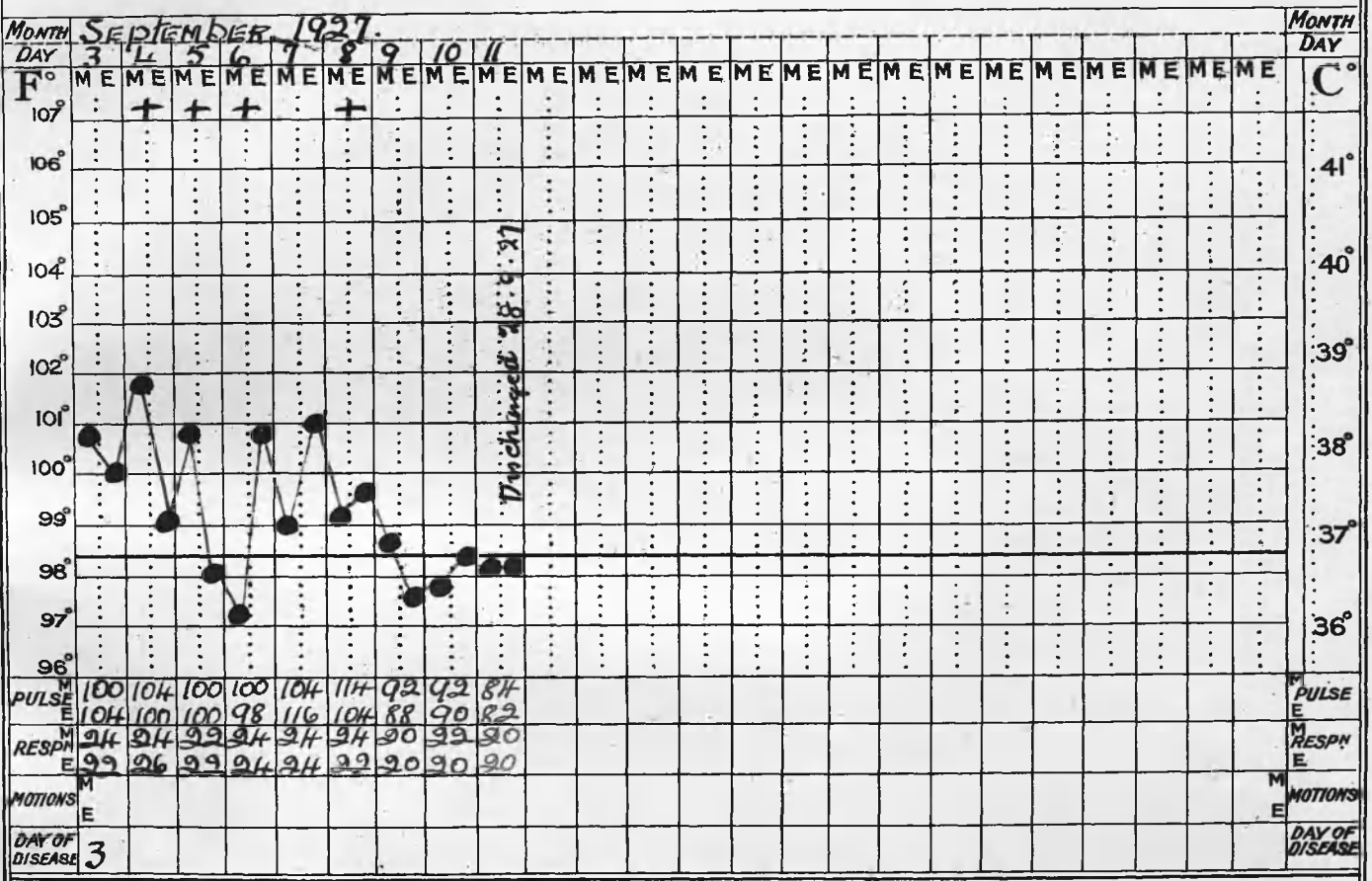
PATIENT'S NAME 293 AGE

CLINICAL CHART.

DIAGNOSIS. Complicated forceps labour.



Cervical culture - haemolytic streptococci
Blood " - sterile

URINE.

September.

DATE	3	4	5	6	7
No of oz. in 24 hrs.					
REACTION	Acid	Acid	Acid	Acid	Acid
SP. GR.					
ALBUMEN	Trace of albumen				
BLOOD					
UREA	Slightly muddy				
Microscop! Appearance Etc.					
COUGH Simple					
" Spasmodic					
" Whoop					

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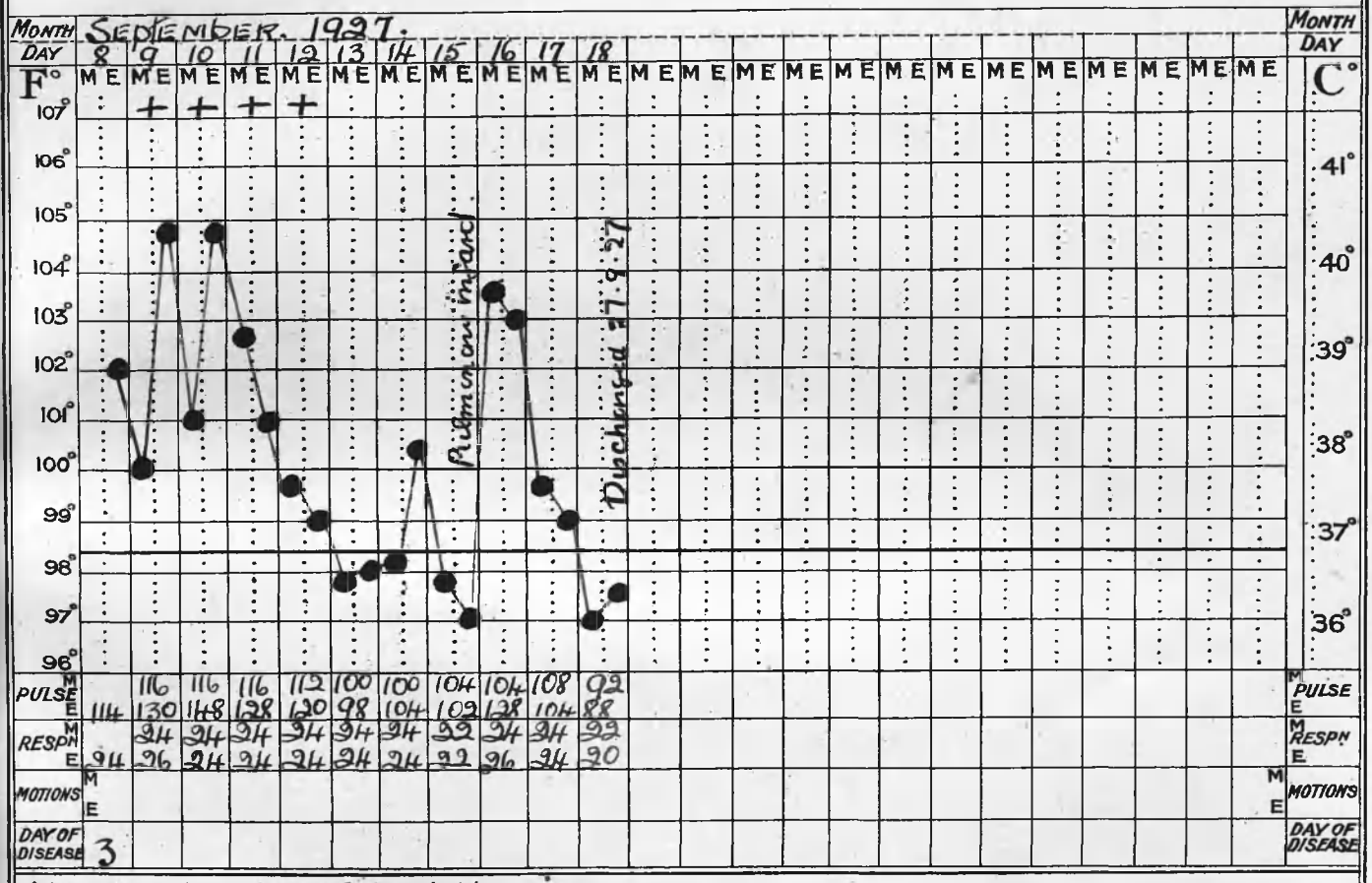
PATIENT'S NAME 294 AGE

CLINICAL CHART.

DIAGNOSIS. Membranes ragged: note pulmonary infarction.



Cervical culture - haemolytic streptococci
Urine " - sterile
Blood " - "

URINE.

DATE	
No of oz. in 24 hrs.	
REACTION	NORMAL
SP. GR.	NORMAL
ALBUMEN	NORMAL
BLOOD	NORMAL
UREA	NORMAL
Microscop! Appearance Etc.	
COUGH Simple	
" Spasmodic	
" Whoop	

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PATIENT'S NAME 296 AGE

CLINICAL CHART.

DIAGNOSIS. History of rigors + delirium prior to admission

Month: September. 1927.

Day	8	9	10	11	12	13	14	15	16
Temp. M		+	+	+	+				
Temp. E									
Pulse M		112	100	100	96	88	76	76	92
Pulse E	110	110	98	100	88	76	82	92	80
Respn M		24	24	24	22	20	20	20	20
Respn E	26	24	24	24	22	20	20	20	20
Motions M									
Motions E									
Day of Disease	6								

Discharged 12.9.27

Cervical culture - haemolytic streptococci + coliform bacilli

Blood culture - sterile

September.

URINE.

Date	9
No. of oz. in 24 hrs.	
Reaction	
Sp. Gr.	
Albumen	VFT
Blood	
Urea	S.M.
Microscopic Appearance Etc.	
Cough Simple	
" Spasmodic	
" Whoop	

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PATIENT'S NAME 298 AGE

CLINICAL CHART.

DIAGNOSIS.

MONTH SEPTEMBER 1927.

DAY	2	3	4	5	6	7	8	9	10
PULSE M	98	94	96	94	84	92	82	86	80
PULSE E		100	94	96	100	88	90	100	90
RESPN M	28	24	22	22	22	24	26	20	20
RESPN E		22	22	24	24	22	22	20	20
MOTIONS M									
MOTIONS E									
DAY OF DISEASE	5								

Discharged 31.9.27

Cervical culture - num. haemolytic streptococci
Blood " - sterile

September.

URINE.

DATE	2
No of oz. in 24 hrs.	
REACTION	
SP. GR.	
ALBUMEN	Trace
BLOOD	
UREA	
Microscopic Appearance Etc.	
COUGH Simple	
" Spasmodic	
" Whoop	

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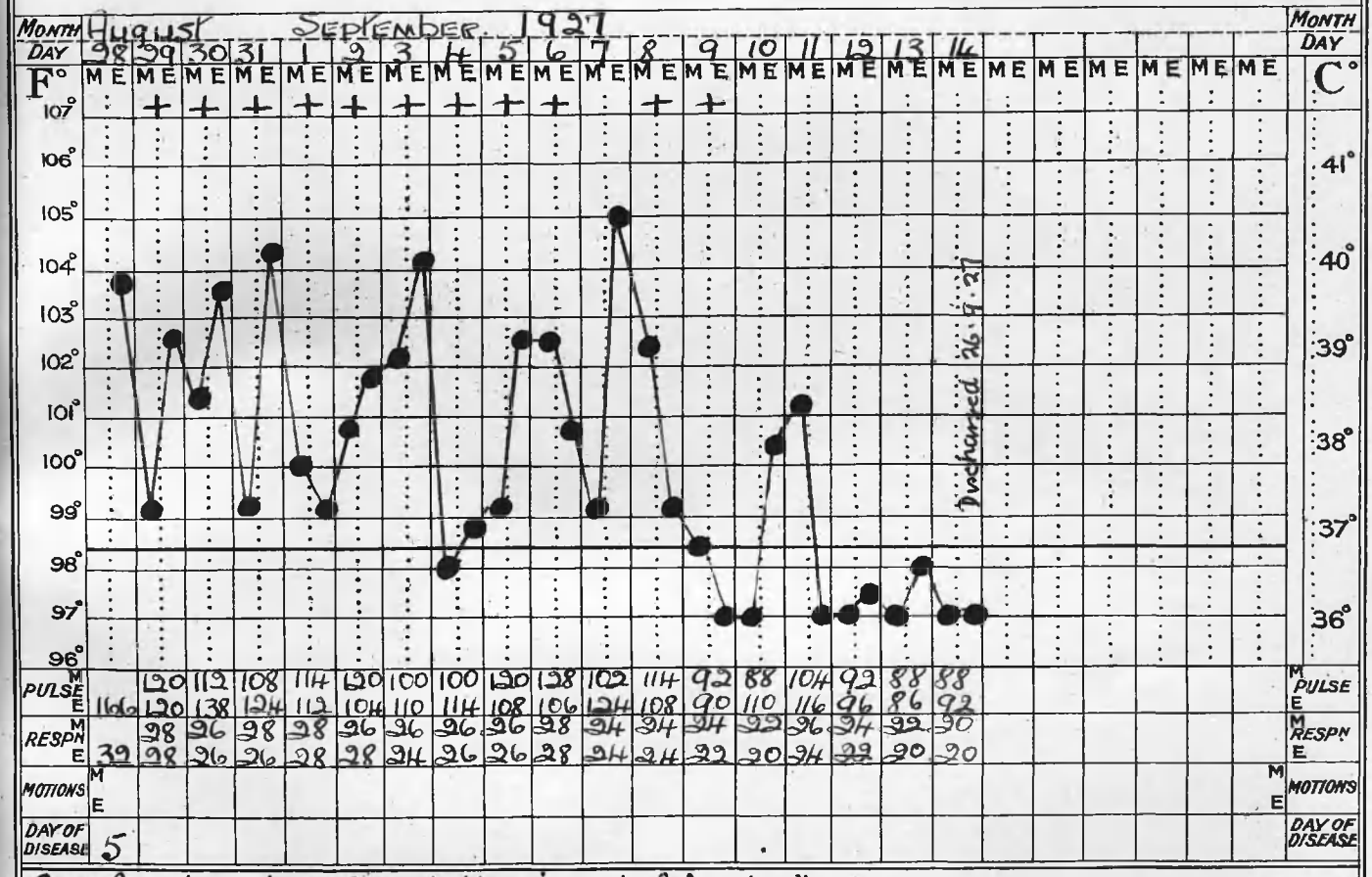
PATIENT'S NAME ..... Ogg ..... AGE .....

CLINICAL CHART.

DIAGNOSIS. Uterus much pulled to L. by parametric infiltration on admission



Cervical culture - haemolytic streptococci and coliform bacilli

URINE.

August September.

DATE	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14
No of oz. in 24 hrs.																		
REACTION																		
SP. GR.																		
ALBUMEN	Cloud	Cloud	Cloud	Cloud	Cloud	Trace	Trace	V F T	Trace	Deposit	Trace	Cloud	Trace	Cloud	V F T	V F T	Nil	Nil
BLOOD																		
UREA																		
Microscop! Appearance Etc.																		
COUGH Simple																		
" Spasmodic																		
" Whoop																		

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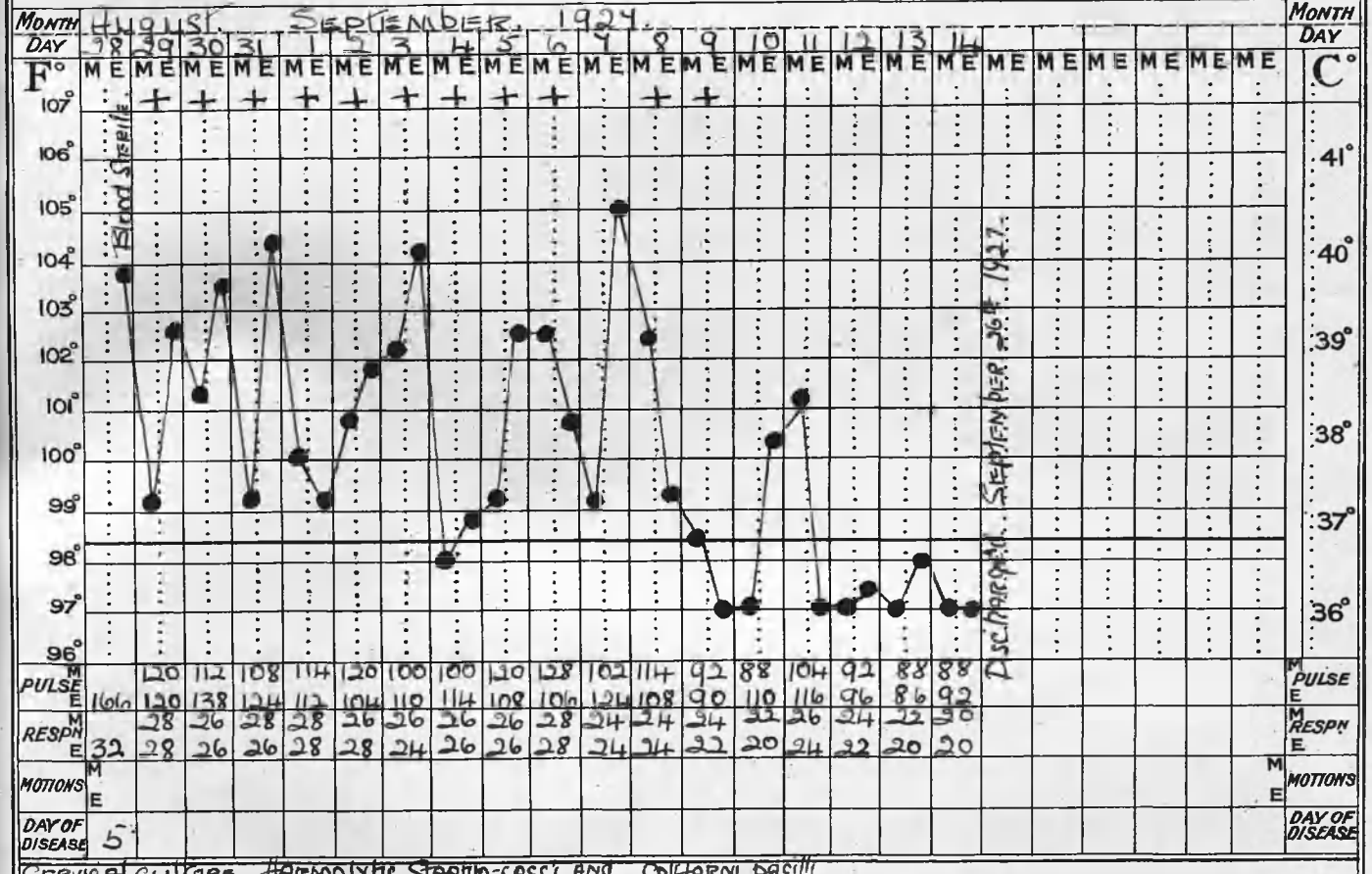
PATIENT'S NAME 299 AGE

CLINICAL CHART.

DIAGNOSIS. Uterus much pulled to Left by parametritis on Admission



Day	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Pulse M		120	112	108	114	120	100	100	120	128	102	114	92	88	104	92	88	88
Pulse E	166	120	138	124	112	104	110	114	108	106	124	108	90	110	116	96	86	92
Respn M		28	26	28	28	26	26	26	26	28	24	24	24	22	26	24	22	20
Respn E	32	28	26	26	28	28	24	26	26	28	24	24	22	20	24	22	20	20
Motions M																		
Motions E																		
Day of Disease	5																	

Cervical Culture. Haemolythe Staphylo-cocci and. Coliform Bacilli

URINE.

August September

Date	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14
No of oz. in 24 hrs.																		
Reaction																		
Sp. Gr.																		
Albumen	Cloud	Cloud	Cloud	Cloud	Cloud	Trace	Trace	Trace	Trace	Den: Cloud	Trace	Cloud	Trace	Cloud	Trace	Trace	Nil	Nil
Blood																		
Urea																		
Microscop! Appearance Etc.																		
Cough Simple																		
" Spasmodic																		
" Whoop																		

The best results will probably be got with the application thereof, as practiced by Hobbs - i.e. its adoption as a routine in all, post-natal wards in obsteteric hospitals. In the majority of the cases, which are definitely labelled, "puerperal sepsis" the mischief has spread beyond the source.

A series of charts showing the beneficial effects of drainage are enclosed - 84, 99, 101, 112, 128, 129, 244, 262, 263, 279, 293, 294, 296, 298, 299.

All cases on admission have a culture taken from the cervix by a modification of a West's swab, prior to douching, and the latter is plated out on blood agar. The following are some of the results obtained.

Haemolytic streptococci.	76.
Staphylococci.	40.
Sterile.	36.
Coliform bacilli.	22.
Staphylococci, and Streptococci.	20.
Staphylococci, and Coliform bacilli.	13.
Streptococci and Coliform Bacilli. .	10.
Other organisms.	10.
Total.	227.

Taken from practically a consecutive series of cases, leaving out the sterile culture, only 55% shows Streptococci, a very low porportion compared with other observers, but probably accounted for by a relatively high proportion of mild cases.

The significance of finding haemolytic streptococci in the cervix is that it makes the prognosis more serious. Unfortunately, the writer has not always found that the reults of cervical and blood culture coincided, possibly streptococci being overgrown by other organisms.

(c). Prevention of the entry of septic blot into the general circulation:- This subject will be dealt with after the routine treatment for blood infection has been described. Every case on admission has a blood culture taken. Formerly only those cases

which presented a suggestive clinical picture was blood cultured, but owing to the difficulty in diagnosis, this was abandoned. The discovery of many mild cases of Septicaemia which would otherwise have been missed, has markedly improved the recovery rate. Five or six cc's of blood are removed and inoculated in equal proportions into two tubes containing 5% saline and 0.4% citrate, which are at once prevented from clotting by shaking. Later the contents of these tubes are mixed with blood agar, and plated out. Thus we get at the end of 24-48 hours a quantitative estimation of the number of organisms per c.c. of blood, and this latter is absolutely essential for estimation of the value or otherwise of antiseptics, the relative decrease or otherwise of the number of colonies being an indication of the efficacy of the drug used. It also gives us an opportunity of forming a fairly accurate estimate of the prognosis. In the bad cases of septicaemia, haemolytic streptococci are always found in pure culture.

It should be mentioned here that the writer found on commencing this work that a staphylococcic septicaemia was not unknown, whereas, formerly he had considered it rare in peurperal work.

The principal line of treatment adopted in the case of Septicaemias treated was the intravenous administration of Kharsulphan.

The writer based his ideas on the work of Colebrook (5) who said - "The reasons why I think Neokharsivan, and the compounds closely allied to it, seem to offer more hope of success, in the treatment of peurperal septicaemia than anything already tried, is that after the administration of Neokharsivan the blood serum of the patient, has, and retains usually for twenty four hours, a largely increased power to kill haemolytic streptococci. The clinical results, indicatedup to the present are too few to warrant any definite statement. They are certainly not so good as to suggest that in Neokharsivan

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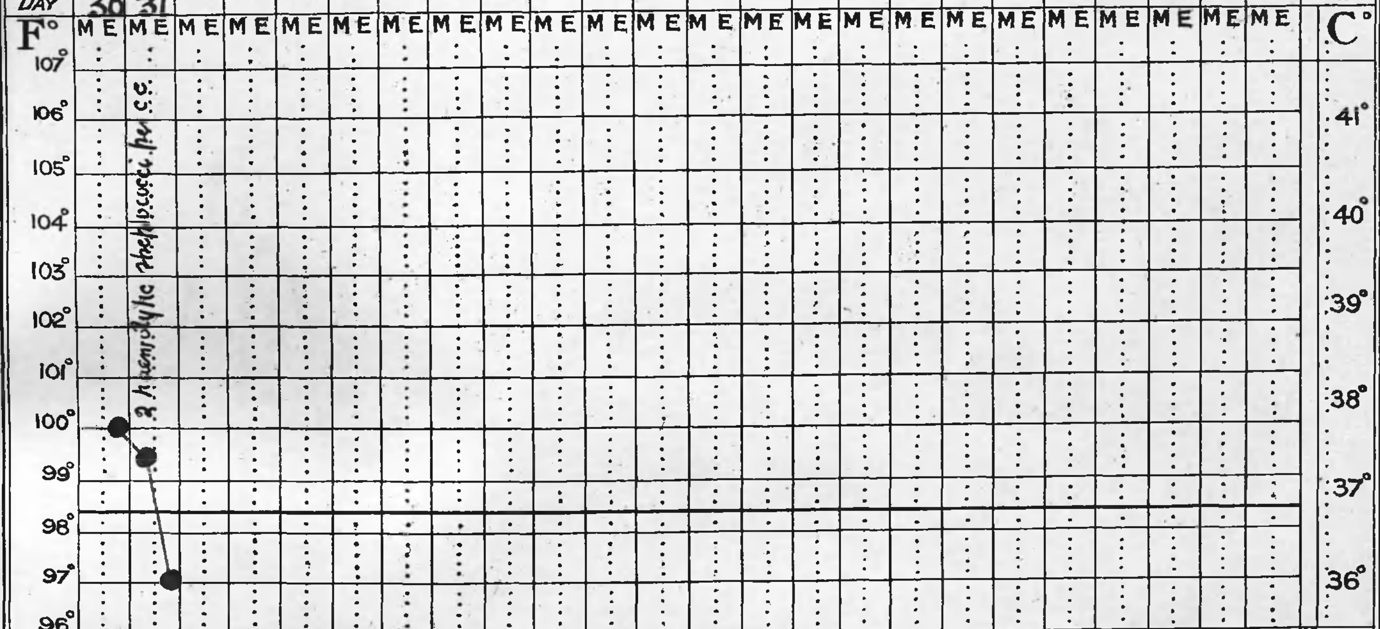
PATIENT'S NAME .... 11 .... AGE ....

CLINICAL CHART.

DIAGNOSIS. Streptococcic septicaemia. Died 36 hours after admission

MONTH: October 1925

DAY: 30, 31



	30 M	30 E	31 M	31 E
PULSE		132	140	144
RESPN		36	48	42
MOTIONS				
DAY OF DISEASE	3			

Blood culture - haemolytic streptococci

URINE.

DATE	
Nº of oz. in 24 hrs.	
REACTION	
SP. GR.	
ALBUMEN	
BLOOD	
UREA	
Microscop! Appearance Etc.	
COUGH Simple	
" Spasmodic	
" Whoop	

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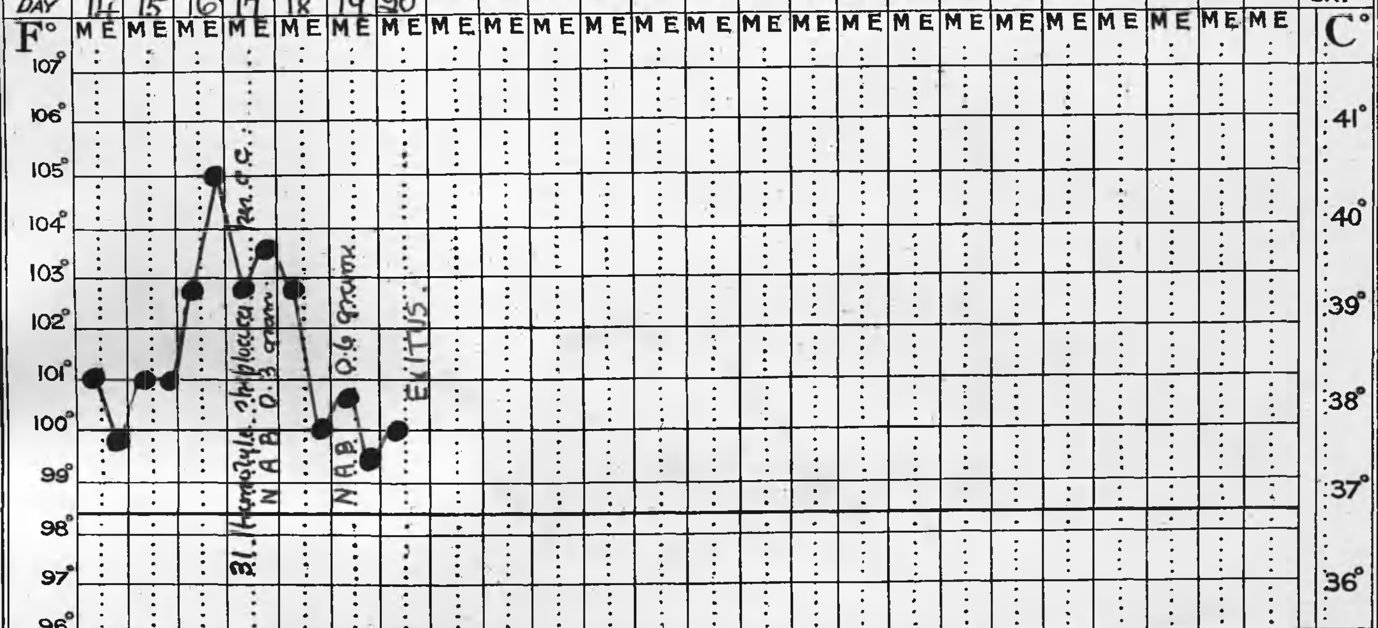
PATIENT'S NAME 52 AGE

CLINICAL CHART.

DIAGNOSIS. Septicaemia not suspected until 19.1.26. Probably would have been saved by earlier diagnosis. Reacted well to N.A.B.

MONTH: JANUARY 1926.

DAY	14	15	16	17	18	19	20
	M E	M E	M E	M E	M E	M E	M E



		14	15	16	17	18	19	20
PULSE	M	100	112	120	124	?	136	?
	E	114	106	132	128	?	146	
RESPN	M	26	24	28	40	52	48	56
	E	24	24	32	36	38	48	
MOTIONS	M E				X		X	← Arsenical injections
DAY OF DISEASE		2						

Cervical culture – haemolytic streptococci
Blood " – " "

URINE.

DATE					
No. of oz. in 24 hrs.					
REACTION					
SP. GR.					
ALBUMEN					
BLOOD					
UREA					
Microscop! Appearance Etc.					
COUGH Simple					
" Spasmodic					
" Whoop					

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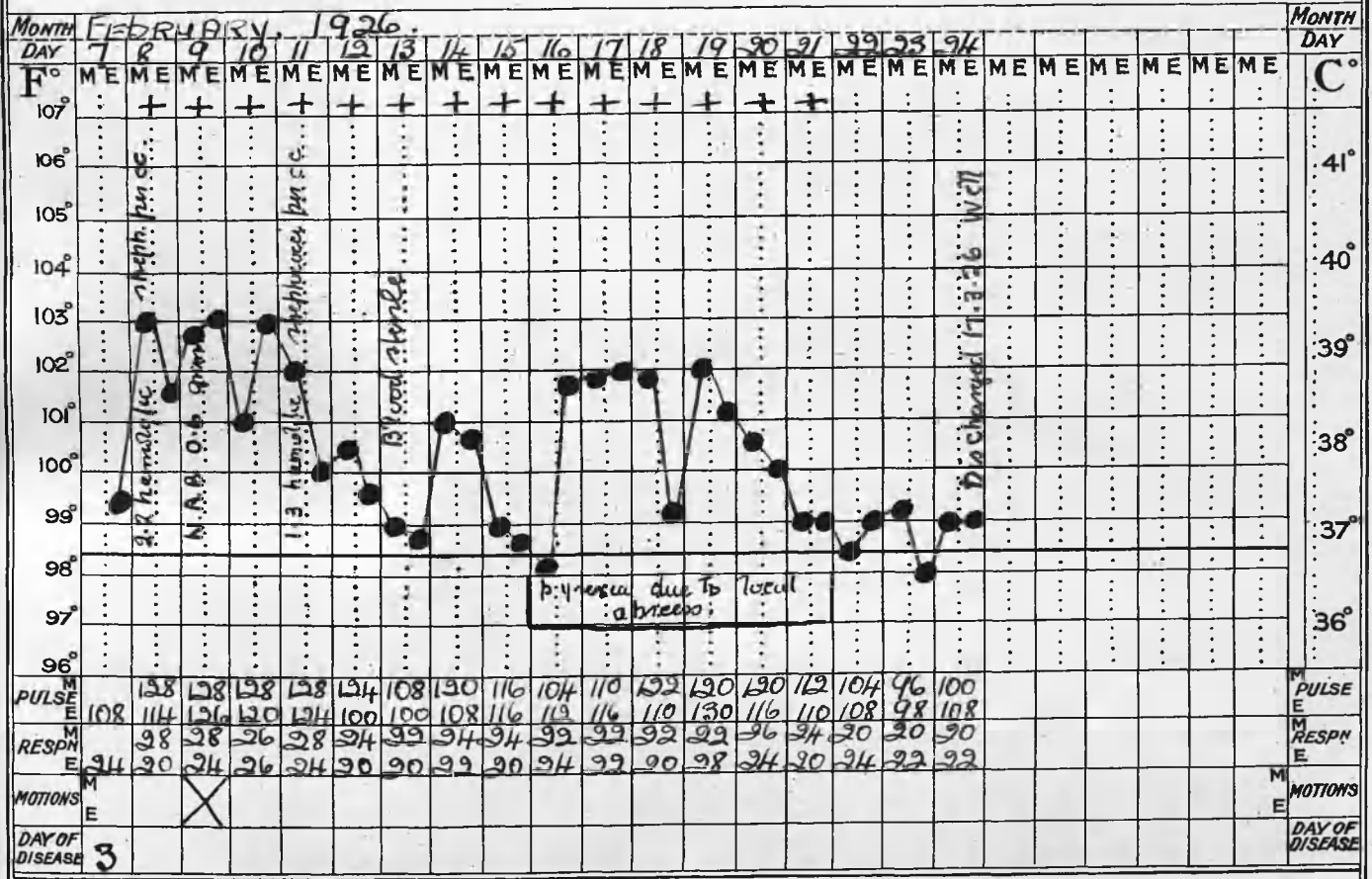
PATIENT'S NAME 62 AGE

CLINICAL CHART.

DIAGNOSIS.



Blood culture - haemolytic streptococci
Cervical " - coliform bacilli in pure culture

URINE.

DATE																								
No of oz. in 24 hrs.																								
REACTION																								
SP. GR.																								
ALBUMEN																								
BLOOD																								
UREA																								
Microscop! Appearance Etc.																								
COUGH Simple																								
" Spasmodic																								
" Whoop																								

we have an easy and sure cure for septicaemia, but they are not without some element of hope. The drug has been usually given in one large dose of 0.9 gram or in two of 0.6 gram, but it has been suggested that a course of four doses of 0.3 gram, at five days interval, would prolong the anti-bactericidal effect. The difficulty is to attain the concentration of arsenic in the blood, which would be toxic to organisms, but not to leucocytes.
The writer is firmly convinced that we have in this drug one of the great weapons in the fight against puerperal septicaemia.
The results achieved in the Septicaemias out of three hundred and fifty cases here show that Neokharsivan will render sterile, in most cases any blood which contains less than 30/40 haemolytic streptococci or even higher numbers of other organisms.
If the blood is not rendered sterile, one of two things must be happening. Either the organisms are actually multiplying in the vascular system, which may or may not be the case, or, further reinforeements may be occasionaly thrown into the blood stream from a local focus.
When one considers the onset of a succession of pulmonary infarcts in a case, the latter contingency is much more likely to cause the drug to fail. To substantiate these conclusions, the date of the cases treated with Neokharsivan will be given in some detail,along with the charts - the latter being inserted for the sake of brevity. In this series all the arsenical preparations used are referred to as N.A.B.

(11). 12 lbs. baby, extensive lacerations. Patient already collapsed on admission. Died 36 hours after admission. Two haemolytic streptococci per c.c.

(52) Eight previous miscarriages with persistent leucorrhoea. Treated with N.A.B. without avail. Probably would have been saved by earlier diagnosis as she reacted well to N.A.B.

(63) Failed forceps and craniotomy. Very severely lacerated. Embolic abscess in arm. Reacted well to general and local treatment. Discharged fit 17.3.26.

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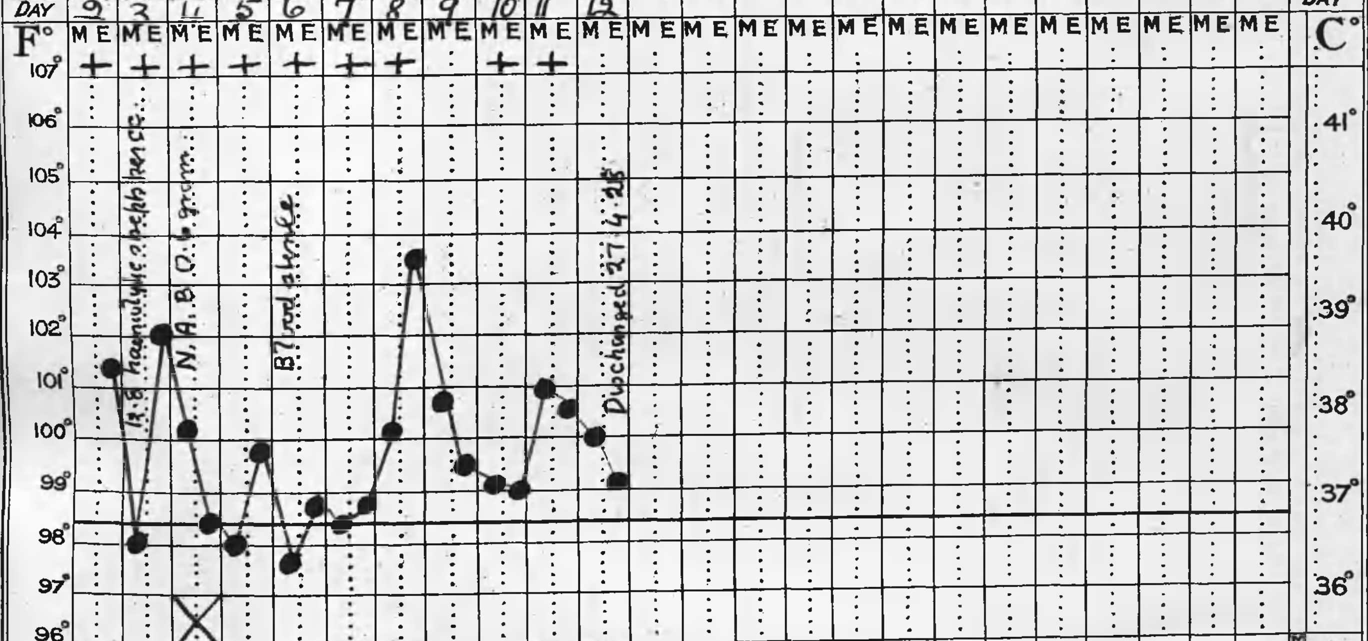
PATIENT'S NAME 69 AGE

CLINICAL CHART.

DIAGNOSIS. Patient awaiting operation for retroversion

MONTH: March. 1926.



DAY	2	3	4	5	6	7	8	9	10	11	12
PULSE M	100	100	100	100	96	96	88	92	80	96	72
PULSE E	120	118	104	88	99	110	120	84	102	104	88
RESPN M	24	24	28	24	24	24	24	28	20	24	24
RESPN E	22	34	28	24	20	24	28	20	24	24	24
MOTIONS M / E											
DAY OF DISEASE	12										

Cervical culture - haemolytic streptococci
Blood " " "

URINE.

DATE	
Nº of oz. in 24 hrs.	
REACTION	
SP. GR.	
ALBUMEN	
BLOOD	
UREA	
Microscop! Appearance Etc.	
COUGH Simple	
" Spasmodic	
" Whoop	

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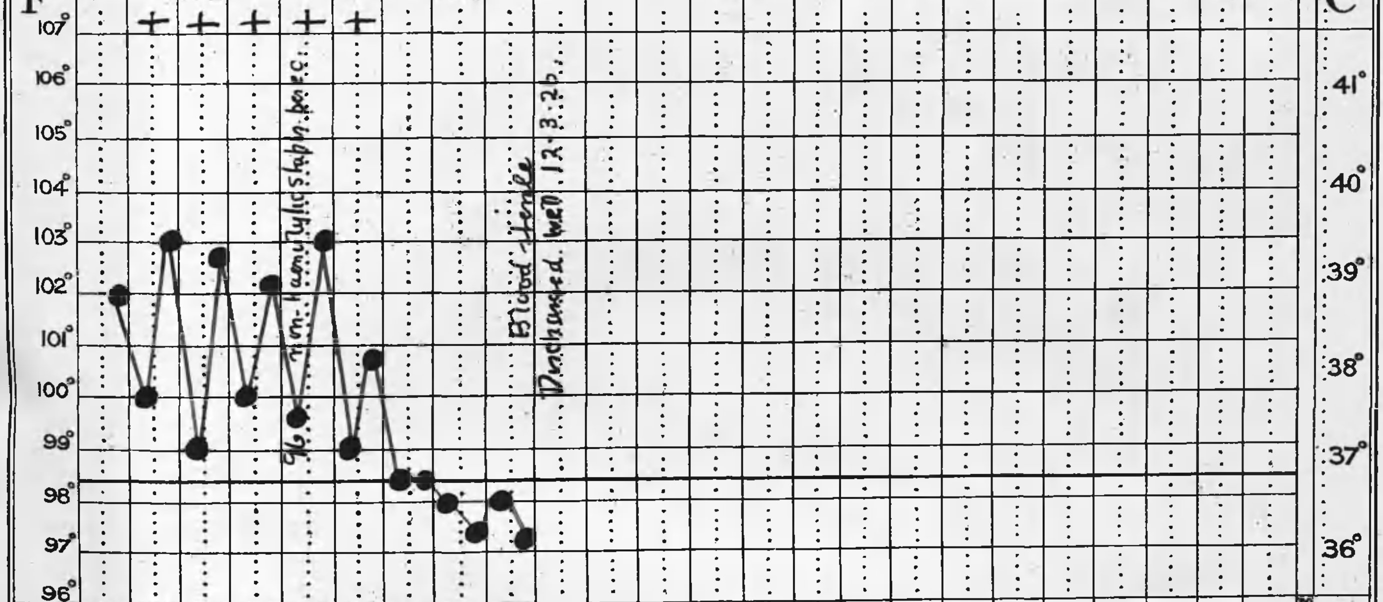
PATIENT'S NAME 71 AGE

CLINICAL CHART.

DIAGNOSIS. Septicaemia not suspected until 3·3·26. Patient delirious from 26·2·26 until ~~3·3·26~~

MONTH: February March 1926

DAY	25	26	27	28	1	2	3	4	5
	M E	M E	M E	M E	M E	M E	M E	M E	M E
		+	+	+	+	+			



	25	26	27	28	1	2	3	4	5
PULSE M	126	128	120	130	122	124	100	96	88
PULSE E	124	136	122	120	128	120	96	90	90
RESPN M	24	24	24	24	24	24	22	20	20
RESPN E	24	26	24	24	26	22	20	20	20
MOTIONS M / E		No arsenical injections							
DAY OF DISEASE	8								

Cervical culture - staphylococci and short-chained non-haemolytic streptococci
Blood " - non-haemolytic staphylococci

URINE.

DATE									
Nº of oz. in 24 hrs.									
REACTION									
SP. GR.									
ALBUMEN									
BLOOD									
UREA									
Microscop! Appearance Etc.									
COUGH Simple									
" Spasmodic									
" Whoop									

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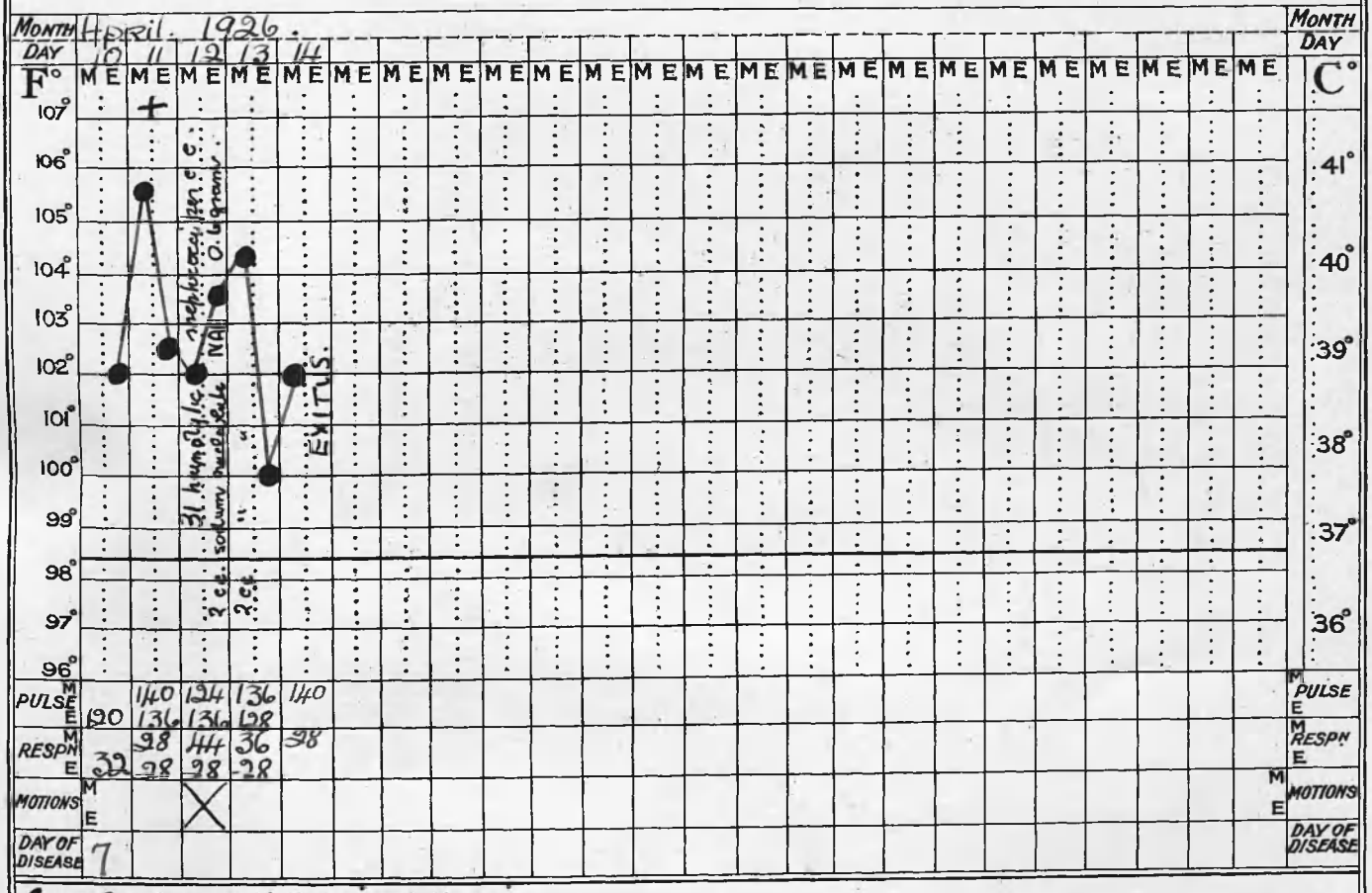
PATIENT'S NAME 91 AGE

CLINICAL CHART.

DIAGNOSIS. Normal puerperium up to 12th day. Admitted 19 days after confinement.



Cervical culture - staphylococci + streptococci
Blood " - haemolytic streptococci

URINE.

DATE																											
No of oz. in 24 hrs.																											
REACTION																											
SP. GR.																											
ALBUMEN																											
BLOOD																											
UREA																											
Microscop! Appearance Etc.																											
COUGH Simple																											
" Spasmodic																											
" Whoop																											

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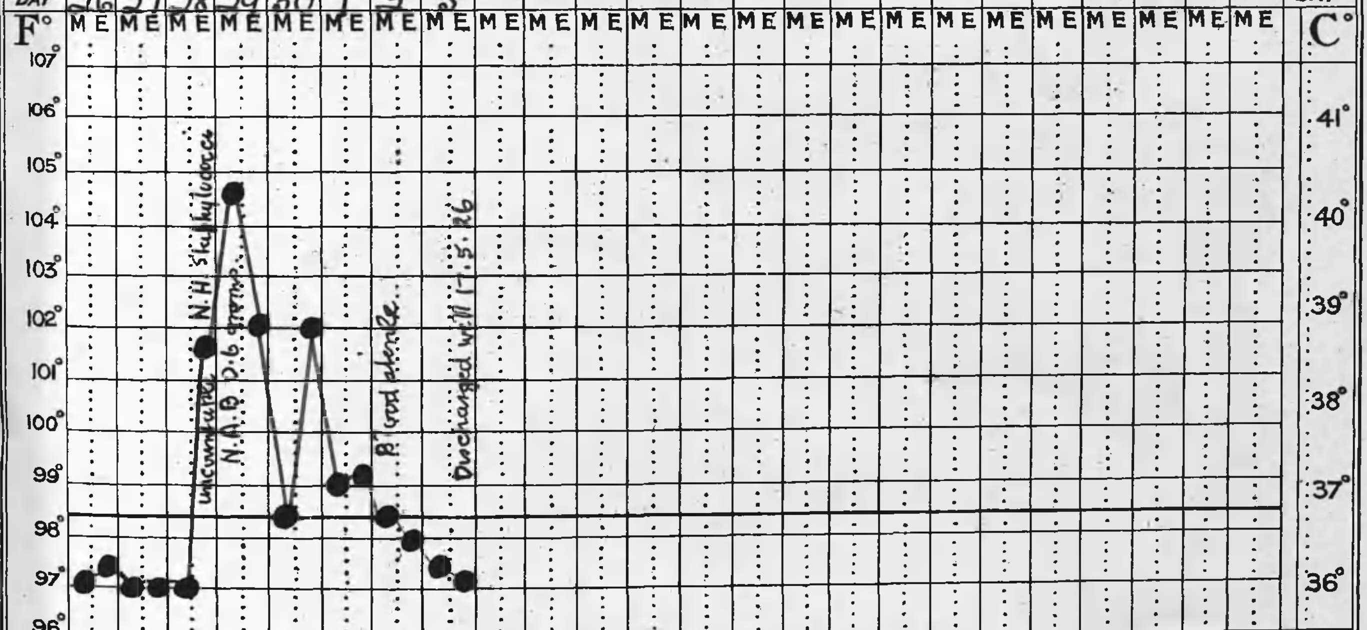
PATIENT'S NAME .... 92 .... AGE ....

CLINICAL CHART.

DIAGNOSIS. Sudden onset of septicaemia 3 weeks after admission.

MONTH	April					May			
DAY	26	27	28	29	30	1	2	3	
F°	M E	M E	M E	M E	M E	M E	M E	M E	C°



	26	27	28	29	30	1	2	3
PULSE M	76	64	80	128	108	80	76	72
PULSE E	80	80	116	128	120	84	80	74
RESPN M	20	20	20	24	32	24	20	20
RESPN E	20	20	20	22	32	24	20	20
MOTIONS M / E				X				
DAY OF DISEASE	19							

Cervical culture - long-chained haemolytic streptococci
Blood " " " "

URINE.

DATE	
Nº of oz. in 24 hrs.	
REACTION	
SP. GR.	
ALBUMEN	
BLOOD	
UREA	
Microscop! Appearance Etc.	
COUGH Simple	
" Spasmodic	
" Whoop	

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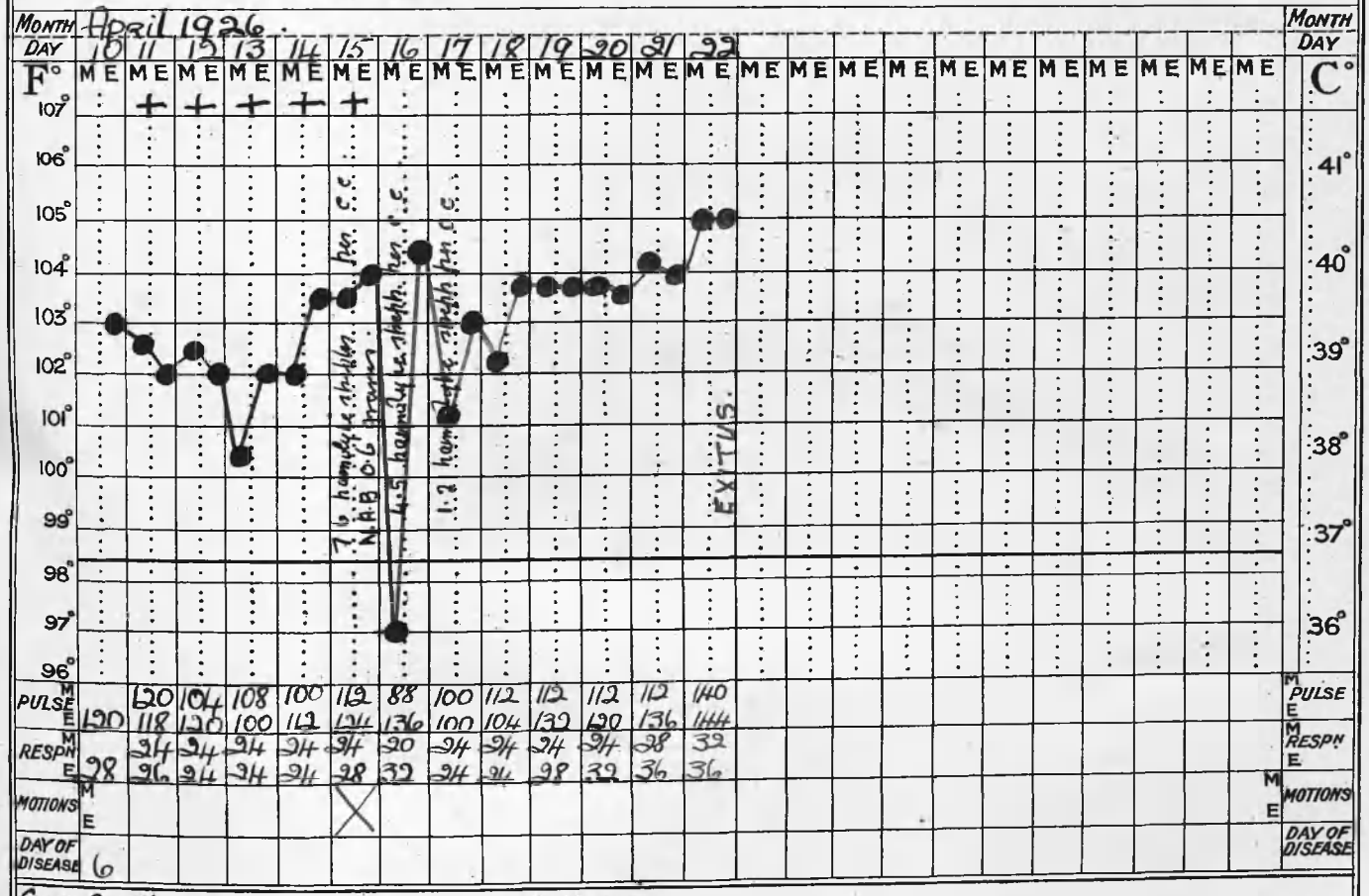
PATIENT'S NAME 96 AGE

CLINICAL CHART.

DIAGNOSIS. Septicaemia not suspected owing to slow pulse and temperature. Patient died of generalized phlebitis



Cervical culture — long-chained haemolytic streptococci

Blood " " " "

URINE.

DATE																												
No of oz. in 24 hrs.																												
REACTION																												
SP. GR.																												
ALBUMEN																												
BLOOD																												
UREA																												
Microscop! Appearance Etc.																												
COUGH Simple																												
" Spasmodic																												
" Whoop																												

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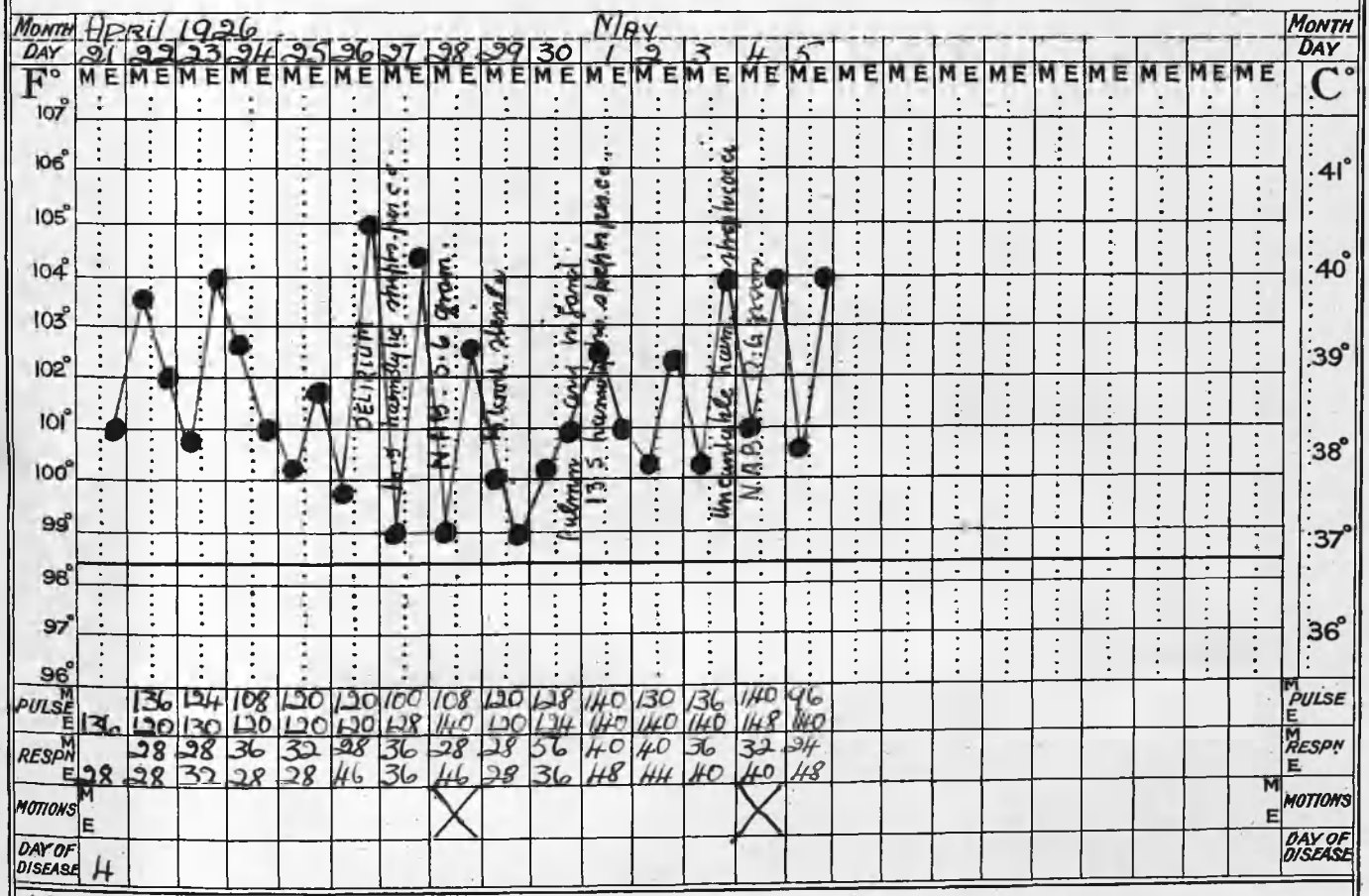
PATIENT'S NAME ..... 100 ..... AGE .....

CLINICAL CHART.

DIAGNOSIS. Admitted 3 weeks after confinement and one week after discharge from obstetric hospital
Cardio-renal case on admission 21.4.26 Thrombo-phlebitis R.leg 26.4.26 Pelvimetry



Blood culture - haemolytic streptococci

URINE.

DATE	April 21																									
No of oz. in 24 hrs.																										
REACTION																										
SP. GR.																										
ALBUMEN																										
BLOOD	Present.																									
UREA																										
Microscopic Appearance Etc.																										
COUGH Simple																										
" Spasmodic																										
" Whoop																										

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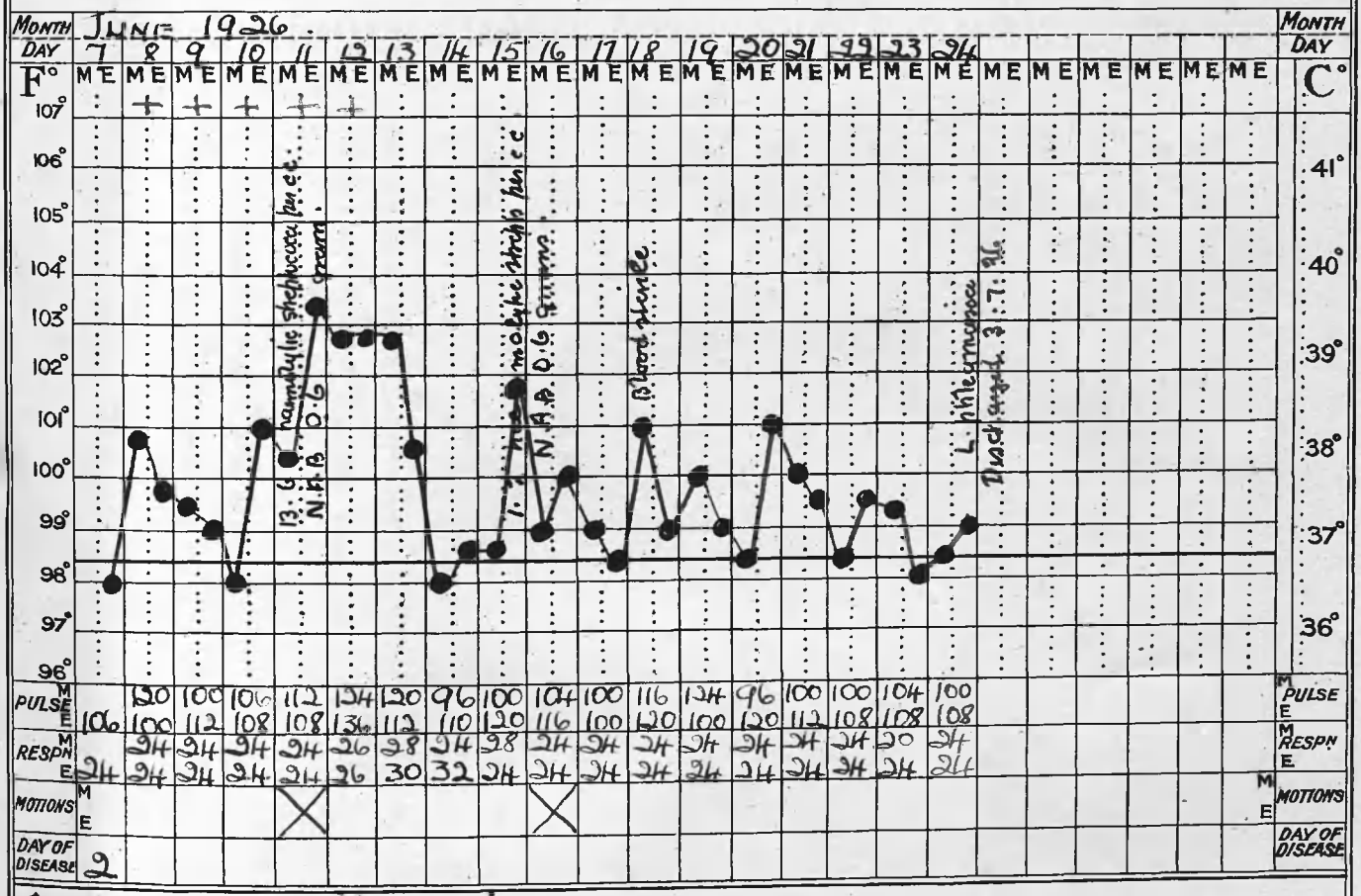
PATIENT'S NAME ..... 127 ..... AGE .....

CLINICAL CHART.

DIAGNOSIS. Did well under arsenical administration, but not improved by local irrigation.



Cervical culture – haemolytic streptococci
Blood " – " "
Urine " – sterile

URINE.

DATE																									
No of oz. in 24 hrs.																									
REACTION																									
SP. GR.																									
ALBUMEN																									
BLOOD																									
UREA																									
Microscopic Appearance Etc.																									
COUGH Simple																									
" Spasmodic																									
" Whoop																									

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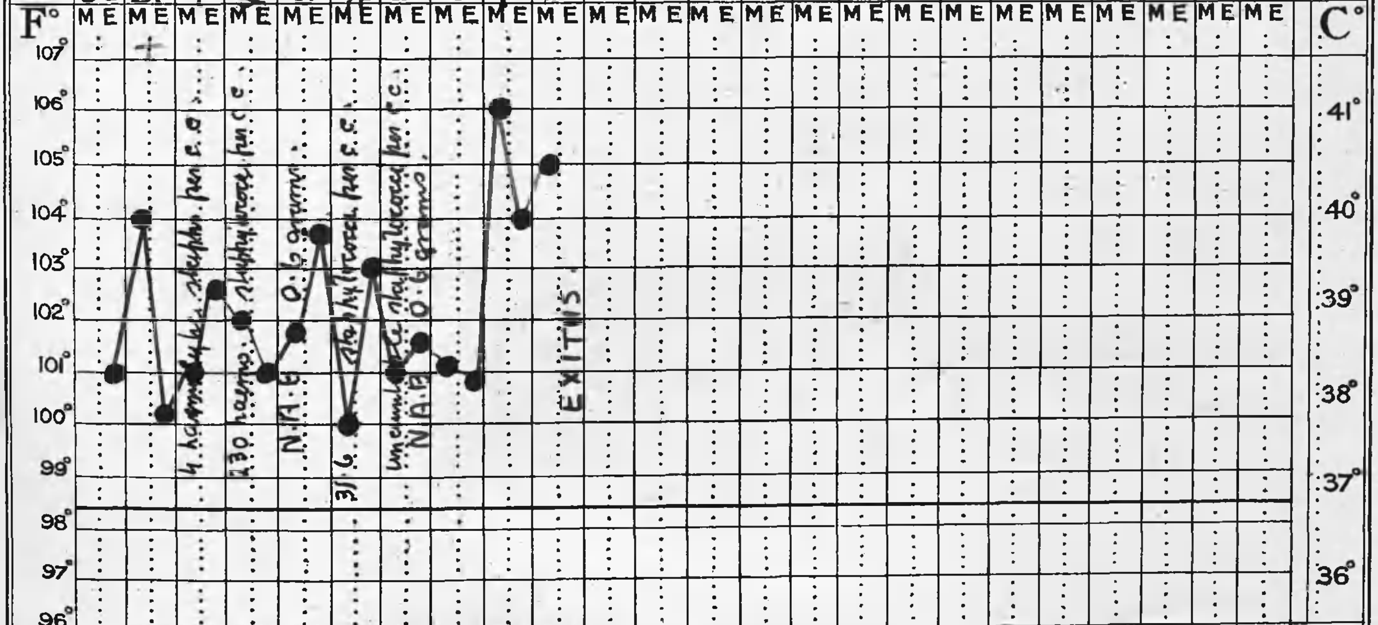
PATIENT'S NAME .... 154 .... AGE ....

CLINICAL CHART.

DIAGNOSIS. Placenta praevia. Offensive leucorrhoea for 5 months prior to parturition.
Organisms became non-haemolytic during treatment!

MONTH: August - September 1926



DAY	30	31	1	2	3	4	5	6	7	8
PULSE M		120	120	120	116	110	114	116	132	140
PULSE E	110	116	128	112	120	128	120	96	120	
RESPN M		26	24	32	32	28	32	26	32	44
RESPN E	24	24	32	36	36	32	32	24	28	
MOTIONS M/E					X		X			
DAY OF DISEASE	1									

Cervical culture - haemolytic staphylococci
Blood " - " "

URINE.

DATE	
Nº of oz. in 24 hrs.	
REACTION	
SP. GR.	
ALBUMEN	
BLOOD	
UREA	
Microscop! Appearance Etc.	
COUGH Simple	
" Spasmodic	
" Whoop	

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CORPORATION OF MANCHESTER.

MONSALL HOSPITAL.

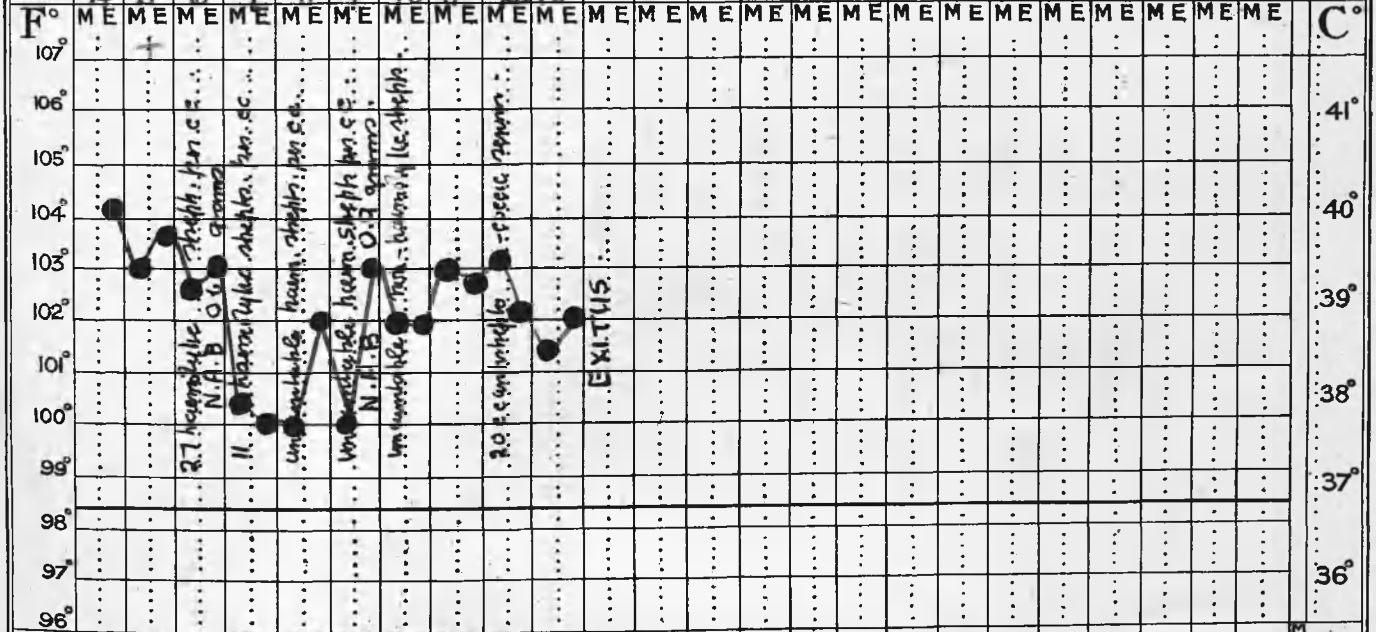
PATIENT'S NAME ......187...... AGE ....

CLINICAL CHART.

DIAGNOSIS. Central placenta praevia and severe P.P.H. Organisms became non-haemolytic.

MONTH: November 1926

DAY: 4, 5, 6, 7, 8, 9, 10, 11, 12, 13



		4	5	6	7	8	9	10	11	12	13
PULSE	M		116	132	104	130	86	120	120	130	124
	E	120	120	124	128	118	140	124	156	158	
RESPN	M		26	32	22	26	28	30	32	36	40
	E	26	24	26	24	28	36	26	28	48	
MOTIONS	M/E			X			X				
DAY OF DISEASE		3									

Cervical culture – haemolytic streptococci
Blood " – " "

URINE.

DATE	
No. of oz. in 24 hrs.	
REACTION	
SP. GR.	
ALBUMEN	
BLOOD	
UREA	
Microscop! Appearance Etc.	
COUGH Simple	
" Spasmodic	
" Whoop	

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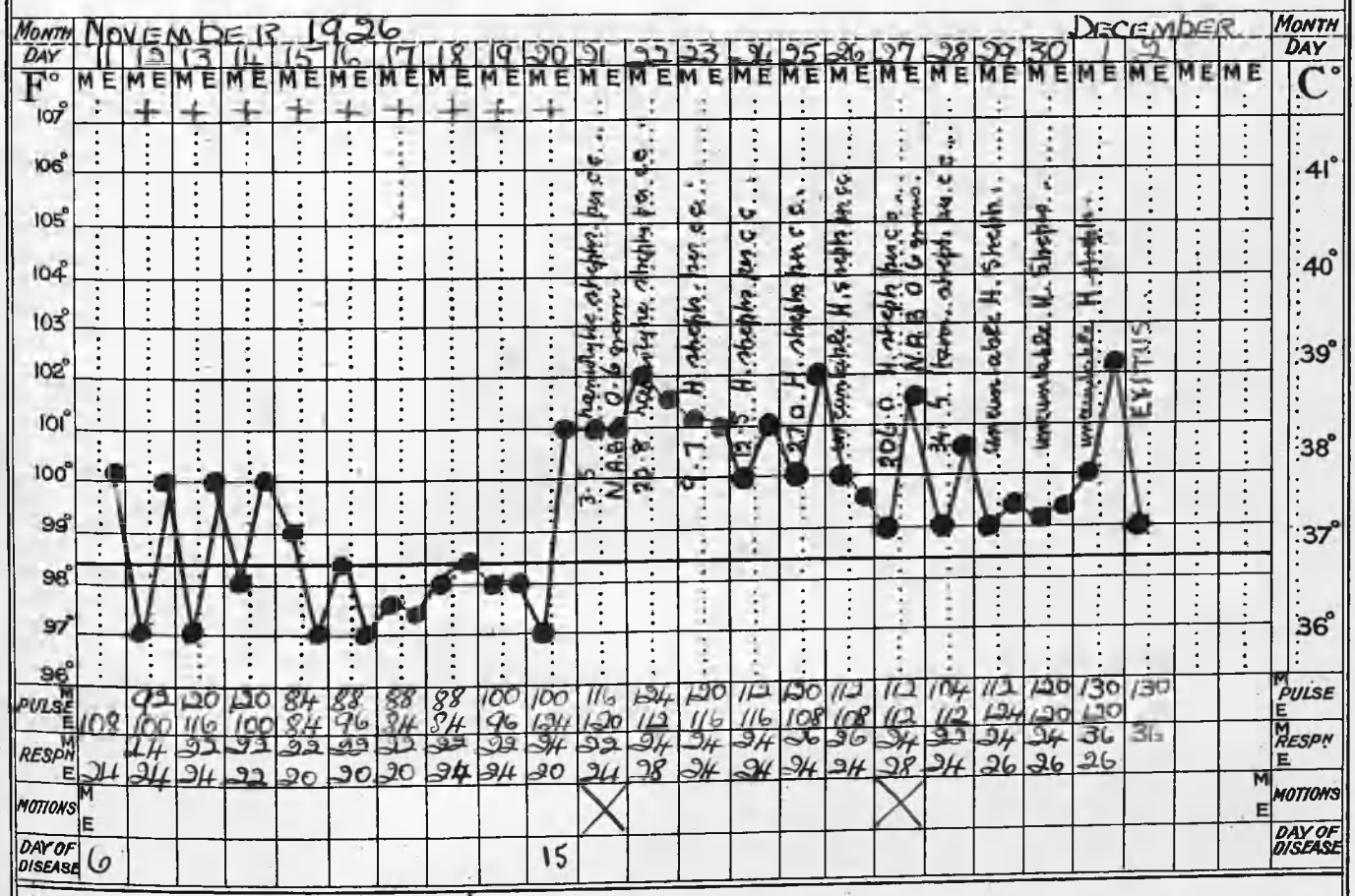
PATIENT'S NAME 190 AGE

CLINICAL CHART.

DIAGNOSIS. Late onset of septicaemia, hence improved by arsenical administration.



Blood culture - haemolytic staphylococci
Cervical " - Gram-positive diplococci fermenting Glucose with acid + gas production.

URINE.

DATE																									
No of oz. in 24 hrs.																									
REACTION																									
SP. GR.																									
ALBUMEN																									
BLOOD																									
UREA																									
Microscop! Appearance Etc.																									
COUGH Simple																									
" Spasmodic																									
" Whoop																									

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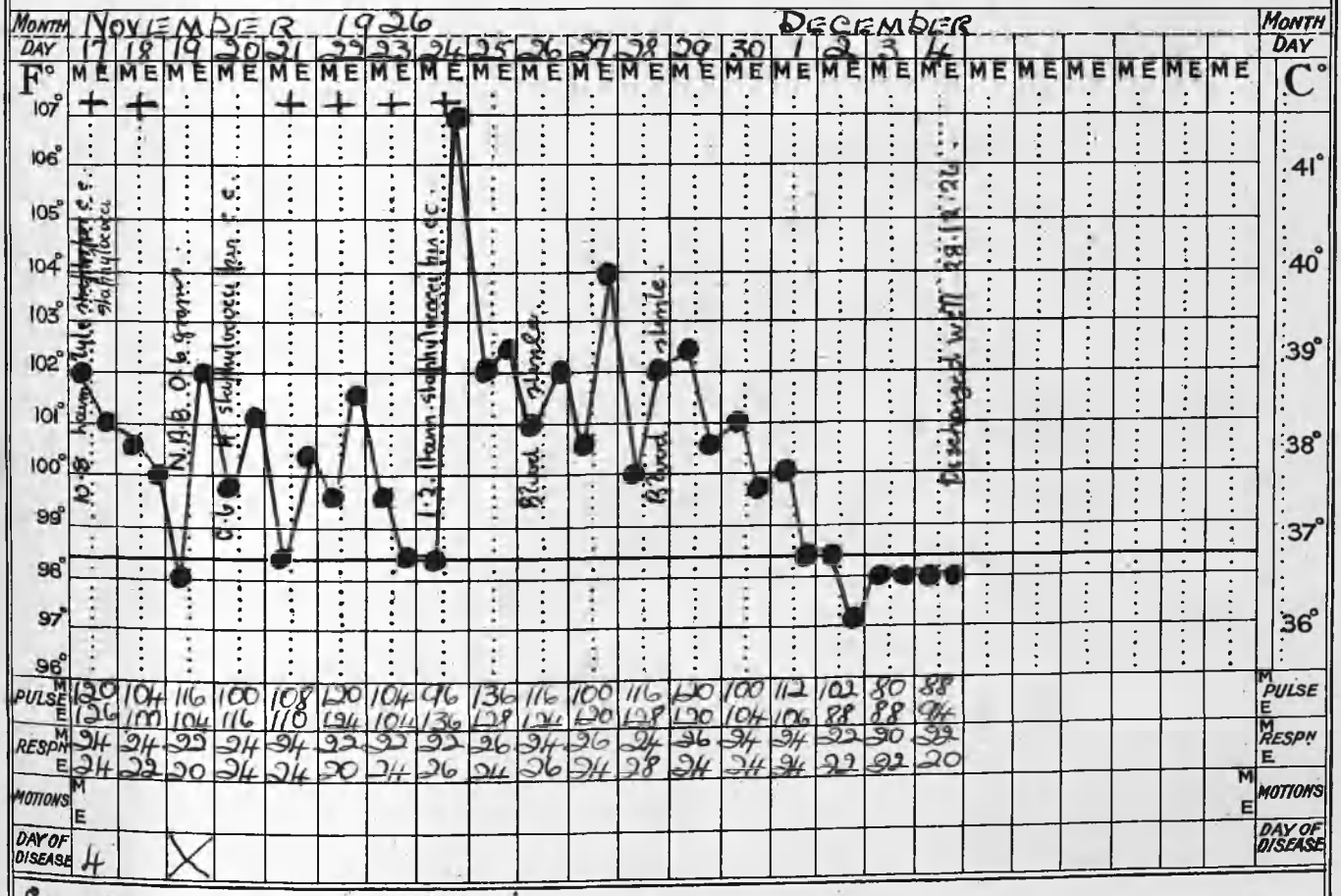
MONSALL HOSPITAL.

PATIENT'S NAME 194 AGE

CLINICAL CHART.

DIAGNOSIS. Nute hyperpyrexia



Cervical culture - haemolytic staphylococci
Blood " - " "

URINE.

DATE																									
No of cc. in 24 hrs.																									
REACTION																									
SP. GR.																									
ALBUMEN																									
BLOOD																									
UREA																									
Microscop! Appearance Etc.																									
COUGH Simple																									
" Spasmodic																									
" Whoop																									

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(71) Persistent occipito-posterior admitted on the 8th day of disease. Became delirious on day after admission, but Septicaemia not suspected for some time. Recovered spontaneously - a fact which makes one think. It was at that time though that N.A.B. was specific for Streptococci.

(96) Typical history. Got up at home on the 12th day, and went back to bed with pain in the legs, headache, and offensive leucorrhoea. N.A.B. apparently useless. Post-mortem performed on this case, sodium nucleolate also tried without avail. Admitted nineteen days after confinement.

(92) This patient had been in for some time and was apparently quite settled down, when three weeks after admission lymph-adenitis suddenly appeared in Rt.axilla and a septicaemia developed, which cleared up at once with N.A.B.

(96) Admitted on the twelfth day of puerperium with very suggestive history of septicaemia, but latter not suspected owing to relative slow pulse. Septicaemia condition somewhat improved by N.A.B. administration, but death gradually ensued from increasing thrombo-phlebitis which became generalised, even the veins of the arm becoming clotted.

(100) Admitted on the twenty first day of confinement, one week after discharge from an obstetric hospital with thrombo-phlebitis of the rt.leg and haematomata. Developed hypostatic pneumonia on 1.5.27, probably due to pulmonic infarction. Blood rendered sterile with N.A.B. but further re-infection subsequently led to an intense septicaemia.

(127) After admission hyperpyexia and delirium, urine proved negative. Glycerine-irrigation appeared to spread a septicaemia which yielded well to N.A.B. treatment. Convalescence retared by prepatellar bursitis.

(154) History of offensive leucorrhoea for five months before confinement. Placenta praevia and breech. The N.A.B. temporarily cleared up the blood a little, but this was not maintained. The remarkable result about this case was that the staphylococci became definitely nom-haemolytic, whether due to treatment or not is not known.

(181) Central placenta praevia with bipolar version; manual removal of placenta. Severe P.P.H. with uterine temponage. Septicaemic condition did not yield to N.A.B. but organisms became non-haemolytic. Note sudden drop in pulce rate of 9.11.27.

(190) Face presentation and s evere laceration. Settled down fairly comfortably on drainage. Developed a cystitis and suddenly, later a septicaemia of streptococcal origin with headache and vomiting. Latter were beaten back by N.A.B.and later the infection became massive and the veins became thrombosed especially those of the upper limbs. No rigors, rapid pulse, or delirium.

(194) Mild delirium with staphylococcic septicaemia. The release of a little clot with a small number of organisms sent the temperature up to 107°.

(202) Membrane ragged. Very ill on admission with poor pulse and marked dysarthria and bronchitis and swelling of labiae, and double incontinence. Made some temporary improvement with N.A.B. administration.

(204) History of rigors, pyrexia and marked varicosity of legs. Headache and swimminess present. Soon after admission patient developed signs of incomplete obstruction with visible peristalsis. The vulvae were swollen and oedematous, and the arms fixed owing to muscular rigidity. An ischial rectal abscess was traced, and a septic haematoma found. Abdominal distension was thereby much relieved, and also the muscular stiffness. The condition remained very stationary until the patient developed a Phlegmasia, with an infarct which afterwards sloughed. The patient then faded out with septicaemia and septic infarcts. Note that the streptococci became non-haemolytic.

(213) Got up on the fourteenth day after apparently normal puerperium, a typical history. Rigors and delirium promptly ensued. Septicaemia on admission, and persistent headache while in hospital. Patient died nine days after admission.

(216) Severe lacerations, but condition quite s ettled down. Later there was a sudden release of clot with resultant Septicaemia with pyrexia suggestive of abdominal phlebitis immediately afterwards.

(223) Mild septicaemia on admission with uninterrupted recovery.

(224) Septic miscarriage. Passed placenta intact after admission. On the fourth to seventh day the patient developed very severe headache, and pain referred to the right Supraorbital region with mild septicaemia condition. Note how the pulse is often more rapid with streptococcal infections.

(221) Very extensive lacerations. Mild release of clot with Septicaemia which cleared up under N.A.B. Convalescence uninteresting, except for several superficial abscesses. (chart not included)

(291) Normal labour with some parametritis on admission. A fairly severe staphylococcic septicaemia which cleared up rapidly under drug treatment. Note that staphylococci became non-haemolytic.

(294) History of insomnia and vomiting. Marked abdominal distention. Two slight reinfections of blood stream which settled down without any drug treatment.

(292) Hydrocephalus and perforation; manual removal of placenta. Two days after admission "swimminess" and hemicrania. Three days later, further mild release of clot with "swimminess". Mild septicaemia treated by drug. Sudden death from pulmonary embolism on the twentyth day of disease.

The following points may be noted with regard to these septicaemiae.

(a) Often the relatively late and at the same time, sudden onset.

(b) The pulse is often only 100-110, but is usually more rapid.

(c) Haemolytic streptococci became non-haemolytic in many cases, whether due to drug treatment or not is unknown.

CORPORATION OF MANCHESTER.

MONSALL HOSPITAL.

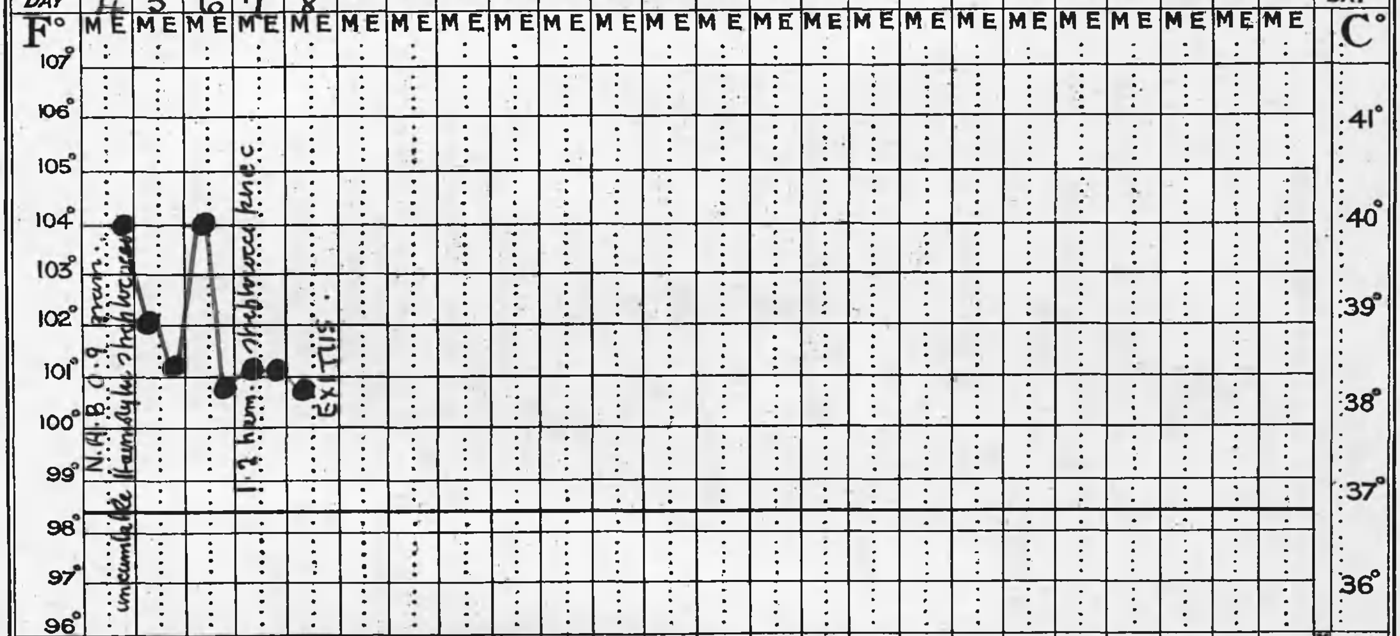
PATIENT'S NAME 202 AGE

CLINICAL CHART.

DIAGNOSIS. On admission, dysarthria a marked feature.

MONTH: December 1926

DAY	4		5		6		7		8	
	M	E	M	E	M	E	M	E	M	E



	4 M	4 E	5 M	5 E	6 M	6 E	7 M	7 E	8 M	8 E
PULSE		124	124	114	122	110	136	120	120	
RESPN		40	44	36	42	28	36	32	48	
MOTIONS		X								
DAY OF DISEASE										

Blood culture - haemolytic streptococci

URINE.

DATE	
Nº of oz. in 24 hrs.	
REACTION	
SP. GR.	
ALBUMEN	
BLOOD	
UREA	
Microscopl Appearance Etc.	
COUGH Simple	
" Spasmodic	
" Whoop	

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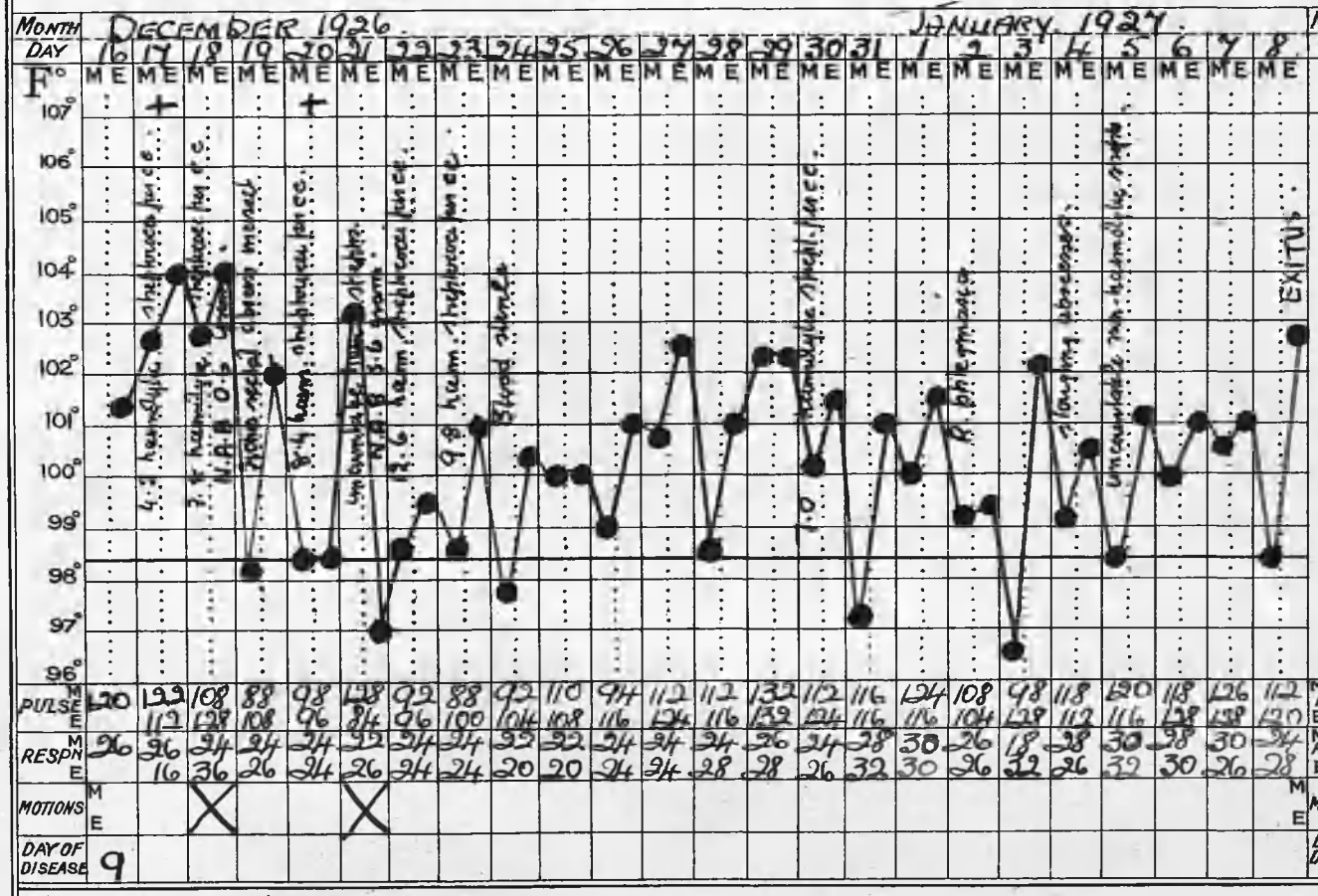
MONSALL HOSPITAL.

PATIENT'S NAME ..... 204 ..... AGE .....

CLINICAL CHART.

DIAGNOSIS. Ischio-rectal abscess · Died from multiple pyaemic abscesses · Septicaemia successfully combated · Organisms became non-haemolytic ·



PULSE M	120	122	108	88	98	128	92	88	92	110	94	112	112	132	112	116	124	108	98	118	120	118	126	112	M
PULSE E		112	128	108	96	84	96	100	104	108	116	124	116	132	124	116	116	104	128	112	116	128	128	120	E
RESPN M	26	26	24	24	24	32	24	24	32	32	24	24	24	26	24	28	30	26	18	28	30	28	30	24	M
RESPN E		16	36	26	24	26	24	24	20	20	24	24	28	28	26	32	30	26	32	26	32	30	26	28	E
MOTIONS M			X			X																			M
MOTIONS E																									E
DAY OF DISEASE	9																								

Conical culture - Sterile
Blood " - haemolytic streptococci

URINE.

DATE																								
No of oz. in 24 hrs.																								
REACTION																								
SP. GR.																								
ALBUMEN																								
BLOOD																								
UREA																								
Microscop! Appearance Etc.																								
COUGH Simple																								
" Spasmodic																								
" Whoop																								

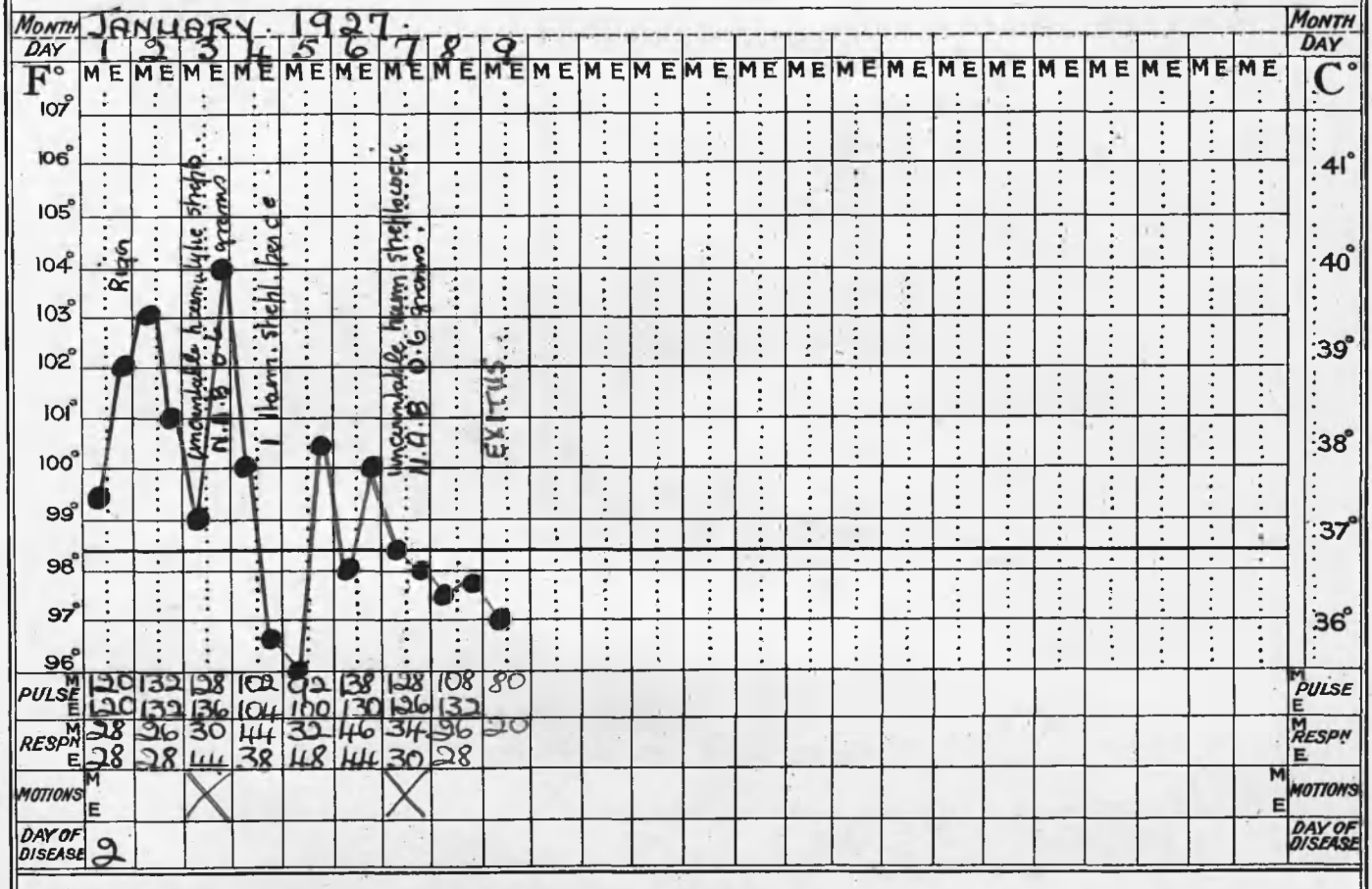
CORPORATION OF MANCHESTER.

MONSALL HOSPITAL.

PATIENT'S NAME 213 AGE

CLINICAL CHART.

DIAGNOSIS. Note unusual history prior to admission: No leucorrhoea on admission.



URINE.

DATE																								
Nº of oz. in 24 hrs.																								
REACTION																								
SP. GR.																								
ALBUMEN																								
BLOOD																								
UREA																								
Microscop! Appearance Etc.																								
COUGH Simple																								
" Spasmodic																								
" Whoop																								

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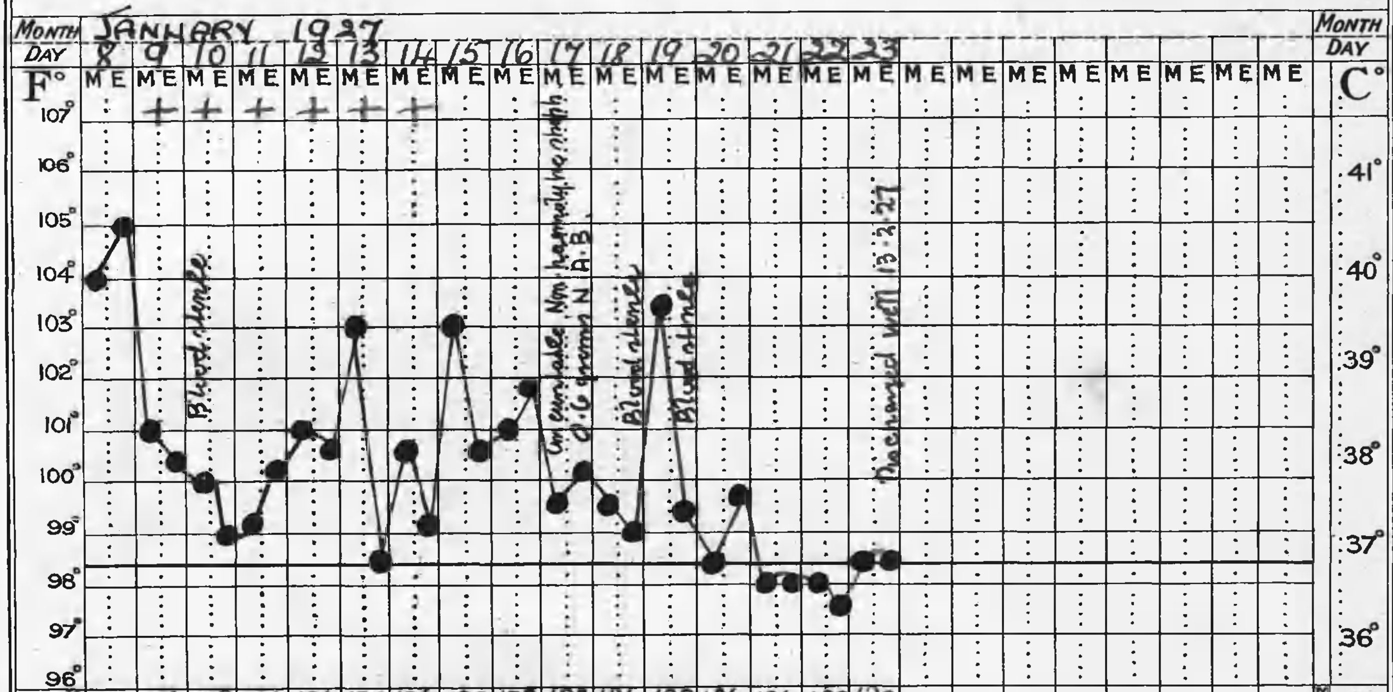
MONSALL HOSPITAL.

PATIENT'S NAME 216 AGE ....

CLINICAL CHART.

DIAGNOSIS. Note late appearance of septicaemia



Day	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
PULSE M	132	106	100	136	124	120	126	130	138	128	126	122	126	124	120	120
PULSE E	140	110	104	112	116	108	136	110	124	120	112	126	116	110	100	110
RESPN M	28	24	20	26	24	22	24	26	26	26	26	24	26	24	20	24
RESPN E	24	24	24	24	24	24	26	24	24	24	24	24	24	20	20	22
MOTIONS M/E										X						
DAY OF DISEASE	4															

Cervical culture - staphylococci and non-haemolytic streptococci
Blood " - non-haemolytic streptococci

URINE.

DATE																									
Nº of oz. in 24 hrs.																								
REACTION																								
SP. GR.																								
ALBUMEN																								
BLOOD																								
UREA																								
Microscop! Appearance Etc.																								
COUGH Simple																								
" Spasmodic																								
" Whoop																								

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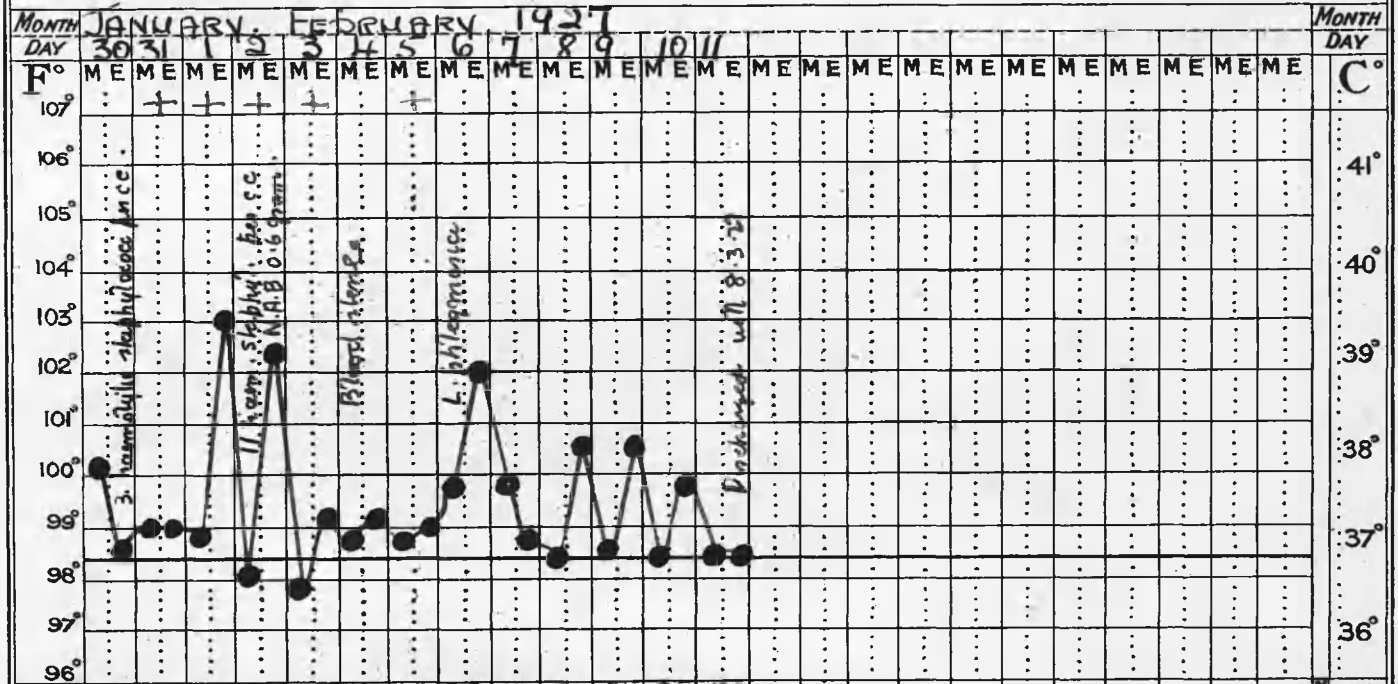
MONSALL HOSPITAL.

PATIENT'S NAME ....223........ AGE ....

CLINICAL CHART.

DIAGNOSIS.



Day	30	31	1	2	3	4	5	6	7	8	9	10	11
PULSE M	118	100	98	110	102	110	100	110	114	104	82	90	100
PULSE E	102	110	96	110	96	104	104	122	112	110	102	100	104
RESPN M	30	20	22	24	24	22	22	24	24	24	22	24	22
RESPN E	22	20	24	24	22	20	24	24	24	24	20	24	20
MOTIONS M / E				X									
DAY OF DISEASE	5												

Cervical culture – haemolytic staphylococci
Blood " – "

URINE.

DATE	
Nº of oz. in 24 hrs.	
REACTION	
SP. GR.	
ALBUMEN	
BLOOD	
UREA	
Microscop! Appearance Etc.	
COUGH Simple	
" Spasmodic	
" Whoop	

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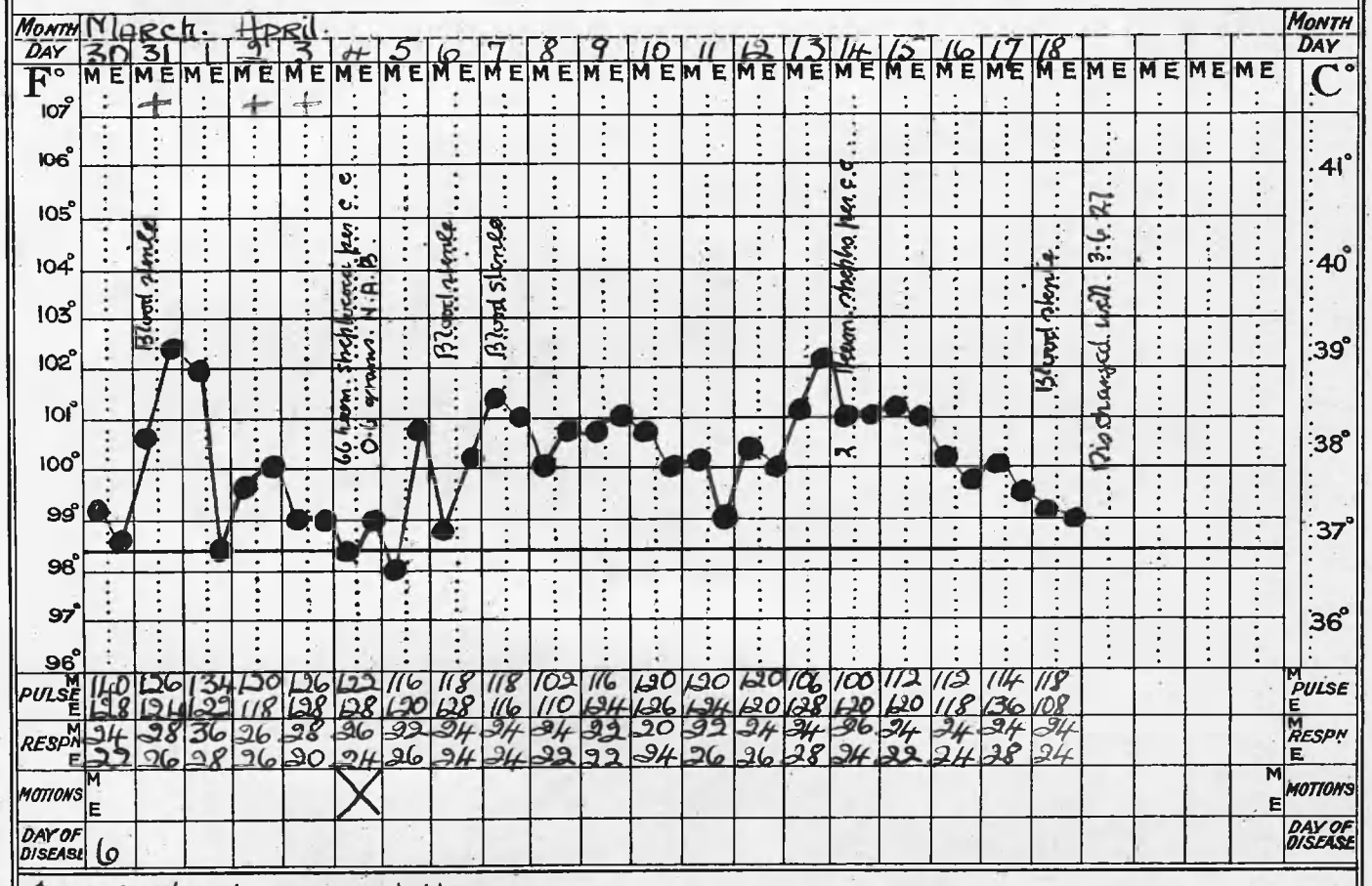
CORPORATION OF MANCHESTER.

MONSALL HOSPITAL.

PATIENT'S NAME 240 AGE

CLINICAL CHART.

DIAGNOSIS. Developed septicaemia on 4.4.27 with associated R. hemicrania



Conical culture - haemolyhe staphylococci
Blood " - " "

URINE.

DATE																								
Nº of oz. in 24 hrs.																								
REACTION																								
SP. GR.																								
ALBUMEN																								
BLOOD																								
UREA																								
Microscop! Appearance Etc.																								
COUGH Simple																								
" Spasmodic																								
" Whoop																								

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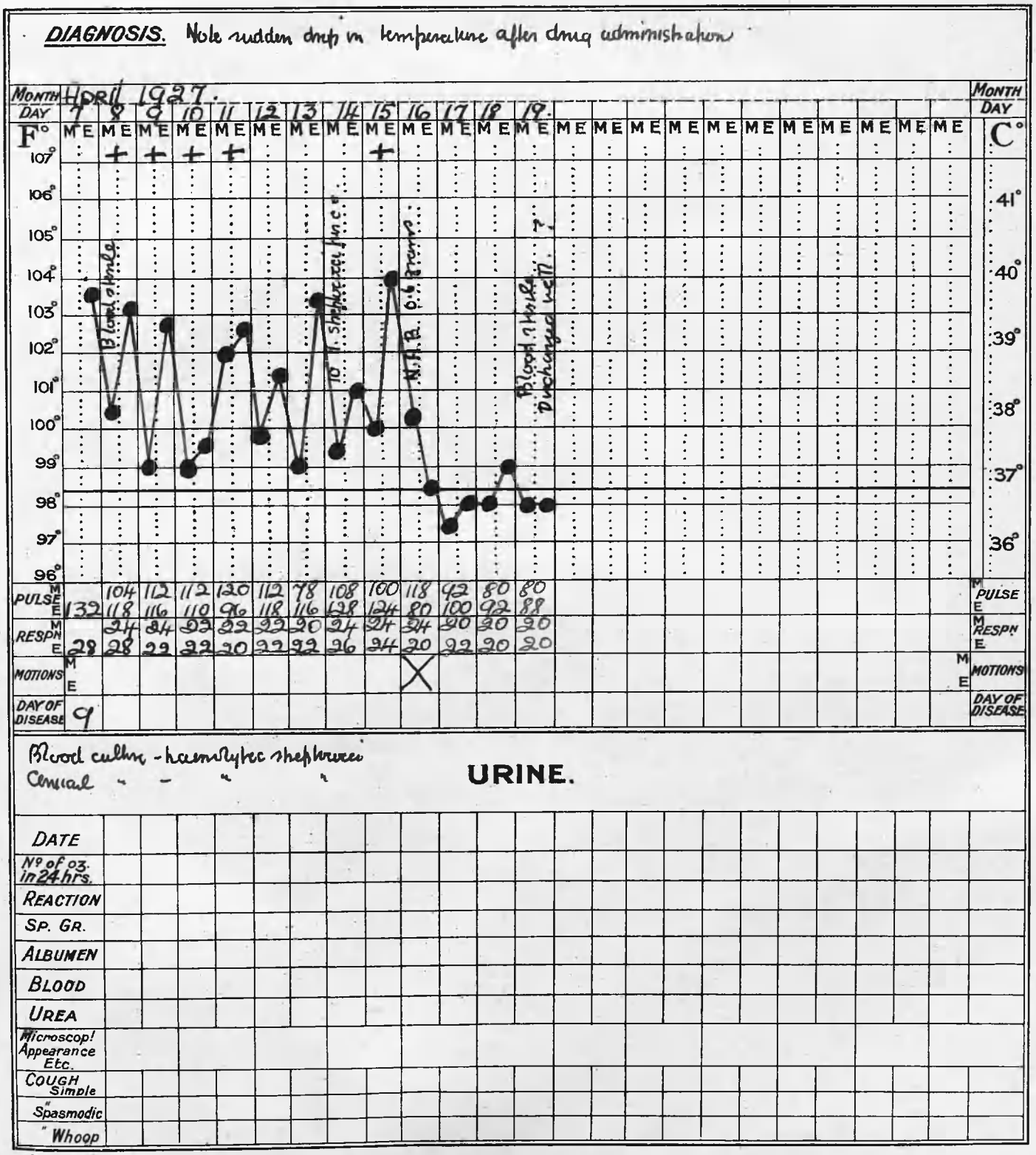
MONSALL HOSPITAL.

PATIENT'S NAME 241 AGE

CLINICAL CHART.



Blood culture - haemolytic streptococci
Cervical " " " "

URINE.

DATE																								
No of oz. in 24 hrs.																								
REACTION																								
SP. GR.																								
ALBUMEN																								
BLOOD																								
UREA																								
Microscopic Appearance Etc.																								
COUGH Simple																								
" Spasmodic																								
" Whoop																								

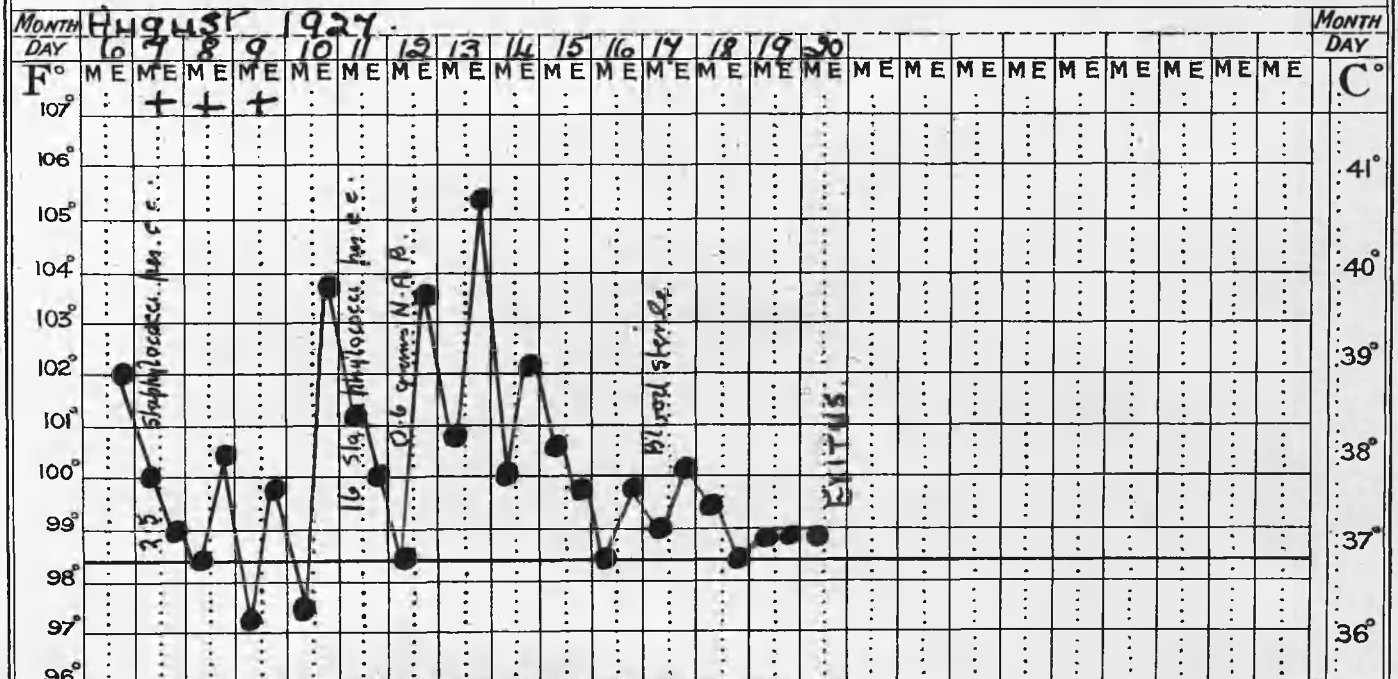
CORPORATION OF MANCHESTER.

MONSALL HOSPITAL.

PATIENT'S NAME 292 AGE

CLINICAL CHART.

DIAGNOSIS. Septicaemia cured. Died suddenly from splenic or pulmonary infarction.



Day	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PULSE M		116	108	100	116	124	124	128	124	132	112	124	126	124	108
PULSE E	138	120	138	120	140	112	128	144	120	128	120	124	124	104	
RESPN M		26	24	24	24	26	24	36	26	28	26	28	26	26	24
RESPN E	28	24	24	22	28	24	24	28	26	28	28	26	24	24	
MOTIONS M/E							X								
DAY OF DISEASE	6														

Cervical culture – non haemolytic streptococci, staphylococci and coliform bacilli
Blood " – staphylococci

URINE.

DATE																									
Nº of oz. in 24 hrs.																									
REACTION																									
SP. GR.																									
ALBUMEN																									
BLOOD																									
UREA																									
Microscop! Appearance Etc.																									
COUGH Simple																									
" Spasmodic																									
" Whoop																									

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(d) The relative infrequency of rigors. (They are not always noted on the temperature charts herewith.)

(e) Two clinical signs which always lead one to suspect a severe septicaemia and a poor prognosis are, dysarthria and a double incontinence.

(f) A blood culture should always be taken when there is a relative increase in the pulse, together with, what, for want of a better name, the patient usually refers to as "swimminess" - i.e. slight light headedness.

(g) There seems to be no doubt that Neokharsivan has a slightly toxic affect on an already toxic patient. The writer has often though that the drug would be more efficacious if something could be done to increase the hydrogenion concentration of the blood, although physiologists say this is almost impossible to maintain. In addition to this antiseptic effect, there is also probably a beneficial effect of antibody formation stimulated by the arsenical component, although the evidence on this point is conflicting.

(h) Colebrook definitely states that the Neokharsivan has a specificity for the particular type of streptococci, which are found in puerperal fever, other types being little affected.

(i) The results of this antiseptic, though by no means perfect, are better than the results from others recommended. e.g. - the sodium sulphocarbolate used in ulcerative endocarditis. The antiseptic effect is more lasting owing to the gradual release of formaldehyde.

A survey of the results of treatment of these septicaemia conditions will show that there is something to be said for the intravenous administration of arsenical compounds. At the same time, it will be noted among earlier cases of the series, the septicaemic condition was apparently precipitated or aggravated by injudicious use of local treatment.

Another point to be noted is, that proof is wanting that these arsenical compounds do not damage the intima and increase the tendency to thrombos is common in this type of case. At the same time it must be realised that the arsenical compounds cannot get at the organisms enclosed in the thrombi.

There is no doubt that the bactericidal power both of the whole blood and the serum is improved by injection of N.A.B.[6]

The technique for estimating the bactericidal power of the whole blood is as follows:-

A blood culture is taken as usual at 0.6, twenty four hours after administration of N.A.B. Two 50 cu. mm's. of this blood were inoculated with 2.5 c.mms. and 5 cc.mms. respectively of sa suspension of virulent haemolytic streptococci on a sterile paraffin slide, the microbic suspension and the blood being well mixed. Each volume of blood is then drawn up into the stem of a sterile opsonic pipette, the end of which is then sealed, the bulb end being guarded by a small column of sterile normal saline. These pipettes are then incubated for three hours at 37°c, and the contents are then expelled into separate petri dishes, the stem of each pipette being carefulle washed out with a little sterile normal saline previously placed in each Petri dish. Melted blood agar was then poured into each dish, and the plates were incubated for 24 hours at 37°c. The number of Streptococci planted in each volume of blood is calculated by agar count, measured volumes of suspension being incubated on blood agar for twenty four hours, and the number of surviving colonies counted. This technique was carried out in a few cases of septicaemia due to streptococci, and the bacteriocidal power of the blood in these rose from 50 - 60% killed to 80-90% killed. The percentage killed after six hours was usually about the same as that at 24 hours.

As regards the technique for estimating the bacteriocidal power for the serum: -

Graduated dilutions of haemolytic streptococci emulsions were made as follows 1/50, 1/250, 1/1250, 1/6250, 1/31250, 2.5 cu.mms of each of these dilutions were innoculated into 25 cu.mms. Of the patients serum on a sterile paraffin slide, each mixturefof serum and cocci was drawn up into the stem of a sterile opsonic pipette, each of which was sealed as before, and all were incubated for twenty four hours at 37°c. At the end of this time, the contents of each pipette was introduced into separate tubes of glucose broth. The latter incubated for twenty four hours and the presence or absence of growth noted.

Typical result.	Before injection.	Growth.
Dilution 1 -1250.		
1 -6250.		
1-31250.		-

Serum six hours after injection.

1/50.	-
1/250.	-
1/1250.	-
1/6250.	-
1/31250.	-

The original suspension contained 15,000,000 per cc.

The before injection 1 c.c. of serum killed 500 cocci,

The six hours after 1 c.c of serum killed 300,000, cocci.

This latter technique was not practiced as a routine.

Leucostimulants.

The other measures which are utilised to combat a generalised blood infection, are those by which the patient's own mechanism is aided.

One of the methods which has been employed is immunotransfusion. For this, a suitably typed donor is inoculated with an optimum dose of vaccine, and the blood transfused when the immunising response is at its maximum. This response has been found to be non-specific, and thus we get an increased bactericidal power of the blood, not only for the vaccine injected, but also for other organisms. The technique has been fully described by Colebrook and Storer. (7)

The optimum dose of vaccine is said to them to be 1000 million staphylococci, and the blood should be treansfused 4/6 hours after the injection.

The writer has not practiced this form of treatment, because the results obtained by other workers seemed so disappointing.

By his predecessor, seven cases were transfused, five receiving 500 c.c. each. All except one case of staphylococcic septicaemia, proved fatal.

The writer has often wondered whether the introduction of blood, or serum, or saline into the circulation, does anything to predispose towards that bugbear of puerperal work - the onset of thrombosis.

The writer, however, hopes to recommence a modification of this type of treatment as soon as suitable types of case again present themselves. Two new factors have been introduced, which it is hoped will lead to an improvement.

(a) - A new type of blood transfusion apparatus - an American modification of the Ungar's apparatus has been obtained, and has been thoroughly tested with ordinary blood transfusions after severe haemorrhage. By it, large amounts of blood can be relatively rapidly transfused directly, and we have a gain of 30% leucocytes, which are lost in defibrination.

(b) Dr.Colebrook (8) recommends the injection to the donor of 2 c.c of nuclein intramuscularly instead of vaccine. He found that the white cells had increased in four hours from 5500, to 20,000, and the blood also showed a remarkable increase in bactericidal efficiency. He injected fifty cu.mm. of each blood with a bacterial suspension of 3,600 streptococci, and kept them slowly moving in an incubator fpr two hours. They were then plated out on an agar. In the blood taken before the injection of nuclein, 1,050 colonies survived, while, in the blood taken four hours after the injection of nuclein eight survived. Such work looks full of promise, even in vitreo. At the same time, the writer has had a poor response as judged by a leucocyte count, from the nuclein injected in the patient direct. All the other remedies which have been tried with varying degrees of success, owe any merit which they possess, to their power of

stimulating leucocytes, e.g. Injection of nucleinic acid, the old fashioned fixation abscess, injections of foreign potions or antiseptic drugs, the administration of anti-streptococcic sera etc., As regards the latter, it has been most disappointing, although many varieties have been tried, the only apparent result being to cause an irritating serum rash in the majority of cases.

The Question of Vein Ligation.

This is one of the most important points in the prevention of puerperal septicaemia. While the writer preserves an absolutely open mind on the subject, he thinks that now that we have some degrees of control of an infection in the blood stream, the question should be re-opened. Various German and Austrians surgeons had a recovery rate of 50%. It is an extremely drastic line of treatment, but, after all, it should be remembered, that fifteen years ago the routine treatment at the hospital where the writer is at present, for puerperal sepsis, was hysterectomy. The great distinction between a puerperal infection and other types of blood infection, is the marked tendency to thrombosis in the latter. At the present time it must be understood that the difficulties are to a certain extent, "mechanical" as well as bacteriological. What the writer means by this will become more apparent later on. Under modern treatment, the prognosis in a septicaemia is by no means hopeless, unless the general condition of the patient is poor. The infection is massive, and the strain of the infecting organisms is of extreme virulence. To appreciate the argument, a short synopsis of the forty four fatal cases will assist.

10. Multip. Admitted 15th day of disease. Age 41. Incomplete abortion. Acute constipation. Collapsed on admission. Blood sterile. Died from Toxaemia within forty eight hours.

11. Primip. Admitted third day of disease. Severe labour and severe tears. Patient collapsed on admission. Haemolytic Streptococcic septicaemia. Died twelve hours after admission.

12. Admitted on the 8th day of disease, with endocarditis present. Multip. Age 43. Abortion. Died suddenly from Cerebral embolism two days after admission,

18. Multip. Admitted eighth day of disease. Age 42. Very complicated labour. Collapsed on admission. Death eight days after admission from toxaemia.

22. Multip. Admitted sixth day of disease. Abortion. Unattended for a week prior to admission. Acute constipation. Curettage performed. Died 40 hours after admission from asthenia. Concurrent tubercular peritonitis.

31. Primip, Admitted fifth day of disease, Very complicated labour. On admission patient collapsed. Severe endocarditis, plus double parametritis present on admission. Blood sterile. Died forty four days after admission from endocarditis.

36. Multip. Admitted fifth day of disease. Complicated prolonged labour. Severe anaemia and cardiac trouble at last confinement. Previous pelvic operation. Very mild septicaemia on admission. Died thirty two days after admission from cardiac failure, due to lowered resistance from salpingitis, present on admission, and increased strain from pleurisy which developed.

45; Multip. Admitted eighth day of disease. Very ill. Rigors plus délirium. Blood apparently sterile. Died from Toxaemia five days after admission.

48. Admitted 8.1.26. on the third day of illness. Desperately ill on admission. No blood infection but generalised phlebitis. Died thirty six hours after admission.

49. Admitted 9.1.26. on third day of illness. Very severe lacerations. Died sixty hours after admission from broncho-pneumonia.

52. Admitted 14.1.26. On second day of illness, Forceps delivery. Still birth. History of eight previous miscarriages. Very ill on admission and general physique not good. Died six days after admission from a septicaemia, which made no response to treatment whatsoever.

57. Admitted 25.1.26. on sixth day of illness, with a generalised peritonitis. Operated on immediately, but died thirty six hours after admission.

58. Admitted 28.1.26. on eighth day of illness. History of poor health for many years. Developed gangrene of breast, following mastitis, and died nine days after admission.

66. Admitted 9.2.26 on day of confinement with placenta in situ. Still birth. Blood always sterile. Bowel became infected, and gradually increasing gastro-enteritis led to a fatal issue twenty four days after admission.

73. Admitted 3.3.26. on the fourth day of illness. Very ill on admission, and septicaemia gradually became intensified and patient died four days after admission.

96. Admitted 10.4.26. on the seventh day of illness, sixteen days after confinement, with septicaemia and endocarditis. Died four days later.

99. Admitted 10.4.26. on sixth day of illness, twelve days after confinement with septicaemia. This latter was successfully combatted with arsenical administrations, but the patient succumbed to a generalised phlebitis thirteen days after admission.

100. Admitted 21.4.26. on the fourth day of illness. Twin pregnancy - still born. Instrumental delivery. Poor physique, and cardio-renal disease. Temporary improvement in septicaemic condition, but later became worse, through lowered vitality following hypostatic congestion of the lungs. Died fourteen days after admission.

105. Admitted 4.5.26. on eighth day of illness. Had had haemorrhage for two months prior to admission to another institution. After uterus emptied, further severe haemorrhage. Transferred to hospital and died three days after admission, from anaemia, despite saline and blood transfusions.

109. Admitted 10.5.26. on the third day of illness. Mild septicaemia which was combated. Double phlegmasiae, both legs being swollen to enormous size. Died 36 hours after admission, and after repeated pulmonary infarction.

108. Admitted 27.5.26. on the third day of illness . Placenta praevia bipolar version. Stillbirth and manual removal of placenta. Very collapsed on admission, but made good progress. Died suddenly on twentieth day from pulmonary embolism.

119. Admitted on 27.5.26.on third day of illness. APH and still birth. Blood sterile. Developed intractable phlebitis, which progressed slowly, and led to death on the forty fifth day.

120. Admitted 28.5.26. on the nineteenth day of illness. Admitted with very severe gastro-enteritis, which proved intractable. Blood sterile. Died on thirteenth day.

144. Admitted 30.7.26. on the eleventh day of illness. Curettage became essential some days after admission despite precarious condition. Four days later developed a left sided hemiplegia, and never really recovered, although this patient lived for seventy seven days. Note the dangers of surgical intervention.

145. Admitted 2.8.26. on nineth day of illness. Condition very poor on admission. Developed double broncho-pneumonia, and died nine days after admission.

148. Admitted 10.8.26. on third day of illness. Very ill. Slight peurperal sepsis and severe choreic toxaemia. Died sixty hours after admission.

154. Admitted 30.8.26. on the 1st day of illness. An intractable septicaemia which showed temporary amelioration, but later defensive mechanism overwhelmed, and patient died ten days after admission.

167. Admitted 28.9.26. on the seventh day of disease. Placenta praevia, version forceps and stillbirth. Mild septicaemia. Died suddenly from cerebral embolism sixty hours after admission.

169. Admitted 4.10.26. on the tenth day of illness. Blodd sterile, but remarkable series of paresis occurred - paresis of right arm, right ptosis. Patient died suddenly of cerebral embolism on the twenty third day.

181. Admitted 23.10.26. on day of confinement. Died five hours after admission from primary shock.

185. Admitted 1.11.26. on the nineteenth day of illness. Semi-conscious on admission and very weak. Blood sterile. Died seven days later.

187. Admitted 4.11.26. on the third day of illness. Central Placenta praevia and stillbirth. Severely lacerated, and massive septicaemic condition on admission. Died nine days after admission.

190. Admitted 11.11.26. on sixth day of illness, Not very ill on admission, except for cystitis and fairly severe lacerations. On 20.11.26. suddenly developed severe septicaemic condition, which persisted despite all treatment, together with gradually increasing phlebitis. . Died twenty one days after admission.

198. Admitted 21.11.26. on fourth day of illness, Bipolar version and stillbirth. Developed pleurisy and apparent pulmonic infarction and died nine days after admission.

199. Admitted 23.11.26. on fifth day of illness. Apparently quite a mild case, but died of pulmonary embolism nine days after admission.

202. Admitted 4.12.26. on third day of illness. Massive septicaemia combined with dysarthria on admission. Patient died four days later.

204. Admitted 16.12.26, on nineth day of illness. Poor physique with much myodema. Septicaemia present on admission. On 19.12.26. operated on for ischio rectal abscess causing subacute obstruction. Septicaemia disappeared duner treatment. On twenty third day sudden severe return of septicaemia, which proved intractable. Patient died four days later.

206. Admitted 18.12.26. on eighth day of illness. Condition very poor on admission, Mild peurperal spesis and very severe bronchitis. Gradually went downhill through failing R.heart, and died on the sixteenth day after admission.

213. Admitted on 1.1.27. Confined fourteen days prior to admission Sudden onset of septicaemia after getting out of bed, with a phlegmasia prior to admission to hospital. Slight improvement under N.A.B. but died of streptococcal septicaemia.

214. Admitted 6.1.27. on fifth day of illness, in an extremely collapsed condition, and died from streptococcal septicaemia twenty hours after admission.

251. Admitted on 7.5.27. after an instrumental delivery without anaesthesia. General peritonitis on admission. Laparotomy performed, but patient died two days later.

257. Admitted 20.5.27. on the fourth day of illness. Inflammation gradually settled down, but some pus still remained somewhere about the pelvis. Three months after admission it commenced to point through the great sciatic notch (Rt.) Abscess was incised but later the leg became gangrenous.

281. Admitted 2.8.27. on sixth day of illness, History of ragged membranes, but patient settled down comfortably. Blood sterile. Died suddenly from pulmonary embolism, six days after admission.

292. Admitted 6.8.27. on sixth day of disease. Hydrocephalus, perforation and manual removal of placenta. Complained of hemicrania , occasional mild release of clot with Streptococcic septicaemia. Died suddenly from pulmonary embolism fourteen days after admission.

The writer has included this apparent catalogue of synopsis of cases, in order that the figures now given may be verified.

By a "mechanical" death, the writer means one which is apparently due to the release of apparently sterile clot, leading to pulmonary embolism etc., without an apparent septicaemia.

The classification of these deaths may roughly be put down as follows:-

(a) Mechanical. 16 - 36%

(b) Septicaemic. 11 - 25%

(c) Others. 17 - 39%

The giving of these percentages by the writer is not meant to infer that any hard and fast line can be drawn between the groups.

The"Septicaemic" deaths might easily, as will be shown, come under the category of "mechanical" deaths.

It is these figures which make the writer think that the advisability of ligation of some of the larger veins should be seriously considered by the general surgeons and gynaecologists. Some say that the collateral circulation will not suffice. An ordinary phlegmasia raerly shows any signs of venous congestion. Cases have been seen at post mortem examinations, where there has been old standing clot in the common iliac vein without any other outward symptoms than that of an ordinary phlegmasia.

There is the case of ligation of the external jugular vein, when thrombosis is diagnosed in the cavernous sinus. Othere suggest that there is no indication which can be relied on for such a radical line of treatment. Kohler suggests that the only certain indications

of thrombosis is the palpation of worm-like thrombosed veins. These may occasionally be palpated in the posterior fornix, and are a warning that thrombosis has occurred, but give no indication of the amount of its upward extension.

The occurrence of thrombosis appears to depend more on the question of uterine drainage than on the causal organism. Thus the day of disease on which the case comes under treatment appears to be the principal causal factor in the incidence of thrombosis, and it is relatively more frequent among severely lacerated cases, than amongst, for example, septic miscarriages. This is one of the reasons which has so puzzled many who have not studied the matter deeply, - the apparently mild cases die, the severe recover.

The writer has evolved some indications for vein ligations, which he thinks are in advance of any propounded by the German and Austrian workers. These are the result of very full, and often apparently useless. daily note taking, and a very critical analysis in every fatal case, of the previous symptoms and treatment, combined with an autopsy if possible. The following symptoms and signs point to the existence of venous thrombosis and the question of the advisability of vein ligation:-

(1). The sudden appearance of phlegmasia very <u>late</u> in the illness . If a clot can be spread from the common iliac vein downwards via the external iliac vein, it can also go up by the common iliac vein. This has been confirmed at a post mortem examination.

(2) The appearance of any symptoms and signs of pulmonary embolism. The writer does not regard this with the dread he once did. It is considered that the immediate prognosis in the latter depends on how much lung is put out of action, and how severely shocked the patient is.

(3) A relatively sudden, and severe attack of gastro-enteritis,

especially if associated with continued steady pyrexia and a sterile urine.

(4) Repeated attacks of mild septicaemia are another indication. Nothing is more disheartening than to be successfully combating a mild septicaemia with drug treatment, in a case with an ordinary phlegmasia, which is continually releasing a little septic clot.

Whenever a case exhibited during treatment, any symptoms suggestive of septicaemia, a blood culture was at once taken. These symptoms include severe headache, "swimminess", rigors, sudden unexplained pyrexia, tinitus, etc. Often the blood cultures proved sterile, and the symptoms subsided as quickly as they had arisen. These are apparently cases where sterile clot has been released, and are liable to lead to pulmonary embolism as a septicaemic case. The fallacy is, that an organism in the blood stream may not be given owing to faulty technique. It has been suggested that the addition that a little tryptsin broth to the media at present employed might aid the growth of organisms. Professor Schwartz of St.Louis University suggested that, in apparently septicaemic cases, where the organism could not be isolated, the organism was probably an anaerobic streptococcus, anaerobic blood cultures were made of about twelve of these cases, but without a positive result. At the same time the writer has had several cases in which a septicaemic condition could not be proved, but in which it was probably present. One case in point, which developed haemolytic streptococcal empyema, had persistently negative blood cultures. It recovered after rib-resection.

The veins requiring ligation would be the uterine or the ovarian veins or their larger tributaries as far as they are involved. It is not pretended that the technical difficulties which certainly beset this

very radical line of treatment are easily surmountable, but it is by no means as radical a course as the hysterectomy formerly practiced. As the writer has not sufficient surgical experience to express an opinion on this point, he holds that a case has been made out for the consideration of vein ligation. After all, surgery has now reached a point, where a successful embolectomy is not unknown. From a consideration of the literature, the writer thinks that the extraperitoneal route is to be preferred, except on account of the difficulty of good exposure, because a piece of the vein can be removed "en bloc". It is useless to endeavour to remove the thrombus which probably spreads right down to the uterus; amd the optimum site of operation is probably the common iliac vein. In the limited number of autopsies he has performed, the writer has never seen any evidence of periphlebitis, which would contraindicate operation, neither has he seen any cases of "discontinous Thrombosis" as described by Kohler, although it is quite feasible that these occur. Baldwin (9) recommends hysterectomy in addition to vein ligation. It must always be remembered that many authorities say that lymphogemic infections form as many as 30 - 40% of the whole, but the writer does not think this to be the case.

PREVENTION OF THROMBOSIS.

If the supposition be correct that there is some other factor than sepsis in the thrombosis, which is such a marked feature in puerperal fever, then the question of the alteration of the calcium on concentration in pregnancy might be of interest.
Unfortunately pregnancy appears to have not the slightest effect on the former, according to all the writers on the subject.
On the suggestion of Dr.Colebrook, the writer gave citric acid drinks ad.lib, to all patients, except those who had an infection of their urinary tracts, but, on a series of about twelve cases, this was found

to have no effect on the calcium content of the blood, and in addition there appeared to be a higher incidence affections of the urinary tract among those patients who were treated in this manner.

The writer then began to hunt around for some substance which would act as an anti-coagulant when added to the blood. Unlike the haemostatic drugs, there seemed to be no drug which performed this function.

The writer discussed this question with Professor H.S.Raper, who went to a great deal of trouble in the matter, and finally suggested Heparin, which was being used experimentally at King's College, London, and in America. Dr. L.G. Rowntree (10) read a paper to the annual meeting of the American Association of Physicians in May 1927, advocating the use of this substance as a means of diminshing deaths from pulmonary embolism in surgical cases, and said that the frug was in the nature of an antiprothrombin. The discoverer of the drug, Dr.William H.Howell, of the School of Hygiene, John Hopkins University, has personally assured the writer that he has added heparin in cases of blood transfusion in man with very successful results and without any risk whatsoever. It is prepared in capsules containing 1 - 5 milligrams and of such strength that one milligram will prevent clotting of 100 c.c. of blood. It has not yet been tried by the writer for three reasons:-

(a) The indications for administrations have not yet been adequately worked out. One would be inclined to suggest a routine administration at the onset of the sepsis.

(b) The mode of preparation gives a very small yield, and therefore the cost would be relatively high, despite the great potency.

(c) The main disadvantage in peurperal work is that the effects pass off entirely in two to three hours and the administration of the drug would have to be repeated.

SOME SUGGESTIVE CASES.

(12) Had been ill for a week on admission, with rigors and delirium, but none for the last three days. Uterus enlarged and flaccid, with slight sanous leucorrhoea. Complained of deafness and tinnitus on admission. Endocarditis was found to be present. Two days after admission sudden cerebral embolism occurred, with no localising signs, other than pharyngeal paralysis, and marked aphasia. Blood cultures sterile. Gradually succumbed to intrapontine haemorrhage (T.108^{8} - 2.)

(29) Admitted on the seventh day of the disease after a protracted labour and a history of rigors. Uterus well involuted and short gram positive anaerobic bacilli were found in the cervic. Discharged twelve days after admission, apparently cured by three glycerine-iodine irrigations. But afterwards found that a L.parametric abscess ruptured fourteen days after discharge, and took twenty eight days to heal.
This case brought forcibly to the writer's notice, the fact that pus in the parametrium takes a long time to track, and many travel long distances, even as far as the knee joint.
No case is ever discharged which has any tenderness on bimanual palpation since this case.

(30) A four and a half months septic mis-carriage, admitted on the sixth day of disease, with a history of repeated rigors, and delirium lasting for four days. On admission, offensive Leucorrhoea and vomiting, with s emi-rigid abdomen and marked pouching in pouch of Douglas. External os practically closed. Remains of placenta removed from uterus. Posterior colpotomy performed and patient discharged in sixteen days. Blood cultures sterile.

(54) Forceps labour. Admitted on the fourth day of disease with slight erosiion of servix on eighth day of disease. Had a slight rigor, and on the fifteenth day of disease had a severe rigor with a thready pulse. On the eighteenth day the patient developed a swelling behind, in the left calf, on the nineteenth day an abscess appeared in the left arm, which was incised and drained. On the twenty first day there was a further rigor, and on the twenty second day, there was a temporary appearance of a systolic bruit, while two days later, the patient had a small pulmonary infarct. All this was due to small emboli from pelvic thrombosis, the blood remaining apparently sterile throughout. On the twenty seventh day of disease a L.phlegmasia appeared, and the patient was discharged fit and well after a stay in hospital og sixty one days.

(61) Failed forceps, craniotomy and extraction, much lacerated on admission on second day of diseaee. Blood sterile, coliform bacilli in cervix. Sixteen glycero-iodine irrigations. A month after admission pus commenced to ooze from the right lateral fornix which was drained. A month later abscesses were

(61) drained in the left groin and left labia, and the patient was discharged after three months stay in hsopital. NOTE the very slow progree of the pus.

(86) Admitted on the third day of disease with severe cervical and and vaginal lacerations. On the tenth day of illness patient developed a right pleural effusion, which at first seemed to be sterile, but in which, long chained haemolytic streptococci appeared, although the blood remained sterile on the culture. Operation was delayed until the twenty seventh day, when definite thick creamy pus was found. Rib resection was performed, and the patient was discharged cured, at the end of three months. A noteable feature of this case was, that a L.phlegmasia appeared on the sixty fifth day of disease.

(91) Got up on the twelfth day, but retired to bed with pain in limbs, headache, pleurisy, purulent leucorrhoea and rigors. Admitted on the seventh day of disease and found to have thirty one haemolytic streptococci per cc. on admission. The latter did not yield to treatment and patient died four days later.

Post Mortem. - Pale yellow appearance, with oedematous lt.lower limb. Uterus large and flabby, but no pus or retained products, but the placental site showed old thrombosis, which had extended on the Lt. side, through the uterine and ovarian plexuses to (1) internal and external iliac veins - (2) L.ovarian vein as high up as the junction with the L.renal veins. The Lt.ovarian vein was greatly enlarged (in places equal to femoral vein in size) and the walls were thickened. In all the veins, the clot was not recent and showed signs of degeneration. The pelvic contebts were otherwise normal. The heart showed excessive post mortem and fair amount of anti-morten clot in both chambers, extending to the aorta and the pulmonary artery respectively, but no evidence of endocarditis. There was hypostatic congestion of both lungs without infarction. The spleen was enlarged, flabby and friable, but with no infarction. The liver was large, pale and granular. The kidneys showed cloudy swelling.

This was evidently a case where vein ligation of the upper extremity

of the Lt.ovarian vein might have been of service.

(96) Felt well, until sixth day of puerperium. Admitted from obstetric hospital six days later with rigor, vomiting, and offensive leucorrhoea. Cervical culture showed haemolytic streptococci. Some headache and shivering, but septicaemia not suspected until five days after admission. On the following day the patient developed bulbar paresis. The septicaemia was successfully attacked by N.A.B. but gradually increasing thrombosis succeeded. On the fourteenth day of disease deafness appeared, on the sixteenth, multiple haematomata, and on the following day, the veins of the arms stood out like knotted cords, and petechial haemorrhages appeared. Patient died thirteen days after admission.

(98) Admitted ten days after discharge from obstetric hospital., after apparently normal puerperium. Lochia found to be sterile. Forty three days after admission, an abscess on the surface of the psoas muscle was incised just medial to the femoral vessels.
Note - the long time pus takes to point, when opportunity for lymph drainage in early stages is not available.
Haemolytic streptococci found in pus. Patient discharged after four months stay in hospital.

(99) History of pain and vomiting during pregnancy.
Developed a Rt.phlegmasia on the thirty third day of disease, and a left one on the fourty first day, but thrombosed veins, - a warning sign, palpated in posterior fornix, on admission.
Discharged in two months.

(109) Manual removal of placenta. Rigors on admission, and haemolytic staphylococci in blood. On the eleventh day of disease passed large fragments of membrane. Marked tendency to gastro-enteritis. Later developed double phlegmasia, and died thirty six days after admission, after blood had been sterile for fourteen days.
During three days prior to death, there were showers of small pulmonic infarcts.

(118) Placenta praevia, bipolar version and manual removal of placenta. Admitted on the third day of disease in collapsed condition owing to anaemia. Slight fullness in L.lateral fornix.
On admission patient had haemolytic staphylococci and coliform bacilli in the cervix, but the blood was sterile. The subsequent history was very typical. On the fifth day of disease attack of gastro-enteritis supervened. (1st warning) on the sixteenth day a L.phlegmasia occurred, (2nd warning) and twenty days after admission, the patient died suddenly of pulmonary embolism, the symptoms and signs being suggestive.

Post mortem:- No evidence of disease externally except the L.phlegmasia, and the signs of profound anaemia noted above.
On opening the pericardium, a fair amount of hydropericardium was observed . The wall of the r.ventricle showed some signs of fatty degeneration, and coronary arteries were healthy. Marked anti-mortem clot extending from the bifurcation of the pulmonary artery into all the branches of the arterial tree in both lungs, but there was no definite evidence of pulmonary infarction.
There was also marked anti-mortem clotting on the Lt.side via the uterine and internal iliac vein and thence up the common iliac vein as far as the bifurcation of the inferior vena cava, and downwards into the femoral vein. (Hence the phlegmasia). The Lt.ovarian vein also showed antimortem clotting as far as the junction of The Lt.renal vein. On the rt.side the internal iliac vein was clotted, but thrombosis did not extend into either the external or the common iliac veins. The rt. ovarian vein was clotted as far as the inferior vena cava. The uterus was well involuted, but showed signs of thrombosis in the walls. The liver was slightly enlarged with fair amount of fatty degeneration. Spleen somewhat enlarged, but normal, except for infarct of old standing. Kidneys showed some signs of chronic nephritis. One calcified mesenteric gland was observed.

Note:-That there was no pulmonary infarction.

(119) Lateral placenta praevia with still birth and severe haemorrhage. Admitted on the third day of the illness, but three days later varicose veins were palpated in the posterior fornix. On the twenty first day of disease, the patient developed a Lt.phlegmasia. On the twenty third a pleurisy, and also thrombotic haematomata on the lower abdominal wall. On the twenty sixth day pain at the nape of the neck, and on the twenty eighth day, pain in the Lt. shoulder joint together with neuralgia, On the thirty second day of disease the patient developed a rt.phlegmasia, and ten days later there occurred a paresis of the rt.arm, and the patient slowly became comatose, dying forty five days after admission.
Compare cases 144, and 221.

(120) Discharged from a poor law hospital at close of an apparently normal puerperism. After an illness at home, admitted on the eighteenth day of disease, with history of headache, rigors, and abdominal pain. Repeated blood cultures proved sterile, and there were signs of gradually ascending abdominal thrombosis (one should suspect this when the temperature is elevated, and not swinging, the patient not complaining and the urine sterile) which gave rise to pronounced abdominal symptoms, and the patient being fed for the last few days per rectum, and dying thirteen days after admission.

(121) Much ulcerated cervix on admission. Cervical culture yielded staphylococci and non-haemolytic streptococci.
Thrombosis of veins palpable in fornices, but this did not give rise to any trouble. A Lt.parametric abscess (pointed) after eleven weeks, and the patient was discharged cured in six months.

(122) Admitted on the third day with s-evere lacerations, and previous history of rigors and delirium. Haemolytic streptococci in cervix. Despite repeated irrigation this case did not settle down, the pelvis being infiltrated with pus. Seven weeks after admission a posterior colpotomy was done, but although free drainage was established, little improvement in the general condition occurred. A fortnight later a R.parametric abscess was incised by the abdominal route and drained for two months. When it commenced to heal pain over the gall bladder and in epigastrium ensued, and the sinus had to be reopened. Eight months after admission a panhysterectomy was performed, and double tube-ovarian abscesses were found. Convalescence was retared by the onset of pelvic cellulitis, but the patient was discharged ten and a half months after admission and is now very fit and well.

(144) Incomplete three months septic miscarriage. After passing placenta, severe P.P.H. occurred, and the uterus was packed. Two days later, owing to severe vomiting, dilation and curettage was performed. On the fourteenth day of illness three days later, the patient developed paraesthesia of entire left side of body, combined with right hemicrania, with marked cervical rigidity, slight aphasia and loss of power in left leg, - of case 248. She then developed a left phlegmasia and later a Left pleurisy. After some improvement, seven weeks after admission she developed a right lymphatic phlegmasia, and then a right pleurisy, and finally a terminal severe gastro-enteritis, dying eight weeks after admission.
The oedema in this case was extremely marked, and it was one of the few cases in which the writer has seen what he considers, were lymphogenic in origin.
The blood cultures were always sterile.
It may be noted, that this was an exceptionally large subject, and in these cases the prognosis never seems so good probably owing to poor resistance. This case shows the great danger of surgical interference in a septic case after the first week has passed.

(146) Discharged home from hospital after normal puerperism. Readmitted here after a vague history of rigors, sixth day. On admission, thrombosed veins were palpated in the posterior fornix. Very vague symptoms, but after a month in hospital refused to stay and took her discharge, although occasional unexplained pyrexia every few days. Admitted ten days later to a general hospital labelled "appendicitis" and died on the operaring table - a large abscess in Riedel's lobe of the liver, rupturing into the general peritoneum. No symptoms or rigors gave any indication of the abscess.

(169) Septic miscarriage, admitted on tenth day of disease, with history of delirium, vomiting, rigors and offensive leucorrhoea. A week after admission there was a sudden paresis of the right arm occurred, which persisted. A week later there was a ptosis of the rt.eye and an occasional dysarthria. Later the patient was apparently convalescent, when she died suddenly from cerebral embolism, twenty three days after admission.

Post mortem:- A small piece of old standing clot was found to be obstructing the lumen of the left middle meningial artery in motor area of the lt.arm. On cutting into the brain substance, a small wedge shaped abscess cavity was found filled with pus, which proved to be sterile - probably a small infarct which had broken down. The cardiac muscle seemed healthy, but in the Lt. ventricle there was a small kernel of old standing thrombus, surrounded by a good deal of agonal clot. There was no evidence of disease in the valves. The lungs appeared normal, and showed no evidence of consolidation or infarction. The other abdominal and pelvic organs were not examined.
How did this thrombus appear in the lt,ventricle originally? There were no signs of patent foramen ovale (of case 245)

(178) Admitted on the seventh day of disease with a history of forceps delivery and rigors. Condition settled down under lymph drainage. Patient developed a phlegmasia on the twenty first day of disease, and a pulmonic infarct on the forty first day. Discharged home after ten weeks, against medical advice.

(198) Severe A.P.H. podalic version and stillbirth; central placenta praevia. No history of delirium. Admitted on the fourth day of disease. Five days after admission developed pleuritic friction and signs of pulmonic infarction. Blood cultured repeatedly sterile. Died suddenly from pulmonary embolism four days after the first attack. A possible case for vein ligation.

(199) Unattended confinement, Apparently a mild case admitted on the fifth day of illness, although haemolytic streptococci found in the cervix, Pain in L.calf on admission, five days after admission, complained of right pleurisy, and lymph drainage was temporarily stopped. Further irrigation later gave rise to a definite infarction at the base of the r.lung. The patient died nine days after admission from further emboli. This seemed to be an excellent case for vein ligation, which had been adversely affected by excessive zeal in draining the uterus.
One interesting point is, that in one infarction, the patient complained of severe pain in the groin immediately prior thereto.

(201) Normal labour. Admitted eleventh day of illness as an apparently straightforward phlegmasia. Three weeks later, there was the "stair-case" rise of abdominal plebitis, which fortunately cleared up. The latter condition can be diagnosed from a septicaemia or a pelvic cellulitis, by the aaaociation of pyrexia with the apparent well being of the patient.
The circulation in the legs took a long time to re-establish, and the patient was in hospital eleven weeks.

(212) Normal confinement. Admitted on the fourth day of disease. Relaxed and offensive stools, cervical culture showed haemolytic staphylococci, while the blood was sterile. Twelve days after admission, Ileus paralyticus having appeared, a colostomy was performed. The bowel recovered its tone, the colostomy was closed in ten weeks, and the patient went home fit and well after a stay in hospital of five months.

(221) Septic miscarriage,admitted on the fifth day of illness. Placenta removed on the following day. Very profound anaemia, and blood transfusion had to be resorted to, A week after admission, patient developed a L.phlegmasia and L.pleurisy, and tend days later, a Rt.phlegmasia appeared, and also paraesthesiae in the L.hemiplegia region with slight motor aphasia, which only lasted four days. The patient became progressively worse, and developed swelling, and later paresis, and anaesthesia of the right arm, and also left facial palsy,

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Case No 231

A CASE OF SPASMODIC AURICULAR FIBRILLATION AND BRONCHO-PNEUMONIA COMPLICATING SEPSIS IN THE PUERPERIUM.

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THIS case is considered worthy of record for several reasons. It is one with which any general practitioner might suddenly be confronted, and with which he might have to deal without a specialist opinion, and the primary treatment was carried out at a hospital not equipped with special cardiological apparatus, the writer having no special experience in the newer cardiology. The prognosis was very poor. Leyland Robinson [1] gives 13 deaths out of 16 cases of auricular fibrillation following parturition, and G. J. Langley [2] gives one death out of three cases, while the other two responded badly. Many other authorities quote statistics, but do not fully differentiate the types of cardiac case. A search of the literature revealed no case of recovery of severe auricular fibrillation when complicated by broncho-pneumonia. Lastly, the case seems to afford a convincing argument in favour of large doses of digitalis in the treatment of auricular fibrillation. Although the patient never had any blood infection, she was seriously ill from pelvic sepsis, and hæmolytic streptococci were found in her cervical canal. In addition, there had been a breakdown in the cardiac mechanism on at least one previous occasion, auricular fibrillation had been present for at least four days before the treatment was initiated, and there was a fairly marked degree of broncho-pneumonia. It is therefore all the more remarkable that, within 12 hours of the administration of this large dose, fibrillation ceased, and no apparent cardiac irregularity could be detected until 12 hours afterwards, although the pulse-rate was taken at the apex at half-hourly intervals during most of that period.

The patient, aged 41, was sent into Monsall Hospital on March 5th, 1927, by Dr. L. J. Shaw with a diagnosis of puerperal pyrexia. She had had an apparently normal

[1] THE LANCET, 1927, i., 170.
[2] Brit. Med. Jour., 1927, i., 1043.

confinement on Feb. 23rd, ten days previously. She had had auricular fibrillation and broncho-pneumonia for two days before admission. There had been three previous confinements and two miscarriages. There was also a history of rheumatic fever in 1902 and 1910, and of a breakdown in the cardiac mechanism with associated œdema following the previous confinement.

Condition on Admission.—The patient was extremely cyanotic and collapsed, with a typical irregular pulse. She had a troublesome cough with frothy mucopurulent sputum, but there was no hæmoptysis. There were definite signs of broncho-pneumonia at both bases, especially on the left side. The possibility of pulmonary infarcts was ruled out, as the two lungs appeared to be symmetrically affected. There was a definite pleuritic friction rub in front of the area of the apex impulse. The apex-beat was just outside the nipple line and the first sound was completely replaced by a murmur, while there was also a well-marked diastolic murmur. There was a very definite increase in hepatic dullness. The urinary output was extremely low, with slight albuminuria. There was marked tenderness in the lower abdomen. The uterus was fairly well involuted, but with marked bilateral parametric infiltration. There was a little sanious and slightly offensive leucorrhœa.

On the following day there was a definite improvement in the rhythm of the pulse, but the rate remained irregular. A culture from the cervical canal revealed hæmolytic streptococci, but a blood culture proved sterile. On March 7th the condition of the patient was precarious. It was decided to use Eggleston's method of massive digitalis administration,[3] the large dose being indicated by the complete cardiac breakdown with orthopnœa and other complications. The basis of calculations of dosage is 0·15 c.cm. of the tincture of digitalis per pound of body-weight. Unfortunately, the body-weight and the allowance for previous dosage (approximately gr. 1/60 digitalin every four hours for three days) could only be roughly estimated. Fortunately the early toxic symptom of vomiting could be relied on to protect the patient from an overdose. After some trepidation 250 minims of a tincture of digitalis of known potency was administered, without subsequent vomiting.

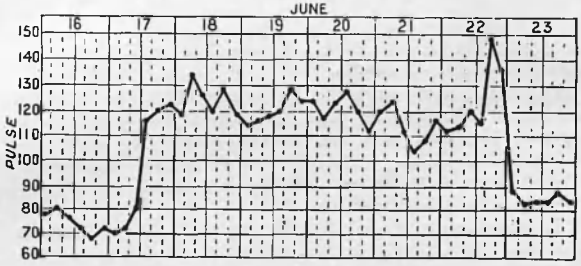
On the following day the patient was much more comfortable, the pulse varied between 110 and 90, and was 100 per cent. improved in volume. There was only occasional cardiac irregularity (two or three irregular beats followed by 10 to 12 regular ones) and there was a definite typical rough, presystolic murmur. The pleurisy was not spreading, and the broncho-pneumonia improved on the right side, but remained about the same on the left. The sputum became nummular and less frothy. The urinary output increased from 25–50 oz.; there was still a good deal of offensive leucorrhœa.

On March 9th the patient's colour had improved markedly, and the pulse was of excellent volume, and only very

[3] Jour. Amer. Med. Assoc., 1920, lxxiv. 974.

occasionally irregular. The presystolic murmur was not nearly so obvious. The broncho-pneumonia on the right side had apparently gone, while the left lung was much clearer. There was no trace of any pleurisy. The cough was less troublesome and the sputum still nummular but less frothy. The urine was clear, but there was still a fair amount of sanous offensive leucorrhœa.

On March 11th the pulse was absolutely regular, with a rate of about 70. There was still a small patch of tubular breathing over the left lower lobe posteriorly. On March 15th, one week after the administration of the dose, it was realised that its beneficial effect had reached a maximum, but, as the pulse remained regular at 70–80 and the urinary output remained about 66–70 oz., the patient



Pulse chart including the period June 17th–23rd during which the patient had auricular fibrillation.

was allowed up, without ill-effects. Five days later the pulse became slightly irregular, and the patient was put on tinct. digital. ℥ v. t.d.s. This was increased on March 22nd to ℥ xv. t.d.s. During this period the inflammatory conditions in the pelvis were gradually settling down, and on March 30th the offensive leucorrhœa ceased.

On April 8th the patient was discharged. She had a well-marked presystolic murmur, and the apex-beat was in the nipple line. The pulse-rate was between 80 and 100, but absolutely regular, and the patient's exercise tolerance was better than it had been for the last 15 years. The pelvic organs were healthy, except that the uterus was pulled over to one side of the vertical axis. The lungs appeared normal, but the liver still extended down to near the umbilicus, being partly enlarged and partly ptosed. Digitalis, once utilised, must be continued,[4] so the patient was referred to the cardiac clinic at Ancoats Hospital, where Dr. G. J. Langley found mitral stenosis, stage II., with definite murmur and thrill, but without fibrillation. An electrocardiogram taken on April 8th shows normal

[4] Mackenzie: Diseases of the Heart, 4th edition, p. 205.

rhythm of the heart with the auricular waves clearly marked and the spacing regular.

One month later she was much worse, being cyanosed and dyspnœic. Her auricle was fibrillating at 120 per minute and was grossly irregular. A full diastolic rumble was still present, but no presystolic thrill could be detected. She was admitted on May 31st for observation. Her heart remained regular until the period for which the temperature chart is shown, when her auricular fibrillation became spasmodic in type. She had a sudden onset of auricular fibrillation at 10 A.M. on June 17th, and four hours later her pulse had risen to 120. In an electrocardiogram taken on this day the auricular waves have disappeared, the rhythm has become completely irregular, the ventricular complexes are unequal in size, and the usual undulations of fibrillation are visible in lead III. She remained in this condition until June 22nd at 10 P.M., when 13 tablets, each equivalent to 1 c.cm. of tincture of digitalis, were administered. The rate fell from 150 (after atropine release) to 72, at 4 A.M. on June 23rd, after which it remained regular until discharge (see chart).

Digitalis, although fully competent to control auricular fibrillation, has no power to reinstate a normal rhythm, and the accompanying chart gives the explanation, the onset and offset of the tachycardia due to auricular fibrillation being absolutely sudden and spontaneous.

In conclusion, I wish to express my indebtedness to Dr. D. Sage Sutherland, medical superintendent, Monsall Hospital, Manchester, for permission to publish this case; and to Dr. G. J. Langley, physician to Ancoats Hospital, for permission to utilise his notes of the subsequent history of the case.

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the latter only lasting for a week. There was practically an apparently complete venous thrombosis throughout the the body, and the patient showed marked swelling and oedema everywhere, and was practically unconscious for a fortnight. Suddenly the phlegmasiae began to go down, the power returned to the rt.arm, and after a slow convalescence, the patient was discharged at the end of four months, well.
The reason for this change in the clinical picture is not known, but since this case, the writer has had to revise his ideas about prognosis, in cases where there was marked thrombosis associated with sterile blood cultures - of cases 119, and 144.

(229) Puerperal sepsis complicated by post-influenzal sino-auricular block and also pleurisy. Former treated successfully with large doses of Belladonna.

(231) Case complicated by auricular fibrillation with double broncho-pneumonia of four days standing, and treated by massive dose of tincture digitalis (m.250). Patient discharged, cured, in a month. (cf.Lancet. January 1927.)

(245) History of severe P.P.H. admitted on the third day of illness with history of dysarthria and offensive leucorrhoea. On day of admission, patient without any preliminary rigor, developed a sudden hemiplegia. the patient suffering for about thirty minutes from "swimminess", dysarthria and Right supraorbital headache. The blood proved sterile, and ophthalmoscopic examination proved negative. The hemiplegia ran an ordinary course, with motor power normal, in one week, and sensation mormal in three weeks.
The patient was discharged a week later, and a cardiologist, who took an electro-cardiogram, expressed the opinion that the heart was absolutely normal, and that this case must be due to a patent foramen ovule (cf. case 169)

(247) Failed forceps, and stillbirth. Admitted on the fifth day of illness with history of rigors. Severe lacerations, and haemolytic streptococci in cervix, but blood cultures repeatedly sterile. On the sixth day of illness, patient developed pain over the rt.eye and slight paraesthesia of left hand. Twelve days later complained of paraesthesiae of rt.foot and rt.forearm and left supraorbital headache (the reverse of the above). Patient was discharged fit and well.
Were not these disturbances manifestations of toxic hemiplegias ?

(248) Infiltrated right parametrium present on admission. Persistent symptomless unremittant pyrexia, suggesing abdominal phlebitis, and associated with attacks of gastro-enteritis.
Discharged cured, in six weeks.

(257) A case of generalised peritonitis with empyema, admitted on the twenty fifth day, when laparotomy was performed.
Patient died two days later.

Post mortem:- Good deal of fattu degeneration of heart. Valves normal. Entire part filled with "agonal" clot, with no signs of organised thrombosis. Lung normal with no sign of pulmonary infarction. Definite left sided empyema, without any signs of diaphragmatic perforation. Abdomen filled with free fluid, and all organs covered with fibrinous exudate have extended to one and a half inches below the actual margin, and showed marked signs of fatty infiltration. Spleen soft and pulpy, adherent in places to anterior abdominal wall. Kidneys large and pale with typical cloudy swelling. Uterus quite small and well involuted, empty and freely mobile. Both tubes somewhat thickened, no serious thrombosis, except just mid-uterus, and no "glueing" down of abdominal viscera to latter organ.

(287) Admitted on sixth day of illness, with practically no symptoms but history of ragged membrane. Blood sterile, and non -haemolytic streptococci in cervix. Five days after admission patient had a slight pulmonary infarction, and died suddenly from a repetition of the same on the following day.
Note that this case from another hospital, that glycero-iodine irrigation was commenced late in the disease, and that it might have been suitable for vein ligation.

(292) Hydrocephalus and spina bifida, perforation, extraction, and manual removal of placenta. Cervical culture showed staphylococci, nom-haemolytic streptococci and coliform bacilli, while the blood had 2.5 non-haemolytic staphylococci per c c,.
The latter condition clearing up under N.A.B. treatment. The pulse was always a little rapid, and out of proportion to the temperature (warning) Two days after admission patient had "swimminess" and hemicrania (warning 2.), Five days later the patient had a further slight attack of "swimminess" with sterile blood - probably a mild release of clot.(warning 3), nine days later, and fourteen days after admission, the patient died suddenly from pulmonary embolism.
This has seemed to the writer to have been a case where vein ligation seemed feasible.

A study of these unselected cases leads to the following conclusions:-

(1) The infinite variety of the clinical manifestations of peurperal sepsis.

(2) When pus has been allowed to infiltrate into the pelvic tissues, it may takes months to come to the surface.

(3) It must be remembered that these interesting cases, from a clinical point of view, are those which may be classed as failures.
Either the patient has died, or, for some reason or other, the local treatment has not been efficacious. The simple straightforward cases which respond readily to treatment, are not as illuminating as the failures.

4. It must be noted that often patients are discharged home from hospital after an apparently normal puerperium, and later develop signs of sepsis, which has been latent.

INFECTION OF THE URINARY TRACT.

At one time the writer paid little attention to the urinary tract, but later it was found that even when there were no symptoms, there was a bacteriological infection of the urinary tract.

A nutrine urine culture is made on MacConkey, and in blood agar media on admission, and similarly every case of sudden pyrexia, receives an immediate urine culture as well as a blood culture. The majority of organisms found in the urine are coliform bacilli, irrespective of the organisms present in the genital tract, but less commonly, the pyogenic organisms are present.

The incidence of urinary infection appears to bear no correlation. to the degree of pelvic laceration.

AFTER CURE.

No patient is discharged from hospital until (a) the temperature has been normal for a fortnight, (b) there has been no leucorrhoea for a week, (c) the urine has been normal for a week, and is reported sterile and (d) there is no tenderness on bimanual examination. Should the uterus be out of position owing to adhesions, the patient is given a cure of potassium iodide by mouth, associated with glycerine-ichthyol pessaries. Ultra Violet therapy has proved very good for convalescent cases. A sustained effort is made to keep in touch with ex-patients, and the results from the general treatment, glycero-iodine irrigations in preventing puerperal morbidity seems very striking, although there appears to have been no work done in following up previously treated puerperal patients, as far as the writer is aware.

CONCLUSION.

Finally the writer thinks that the best prophylactic measure at present available for puerperal septicaemia is the glycero-iodine method of uterine irrigation, as practiced by Hobbs.

It is also useful in clearing out retained products from the uterus post-abortum. The disadvantages attached to it, do not hold, provided the treatment is begun early enough.

As the writer has endeavoured to show, it only becomes a two-edged sword when commenced after the first week of illness.

When considering the advisability of commencing it in a case, more attention should be paid to the pulse than to the temperature.

As regards the treatment of puerperal septicaemia, we have four methods of attack at present.

The blood infection can be attacked by - (a) intravenous administration of arsenical compounds, and (b) immunotransfusion, using nucleim and whole blood.

Further reinforcements maby be prevented by (a) Vein ligation, and (b) heparin.

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(1) Janet Campbell. Report on Public Health and Medical Subject. No. 25. (Ministry of Health)

(2). Hobbs Public Health. Vol. XXXlX. pg. 307.

(3) Hobbs. ibid. pg. 309.

(4) (Philips) Proc.Roy.Soc.Med.1926. Vol. 19. (See Obs & Gyn.)

(5) Colebrook " " " " " " " " Pg.31.

(6) Douglas and Colebrook Lancet. Vol.2. July.29. 1916.

(7) Colebrook and Storer Lancet. Vol. 2.1923. pg. 1341.

(8) Colebrook, Proceeding Roy.Soc.Med.1926. Vol.XlX. pg. 31.

(9) Baldwin American Journal Obstet. & Gyn. 1923. sec. 5.

(10) Rowntree. Lancet. Vol.11. 1927. pg.17.

(X) Puerperal Infection 1910. (Oxford University Press)

(Y) The Therapy of Puerperal Fever 1926. (Henry Kimpton. London.)
