BLOOD COUNTS
IN THE NEWBORN.

Sept. 30th 1901.

John Cuthbert M.B.

ProQuest LLC.
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P.O. Box 1346
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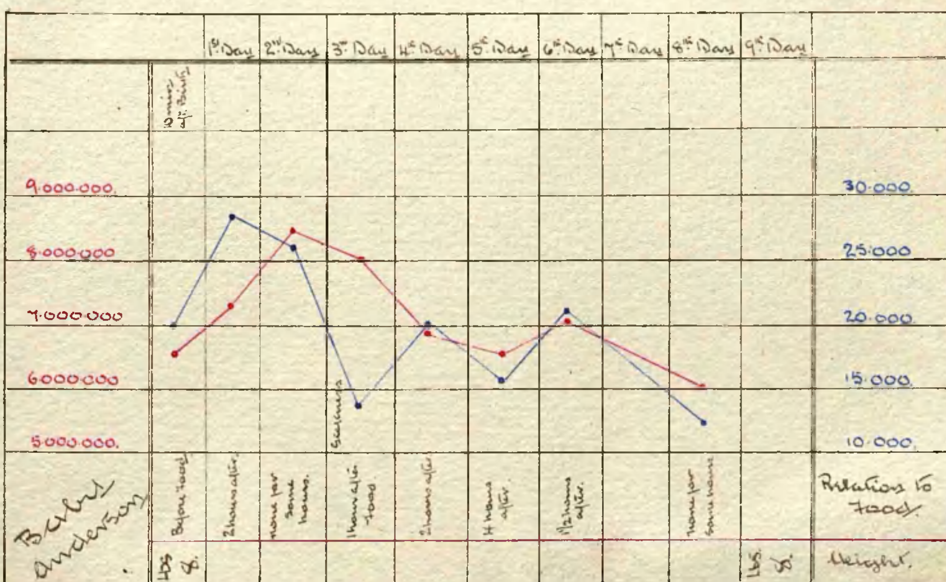
Case 1.

Anderson. aet. 24. Delivered 30.XII.00 7.10 p.m.
Full term male.

Normal Delivery.

Date	Leucocytes.	weight	Hb	Lymphoc.	Neutroph.	Eosinoph.	Nucleated reds	Number counted	Relat.ⁿ to food	Day of [illegible]
30.XII.00. 7.30 p.m.	20.000.	8 lbs.	103%.	55%.	40%.	4%.	4.	500	Before food.	Birth
31.XII.00 8 p.m.	28.000.			50%.	45%.	3%.	4	500	food 2 hours pre.	End of 1st Day
1.1.01. 9 p.m.	26.000.								none for some hours	" " 2nd "
2.1.01. 9 p.m.	14.400.								1 hour after food.	" " 3rd "
3.1.01 9 p.m.	20.400.								2 hours after	" " 4th "
4.1.01 9 p.m.	16.600.								4 hours after	" " 5th "
5.1.01. 9 p.m.	21.200.			68%	25%	6	0	500.	1½ hours after	" " 6th "
7.1.01. 7 p.m.	13.200.	8 lb.							none for some hours.	" " 8th Day

Sickness on 3rd Day.



Case 2.

McKenzie. aet 25. Delivered 1.1.01. 10am.
Full term male.

Normal Delivery.

Date	Leucocytes	Weight	Hb.	Lymphos	Polymorph	Eosinoph	Mononuclear	Number counted	Relation to Food.	Days of Illness
1.1.01. 10.30am	14.000.	6lb.	110%.	65%.	34%.	1%.	11	500	Before food.	Birth.
2.1.01. 10.30 "	26.000								none for some hours	End of 1st Day
3.1.01. 11am	15.000			60%.	34%.	6%	11	500	2 hours after.	" " 2nd Day
4.1.01. 11am	16.000.			58%.	39%.	3%	11	500	3½ hours after	" " 3rd "
5.1.01. 11am	15.600.								½ hour after	" " 4th "
6.1.01. 11am	13.900			64%	30%.	1%	5	500	none for some hours.	" " 5th "
8.1.01. 10am	14.800								4 hours after	" " 7th "
9.1.01. 10am	13.400.	6lb.	100%.	43%	23%.	3%	12	500.	4 hours after	End of 8th Day

Sickness on 2nd and 4th Days.

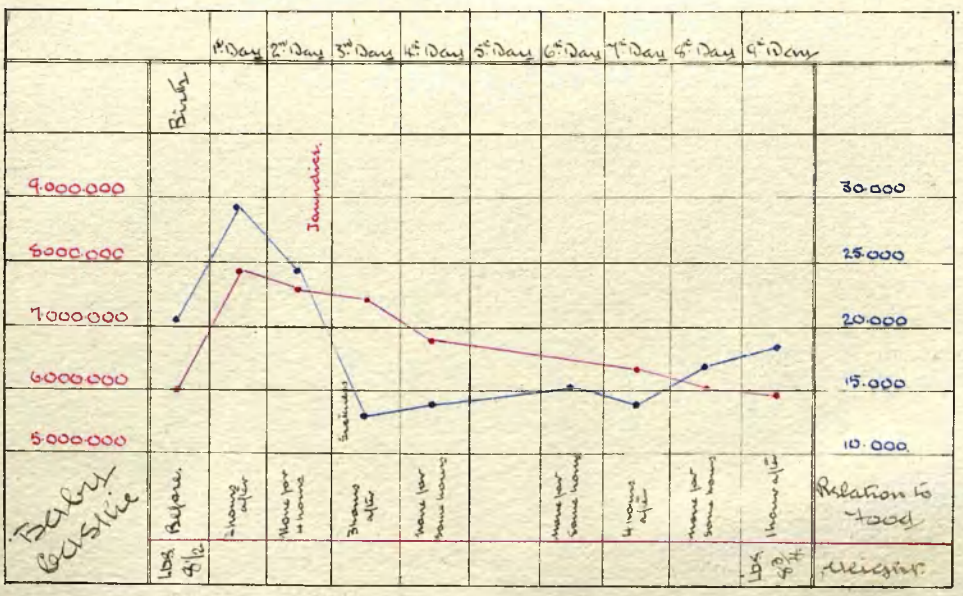
Case 3.

Cuskin. aet 21. Delivered. 8.1.01. 12.15 am.
Full term male.

Normal Delivery.

Date	Leucocytes	weight	Hb.						Relation to food	Day of stay
8.1.01 12.15 am	20.000.	8½ lbs	102%	50%	45%	4%	H	500.	Before food.	Birth
9.1.01. 1 am	24.000.								2 hours after.	end of 1st Day.
10.1.01. 1 am	24.000.								none for 4 hours.	" 2nd "
11.1.01. 1 am	13.200.								3 hours after.	" 3rd "
12.1.01. 1 am	14.200.								none for some hours.	" 4th "
13.1.01. 11 pm	15.200.								none for some hours.	" 6th "
14.1.01 11 pm	14.000.								4 hours previous.	" 7th "
15.1.01 11 pm	16.800								none for some hours.	" 8th "
16.1.01. 11 pm	18.000.	8¾ lbs.		60%.	32%	7½%.	0	500.	1 hour after.	end of 9th Day.

Sickness on 3rd Day.
Jaundice from 2nd Day.

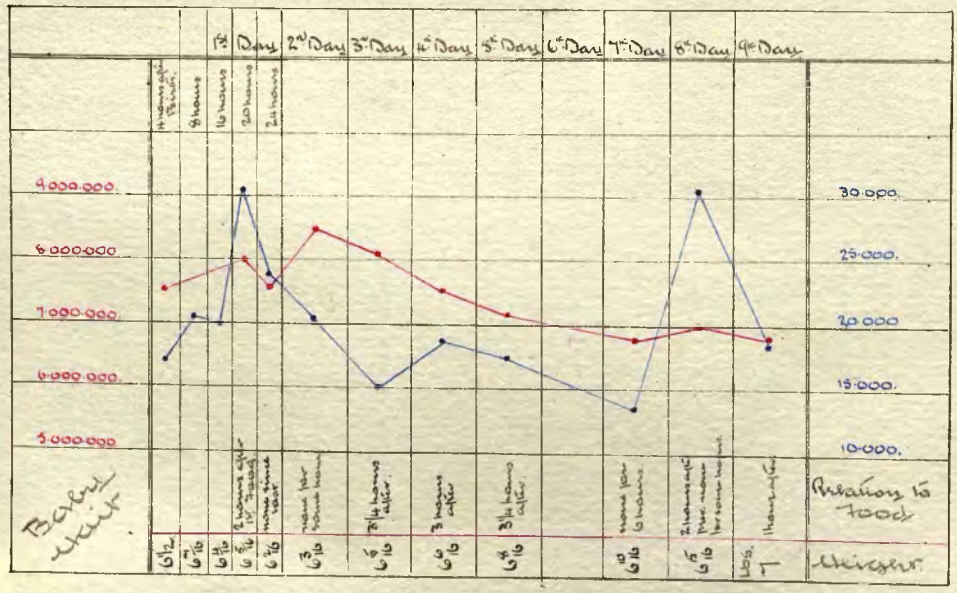


Case H.

Male. aet. 18. Delivered 18.1.01. 8 pms.
Full Term: male

Delivered in open air – child exposed for an hour.

Date.	Leucocytes per c.mm.		Weather	Haemoglobin	Eosinophils	Nucleated Reds	Normoblasts counted	Relation to Food.	Day of Exam.
18.1.01. 12 pms	14.400.	6½ lbs.	34%	63%	2%	1.	500	Before Food	4 hours after Birth
19.1.01. 4 ams	20.600.	6 11/16						" "	8 " " "
12 ams	20.000.	6 11/16						" "	16 " " "
4 pms	32.400.	6 5/16.						2 hours after 1st Feeding.	20 " " "
8 pms	24.000.	6 3/16.	50%	47%	2%	0.	500.	none since alone.	End of 1st Day
20.1.01. 8 ams	20.400.	6 3/16.						none for some hours.	" " 2nd "
21.1.01 9 pms	15.000.	6 5/16	44%	52%	2%	0	500.	3¼ hours after	" " 3rd "
22.1.01. 6 pms	19.000.	6 6/16						3 " "	" " 4th "
23.1.01 9 pms	17.600.	6 8/16.	35%	64%	2%	0	500	3¼ " "	" " 5th "
25.1.01 6 pms	13.800.	6 10/16						none for 6 hours.	" " 7th "
26.1.01 6 pms	31.200	6 15/16.	25%	71%	3%	0	500.	2 hours after. long fast previous	" " 8th "
27.1.01 6 pms	19.000.	7 lbs						1 hour after	End of 9th Day



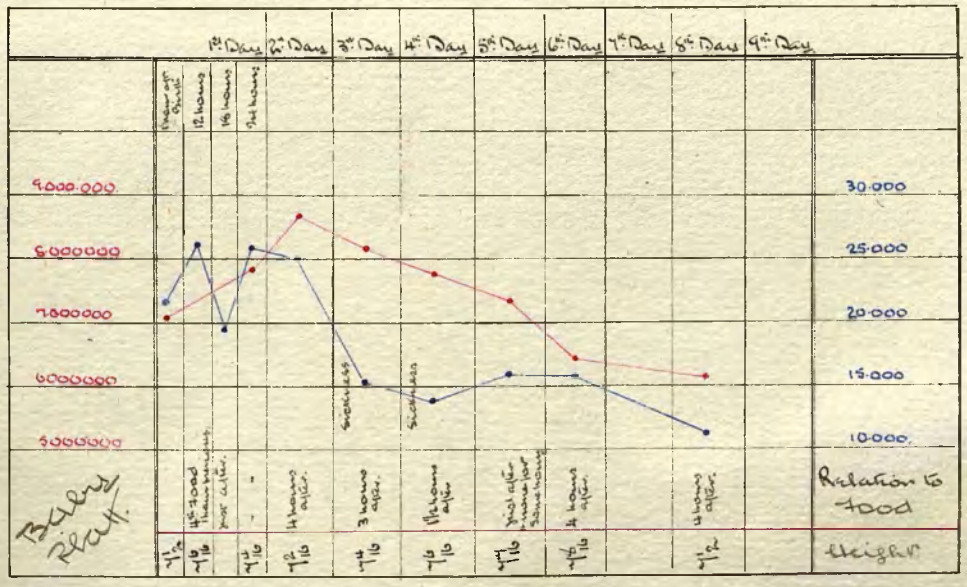
Case 5.

Platt. aet 32. Delivered 24.1.01. 8.30am.
Full Term. male.

Normal Delivery.

Date	Leucocytes	Weight	Hb.	Lymphos	Neutrophs	Eosinophs	Nucleated Red	Hæmic Count	Relation to Food.	Day of Exam.
24.1.01. 9am.	22.000.	7 1/2 lbs.	102%.	56%.	40%.	3%.	83.	500.	Before Food.	1 hour after Birth.
25.1.01. 8.30am.	26.800.	7 6/16.		35%.	61%.	3%.	13	500.	1st Feeding. 1 hour after.	12 " " "
25.1.01. 2.30am.	19.000.								Food given at 8am. Some low some not bile.	18 " " "
26.1.01. 8.30am.	26.200.	7 5/16.							" " "	End of 1st Day.
27.1.01. 10am.	25.000.	7 3/16.							24 hours after	" " 2nd. "
30.1.01. 11am.	15.400.	7 1/16.							3 " "	" " 3rd. "
31.1.01. 11am.	14.400.	7 0/16.							1 1/2 " "	" " 4th. "
1.2.01. 9.30am.	16.400.	7 1/16		48%.	47.1%.	4%.	6	500.	Some but some low Fell 5 min. hearing.	" " 5th. "
2.2.01. 9.30am.	16.400.	7 5/16.							24 hours after	" " 6th. "
4.2.01. 10am.	12.400.	7 1/2		65%.	31%.	3%.	5	500.	48 hours after	" " 8th. Day

Sickness on 3rd and 4th Days.



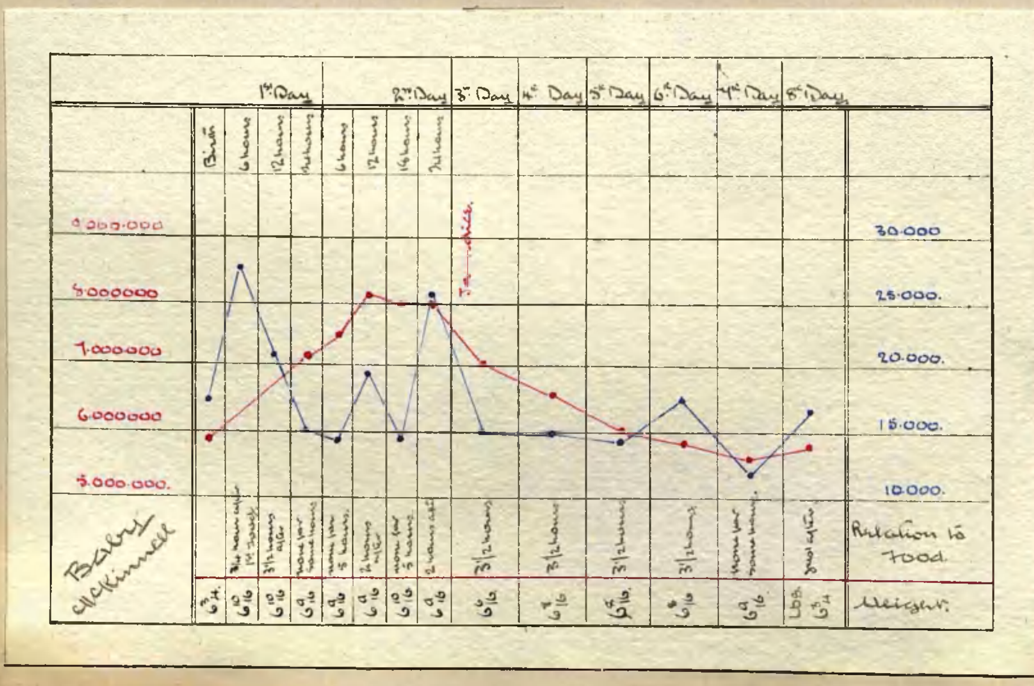
Case 6.

McKinnell. aet. ? Delivered 31.1.01. 9am.
Full term male.

Normal Delivery.

Date	Leucocytes	Weight		Lymphoc.	Neutroph.	Eosinoph.	Nucleated Reds	Number counted	Relation to Food.	Day of Exam.
31.1.01. 9.10am	17.600.	6¾ lbs.		54%	44%	1%	20	500.	Before food.	Birth.
31.1.01. 3pm.	27.800	6 10/16.							3/4 hour after 1st food.	6 hours aft. "
31.1.01. 9pm.	21.200	6 10/16.							3½ hours prev.	12 " " "
1.2.01. 9am	15.000.	6 9/16.							none for some hours	End of 1st Day
1.2.01 3pm	14.900	6 9/16.							none for 5 hours.	6 hours.
1.2.01. 9pm	19.000.	6 9/16.							2 hours after.	12 "
2.2.01 3am.	14.000.	6 10/16.							None for 4 hours.	18 "
2.2.01. 9am.	25.800.	6 9/16.		46%	48%	5%.	3	500	2 hours after	End of 2nd Day
3.2.01 9am	15.200.	6 6/16		32%	63%.	4%.	8.	500	3½ " "	" " 3rd "
4.2.01	15.000.	6 7/16.							3½ " "	" " 4th "
5.2.01.	15.000.	6 8/16.							3½ " "	" " 5th "
6.2.01	17.500.	6 8/16.							3½ " "	" " 6th "
7.2.01.	13.400	6 9/16.							none for some hours.	" " 7th "
8.2.01.	16.800.	6¾.							Just after (½ hour.)	End of 8th Day

Marked Jaundice from 2nd day.



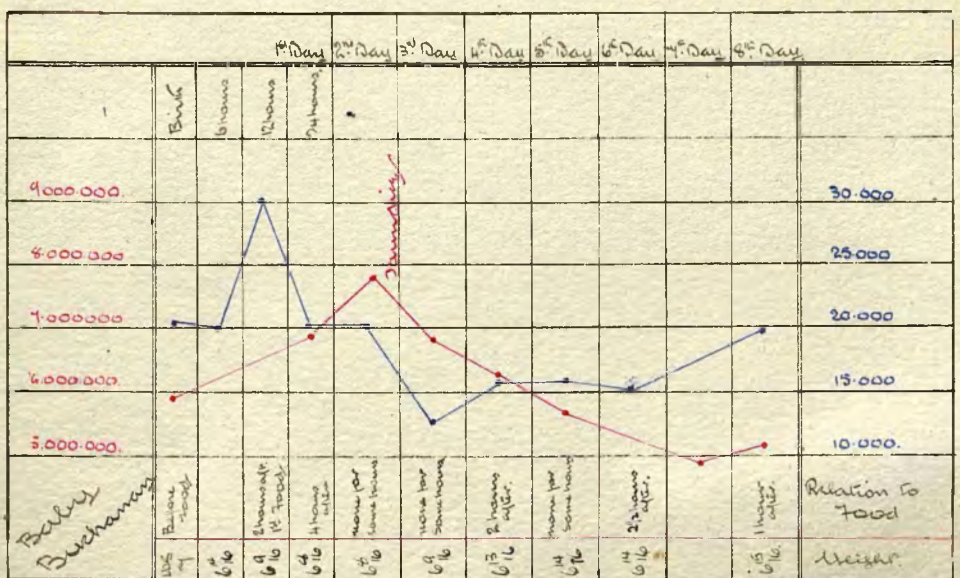
Case 7.

Buchanan. aet. ? Delivered 1.2.01. 3.30 p.m.
Full term. male

Normal Delivery. (cord tied at once)

Date	Leucocytes	Weight		Lymphoc.	Neutroph.	Eosinoph.	Nucleated Reds.	Number Counted.	Relatn. to Food.	Day of Obsn.
1.2.01 3.35 p.m.	20.600.	7 lbs.		60%	36%	3%.	36	500.	Before food	Birth
1.2.01 9.30 p.m.	20.000.	$6\frac{14}{16}$.							" "	6 hours after -
1.2.01. 3.30 a.m.	30.200.	$6\frac{9}{16}$.		39%.	57%.	3%.	10	500.	2 hours after 1st food	12 " " "
2.2.01. 3 p.m.	19.000.	$6\frac{8}{16}$.							4 hours after.	End of 1st Day.
3.2.01 3½ p.m.	20.000	$6\frac{8}{16}$.		43%	43%	13%.	5	500.	None for some hours.	" " 2nd "
4.2.01. 3 p.m.	13.200.	$6\frac{9}{16}$.		50%	42%.	7%.	16	500.	" " "	" " 3rd "
5.2.01 "	16.000.	$6\frac{13}{32}$.		44%.	45%.	10%.	5	500	2 hours after	" " 4th "
6.2.01 "	16.600.	$6\frac{14}{32}$.		52%.	36%.	11%5.	5	500.	½ " " " none [illegible] for some hours	" " 5th "
7.2.01 "	15.000	$6\frac{14}{32}$							2½ " "	" " 6th "
9.2.01 "	19.800.	$6\frac{15}{32}$		35%.	58%	6%	2	500.	1 hour after	End of 8th Day

Jaundice on 3rd Day.



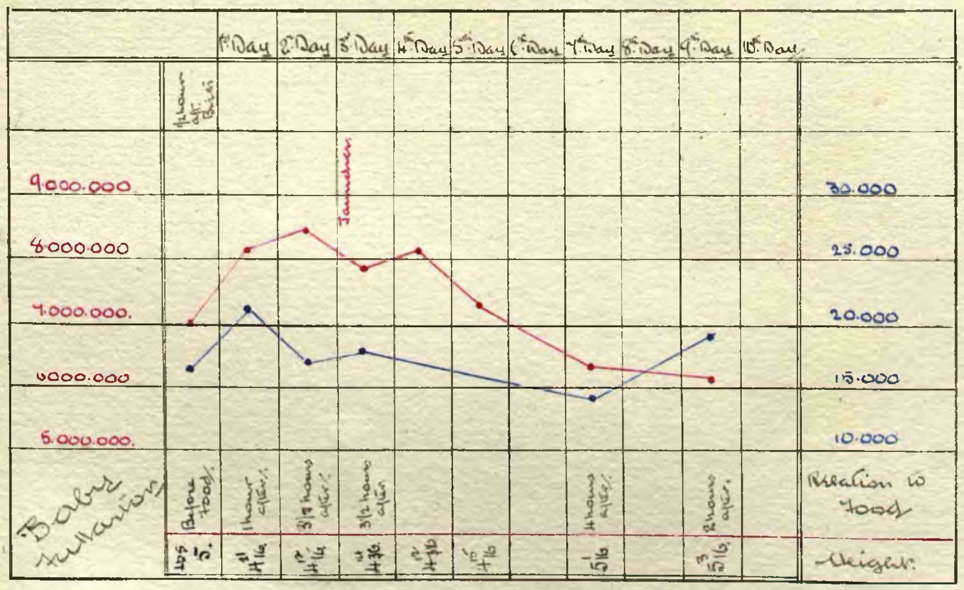
Case 8.

Fullarton. aet. 30 Delivered. 5.2.01. 8 pm.
Full term male.

Normal Delivery.

Date	Leucocytes	Weight		Lymphos.	Neutroph.	Eosinoph.	Nucleated Reds	Number counted	Relatn to Food	Day of exam
5.2.01. 8.40 pm	17.000	5 lbs.		48%.	46%.	4%.	6	500.	Before food.	40 m. after Birth.
6.2.01 8 am	21.000	4 13/16							1st feeding just before.	12 hours - -
6.2.01 8 pm	22.000	4 11/16.							1 hour after food.	End of 1st Day.
7.2.01. 8 am		4 12/16.								12 hours.
7.2.01 8 pm	17.600	4 12/16.							3½ hours - -	End of 2nd Day
8.2.01. 9 pm	18.000.	4 14/16							3½ hours - -	" " 3rd "
9.2.01. 6 pm		4 12/16.								" " 4th "
10.2.01. 8 pm		4 15/16								" " 5th "
12.2.01 7 pm	14.800.	5 1/16.							4 hours after	" " 7th "
13.2.01. 8 pm	19.000.	5 3/16.							2 hours after	End of 8th Day

Jaundice from 3rd Day.



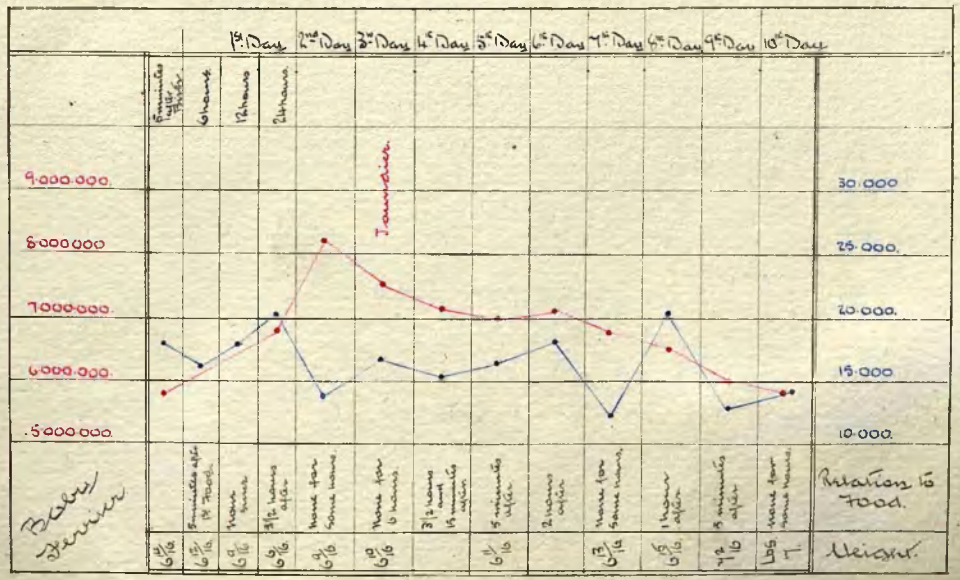
Case 9.

Terrier ser.[2] Delivered 6.2.01. 4 hrs.
Full term male

Normal Delivery.

Date	Leucocytes	weight	Polymorphs	Mononuclears	Eosinophiles	Myelocytes	Nucleated Red	Relation to Food	Days of Exam
6.2.01 4 hrs	18.000	6 lb 16	66%	24%	7%	2	500	Before food	Birth
6.2.01. 10 hrs	16.400	6 lb 12						5 minutes after 1st feeding	6 hours after
7.2.01 4 hrs	18.000	6 lb 9	35%	61%	4%	2	500	none since 1st	12 hours after
8.2.01 4 hrs	20.400	6 lb 6						3½ hours after	End of 1st Day
8.2.01 4 hrs	14.200	6 lb 9	51%	43%	6%	1	500	none for some hours	" - 2nd "
9.2.01 4 hrs	16.800	6 lb 10						none for 6 hours	" " 3rd "
10.2.01 4 hrs	15.400		47%	44%	9%	1	500	3½ hours and 15 mins after	" " 4th "
11.2.01 3 hrs	16.600	6 lb 11						5 min. after	" " 5th "
12.2.01 4 hrs	18.000		48%	45%	6%	3	500	2 hours after.	" " 6th "
13.2.01 3 hrs	12.200	6 lb 13	47%	42%	10%	0	500	none for some hours	" " 7th "
14.2.01 4 hrs	20.400	6 lb 15						1 hour after	" " 8th "
15.2.01 3 hrs	11.000	7 lb 2						5 mins after	" " 9th "
16.2.01 4 hrs	14.600	7 lb	57%	35%	6%	0	500	none for some hours	" " 10th "

Jaundice from 3rd Day.
Ophthalmica from 3rd Day.



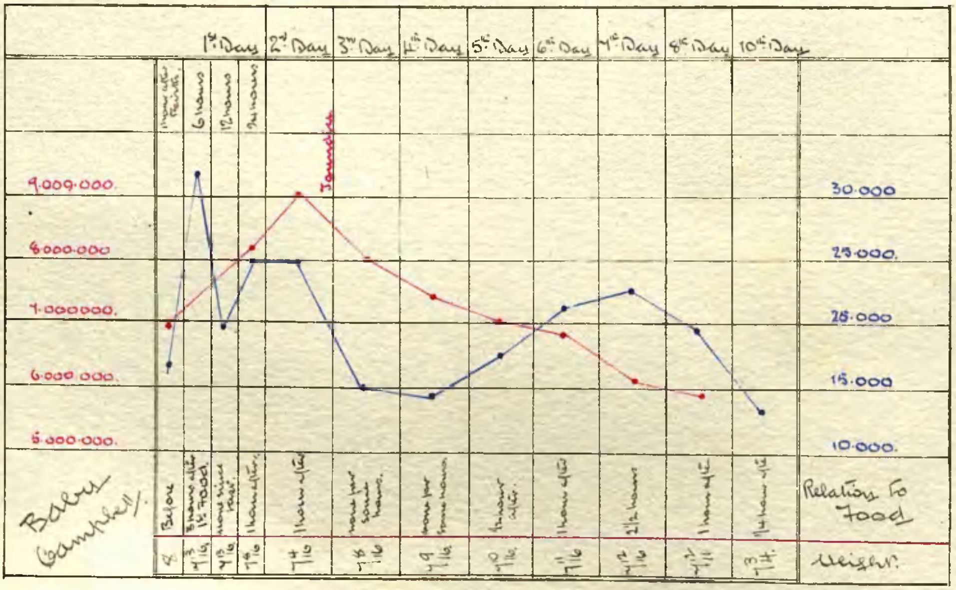
Case 10.

Campbell. aet. 30. Delivered. 8.2.01. 1.30 pm.
Full term male.

Normal Delivery. (cord tied early)

Date	Leucocytes	Weight		Lymphocytes	Neutrophils	Eosinophils	Nucleated Reds	Number counted	Relation to Food	Day of exam.
8.2.01. 2.20 pm	16.400	8 lbs.		48%	46%	5%	13.	500.	Before Food.	50 mins aft. Birth
8.2.01 4.30 pm	33.400.	$7\frac{13}{16}$.		37%	60%	2%	3	500	3 hours after 1st Food	6 hours " "
9.2.01 9.30 am	19.400.	$7\frac{13}{16}$.							none for some hours.	12 " " "
9.2.01 2.30 pm	25.000.	$7\frac{8}{16}$.							1 hour after "	End of 1st Day
10.2.01 3 pm	25.000.	$7\frac{4}{16}$.							1 hour " "	" " 2nd "
11.2.01.	15.000.	$7\frac{8}{16}$.							none for some hours	" " 3rd "
12.2.01	14.000	$7\frac{9}{16}$.							" " "	" " 4th "
13.2.01	17.800.	$7\frac{10}{16}$.							1/2 hour after.	" " 5th "
14.2.01	21.600.	$7\frac{11}{16}$.							1 " "	" " 6th "
15.2.01.	23.000.	$7\frac{12}{16}$.							2 1/2 " "	" " 7th "
16.2.01	19.600	$7\frac{12}{16}$.							1 hour after.	" " 8th "
18.2.01.	13.800	$7\frac{3}{4}$.							1/4 " "	End of 10th Day

Jaundice marked from 3rd Day.



Case II.

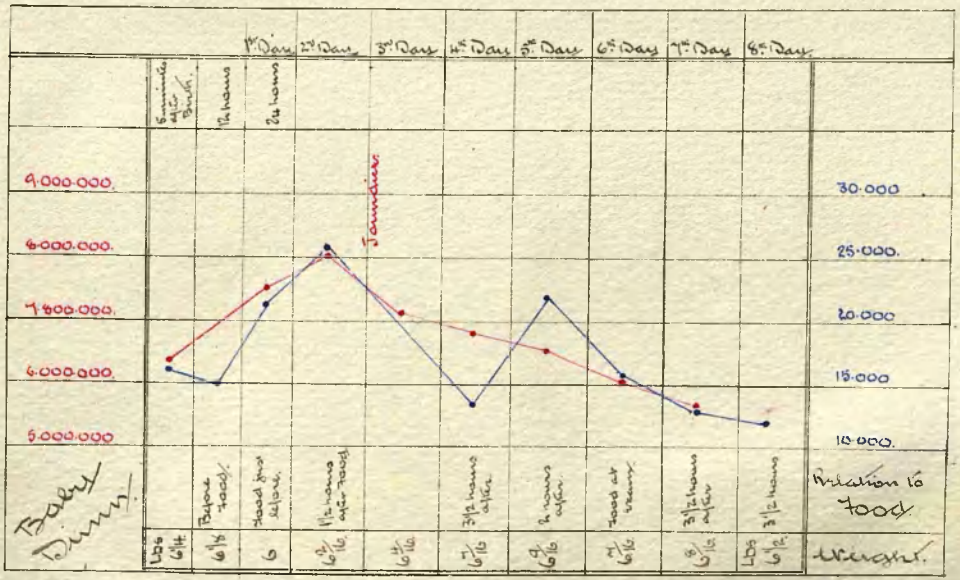
Name: aet. 25 Delivered: 12.2.01. 2 a.m.

Full term. male

Normal Delivery. (cord tied early)

Date	Leucocytes	Weight		Lymphos	Neutrophs	Eosinophs	Nucleated Reds	Number Count	Relation to Food	Day of Exam.
12.2.01 2.5 am	16.400.	6 4 lbs.		54%	43%	2%	5	500	Before Food.	Birth
12.2.01 2 pm	15.000.	6 8/16.							" "	12 hours after
13.2.01 1 am	22.000.	6							Just after	End of 1st Day
14.2.01 1 am	25.000.	6 7/16							1 1/2 hours after.	" - 2nd "
15.2.01		6 4/16.								" - 3rd "
16.2.01	13.600	6 2/16							3 1/2 " "	" - 4th "
17.2.01	22.000.	6 9/16							2 " "	" - 5th "
18.2.01	15.800.	6 1/16.							Just after	" " 6th "
19.2.01	13.800.	6 8/16							3 1/2 hours after.	" " 7th "
20.2.01	12.800	6 1/2.							3 1/2 hours after.	End of 8th Day

Jaundice on 2nd and 3rd Days.



Case 12.

Gonagill. aet.? Delivered 13.2.01. 12.55 pm.
Full term female.

Normal Delivery.

Date	Leucocytes	Weight		Lymphocytes	Neutrophils	Eosinophils	Nucleated reds	Number counted	Relat. to Food	Day of exam.
13.2.01 1 pm	18.400	8 1/8		52%.	44%.	3%	15	500	Before food.	Birth
13.2.01 4 pm	13.600	8.							1st food at 6 am	6 hours aft.
14.2.01. 1 am	26.400	7 14/16.							1 1/2 hours after.	12 " "
14.2.01 7 am	26.000.	7 13/16.							1 1/2 " "	18 " "
14.2.01 1 pm.	25.000.	7 11/16		30%.	63%.	6%	2	500.	1 1/2 " "	End of 1st Day
15.2.01	14.400.	7 11/16							Just after food.	" " 2nd "
16.2.01	17.600.	7 14/16							3 1/2 hours after.	" " 3rd "
17.2.01	15.400.	8 3/16.							3 1/2 " "	" " 4th "
18.2.01										" " 5th "
19.2.01	15.400.	8 4/16.							3 1/2 " "	" " 6th "
20.2.01.	14.800	8 1/2							3 1/2 hours after.	End of 7th Day

Jaundice from end of 1st Day.

Case 13.

Hughes. aet 24. Delivered 10.xij.00. 8am.
Full time male.

Normal Delivery.

Date	Red corpuscles	Leucocytes	Weight	Hb.	Lymphos	Neutrophs	Eosinophs	Nucleated Reds	Number counted	Relation to food.	Day of trans.
10.xij.00. 8.10am	6.400.000	20.000	8½	110%	63%	33%	4%	20	500	Before food.	Birth
14.xij.00. 8am	7.200.000.	14.800.								4 hours after.	End of 4th Day
18.xij.00. 8am	6.600.000	13.800.								4 hours after	" " 8th "
19.xij.00.	5.500.000	13.000	8¾	100%						None for some hours	End of 9th Day

Case 14.

Boyle. aet. 24. Delivered. 24.xij.00. 2 Pm.
Full time male.

Normal Delivery.

26.xij.00 2Pm	9.100.000.	35.000.	7½	110%	34%	61%	3%	2	500	1 hour after	End of 2nd Day
28.xij.00 4Pm	7.600.000.	14.000	7½							none for some hours	End of 4th Day

Case 15.

Mc Andrews. aet 22. Delivered. 12.xij.00. 1.30am.
Full time female.

Normal Delivery.

12.xij.00 1.40am	6.200.000	20.000.	8 lbs	105%						Before food	Birth
15.xij.00 2am	8.300.000.	15.400.			50%	43%	6%	4.	500	none for some hours	End of 3rd Day
21.xij.00 1am	6.200.000.	15.000.	8½.	96%.						3½ hours after	End of 9th Day

Case 16.

McLean. aet. 24. Delivered. 11.xij.00. 8am.
Full time female.

Normal Delivery.

13.xij.00 8am	9.300.000	25.600.	8½ lbs.	105%	42%	56%	1%	1	500	4 hours after.	End of 2nd Day
17.xij.00	7.430.000.	17.800			42%	54%	2%	0	500.	2½ hours after	End of 6th Day
20.xij.00.		19.600	9 lbs.		55%	40%	4%	0	500.	2 hours after	End of 9th Day

Case 17.

Gibson aet 23. Delivered 14. xij. 00. 1 pm.
Full time male.

Normal Delivery.

Date.	Red Corpuscles.	Leucocytes.	Weight	Hb.	Lymphs	Neutrophs	Eosinophs	Nucleated Reds	Number cm³	Relat: to Food.	Day of Exam.
14. xij. 00 2 pm.	6.300.000.	17.000.	8 lbs.	110%	48%	45%	6%	4.	500.	Before.	1 hour. after Birth
16. xij. 00 1 pm.	6.090.000	16.000		105%.						None for some hours	End of 2nd Day.
22. xij. 00.	5.466.000.	20.000	8 1/4 lbs.	102%						2 hours after	End of 8th Day.

Case 18.

Lee aet 24. Delivered. 15. xij. 00. 7.30 am.
Full time. male.

Normal Delivery.

15. xij. 00 11 am.	7.150.000.	19.200	7 lbs	108%						Before	Birth
19. xij. 00.	7.200.000	13.600			49%	46%	4%	0	500.	4 hours after.	End of 4th Day
22. xij. 00	6.400000	14.000.	7 1/4 lbs		64%	32%	4%	0	500	none for some hours.	End of 7th Day

Case 19.

Fleeting aet 19. Delivered. 15. xij. 00 10 pm.
Full time female.

Normal Delivery.

15. xij. 00 11 pm.	7.000.000	22.000	7	105%						Before.	1 hr. after Birth
20. xij. 00	7.200.000	21.000								2 hours after	End of 5th Day.
24. xij. 00.	5600.000	12.800.	7 1/4	100%						3 1/2 hours after.	End of 9th Day.

Case 20.

Griffiths aet. 22. Delivered. 16. xij. 00. 11.30 am.
Full time female.

Normal Delivery.

16. xij. 00 12.30 p	6.800.000	20.800	7 1/2	98%						Before.	1 hr. after Birth
19. xij. 00	8.300.000	20.000								None for some hours.	End of 3rd Day.
21. xij. 00.	7.000.000.	22.000	7 3/4.							2 hours after.	End of 5th Day.

Case 21.

Young. aet 22. Delivered 16.xij.00. 3.10 pm.
Full time female.

Normal Delivery.

Date	Red Corpuscles	Leucocytes	Weight	Hb.	Myelocytes	Neutrophils	Eosinophils	Nucleated Reds	Number counted	Relation to Food	Day of Exam
17.xij.00 3 pm	4.200.000	39.200	8¾	110%	33%	63%	3%	1	500	2 hrs after Liver	End of 1st Day
22.xij.00	4.200.000	17.000								none for some hours	" " 4th Day
26.xij.00	5.300.000	23.000	9							1 hour after	End of 9th Day

Case 22.

Kirkpatrick aet 16. Delivered. 18.xij.00. 6 am
Full time female.

Normal Delivery (Cord tied early)

16.12.00 12 pm	4.400.000.	25.000	6½	100%	40%	57%	2%	20	500	2 hrs after 1st food.	6 hours
23.xij.00 6 pm	6.800.000	15.600								none for some hours	End of 5th Day
26.xij.00	5.900.000	17.000								" " "	End of 4th Day
26.xij.00	5.400.000	12.000	7							none for some hours.	End of 6th Day

Jaundice. 1st to 6th Days.

Case 23.

Grant aet 21. Delivered 20.xij.00. 10 am
Full time male.

Normal Delivery.

20.xij.00 10.15 am	5.455.000.	17.000	7½	100%						Before	Birth
23.xij.00 11 am	4.400.000	14.400			56%	40%	3%	0	500	4 hours after.	End of 3rd Day
26.xij.00.	5.450.000		7¾.							" " "	End of 6th Day

Jaundice from 3rd Day.

Donelly. aet 25. Delivered 23.xij.00. 4.30 pm

Case 24.

Full time male.

Normal Delivery.

22.xij.00 4.40 pm	5.200.000	20.800.	7	100%	49%	45%	5%	12	500	Before.	Birth
26.xij.00 4 pm	4.150.000	17.000	7							none for some hours.	End of 3rd Day

Case 25.

Simpson aet 24. Delivered 24. xij. 00 6pm
Full term male.

Normal Delivery. cord tied early.

Date	Red corpuscles	Leucocytes	Weight	Hb.	Lymphocytes	Neutrophils	Eosinophils	Nucleated Red Bl.	Nucleated Corpuscles	Relation to Food.	Day of Icterus
24. xij. 00 6.15 Pm	6.000.000.	20.200.	8¼	115%	51%	40%	8%	2	500	Before.	Birth.
1. 1. 01. 8 pm	6.100.000.	22.600								2 hours after	End of 5th Day
2. 1. 01 6 Pm	5.360.000	15.000	8¼.	100%.	65%	30%	4%.	1	500	3½ hours after.	End of 6th Day

Marked Jaundice from 2nd Day.

Case 26.

Clark. aet 25. Delivered 24. xij. 00. 5.40 pm.
Full term male.
Normal Delivery

24. xij. 00. 6.10 Pm	6.530.000	21.800	8¾	110%.	52%	46%	2%	13	500	Before	Birth
30. xij. 00	4.730.000	12.200								4 hours after	End of 3rd Day
2. 1. 01.	6.465.000	13.600.			59%	36%	4%	4	500	3½ hours after	End of 6th Day
4. 1. 01.	5.900.000	18.200	8¾.							none for some hours.	End of 8th Day

Case 27.

Thompson aet. 30. Delivered 23. xij. 00 9 pm.
Full term Male.

Normal Delivery.

23. xij. 00 9.0 Pm	6.000.000.	23.000	8	109%.	53%	39%	7%	106	500	Before.	Birth.
29. xij 00.	6.150.000	25.400.	8¼.							2 hours after	End of 6th Day

Jaundice 1st to 6th Days.

Case 28.

Barnes. aet 21. Delivered 29. 1. 01.
Full term female

Normal Delivery

29. 1. 01.	5.860.000	19.000.	6¾.		46%	48%	2%	13	500	Before.	Birth

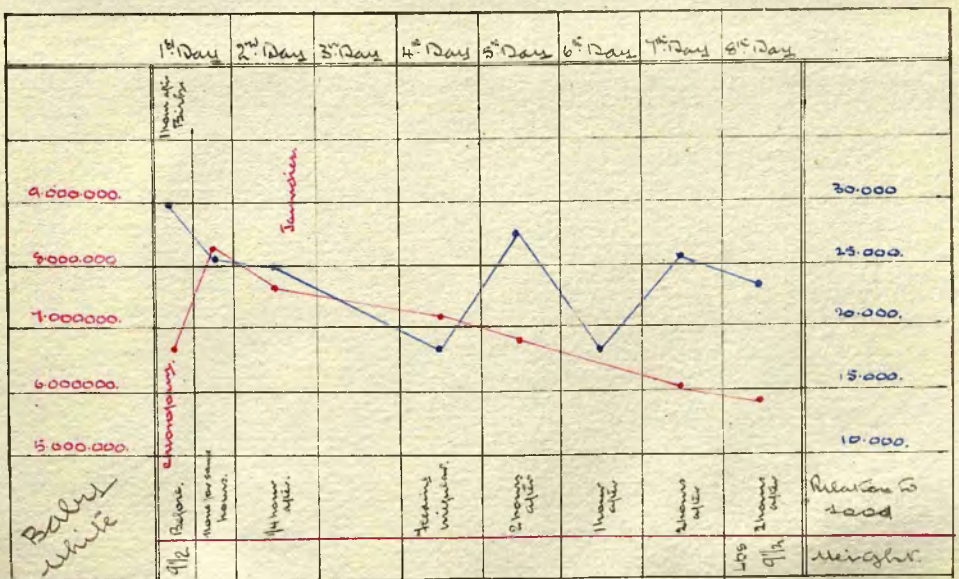
Cover. 29.

White. aet. 24. Delivered 8.1.01. 2.10 am.
Full term. Male.

Chloroform. 1 hour. — contract. pelvis.

Date.	Leucocytes	Weight	Hb.	Lymphos	Neutrophs	Eosinophs	Nucleated Red.	Chamber Count.	Relat. to food.	Day of stay
8.1.01 3.10 am	32.800	9½	102%	52%.	44%	3%	116	500	Before food.	1 hour aft. Birth
9.1.01 3 am	25.600.								none for some hours	End of 1st Day
10.1.01 3 am	25.000								¼ hour after	" " 2nd "
12.1.01 1-3 am	18.400								Heaving vomiting	" " 4th "
13.1.01	24.800.								2 hours after	" " 5th "
14.1.01	18.200		100%	52%	46%	2%	12	500	1 " "	" " 6th "
15.1.01	26.000.			44%	52%	3%	1	500	2 " "	" " 7th "
16.1.01	23.200.	9½		52%	43%	4%	0	500	2 hours after	End of 8th Day

Jaundice from 2nd to 4th Days.



Case 30.

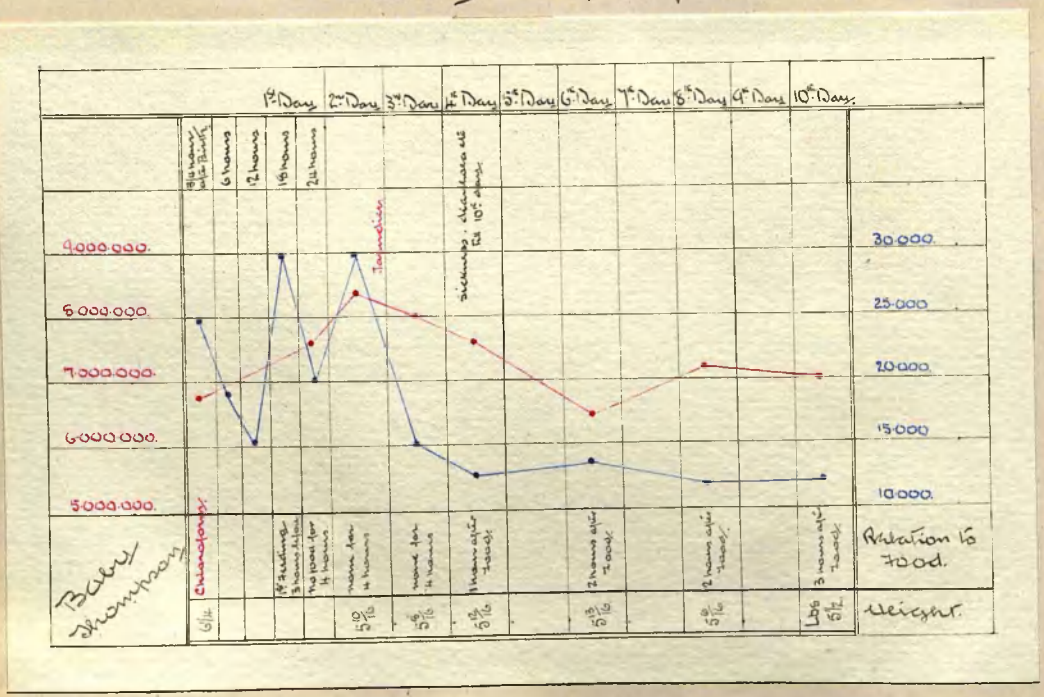
Thompson. aet 32. Delivered. 15.1.01. 8.15 ams.
Full term female.

Chloroform 1/2 hour. —— contracted pelvis.

Wath	Leucocytes	Weight		Hæmoglobin	Erythrocytes	Eosinophils	Neutrophil leucocytes	Mononuclear leucocytes	Relation to food	Days after birth
15.1.01 8 ams	25.000	6 lbs 14 ozs		38%	59%	1%	13	500		3/4 after Birth
15.1.01 3 pms	19.000									6 hours after
15.1.01 9 pms	13.400									12 " "
16.1.01 3 ams	30.000								3 hours after 1st Feeding	18 " "
16.1.01 8 ams	20.000								4 hours after.	End of 1st Day
17.1.01 10 ams	30.000	5 10/16.							" " "	" " 2nd "
18.1.01	15.000	5 1/2.		46%	49%	4%	8	500	" " "	" " 3rd "
19.1.01	13.200	5 12/16.		68%	24%	5%	8	500	1 hour after	" " 4th "
21.1.01	14.000	5 13/16.		56%	40%	3%	8	500	2 " "	" " 6th "
23.1.01	12.000	5 6/16							2 " "	" " 8th "
25.1.01	12.400	5 1/2.							3 hours after	End of 10th Day

Differentiation

Jaundice from 2nd Day.
Sickness, Diarrhœa. Thrush: 4th to 10th
Menstruating 4th to 7th Days



Case 31.

Kennedy. aet 24. Delivered 20.1.01. 6.30am.
Full term Male.

Chloroform 35m. — Prolapse of cord.

Date	Leucocytes	Weight	Hb.	Lymphocytes	Neutrophils	Eosinophils	Nucleated Reds	Platelet count	Relat. to food	Day of Exam.
20.1.01. 7am	29.000	9½	105%	39%	57%	3%	30	500		½ hour aft. Birth
20.1.01. 12am	21.800	9½								6 hours after
20.1.01. 12pm	28.400.	9 7/16		41%	55%	3%	25	500	1 hour after 1st feeding	18 " "
21.1.01 7am	24.000	9 4/16.							3 hours after.	End of 1st Day
21.1.01. 6pm	24.500.	9 2/16.							3½ " "	12 hours after
21.1.01. 12pm										
22.1.01. 6am	26.600	9 3/16		41%	56%	2%	5	500	3½ " "	End of 2nd Day
23.1.01 6am	29.600	9 3/16.							2 " "	" " 3rd "
24.1.01	17.800	9 4/16		36%	54%	9%	1	500	4 " "	" " 4th "
25.1.01.	21.600	9 6/16.							1 " "	" " 5th "
26.1.01	29.400.								1½ " " none prev. for some hrs	" " 6th "
28.1.01.	30.000	9½							1½ " " none prev. for some hrs	End of 8th Day

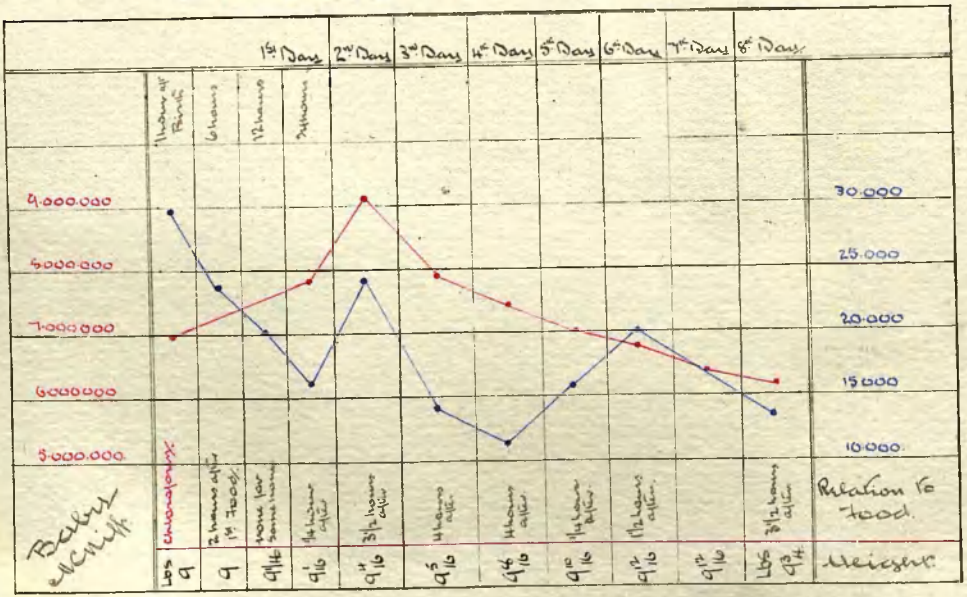
Jaundice from 2nd to 8th Days.

Case 32.

Mc. Diff. aet 28. Delivered 22.1.01. 4.30am.
Full term Male.

Chloroform 1 hour —— contract. pains.

Date.	Leucocytes.	Weight.	Hb.	Lymphs.	Neutrs.	Eosins.	Nucleated Reds.	Number counted.	Relation to Food.	Days of Hosp.
22.1.01. 5.30am	30.800	9lbs.	106%	43%	55%	2%	46	500.		1 hour after Birth
22.1.01. 10am	24.000	9.							2 hours after 1st Feeding	6 hours after
22.1.01. 4pm	20.000	9¼.							none for some hours.	12 " "
23.1.01 4am	16.000	9⅛.		31%	65%	3%	6.	500.	¼ hour after.	end of 1st Day
24.1.01. 4am	24.800.	9⅜.		36%	60%	3%	13.	500.	½ " "	" " 2nd "
25.1.01.	14 500	9⅝.							¼ " "	" " 3rd "
26.1.01.	12.400.	9⅞.							¼ " "	" " 4th "
27.1.01.	16.000	9 10/16.							¼ " "	" " 5th "
28.1.01.	20.000	9 12/16.		44%	52%	2%	0	500.	½ " "	" " 6th "
29.1.01.		9 14/16.							¼ " "	" " 7th "
30.1.01.	13.900	9¾.							½ hours after.	end of 8th Day



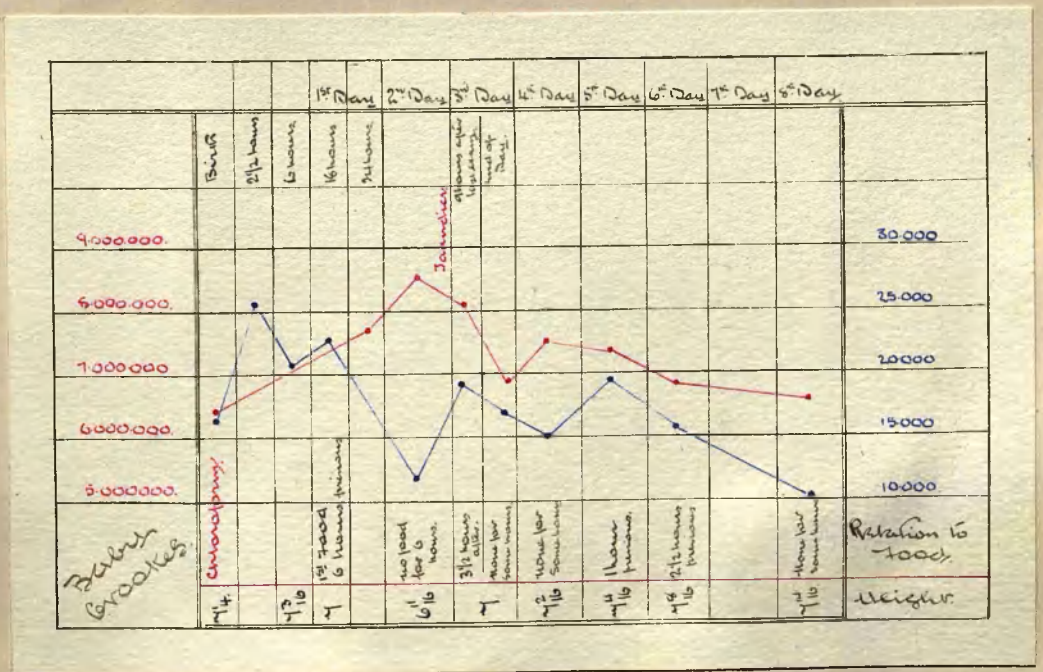
Case 33.

Crookes. aet 22. Delivered 25.1.01. 5.45 pm.
Full term. female.

Chloroform 1/4 hour — contracted pelvis.

Date.	Leucocytes	Weight		Hæmatin	Hæmatin	Hæmatin	Nucleated Red	Number counted	Relation to Food	Day of Illness
25.1.01 6 pm	14.000.	4¼ lbs.		36%.	60%.	2%.	20	500.		Birth
25.1.01 8 pm	26.000									2½ hours after.
25.1.01 12 pm	20.700.	4 5/16.								16 " "
26.1.01 1 am	23.000.	4.							1st food 16 hours previous	16 " "
26.1.01. 6 am										End of 1st Day
26.1.01. 6 pm	12.400	6 11/16.							no food for 6 hours.	" " 2nd "
27.1.01 3 am	19.400			31%.	62½%.	6%.	3	500.	3½ hours after	(9 hours later).
27.1.01. 6 pm	16.800.	4		60%.	33½%.	6%.	5.	500.	no food for some hours	" " 3rd "
28.1.01 6 pm	15.000	4 7/16.							" " "	" " 4th "
30.1.01	19.800.	4 5/16.							1 hour after	" " 5th "
31.1.01	16.000	4 8/16.		34%.	44½%.	17½%.	0	500.	2½ " "	" " 6th "
2.1.01.	10.000.	4 11/16.							no food for some hours	End of 8th Day

Jaundice from 2nd Day.

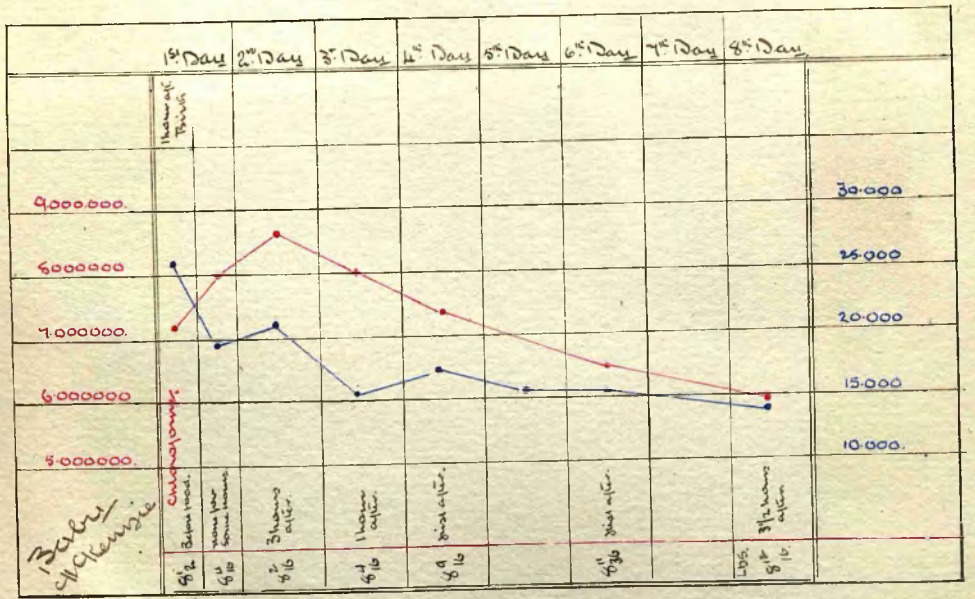


Cover 34.

Mc Kenzie. aet 24. Delivered 24.1.01. 7.40pm.
Full term female.

Chloroform for pain. — Contract. pelvis.

Date	Leucocytes	Weight	Hb.	Hæmato	Albumin	Casts	Nucleated Reds	Number counted	Relat. to Food.	Days of Hæm.
24.1.01 8.40p.	24.200.	8'2 lbs.	105%	42%	53%.	4%.	100	500.	Before food.	1 hour after Birth
25.1.01 8p.	19.400.	8 11/16.							none for some hours.	End of 1st Day
29.1.01 10p.	22.000.	8 7/16.		57%.	41%.	1%.	12.	500	3 hours after.	- - 2nd -
30.1.01 8p.	15.600	8 11/16.							1 - -	- - 3rd -
31.1.01	17.600.	8 9/16.							just after.	- - 4th -
2.2.01.	16.000.	8 11/16.		47%.	41%.	11%.	3	500.	10 min -	- - 6th -
4.2.01.	15.000	8 3/4.							3½ hours after	End of 8th Day



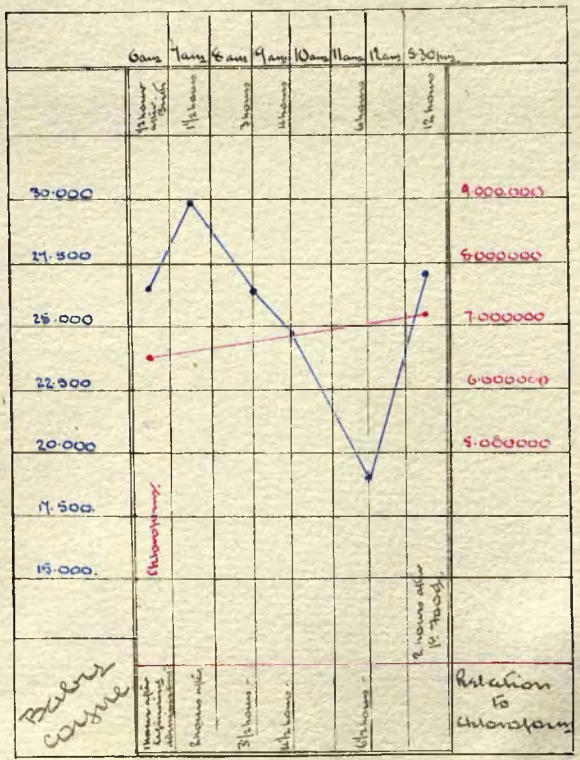
Case 35.

Coyne. adl.? Delivered 10.2.01. 5.30am.
Full term. male.

Chloroform 1/2 hour — contract pelvis.

Date	Leucocytes			Lymphos	Neutrophs	Eosinophs	Nucleated Red	Number counted	Relation to Hood.	Day of Hosp.
10.2.01 6 am	26.800			33%	63%	3%	4	500.		1/2 hour after Birth
10.2.01 9 am	30.000.			36%	40%	3%	6.	500		1 1/2 " " "
10.2.01 8.30a	26.500.			34%	63%	3%	4.	500		3 " " "
10.2.01 9.30am	24.800									4. " " "
10.2.01 11.30am	19.000.									6 " " "
10.2.01. 5 Pm.	27.000.			33%	63%	2%	5	500.	2 hours after 1st Hood.	12 1/2 hours after

Jaundice from 1st Day.



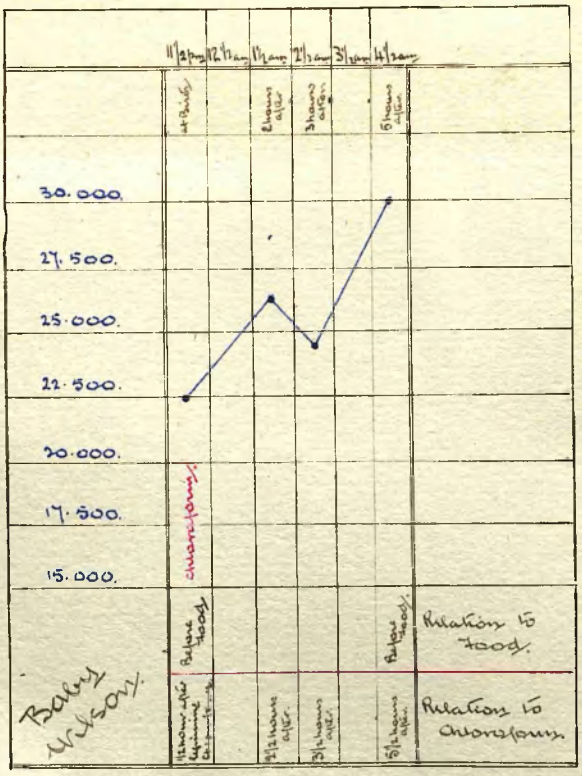
Case 36.

Wilson set.? Delivered 11.2.01. 11.30 pm.
Full term. female.

Chloroform for 25 min contract. pelvis.

Date	Leucocytes.			Lymphs	Mononuc.	Eosinophs	Nucleated Red.	Normoblasts counted	Relat. to Food.	Age.
11.2.01 11.30 pm	23.000.			26%	40%	3%	16	500		Birth
12.2.01. 1.30 am	26.000			24%	40%	2%	18	500.		2 hours after
12.2.01 2.30 am	23.500									3 hours after
12.2.01 4.30 am	33.000.								Before 1st Food.	5 hours after.

Jaundice from 1st Day.



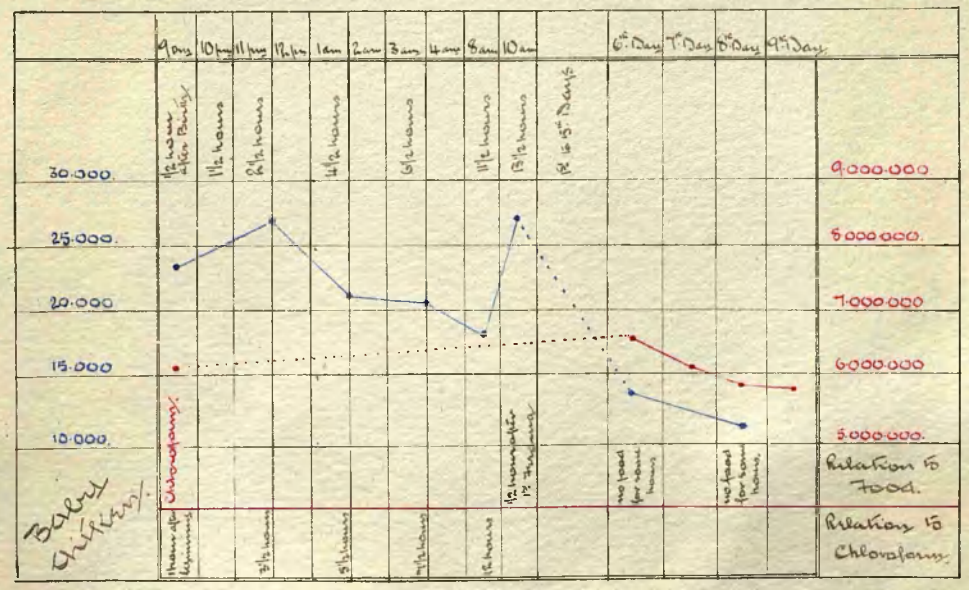
CASE 37.

Arikan aet. Delivered 15.2.01. 8.30 pm.
Full term male.

Chloroform 10 min. Occlusion of OS.

Date.	Pancreatics.	Weight.		Vomiting.	Diarrhœa.	Vomiting.	Number Pulse.	Number count.	Relation to Food.	Days of Exam.
15.2.01. 9 pm.	24.000	6 3/4.								½ hour after Birth.
15.2.01. 11.30 pm.	24.000			23%.	74%.	2%.	6	500		3 " " "
16.2.01 1.30 a.	22.800.									5 " " "
16.2.01 3.30 a.	21.200									7 " " "
16.2.01 8 am.	18.800.									11 " " "
16.2.01. 12 am.	24.000.								1½ hours after 1st Food.	End of 1st Day
21.2.01 9 pm.	14.000.			66%.	29%.	4%.	3	500	none for some hours	End of 6th Day
22.2.01				71%.	25%.	3%.	0	500	" " "	" " 4th "
23.2.01	12.000.			56%.	36%.	6%.	0	500	" " "	" " 8th "
24.2.01.										End of 9th Day

Jaundice from 3rd. Day.



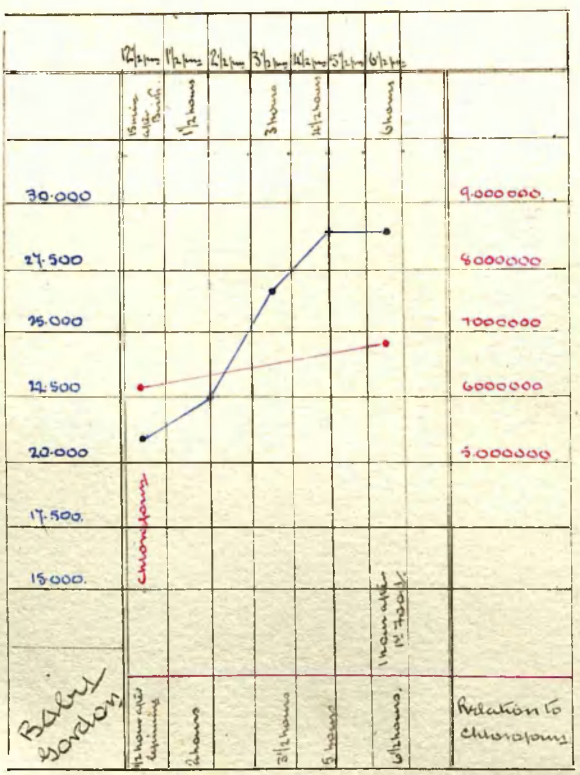
Case 38.

Gordon aet 25. Delivered 20.2.01. 12.30pm.
Full term Male.

Chloroform 30 mins. — Caesarean Sectn.

Date	Leucocytes			Lymphocytes	Neutrophils	Eosinophils	Nucleated Reds	Number counted	Relatn. to Food	Age.
20.2.01 12.45 pm	21.200.			31%	63%	5%	5	500		1/4 hour aft. Birth
20.2.01 2 pm	22.400.									1 1/2 hours .. ..
20.2.01 3.30 pm	27.000.			26%	68%	5%	6.	500.		3 hours .. ..
20.2.01 5 pm	29.000									4 1/2 hours .. ..
20.2.01. 6.30 pm	29.000.			35%	62%	1%	6	500	1 hour after 1st food.	6 hours .. ..

Jaundice from 2nd Day.



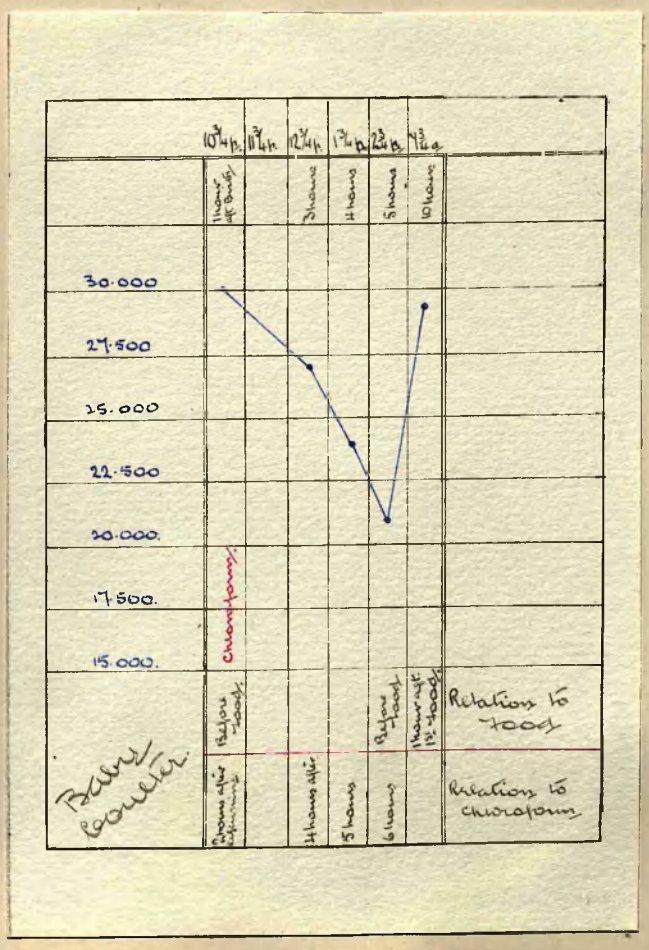
Case 39.

Coulter. aet? Delivered 22.2.01. 9.45 pm.
Full term male.

Chloroform 1 hour — Umbilical OS.

Date.	Leucocytes			Lymphos	Neutrals	Eosinos	Nucleated Reds	Reticulocytes	Relation to Food	Age.
22.2.01	30.000			40%	34%	5%		500		1 hour.
23.2.01	24.000									3 hours
23.2.01	24.000									4 hours
23.2.01	21.200									5 hours
23.2.01.	29.200								1 hour after 1st Food.	10 hours

Jaundice from 1st Day.



Case. H0.

Nelson. aet 24. Delivered 24. xij. 00. 6am.
Full term male.

Chloroform 1 hour contract. pelvis.

Death	Red corpuscles	Leucocytes	weight	Hb.	lymphocytes	Neutrophils	eosinophils	circulating bodies	nucleated cells	Relation to food.	Days of exam.
27.xij.00 6.30am	6.450.000	36.000	8	120%	42%	54%	H.	33	500	Before food	Birth
28.xij.00 6am	8.000.000										End of 1st Day
30.xij.00	7.440.000	16.800								none for some hours	End of 3rd Day
4.1.00	6.130.000	26.000	8½	105%						2 hours after	End of 8th Day

Jaundice from 3rd Day.

Case. H1.

Quinley. aet 20. Delivered 10.1.01. 2.15 am.
Full term female.

Chloroform ½ hour. contract. outlet.

10.1.01. 3am	6.600.000	24.000.	5½		34%	56%	9%	18	500	Before food.	Birth (3½ hrs)

Case. H2.

McKenna. aet 42 Delivered 26.xij.00 3am
Premature. male. (8m.)

Normal Delivery

26.xij.00 4am	4.134.000	20.000	5.	110%						Before.	1hr. after Birth
29.xij.00	8.160.000.	20.200								none for some hours.	End of 1st Day
3.1.01.	8.000.000	19.000								" " "	End of 6th Day
6.1.01.		24.200			62%	33%	4%	2	500	2 hours after	End of 9th Day

Jaundice from 3rd Day. Otherwise normal

Case. H3.

McKenna. aet 24. Delivered 10.1.01. 1.30 pm.
Premature (6½ months.)

Normal Delivery.

12.1.01. 1pm	9.000.000	16.600	4½							Before food.	End of 2nd

Jaundice from 2nd Day till Death.

Case HH.

Craig. aet 29. Delivered 9.1.01. 12 pm

Premature Twins Females.

8 - 8½ months.

Twin. 1.

Date.	Red corpuscles	Leucocytes	Height	Hb.	Lymphos	Neutrils	Eosinophs	Mononuclear Cells	Number counted	Relat^n to Food.	Days of Illness
9.1.01 12.30 pm		22.000	5		55%	35%	9%	72.	500	Before.	1 hour aft. Birth
9.1.01. 12 pm	8.860.000.	34.000								2 hours after	End of 1st Day
11.1.01 1 am	8.350.000	21.200			33%	60%	2%	6	500	none for some hours	" " 2nd "
12.1.01 12 pm	7.800.000	12.600								" " "	" " 3rd "
13.1.01.		17.200								" " "	" " 4th "
14.1.01	7.510.000	15.400								" " "	" " 5th "
17.1.01.	7.200.000	18.600.								" " "	" " 8th "
18.1.01	7.000.000	15.000								½ hour after	" " 9th "
20.1.01.	7.200.000	14.800	4¾							" " "	End of 11th Day

Jaundice, Sickness, etc from 1st Day.

Case. HH.

Delivered 9.1.01. 1 am.

Twin. 2.

Date	Red corpuscles	Leucocytes.	Height	Hb.	Lymphos.	Neutrils	Eosinophs	Mononuclear Cells	Number counted	Relat^n to Food.	Days of Illness
9.1.01 1.30 am		20.200	5¼		60%	33%	6%	60	500	Before.	1 hr. aft. Birth
9.1.01. 12 pm	8.350.000.	40.000								2 hours after.	End of 1st Day
11.1.01 12 pm	8.200.000	15.800								none. for some hrs	" " 2nd "
12.1.01.	7.760.000	13.000								" " "	" " 3rd "
13.1.01.		18.000.								3 hours after	" " 4th "
15.1.01. 1 am	7.305.000	14.800								none for some hrs	" " 5th "
17.1.01 8 am	7.400.000	16.000								" " "	" " 8th "
18.1.01.	7.200.000	17.800								1 hour after	" " 9th "
20.1.01.	6.800.000	25.800	5							2 hours after.	End of 11th Day

Jaundice Sickness, etc, from 1st Day

BLOOD COUNTS IN THE NEWBORN.

INTRODUCTION.

These counts were made in the Glasgow Maternity Hospital from 1900, to 1901, on the blood of apparently healthy infants.

The results following, are based upon about two hundred and fifty examinations of fresh blood, and numerations of the red and white corpuscles; and thirty haemoglobin estimations. A hundred and fifty stained Specimens have been examined, and over a hundred differentiated.

The references to the weight of infants, are the conclusions come to from about two hundred weighings.

Tables with the result of each examinations are given, and when a number have been made in the same infant, the blood charts are also shown. As far as possible the examinations have been made at the end of each twenty four hours, counting from the hour of birth; and during the first and second days, when a number of observations have been made on the same infant, the age in hours is stated with each. This of course gives no constant relation to food, but the time elapsed between the previous feeding and the examination, is indicated with each case.

As will be seen, in making up the normal averages of the white corpuscles during the first day, all the counts and differentiations made in infants delivered during the adminstration of chloroform to the mother, have been excluded on account of certain peculiarities presented by them alone.

The method employed in making the examinations and the precautions taken, were practically those described by Cabot, whose book has been the reference on the subject.

The blood was invariably taken from the ear of the child; and this proceeding is much more troublesome than in the adult, on account of the difficulty of getting a free flow of blood,- especially at birth and for a few hours after,- and the movements of the child.

To obviate this, attempts were made to take the blood from the umbilical cord, but the puncture being made into a vessel, the bleeding was so profuse and coagulation set in so rapidly, that it was almost impossible to suck up the exact amount of blood in the pipette. The haste necessary under the circumstances only added to the difficulties.

In preparing the fresh specimen, the effect of pressure upon the cover glass in destroying or modifying rouleaux formation, has been noticed on many

occasions; and great care is necessary to prevent this.

The Thoma-Leitz counters were used. In estimating the number of the red corpuscles, from 2 to 5 fields of 36 squares were counted in two successive drops; and if variation between the counts was great, a third and fourth were counted, and the average of all taken. With the white corpuscles, the number in the total ruled area of the slide was counted with the same precautions. As a rule the individual counts were more variable than those of the red corpuscles, and often five or six drops had to be examined, before an average could be taken.

For the Haemoglobin estimation, Gower's instrument was used; but I had to give up the use of it altogether, as it was impossible to get enough blood (20.C.M.) from an infant's ear to fill the pipette, before coagulation set in; and on account of the fact, that the Carmine in the Standard tube changed colour after a time.

The majority of the blood films were stained with Ehrlich's triple stain,- a few with alcoholic eosin and methyl blue, the latter being fixed with alcohol and ether, the former by passing the film through the flame of a spirit lamp. The Triple stain gave better results than the other, after a little practice in the degree of heating necessary.

In differentiating the varieties of the white corpuscles 500 were counted and the averages taken. The number of the nucleated red corpuscles given, is in 500 leucocytes counted.

Literature.

The literature is scant and mainly in German.
An outline of the subject is found in the chapter on "The Blood in infancy" in Notch's Paediatrics 1896, mainly a review of the continental writings

There is a similar article in Cabots "Clinical Examination of the Blood" 1900.

The only record in English of original work, that I have come across, is a paper by Drs Elder and Hutchison in the Transactions of the Edinburgh Obstetric Society 1894-1895.

I have found no reference to the condition of the blood etc, described under Chloroform.

When it has been possible, the original articles have been read and a list of those is given at the end of the paper. Articles referred to, but which I could not get, are given separately with the names of the Authors who qoute them.

THE RED CORPUSCLES.

At the moment of birth, the blood of the child is richer in red corpuscles, than that of the adult.

The figures given by different observers, show great variation, and this is to be accounted for by the fact that the blood count begins to increase, shortly after birth.

Hayem, in seventeen infants at birth, found the counts to vary from 4,540,000 per C.M. to 6,262,000 per C.M. and gives the average at 5,368,000 per C.M: Cadet (v.Hayem), from 4,500,000 per C.M. to 6,920,000 per C.M. and gives the mean as 5,696,000 per C.M.

Elder and Hutchison, from examinations in six infants at the moment of birth, found the average to be 5,546,000 per C.M.- the extremes being 4,100,000 and 6,700,000 per C.M.

In thirty three infants within an hour of birth, I found the average to be 6,450,000 per C.M: the lowest count was 5,200,000. and the highest 7,100,000 per C.M. both being made within five minutes of birth. The majority of the counts were between 5,800,000. and 6,400,000 per C.M. The counts made at the moment of birth averaged 6,159,000 per C.M.

Hayem found that early ligature of the cord made a difference of about half a million in the count.

In children after early ligation, he found an average of 5,087,000 per C.M., and after late ligation 5,576,000 per C.M. Helot gives the average for the former, as 5,080,000 per C.M., and for the latter, 5,985,587 per C.M.

Schiff has shown that this is only a temporary effect. In four infants in whom the cord was tied comparatively early, and the blood examined within half an hour after birth, I found practically no difference in the number of red corpuscles from those ligatured late, the average being 6,100,000 per C.M.

1st. and 2nd. Days.

After birth, the number gradually increases. The average of twelve counts, taken from six to twenty hours after birth, was found to be 7,690,000 per C.M. In twenty one counts all made twenty four hours after birth, the average was 7,676,000 per C.M., the minimum and maximum being 6,800,000. and 8,600,000 per C.M.

When a number of examinations were made in one infant, during the first day, a slight reduction in the number of the red corpuscles was found, after the first feeding. (cases 4,51, etc.)

During the second day of life, there is again as a rule, a continued rise in the counts of the red corpuscles

Six counts taken at the middle of the second day, averaged 8,177,500 per C.M.: twenty one counts at the end, 8,425,000 per C.M., the extremes being 6,900,000 and 9,500,000 per C.M.

In three cases (Nos.5,12,29.) the counts did not rise at all on the second day, but gradually fell from the latter hours of the first.

Succeeding Days.

From the end of the second day, the number of the corpuscles gradually diminishes, though daily variations still occur. This decrease is greater during the third and fourth, than during the later days, the average drop being about a million during the former, and about two or three hundred thousand per C.M. daily thereafter till normal is reached. This varies very much in different cases, but as a rule, the earlier the blood count reaches normal, the more constant is the daily drop in the number of the corpuscles. Thus on the third day, the average of 23 counts was 7,684,000 per C.M.: on the fifth, of 20 counts 6,757,000 per C.M.: and on the sixth, of 18 counts, 6,413,888 per C.M. From the seventh to the tenth day, 50 counts gave an average of 5,899,800 per C.M. The averages for the different days are tabulated beneath:-

Within 1hour of Birth,	33counts	averaged 6,450,000.per C.M.
		Extremes 5,2 and 7,1
1st. Day.	33counts	averaged 7,679,000.per C.M.
		Extremes 6.8 and 8.6
2nd. Day.	27counts	averaged 8,358,000.per C.M.
		Extremes 6.9 and 9.3

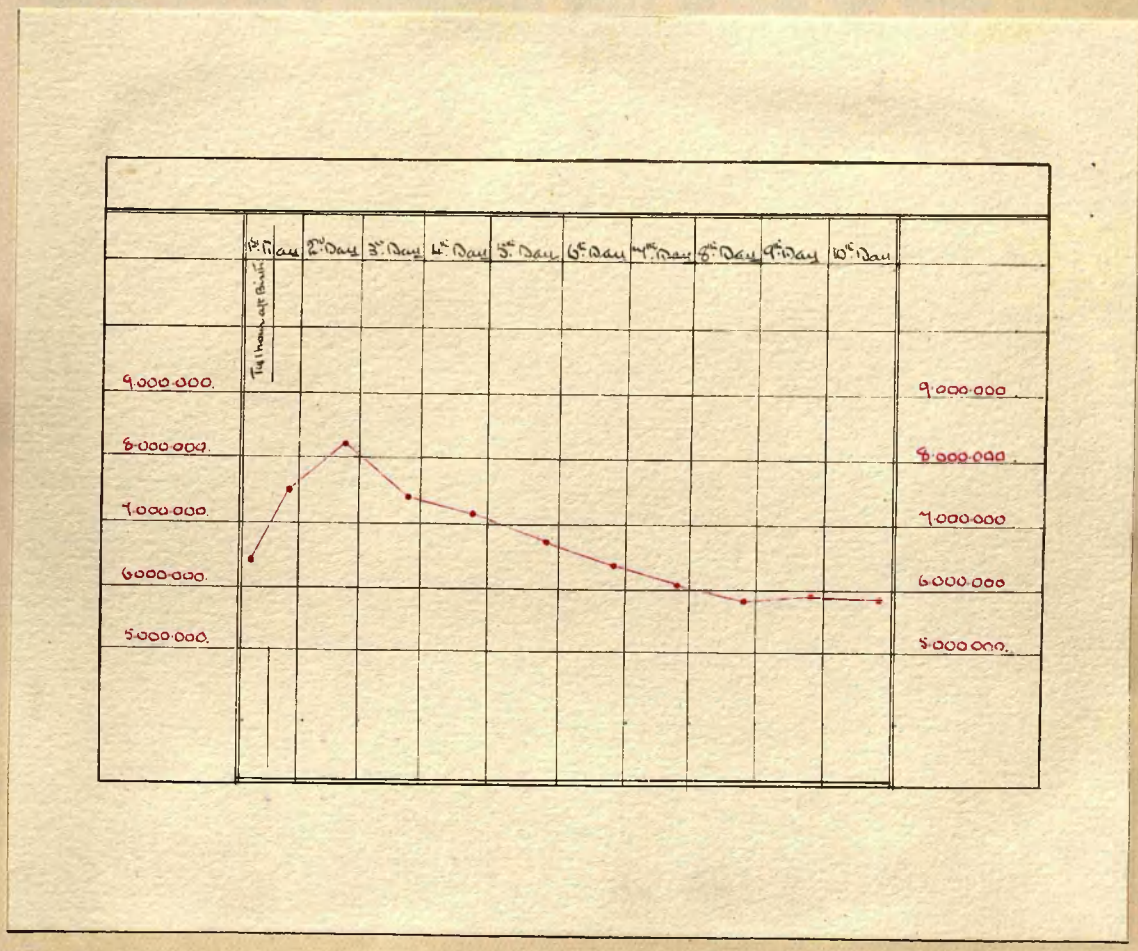
End of 3rd. Day.	25counts	averaged 7,684,000.per C.M.
		Extremes 6.7 and 8.4
End of 4th. Day.	21counts	averaged 7,204,000.per C.M.
		Extremes 6.4 and 8.2
End of 5th. Day.	20counts	averaged 6,757,500.per C.M.
		Extremes 5.4 and 7.4
End of 6th. Day.	18counts	averaged 6,415,888.per C.M.
		Extremes 4.9 and 7.4
End of 7th. Day.	14counts	averaged 6,077,000.per C.M.
		Extremes 5.2 and 6.8
End of 8th. Day.	24counts	averaged 5,853,000.per C.M.
		Extremes 4.9 and 7.0
9th.and 10th.Days.	12counts	averaged 5,841,300.per C.M.
		Extremes 4.9 and 7.0

The averages given by different observers show only a slight difference. Otto gives the average for the fourth day, as 6,165,000.per C.M.; Sörensen for the fifth to eighth day, 5,769,000.per C.M.(my average for the same period, 76 counts, is 6,277,000.per C.M.), whilst Schiff found the average of the first fourteen days,to be 5,825,000.per C.M.

Bouchut and Dubrisay (v.Limbeck) however, in 15 infants of 2½ to 15 days old, give the very small average of 4,269,911.per C.M.

The red line in the following chart represents the

average of 225 counts in healthy infants, during the first ten days of life.



Of twenty one infants whose blood was examined daily, one reached normal (under 6,000,000.per C.M.) on the fifth day: three on the sixth: two on the seventh: seven on the eighth: one on the ninth, and one on the tenth. In the

remaining six, the counts varied from 6 to 7 million. One of these had Sickness and Diarrhoea from the fourth day, and on the tenth day the count was 7,000,000.per C.M From my personal observation of the children, the healthiest were undoubtedly those in whom the blood count reached normal limits earliest (relatively to the count at birth). It is interesting to note, that of the six children in whom this occurred before the eighth day, three were the only infants of the series who were fed with special care, these having been put to the breast night and day at regular intervals, (cases 6, 7, 12). In the other three, and one of the above, the cord was ligatured early,- four out of five cases in the series in which this was done,- the fifth reaching a count within normal limits on the eighth day.

Daily Variations.

The number of the red corpuscles varies at different times of the day, in the same individual, counts taken after feeding, being less than those taken during a fast. Digestive disturbances, sickness, diarrhoea, etc., in this way raise the numbers of the red corpuscles per C.M.. Schiff instances a case, which on the first day of observation, gave a count of 7,278,000.per C.M. On the following day the physiological decrease taking place, the count was from 6.6 to 6,800,000.per C.M.

Diarrhoea began on the third day, and owing to the loss of fluid, the count went up to 8,044,000.per C.M.

In one infant, whose blood I examined, (case 30) the count on the fourth day of life was 6,600,000.per C. M., and falling. On this day, sickness, vomiting, and slight diarrhoea began, and lasted till the eleventh day. On the sixth day the count was 6,480,000.per C.M., on the eighth, 7,200,000per C.M., and on the tenth 7,000,000.per C.M..

Premature Infants.

Judging from the examinations made on the blood of premature children, the polycythaemia is as marked during the first few days of life, as in the mature; but the physiological decrease in the number of the red corpuscles following is much slower. Thus three examinations at the end of the first day gave, 1st. 8,360,000. per C.M. 2nd. 8,860,000.per C.M. 3rd. 8,160,000.per C.M.; on the sixth (eighth) days, 1st. 7,200,000.per C.M. 2nd. 7,400,000 per C.M. 3rd. 8,000,000.per C.M.; and on the eleventh day, 1st. 7,200,000.per C.M. and 2nd. 6,800,000.per C.M.

These children however were hand fed, and had more or less continuous digestive disturbances from time of the first feeding, which may account for the relatively high counts on the later days. In a six and a half month's infant, a count of 9,000,000.per C.M. was made at the end of the second day. The infant was

exceedingly feeble, taking practically no nourishment from its birth, and died on the third day. (cases 42 to 45

Haemoglobin.

As regards the Haemoglobin, observers are much more unanimous. At birth the percentage is relatively much greater than in the adult, and continues so during the first fortnight of life.

Hayem gives the average as 110 per cent at birth, and states that it may be as high 130 per cent. Elder and Hutchison in nine infants at birth, found the percentage to vary between 95 and 115, the average being 105.6 per cent, using Gower's Haemoglobinometer.

In twenty-two examinations, at birth, with the same instrument, I found the extremes 98 and 120 per cent, the average being 106 per cent. A few examinations on subsequent days gave an average of 100 per cent, the individual percentage being always less than that for the same infant at birth. The amount of the Haemoglobin present does not directly correspond with the number of the red corpuscles, as is shown by the following results at birth:- 1st. Red Corpuscles, 5,400,000.per C.M. Hb. 100 per cent, 2nd. Red Corpuscles, 5,200,000.per C.M. Hb. 100 per cent, 3rd. Red Corpuscles, 6,000,000.per C.M. Hb. 110 per cent, 4th. Red Corpuscles, 6,400,000.per C.M.

Hb. 105 per cent.- and the individual corpuscle is richer in Haemoglobin than that of the adult.

Schiff found 104 per cent the average at birth, and states that this gradually diminishes during the first fourteen days to 90 per cent, the decrease being relatively greater than that of the red corpuscles during the same period. His observations were made with Von Fleischl's instrument.

Microscopic Appearances of the Blood.

The microscopic appearances of the blood during the first few days of life, present certain points of difference from that of the adult. These are;- Variations in the size and shape of the red corpuscles, deficiency of rouleaux formation, the presence of "Shadows", and of nucleated red corpuscles.

The variation in size and shape of the red corpuscles, is most noticeable during the early days. The difference in size is decided, many very small cells being present. Hayem gives the measurement of the corpuscles as varying from 3.25m to 10.25m: and as he points out, those small cells are in the greatest numbers during the first two days.

Thereafter the red cells are much more uniform in size, though differences are still noticed even after the second week. The variation in shape is

not nearly so decided, most of the cells showing an almost completely circular outline. After the first week the difference in shape between the individual corpuscles is slight.

Hofmeier[1] drew attention to the fact, that the blood of the newborn seemed to have less tendency to rouleaux formation than that of the adult. Occasionally in the early hours no rouleaux are to be seen in the fresh specimen, even after careful manipulation. In others the rouleaux, though present, are deficient in formation: in others again, abundant rouleaux are present at birth. I have always found them present after the first two days.

Differences in the staining properties of the red cells are also noticed, some staining deeply and evenly all over. Others are deeply stained round the circumference only, and have a more or less white centre: others again, in the same slide, show nothing but a very faint cell wall and are evidently without colouring matter. These latter were first pointed out by Ponfick, and Silbermann[2] found them present in greater abundance, where the child's condition during the first few days was much disturbed.

① (Lancet. 1887. Vol 2. Page 776.)

② (Lancet. 1887. Vol 2. Page 826.)

The numbers present, vary greatly in different slides, but they are more numerous during the first two or three days than later. Occasionally a red cell is noticed, the protoplasm of which shows different depths of staining, but this is most noticeable in the nucleated red corpuscles.

Nucleated Reds.

Much difference of opinion exists, on the question of the presence of these in the blood at birth. Hayem and Luzet could not find them, and hold that they disappear in the latter weeks before birth. Loos and Fischl state, that the large numbers are only found during foetal life, and that they are seldom seen at birth. The latter in two cases, found in one, 5 in a hundred fields of the microscope, and in the other, none. In four children, aged one, three, ten, and twelve days, he found none. He states that Neumann and Kölliker, Hock and Schlesinger, found them common in the blood at birth. Elder and Hutchison found them numerous in the blood of the umbilical cord. (1-8 leucocytes to 1-90 leucocytes) My own examinations agree with the latter opinions. In blood films from forty different mature children at birth, nucleated reds were present in all, though they certainly vary much as regards number, in different cases.

The highest count was 160 in 500 Leucocytes, the

lowest 1 in two cover glasses.

In eight of the cases the counts were high:- 160, 116, 100, 86, 83, 50, 50, 46, in 500 leucocytes counted. The average was about 9 in the remaining thirty two infants. In 13 films taken during the first day, all had nucleated red corpuscles present but one, the highest count being 25 in 500 leucocytes. They were found present in all examined on the second day, 13 in 500 leucocytes being the maximum.

The following table gives the results of 106 slides examined, during the first ten days of life:-

At Birth, 40 infants, Nucleated Reds present in all.
Extremes 160&1 in 500 leucocytes.

1st. Day, 13 infants, Nucleated Reds present in 12.
Extremes 25&0 in 500 leucocytes.

2nd. Day, 12 infants, Nucleated Reds present in all.
Extremes 13&1 in 500 leucocytes.

3rd. Day, 8 infants, Nucleated Reds present in 6.
Extremes 16&0 in 500 leucocytes.

4th. Day, 5 infants, Nucleated Reds present in 4.
Extremes 8&0 in 500 leucocytes.

5th. Day, 4 infants, Nucleated Reds present in 3.
Extremes 6&0 in 500 leucocytes.

6th. Day, 10 infants, Nucleated Reds present in 7.
Extremes 12&0 in 500 leucocytes.

7th. Day, 4 infants, Nucleated Reds present in one (1 in slide.)

8th. Day, 5 infants, Nucleated Reds present in 2. Extremes 12&0 in 500 leucocytes.

9th. Day, 3 infants, Nucleated Reds present in one (2 in slide.)

10th. Day, 2 infants, Nucleated Reds present in none

Woino-Oransky did not find any nucleated red cells present after the fourth day, and concluded that about this time they disappeared from the blood; and Elder and Hutchison agree, having found them present on the second and third days, and none on the fifth. As will be seen from the table above, I found them present as late as the ninth day; and in twenty seven examinations of the blood taken from 5th. to 9th. day, nucleated red corpuscles were present in 14, the greatest number being 12 in 500 leucocytes on the sixth day. The numbers diminish distinctly after birth, but in individual cases one occasionally finds in the later days, a greater count than in the earlier.

The great variation in the number of nucleated red corpuscles found in the blood of different infants at birth, has been explained by the supposition that the blood of some infants at this time, is more mature than that of others.

In two premature infants 8 to 8½ months old, I counted 72 and 60 respectively in 500 leucocytes, in the blood taken at birth, and have noted much larger counts in those at full term.

It seems more probable that the number varies (see cases 6,7,9,32) at different times in the same individual, than that there is a difference in the developement of two bloods at the same age,- some process taking place analagous to the "Blood Crises," described by Von Noorden (v. Cabot) as occurring in regenerating blood?

The prevailing type of nucleated red corpuscles is the Normoblast, and these cells are always to be found in the majority. The most common cell, is about the size of an ordinary red corpuscle, and has a circular nucleus more or less centrally placed, from ½ to ¼ the size of the diameter of the cell, stained deeply blue with Ehrlich's stain. Occasionally a bright white spot is seen in its centre, and sometimes the nucleus seems to lie in a space, the edge of this showing as a light ring around it. Other, and less common forms are seen. Sometimes the cell is larger than a red corpuscle and the nucleus proportionately big, or smaller than a red corpuscle, and with a very small nucleus. Occasionally they approach the Microblasts in appearance, having a very large nucleus and very little protoplasm.

More rarely the nucleus is in two pieces, both deeply stained, and each surrounded by a light ring; or the two pieces may be connected by a lighter stained (green) band. The nucleus may be apparently resting on the cell Wall, or projecting partly beyond it.

When many Normoblasts are present in the infant blood, I have ~~also~~ found a few Megaloblasts also. They are mostly larger than the Normoblasts, and have a larger and less circular nucleus, which stains a pale green with Ehrlich's triple stain, and shows reticulations. Great variation in size and shape is seen in different cells.

Nucleated reds are occasionally found, that can hardly be classified as belonging to either type, as they present resemblances to both.

In one case 8 megaloblasts were present in 32 nucleated reds counted, in another 4 in 14, and in a third 4 in 72;- all shortly after birth. They are less common in the later days.

Colours of the Skin.

Associated with those changes in the blood and circulation, which are taking place in the hours succeeding the birth of the child, are marked colouratios of the skin. At birth, and for a variable time thereafter, the entire surface of the child is of a dead pallor,

and the mucous membranes purplish. Once the child has breathed freely a faint colouration is observed pervading the skin, and this gradually becomes deeper, until about the end of the second day when it reaches its maximum as a rule.

In some infants and, especially in the premature, the intensity of the colour is almost startling. This was the case in an infant of 6½ months, which at the end of the first day was"like a lobster", bright red all over (case 45). When the blood count falls during the first day, a distinct lessening of the depths of the colour is observed, and during the second day a gradual deepening again. From the third day onwards the redness slowly disappears, till on the fifth to the eighth day the skin is practically normal in appearance.

The rapidity of onset of this colouring of the skin varies. It sets in early when the circulation is vigorous and the child cries readily and breathes freely, and when artificial respiration has been resorted to and the child much handled.

In weakly premature infants, the change is slow; and in one or two cases in which the circulation was faulty, and the child died in a few hours, the skin retained its original pallor till death.

The colouration seems to be due to a congestion of the peripheral vessels, with a concentrated and partially aerated blood; and its increase and decrease, to increasing and diminishing concentration.

Diarrhoea, Sickness, and any disturbance of the general health, tend to prolong this congestion.

When the redness of the skin begins to lessen at the middle of the first or the end of the second day, a yellowing makes its appearance. This varies much in degree, from the faint staining lasting an hour or two seen in almost every infant, to a distinct Icterus Neonatorum with bile stained mucous membranes and urine, persisting for days.

Von Limbeck holds, that the decrease in the blood count is due to a lessening of the concentration of the blood, and in no way associated with the Jaundice of the newborn, as Hayem originally believed; but the combination of this colouring of the skin, with a reduction in the number of the red cells per C.M. is so constant, that it suggests that with the gradual dilution of the blood, a certain number of the corpuscles are being destroyed. The presence of the "Shadows", (the Stroma of the red corpuscles only, the Haemoglobin having been removed) already noticed as being present in greatest numbers at this period, tend to strengthen the idea.

(Roich.)
Osler points out that the bile colouring matters, and some of the urinary pigments are derived from altered Haemoglobin, which would require the daily destruction of many corpuscles. This colour, may thus be due to an exaggeration (relatively to the adult), of a physiological process in the first few hours of life; and the more marked colouration in some, to the disturbance of the process on account of digestive disorder etc.

Of the forty five infants from whom these blood examinations were made, twenty six had Icterus more or less marked; and the onset of this in all of them, was associated directly with the fall in the corpuscle count towards the end of the first, second, or third days. (Charts showing this with cases. 6,7,9,10,11, 31 etc). In three infants, the Icterus was very marked, and persisted so till the date of dismissal from Hospital (11th. Day). In two the yellowing began during the latter hours of the second day;- in the third on the third day,- all after a considerable drop in the blood count. Two of them had apparently good health both before and after the Icterus set in, the third had a severe purulent ophthalmia and digestive disturbance. The following is an analysis of the Jaundice cases:-

Of 13 infants delivered during chloroform administration, 10 had Jaundice. 76 per cent.

Of 4 infants born prematurely, 4 had Jaundice.

Of 5 mature infants after normal delivery, with cord tied early, 5 had Jaundice.

Of 23 mature infants, after normal delivery, with cord tied late, 7 had Jaundice. 30 per cent.

From other observations I made in Hospital, of numbers of children whose blood was not examined, the above percentage gives a fairly correct idea of the prevalence of Jaundice amongst them; and especially of its frequent association with chloroform cases.

The four premature children had sickness more or less continually during the first week of life. The infants whose cords were ligatured early, were all in apparently good health otherwise. Of the seven ligatured late, four had digestive disorder, and three were in good health before and after the Jaundice began.

The opinion has been held by some observers, that infants in whom the cord is ligatured late, are more prone to Icterus than those in whom it is ligatured early. According to Galabin, the observations of Schmidt[1] show that exactly the opposite is the case.

[1] (Arch. F. Gynaek. Vol XLVI. 1894).

It certainly was so in these cases. The association also, of early ligation of the cord, with a comparatively early fall of the red corpuscle count to normal limits, is noteworthy. (cases 7,10,11,22,28).

Weight of the Child.

During the first hours of life, certain fairly constant changes in the weight of the child take place; and those are associated very closely, as Hayem points out, with the variations in the counts of the red corpuscles.

Haake found, from the careful weighing of 100 mature infants at the Leipzig lying-in Hospital, that in every child weight decreased during the first few days of life; increase as a rule taking place on the third day, so that the birth weight was generally recovered by the ninth day.

Winckel gives the results of the weighing of 100 children, in a paper to the Berlin Obstetric Society. He found that all children diminished in weight soon after birth, the diminution continuing in most cases for two or three days; and that most of them had regained their normal weight by the tenth day.

Von Siebold found that in the majority of the children weighed, a diminution of weight was observable till the second or third day, the weight then remaining the

same till the fourth to sixth days. From fifth to seventh days (if well), the weight at birth was attained, and then increased. In 14 children he found neither increase nor decrease till the sixth to eighth day. The average nominal increase he gives as ½lb. in the first nine days.

Of 15 children whom I weighed frequently during the first two days, one gradually increased in weight from the time of birth, eleven lost on the first and second days only, and one diminished in weight till the fourth day. The average loss of weight during this period was ¼lb. Daily weighings after the second day, showed as a rule a gradual increase taking place. In 36 infants weighed at birth, and on the ninth or tenth day, twelve had the same weight as at birth; thirteen had gained ¼lb; eight ½lb; and three ¾lb. One weighed ¾lb. less than at birth (Diarrhoea etc.). The average gain during this period was ¼lb.

From the above results, which agree pretty closely, it will be seen that the variations in the weight of the child are associated with the variations in the red corpuscle counts,- while the child is losing weight the count of the corpuscle increases, when the child gains weight again the count falls.

During the first day when the weight of the child is gradually diminishing, a slight increase, or at least a maintenance of the same weight, is noticed for a time after the first feeding. At this time the blood count is less. The relation between the loss of weight and an increased number of red corpuscles per C.M., is so constant, as to suggest that the same causes account for both phenomena.

Polycythaemia of the Newborn.

The great increase in the counts of the red corpuscles occurring during the first two days of life, over those at birth and on later days, is held by some observers to be a true polycythaemia, due to an actual increase in the number of red cells in the blood; and by others to be an apparent increase, on account of a concentrated condition of the blood. The blood of infants, is much more susceptible to both physiological and morbid influences than that of adults, and the changes consequent upon the action of such influences much greater. It is probable therefore, that whatever the causes of this plethoric condition of the blood of infants are, they will produce a much greater effect, than they would on the blood of a grown-up person.

Hayem believes that this increase in the red

corpuscles, is mainly due to "the very abundant production of new elements", on account of the fact that when the increase took place, he found that it was associated with a greater number of corpuscles of very small diameter; and that when the count diminished, the corpuscles as a whole were larger.

The appearances of the blood at birth, the variation in size and shape, the presence of nucleated red corpuscles often in large numbers, and the association of the yellowing of the skin, or distinct icterus with the drop in the blood count, appear to denote that some degree of new formation or regeneration is taking place, during the early hours of life; but it does not seem probable that this alone can account for the great increase of the red cells per C.M.

Schiff points out that during the first hours, when the infant is taking no food, there is a continual loss of fluid from the body by perspiration, urine etc; so that the proportion of solids in the blood is increased by the blood becoming more concentrated. The loss of weight which occurs in close connection with the corpuscular increase, indicated that a loss of fluid is taking place; so that the plethora, in the main, may be considered as analagous to that following profuse diarrhoea or

fasting in older infants. It is probable, however, that other influences may act more or less directly in increasing the blood count, before much fluid has been lost from the body.

The cold of the atmosphere acting upon the child's skin immediately after birth, will cause a general contraction of its capillaries, and raise the blood pressure. As the result of a large number of experiments, Oliver has shown recently, that any influence causing an increase of blood pressure, will slightly concentrate the blood for a time, probably by forcing some of the fluid contents of the vessels, into the surrounding tissues. This contraction is succeeded in a variable time by a dilatation of the peripheral vessels and congestion of the skin. The very marked redness associated with this latter, the difficulty of getting the blood to flow freely from a puncture at this time, and its dark colour as it emerges from the capillaries,- "almost like venous blood", (Hayem)- suggests that there may be a degree of stasis in these vessels in some infants.

The loss of fluid from the body by perspiration etc, and the gain by feeding, seem to counteract each other about the end of the second day, as a rule, when the blood count is at its maximum, and the weight lowest. During the succeeding few days the weight

gradually increases, the intake being greater than the output, and the corpuscle count falls; till about the middle of the second week, the normal equilibrium is established and the red corpuscle count within normal limits.

The Foetus during its life in utero, having little or no loss of heat to counteract, requires probably only a small quantity of oxygen.

Experiments on animals have shown, that if the placental circulation be interrupted, the foetus shows signs of asphyxia in a few minutes; but is capable of being restored after a longer duration of asphyxia, than an air-breathing animal would survive. (Zweifel).

After birth on the other hand, the loss of heat from the body, requires a greater supply of oxygen; and the patency of the Ductus Arteriosus and Eustachian Valve, prevents a thorough aeration of the blood. The relatively greater amount of Haemoglobin and red corpuscles per C.M. at birth, compared with the adult, and the increasing number of the latter during the first forty eight hours, consequent upon diminished bulk of the blood, may be regarded as a compensatory process.

In children with congenital heart disease, a great increase in the number of the red corpuscles per C.M, and of haemoglobin, has been found (Gibson, Osler etc).

THE WHITE CORPUSCLES.

Relative to that of the adult, the blood of the new-born shows a much greater number of leucocytes present per C.M.

"The counts of the whites vary with different examiners, so that our knowledge of the exact figures is by no means accurate" (Rotch). So great are the variations in a sequence of counts in one infant during the first few hours of life, that it is essential in detailing the results of examinations, to note the age of the child and the relation to the taking of food.

At Birth.

As regards the number of leucocytes per C.M, at birth, the results vary greatly because observations were not all made under the same circumstances.

Thus Hayem gives 18.000per C.M., as the average of the first forty eight hours; and Cadet, (quoted by Hayem) 19.500per CM, for the same period; Bayer, 16.000 to 25.000per CM at birth, and Woino-Oransky, 16.980per C.M.

In eighteen counts made in different infants within half-an-hour of birth, after normal delivery and before food, I found an average of 19.055per C.M. The

individual numbers varied from 16.400per C.M. to 25.000per C.M, the majority being about 20.000per C.M.

Elder and Hutchison in twelve examinations at the moment of birth, gave an average of 17.884per C.M., the counts varying from 12.200 to 26.500per C.M. They make no statement of the circumstances of the births, with regard to the higher counts (25.000 and 26.500per C.M.). As will be seen, some counts I have noted at birth were much greater; but these were so constantly associated with chloroform administration during delivery, that they have been excluded from the above counts. (See Page 46).

1st. and 2nd. Days.

From one hour after birth,till the taking of first food, 16 counts were made. These varied from 15.600 to 22.000per C.M. the average being 18.525per C.M., or slightly less than that at birth. The variation is greater than at birth, but the period over which the examinations were made, was from two to sixteen hours. Nineteen counts were made during the later hours of the first day, all after first feeding but without near relation to a meal, (ie.till 3½ hours after it), the average being 20.915,and extremes 15.000per C.M. and 28.000per C.M.

Under the same conditions on the second day, 21 counts gave 22.800per C.M.as the average, the counts varying between 14.800per C.M., and 30.000per C.M.

Succeeding Days.

After the second day, the variations between individual counts are less marked, and the averages gradually fall. Twemty counts on the third day gave an average of 15.585 per C.M.; ten on the seventh, 14.560 per C.M.; and twenty on the eighth, ninth, and tenth days, 13.555 per C.M.

Hayem found a sudden diminution in the white corpuscles taking place on the third day, the counts falling from 18.000 per C.M. to 6.000 per C.M. or even 4.000per C.M., rising again to 7.000 or 9.000 per C.M., and remaining so for an indefinite period. He makes no mention of the effect of digestion on the leucocyte counts. In some cases of my series the fall has been sudden on the third day, but the counts have never fallen below 10.000per C.M.

Denis found that the diminution in the white cells occurred on the fourth day, and observed that after food there was an increase in their numbers; and Schiff calls attention to the daily variation in consequence of digestion.

The above averages of 160 counts are tabulated below, and in the chart of leucocytes on page 35, are represented by the lower (blue) curve.

Within ½ hour of Birth, 18 counts averaged 19.055per C.M.

Extremes 16.400 and 23.000.

From birth till first feeding, 16 counts averaged 18.525per C.M. Extremes 15.600 and 22.000.

1st. day, without food, 19 counts averaged 20.915per C.M. Extremes 15.000 and 28.000.

2nd. day, without food, 21 counts averaged 22.800per C.M. Extremes 14,800 and 30,000.

3rd. day, without food, 20 counts averaged 15,585per C.M. Extremes 12,200 and 20,000.

4th. day, without food, 16 counts averaged 15,365per C.M. Extremes 12,400 and 19,000.

5th. day, without food, 11 counts averaged 16,281per C.M. Extremes 15,900 and 17,800.

6th. day, without food, 9 counts averaged 15,433per C.M. Extremes 14,000 and 17,500.

7th. day, without food, 10 counts averaged 14,560per C.M. Extremes 12,200 and 17,800.

8th. day, without food, 15 counts averaged 15,830per C.M. Extremes 10,000 and 17,000.

9th. day, without food, 5 counts averaged 13,330per C.M. Extremes 11,000 and 15,000.

10th. day, without food, 2 counts averaged 15,500per C.M. Extremes 12,400 and 14,600.

Digestion Leucocytes.

The following examinations were made with a direct relation to food, ie. from ½ to 3½ hours after taking of it. Thirteen counts after the first feeding,- which took

place from 4 to 18 hours after birth, gave an average of 29,450per C.M., the extreme counts being 24,000perCM. and 39,000per C.M. both two hours after the feeding: that is to say, an increase over the birth average of 10,000per C.M. In five cases the count was over 30,000per C.M. The greatest increase noticed in an individual case, was 17,000per C.M. An hour after birth the whites were 16,400per C.M., ~~five~~ two hours later the child had its first food, and the count made three hours after this was 33,400per C.M. (case 10). The smallest increase was 4,800per C.M.: the count at birth being 22,000per C.M., and an hour after the first feeding (11hours later), 26,800per C.M.

Schiff records a case, in which the count an hour after birth was 19,500per C.M., after its first meal 27,625per C.M., and after its fourth, 36,000per C.M.

The average of 6 counts at the end of the first day, all with relation to food other than the first feeding, was 26,200per C.M., (22,000 to 29,000) and on the second day of 4 counts, 27,705 (25,000 to 35,000per C.M.). On succeeding days the counts were as a rule lower, although from the third to the tenth day, counts of 30,000per C.M. were occasionally made. These results are tabulated beneath, and in the chart of leucocytes are represented by the upper (red) line.

After first feeding, 13 counts averaged 29,450per C.M.
Extremes 24,000 and 39,200.

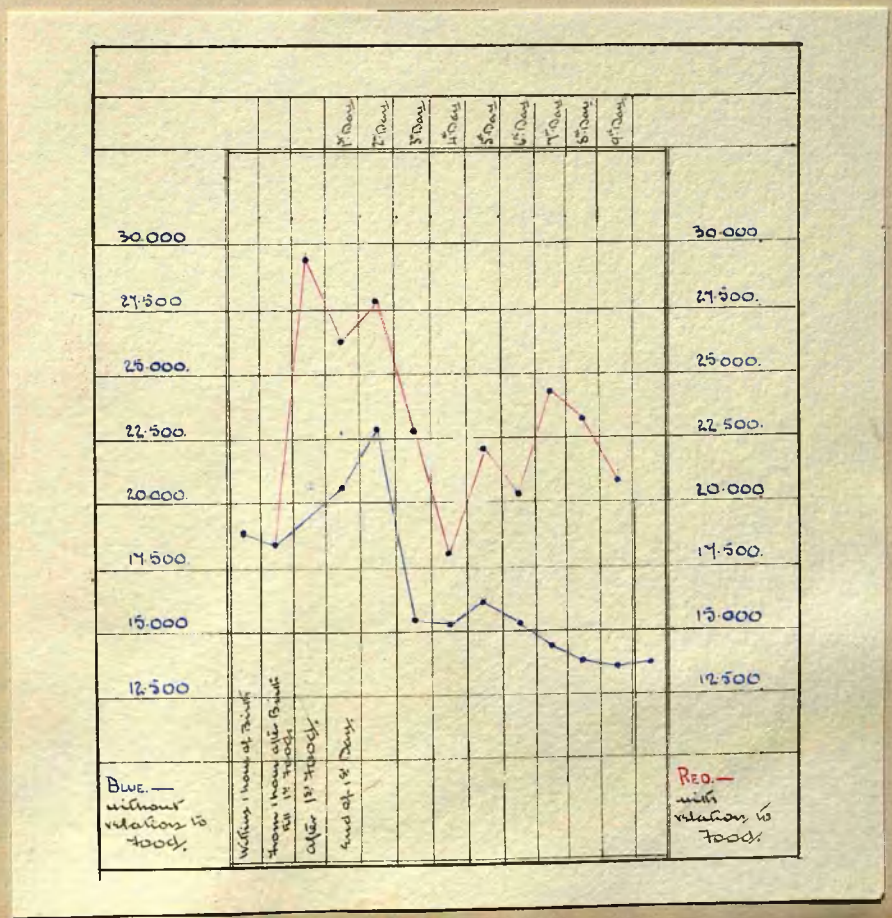
1st. day with food, 6 counts averaged 26,200per C.M.
Extremes 22,000 and 29,000.

2nd. day with food, 4 counts averaged 27,705per C.M.
Extremes 25,000 and 35,000.

3rd. day with food, 2 counts averaged 22,600per C.M.
Extremes 15,600 and 29,600.

4th. to 9th. days with food, 35 counts averaged 21,564 per C.M. Extremes 15,000 and 29,400.

The chart represents the averages of 220 counts; the blue line those counts without, and the red those with, food relation.



The following counts have been excluded from the averages previously given:- on third day, 12,600per C.M. ½hour after food,-Sickness: on fourth day, 14,400 per C.M. 1½hours after food,-Sickness. In a child with diarrhoea and digestive disturbance, 13,200per C.M. was counted on fourth day, one hour after food; 14,000 on sixth, two hours after food; and 12,000per C.M. on eighth day, also two hours after food (case50)

The counts in premature children were too few to make any conclusion from.

The Leucocytosis of the Newborn.

From the above results it will be seen, that the variations in the numbers of white corpuscles present in the blood, during the hours succeeding birth and before first feeding, is slight compared with that of the reds. In 6 infants whose blood was examined on more than two occasions during this period, the leucocyte count increased in two (3,000 to 4,000per C.M.); and diminished slightly in four (about 1,500 per C.M.); and this while the counts of the red corpuscles were increasing.

The average count in a number of examinations, has been seen to diminish slightly from birth till the time of the first feeding. The explanation of this is probably that two influences are at work,-

loss of fluid from the body, and fasting,- both tending to increase the red corpuscles in the drop, while the former only has this effect upon the white cells. Fasting has been shown by many observers to lower the leucocyte count in the adult blood. It would seem therefore, as if the one influence counteracted the other, during the first hours of life. As soon as food is taken, the count rises and the average (without direct relation to food), on the first and second days, is higher than that at birth. During the succeeding days a gradual diminution in the numbers takes place.

These results, and those of the differential counts following, agree with the theory of Lepine, Von Limbeck and others, who hold that the leucocytosis of the newborn is partly due to blood concentration, and partly to the influence of digestion. Gundobin and others, oppose this view. (see page 42.).

In connection with the increased number of white corpuscles in the blood of the infant at birth, relatively to that of the adult, it is interesting to note that during pregnancy there is also an increase in the blood of the mother, and that a digestion leucocytosis does not occur over and above this. (Cabot). The same author suggests, that the whole thing may be only a prolonged digestion leucocytosis, "the mother having to eat for two".

This only occurs during the latter months of pregnancy, when the child is increasing most rapidly in size, and presumably, requiring most nutrition. The child is taking nourishment constantly with the free interchange of fluids going on between the two bloods, not intermittently as at the breast: so that it seems likely, that in utero there will be a larger number of leucocytes continually in the circulation, instead of the variations which are associated with the taking of food after birth.

The effect of digestion of food on the leucocytes of the infant's blood, is much greater as a rule than in adults, and this is especially the case after the first feeding,- 10,000per C.M. being the average increase in the above counts. Increase in white corpuscles almost equal to this, has been noticed after the first meal by the mouth, in adults who have been fed for a time, completely by the rectum. Cabot found in a case of Gastric Ulcer, that after the first food by the stomach, the leucocyte count rose from 4,000per C.M. to 15,500per C.M.; and suggests the "novelty" of the food as an explanation. This is borne out by the results of the examinations in infants. Of sixty counts in relation to food, those made during the first and second days of life (23), gave an average of 27,777per C.M.; whilst those on the third to tenth days (37), gave only an average

of 21,705per C.M.

In a few of the counts included in the table of averages made in relation to food, the number of white corpuscles showed little or no increase, relatively to counts made in other infants of the same age, without food relation,- presumably no leucocytosis or only a slight one, was present. Some healthy adults show no digestion leucocytosis (Von Limbeck). The difficulty of getting accurate information with regard to the child's feeding, from the mother, may however, be the explanation, as the counts are as a rule, greater when a fast of some hours has preceeded the feeding, and less when the feeding is frequent. The leucocytosis is most marked from one to two and a half hours after food, and seems to be practically over (except on the first two or three days) in four hours. This conclusion is come to on account of the relative equality of counts made after this period, and those without food relation in different infants on the same day; and the counts on subsequent days in the same infant. In no case have I noticed a count much above the average given (without food), later than three and a half hours.

Differentiation of White Corpuscles.

It is very generally held that the blood in infants, has a larger percentage of Lymphocytes than that of

the adults; 40 per Cent to 60 per cent in the former, and 20 per cent to 30 per cent in the latter: and correspondingly, the Polymorphonuclear Neutrophiles are less; 20 per cent to 40 per cent in the former, compared with 60 per cent to 70 per cent in the latter. (Hamilton Stanley, Cabot, etc)

In the following differential examinations, the percentages of the lymphocytes were as a rule within the above limits, and above that of the neutrophiles, where there was no relative increase in the count of the leucocytes; but almost invariably when there was a leucocytosis it was associated with an increased percentage of the neutrophiles, and a consequent decrease in the lymphocytes. A few cases show a fairly constant percentage throughout.

Hayem found that at birth, there ~~was~~ were relatively more lymphocytes than in adults. Loos and others hold that they exceed the Neutrophiles in numbers.

Elder and Hutchison found the neutrophiles in excess in every case examined (7), lymphocytes being from 35 per cent to 40 per cent, neutrophiles from 55 per cent to 65 per cent, and Eosinophiles from 1per cent to 2.5 per cent (see page 49.). In 14 differentiations within five minutes of birth, I found the lymphocytes varying from 46 per cent to 66 per cent, the average being 55 per cent: the neutrophiles from 27 per cent to 46 per cent, average 40per cent; and the eosinophiles from 1 per cent to 9 per

cent, average 4.5 per cent. In every case but one, (the two varieties being practically equal), the percentage of lymphocytes was greater than that of the neutrophiles.

In 6 cases, from an hour after birth till the first feeding, the lymphocytes varied from 34 per cent to 56 per cent, the average being 51 per cent: the neutrophiles from 35 per cent to 65 per cent, average 44 per cent. With one exception the lymphocytes percentage was greater than that of the neutrophiles. (This exception should perhaps not be included in the normal averages, as the child was born in the open-air, and exposed for about an hour before being removed. Blood examination made four hours after birth, gave 17,000per C.M., lymphocytes 34 per cent: 65 per cent neutrophiles, and 2½ per cent eosinophiles,- possibly the [illegible] of a leucocytosis? If excluded, the averages of the five cases above would be practically as at birth). Thus from birth till first feeding, lymphocytes were in excess in all but one.

With the first feeding and the rise in the count of the leucocytes, differentiations show a relative and absolute increase in neutrophiles.

In seven infants, in whom the leucocytes were counted and differentiated, the average count, one to three hours after feeding, was 30,000per C.M.;

the average percentage of the lymphocytes was 56 per cent, and of the neutrophiles 59 per cent. In every case the percentage of the neutrophiles was greater than that of the lymphocytes.

During the remainder of the first and on the second days, when the leucocyte count is still higher than at birth, there is a much slighter variation in the percentages between the examinations with food relation, and those without: the majority of the counts both before food and after it, showing the neutrophiles in excess of the lymphocytes. In 6 counts with food relation on first and second days, the average of lymphocytes was 57 per cent and the neutrophiles 56 per cent: and in 10 counts without food relation, lymphocyte average was 42 per cent and neutrophile 55 per cent. From the third day onwards, there is a gradual return to the condition at birth, the lymphocytes being in excess of the neutrophiles in examinations without food relation, and after food only a slight increase in the neutrophiles is found. Twenty two counts were made from the sixth to the tenth day;- in 11 without food relation, the leucocyte count averaged 15,900per C.M., lymphocyte average was 60 per cent, and that of the neutrophiles 37 per cent; while in 11 with food relation, the count averaged 20,700per C.M., the lymphocyte average was 44 per cent and the neutrophile 49

per cent.

In four counts on the ninth and tenth days, two with relation to food, and two without, the lymphocytes were in excess in all. Only on the first day can I say that there was an absolute increase in the neutrophiles, as only then were a series of examinations made, of the blood of the same child.

The three following counts are excluded from the averages above:-

On 2nd. day, 1hour after food, L.60 per cent, P.M.W.34 per cent, E.6 per cent, Leucocytes 15,000per C.M.

- Sickness.

On 4th. day, 1hour after food, L.68 per cent, P.M.W.27 per cent, E.4 per cent, Leucocytes 13,200per C.M.

- Sickness.

On the 6th. day 2hours after food, L.56 per cent, P.M.W.40 per cent, E.4 per cent, Leucocytes 14,000per C.M.

- Sickness.

The above results agree with those of Gundobin, who found the neutrophiles from 60 per cent to 80 per cent during the first two days of life; and that after the second day there was a gradual diminution in their numbers, so that from the seventh to tenth days, there was an absolute and relative increase in the lymphocytes. He holds that the increase in the neutrophiles, is due to a diminished activity of the retrograde metamorphosis (see page 37.).

The percentage of the Eosinophiles is relatively greater than that in the adult. The variations in numbers are great, but show no regularity in change like those of the other leucocytes, either to food or fast.

In the total (85) differentiations, they varied from 1 per cent to 17 per cent the average being about 5 per cent. These results are given in the following table:-

	Without food relation				Milk food relation			
Date	counts	lymphocytes	neutrophiles	Eosinophiles	counts	lymphocytes	neutrophiles	eosinophiles
Ar. Birth	14	55% (40-66)	40% (27-46)	4% (1-9)				
Till 1st food	6	51% (34-56)	44% (35-63)	5% (3-9)				
after 1st food (1-3hrs)					8	36% (33-41)	59% (55-63)	25% (3-4)
1st Day.	3	38% (31-50)	57% (47-65)	3% (2-5)	3	38% (30-50)	56% (45-63)	4% (3-6)
2nd Day.	7	43% (36-51)	50% (41-60)	4% (1-13)	3	37% (31-46)	57% (48-63)	4% (3-6)
3rd Day.	7	52% (44-66)	42% (33-49)	4% (2-7)	1	32%	63%	4%
4th Day.	3	44% (36-49)	48% (44-54)	7% (4-9)	1	44%	45%	10%
5th Day.	4	50% (33-67)	44% (32-64)	4% (1-11)				
6th Day.	4	59% (47-66)	34% (29-41)	6% (4-11)	5	44% (34-52)	48% (45-54)	6% (2-7)
7th Day.	3	60% (47-71)	33% (25-42)	5% (2-5)	1	44%	52%	4%
8th Day.	3	64% (56-73)	30% (23-36)	4% (3-6)	3	37% (25-52)	57% (43-71)	4% (3-6)
9th Day.	1	62%	33%	4%	2	57% (55-60)	36% (32-40)	5% (3-7)
10th Day.	1	54%	35%	6%				

Histology of White Corpuscles.

In those differential counts, no attempt has been made to classify the lymphocytes under the headings "Small" and "Large"; as intermediates in size between the two are very common, and it has often been impossible to draw any accurate line of distinction between them. Small lymphocytes with a deeply stained circular nucleus, are most numerous; but many cells of the same size are seen with a pale (green) nucleus. Occasionally the nucleus is in two pieces lying side by side, bothe being stained deep(blue)as a rule. "Transitional" forms, the large lymphocyte with pale-stained horse-shoe nucleus, are common, though in smaller numbers than those with the circular nucleus.

The Polymorphonuclear neutrophiles vary considerably in size and appearance. The majority have the centrally-placed nucleus or nuclei stained irregularly, deep blue in some parts, green in others; but many are found with evenly stained pale(green) nuclei. Occasionally the nuclei are at opposite poles of the cell, close to the cell wall. Rarely cells having all the appearances of the neutrophiles, but with eosinophilic granules also present are seen, the latter as a rule being clumped in one part of the cell.

A similar variation in size is noticed in the Eosinophiles, the large having the usual loosely

connected appearance, while the smaller ones resemble the neutrophiles more in shape. Between these latter and the small eosinophiles, are corpuscles having resemblances to each variety, and whose granules are neither typically neutrophilic, nor yet typically eosinophilic.

These variations from the typical forms are very numerous, and especially in blood films taken during a leucocytosis.

C H L O R O F O R M.

During examinations of the blood at birth, and in the first few hours of life, that of infants delivered during chloroform administration to the mother, showed much greater numbers of leucocytes per C.M., than was found in the blood of children born under normal conditions. The association between the use of the anaesthetic and the higher leucocyte counts at birth, was so constant, that the following cases have not been included in the first days averages given (page 30).

Some of the deliveries were delayed (e.g. contracted outlet), in others there was no delay (e.g. Caesarean Section); and some infants were exposed longer than others, on account of artificial respiration having to be employed. The only exceptional circumstance common to all, was the anaesthetic, chloroform, or chloroform and ether, to the mother.

All the examinations referred to below, were made before any food had been taken.

The counts of the white cells in the blood of 13 infants, delivered during chloroform administration, taken shortly after birth, were found to vary from 17,000 per C.M. to 36,000 per C.M.; and the average of 29 counts, from birth to first feeding

was 26,140 per C.M.

In normal deliveries on the other hand, the counts varied from 16,400 to 25,000per C.M. at birth, (the average being 19,066per C.M.); and the average of 28 counts from birth to the first feeding, was 18,690 per C.M.

In the former cases, the number of white corpuscles present, seems to be in direct relation to the time that has elapsed between beginning the chloroform, and making the blood examinations; and to the duration of the administration. In one infant the count was 17,000per C.M., ½hour after birth and ½hour after beginning the anaesthetic, but rose to 26,000per C.M. two hours later: in another 21,200per C.M. at birth, the anaesthetic having been given for half an hour before delivery,- and rose to 27,600per C.M. three hours later; while in a third 36,000per C.M. was counted half an hour after birth, and one and a half hours after the chloroform. This increase in the leucocytes reaches its height in the majority from 1½ to 3hours after chloroform, and therefore a variable period after birth. The following are the highest counts made in each of the 13 infants:-

Duration of chloroform.	Time after birth.	Time after beginning Chloroform
36,000per CM. 1hour	½hour	1½hours.
32,800per CM. 1hour	1hour	2hours.

Duration of chloroform.	Time after birth.	Time after beginning chloroform.
24,000per CM. ½hour	¾hour	1¼hours.
25,000per CM. ¼hour	¾hour	1hour.
29,000per CM. ½hour	1hour	1½hours.
30,800per CM. 1hour	1hour	2hours.
26,000per CM. ¼hour	2hours	2¼hours.
27,200per CM. 20min.	1hour	80min.
30,000per CM. ½hour	1½hours	2hours.
35,000per CM. ½hour	5hours	5½hours.
27,800per CM. 20min.	3hours	3hrs.&20min.
29,000per CM. ½hour	4½hours	5hours.
30,000per CM. 1hour	1hour	2hours.

After this the count gradually falls. Of eight of the above whose blood was examined frequently, a normal count (relative to the averages given under normal conditions), was reached in six, from four to seven hours after birth; in the two remaining cases, the highest count was made 4½ to 5hours, after birth. A great increase takes place again after the first feeding. (see charts 29 to 39).

The differential count also differs from that in the majority of children after a normal delivery, in that, as a rule, the neutrophile percentage exceeds that of the lymphocytes. In 20 differentiations after a normal delivery, the lymphocytes varied from 35 per cent to 66 per cent, the average being 55 per cent; and the

neutrophiles from 27 per cent to 63 per cent, average being 42 per cent. In all but two, the lymphocytes were markedly in excess.

In 17 differential counts in chloroform cases, the lymphocytes vary from 23 per cent to 50 per cent, the average being 36 per cent; and the neutrophiles from 44 per cent to 74 per cent, average being 60 per cent. In all of those but one, the neutrophiles were in excess. As has been noted before, Elder and Hutchison in 7 differentiations from the blood of the cord at birth, found the neutrophiles in excess in all. This differs from other observers. No statement as to the nature of the delivery is given.

The Eosinophiles show no regular change, the average in the 19 normal cases being 4,5 per cent and in the chloroform cases 3,5 per cent, both varying from 1 per cent to 9 per cent. An increase in the polymorphonuclear leucocytes, is found in the pathological leucocytes of adults (Cabot).

The stained specimens in some cases, showed large numbers of nucleated red corpuscles; but whether more than in ordinary cases, it is difficult to say, as the numbers vary so much in both. Only here have double nuclei been seen in them. A few megaloblasts were present in all the slides examined.

The white corpuscles show to a marked extent, all the variations noted under Leucocytosis.

The suggestion that the action of Chloroform circulating in the child's blood, may be the cause of the leucocyte increase, is supported by the fact that various chemical substances administered to the mother, have been detected in the circulation of the child, and chloroform amongst them, freely (Galabin); and also by its other effects upon the child. The child at birth is more or less anaesthetised. Even when the administration to the mother had not lasted more than ten minutes, or more than a drachm of chloroform been used, the signs were distinct.

In an ordinary delivery, when the head is born, in clearing the mouth of mucous, the lower jaw closes upon the finger. If an anaesthetic has been used, the finger can be put into the back of the throat without the reflex occurring.

At birth the respirations are slow and shallow, though the cord may be pulsating strongly; and artificial respiration has often to be employed, the cutaneous reflexes being disturbed, and there being seldom the gasp or cry when the child is born. In performing this. the markedrelaxation of all the muscles is noticed, the limbs floping about in a way that contrasts strikingly, with the natural rigidity. In the cases examined, the conjunctival reflex has usually been absent, and occasionally the reaction to light also.

Within an hour of birth, most of these effects have entirely passed away; but in some of the cases there have been subsequent digestive disturbances; and in others (75 per cent), a mild icterus beginning during the first, second, or third days of life. In one of those cases (see chart 30), diarrhoea and sickness began on the fourth day, and continued till the eleventh; and there was a marked jaundice from the second day. Though healthy enough in appearance at birth, the child was white and badly nourished when it left Hospital on the eleventh day, and had lost ¾lb. in weight.

English records a case, in which chloroform was given in a normal labour, administration lasting one hour. The child was born motionless and apparently lifeless, except for the pulsating cord. Artificial respiration was employed for 15 minutes before the child gasped. More or less nausea and prostration lastedtill the tenth day.

The possibility of a more serious effect upon the child in utero, is siggested by the following case which occurred at the Maternity Hospital. The woman was admitted for induction of premature labour, at the seventh month. Just before chloroform administration, the foetal movements were felt, and the foetal heart rate counted. Patient was deeply under for fully an hour, owing to difficulty in inserting the bougies.

After the chloroform the heart beat could not be heard, and the mother felt no further movements. The child was born dead 24 hours later. At Post-Mortem examination no lesion whatever could be found.

SUMMARY.

1. The Red Corpuscles in the blood of the infant at birth, are relatively more numerous than in the adult.

Owing to loss of fluid from the body (concentration of the blood), and changes in the circulation, etc the number per C.M. increases during the first two days of life.

During this period there is a loss of weight.

From the second day, a gradual fall in the numbers takes place, so that by the tenth day, these are less than at birth (average 2-500,000 per C.M.).

During this period the child is gaining weight.

The variation in numbers between different infants, is greater than in adults.

Icterus is frequently associated with this corpuscular fall, especially in premature infants, those delivered under Chloroform, and when the cord has been tied early.

During the early days, the blood shows variations in shape and size of the red corpuscles, and deficiency in rouleaux formation. Nucleated corpuscles are present at birth (normoblasts and megaloblasts), the number varying greatly; they may be found as late as the ninth day.

2. The Haemoglobin is relatively high at birth and in the few succeeding days, usually over 100%, the individual

cells being richer than those of the adult.

3. The White Corpuscles which at birth , are two or three times as numerous as in the adult, increase during the first two days owing to the effect of digestion, and change of volume of the blood. The numbers per C.M. diminishes on the third day, and by the tenth day it is considerably less than at birth, (average 4000 to 6000 per C.M.).

Digestion leucocytosis is marked, especially after the first feeding, and when a fast has preceeded the feeding in the later days.

The Lymphocyte percentage usually exceeds that of the neutrophiles at birth. After first feeding there is a relative and absolute increase in the neutrophiles (50 per cent to 80 per cent). This gradually diminishes as the count falls, till on the second week, the lymphocytes are relatively and absolutely increased again as at birth. The Eosinophiles percentage, is as a rule, greater than in adults.

After delivery under chloroform, the leucocytes are more numerous for a few hours, than in normal children, and the percentage of neutrophiles is relatively [redacted] increased.

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