A New Micro Method for the Hemosedimentation with 0.05 c.c. of Blood.

3rd Hematological Paper.

By

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Introduction.

Blood sedimentation test is not so widely used, within my knowledge, in pediatrics as in adult medicine. The reason is, I believe, very simple: the amount of blood necessary for the test is too large¹⁾ in the case of children. Indeed, there are such micro-methods, as Linzenmeier's²⁾ and Langer-Schmidt's³⁾ ones.[§] But I had been trying a micro method with a very small amount of blood. In the present paper I desire to describe my micro hemosedimeter which requires only 0.05 c.c. of blood.

My Own Hemosedimeter.

1. The amount of blood required is only 0.05 c.c. or $\frac{1}{20}$ c.c.
2. Micro pipette. The pipette is about 9.5 cm long and has an internal diameter 1.3 m.m. It has on it three marks: B, O and C.

1) Cf. Westergren's hemosedimeter: A. Westergren, *Ergeb. d. inn. Med.*, 1924, 26, 577.

2) Linzenmeier *Münch. med. Wschr.*, 1925, 5.

3) H. Langer and W. Schmidt, *Zschr. f. Kinderh.*, 1926, 41, 72.

§ There is also K. Sato's micro-method, which requires 0.2 c.c. of blood i.e. a very large amount of blood in contrast to 0.05 c.c. of blood required in my own method. Cf K. Sato, *Tokyo Iji Shinshi*, 1931, No. 2750, 2517; *Iji Koron*, 1932, No. 1066, 11.

Fig. 1. Diagram of Yoshida's micro pipette.

Fig. 2. Blood taking.

The pipette between O and C is divided into 30 equal parts, each part being 1 m.m. in length (Cf. Fig. I). The mark B is a little above the mark O. Fig. I will show the other details of the apparatus.

3. Solution required. 5% aqueous solution of sodium citrate. 5 grms. of sodium citrate neutral; $C_3H_4OH-(COO.Na)_3 \cdot 5\frac{1}{2} H_2O$ neutral is dissolved in 100 c.c. of distilled water.

4. A white celloid disc with a hollow place in the central part for mixing blood (Cf. Fig. III).

5. The whole apparatus is contained in a metal rack (Cf. Fig. II) which may be kept in a pocket and conveyed anywhere (Cf. Fig. IV).

Technique.

The pipette should of course be epiously cleaned. It is by far better (especially for a beginner) to fill the citrate up to the mark B, and only then to let it fall down to the mark C of the pipette by means of capillarity and then make an incision by use of a knife or Frank's needle on an ear-lobe* or on a finger tip. If a blood drop comes out, bring the point of the pipette into contact with the drop, first holding it almost vertical and then gradually bring it to a horizontal position, keeping the point in contact with the blood drop. During the process, blood will come into the pipette by means of capillarity (Cf. Fig. II). As soon as the

blood column reaches the mark B, take the pipette away from the

* It is still better to apply warm water to the ear for a few minutes.

Fig. 3. Blood mixing.

blood drop and wipe any blood off the point.

Then blow the whole contents of the pipette into the hollow place of the celloid disc and mix well with the point of the pipette. Then fill the pipette again with the mixture up to the mark O (not up to the mark B) by capillarity, the technique of filling it being the same as above described (Cf. Fig. III).

Then bring the pipette into the rack and keep it between the two pieces out of gummi (Cf. Figs. I and IV).

The column of clear serum above the setting red blood cells is read in millimeters at the termination of one hour; if necessary in clinical observation, a reading at 15, 30, 45 and 60 minutes after blood taking ought to be read.

Result of Experiment.

1. Comparison between Langer-Schmidt's and my own methods (Cf. Tab. I).

Here I want to compare the results obtained by the two micro methods, Langer-Schmidt's and the author's. It will be seen from Table I the averaged differences show only ± 0.4 mm. in 15 minutes, ± 0.6 mm. in 30 minutes, ± 0.7 mm. in 45 minutes and ± 0.7 mm. in 60 minutes. The result is, I believe, sufficient to show that my own method can be used for measuring the sedimentation value instead of Langer-Schmidt's method, especially in pediatric practice; because my own method requires only 0.05 c.c. of blood in contrast to 0.12 c.c. of blood required in Langer-Schmidt's method. Besides in my method the apparatus complete

Fig. 4. How to set pipettes in the metal rack.

Fig. 5. Comparison between author's method and Westergren's.

may be carried anywhere in the pocket.** Furthermore, it is rather a nuisance with a micro method of blood sedimentation to have blood easily clotted. It is for this reason that Schierlitz⁴⁾ wrote in detail about the avoidance of such a technical failure. In my own method there is no fear of blood clotting, because one can obtain the small amount of 0.05 c.c. blood very quickly even in the case of a small baby.

2. Comparison between Westergren's and my own method (Cf. Tab. II and Fig. V).

Höcker,⁵⁾ Achard, Lévy and Guthmann⁶⁾ made a comparison between the results of Langer-Schmidt's method and those of Westergren's. Höcker made a diagram as figured in Diagram (Cf. Fig. V), in which the result of my own comparison between Westergren's and my method will be shown. The sedimentation test was performed at a room temperature of 28°C. (Cf. Diagram I). From the latter, the corresponding readings of Westergren's and my own method will be found.

3. Appreciation of the readings in my own method (Cf. Tables III and IV).

Here a preliminary trial is made of the clinical appreciation of the readings in my micro method. Clinical cases may be classified into 5 classes according to the blood sedimentation rate namely:—

1. Subnormal (=protracted).....under 2 mm. in 1 hour.
2. normal4-7 mm. in 1 hour. (Sometimes
9-11 mm. in 1 hour in healthy cases).
3. Slightly accelerated12-15 mm. in 1 hour.
4. Moderately accelerated15-20 mm. in 1 hour.
5. Strongly accelerated21-25-30 mm. in 1 hour.

** The pipette in my method is not placed in a tube of mercury as in Langer-Schmidt's method.

4) K. Schierlitz, Münch. med. Wschr., 1930, 356.

5) H. Höcker, Münch. med. Wschr., 1931, 1556.

6) Achard, Lévy and Guthmann, Le Sang, 1933, 6, 557.

TABLE I.
Results of blood micro-sedimentation in clinical cases (author's method compared to *Langer-Shmidt's*).

No. of cases	Age	Reading after (m.m.)			15'			30'			45'			60'			Clinical diagnosis
		Lan- g's	Au- thor's	Differ- ence	Lan- g's	Au- thor's	Differ- ence	Lan- g's	Au- thor's	Differ- ence	Lan- g's	Au- thor's	Differ- ence	Lan- g's	Au- thor's	Differ- ence	
1	2 y.	3.5	3.5	0	7.5	7.5	0	7.5	7.5	0	10.0	10.0	0	13.5	13.5	0	Pertussis bronchopneumonia
2	2 y.	2.5	2.0	-0.5	6.5	6.5	0	10.0	10.0	0	10.0	10.0	0	11.0	11.0	0	Influenza
3	5 y.	14.0	14.0	0	19.0	19.0	0	20.5	20.5	0	20.5	20.5	0	22.5	22.5	0	Pneumonia
4	9 y.	7.5	7.5	-2.0	17.5	14.5	-3.0	21.0	20.0	-1.0	22.0	20.0	-2.0	22.0	22.0	0	Phthisis pulmonum tuberculosa
5	7 y.	2.5	2.5	0	7.0	7.5	+0.5	10.5	11.0	+0.5	10.5	11.0	+0.5	12.5	14.0	+1.5	Hillitis tuberculosa
6	7 y.	0.5	1.0	+0.5	2.0	2.0	0	3.5	4.0	+0.5	5.0	6.5	+1.5	6.5	6.5	0	Glaucoma
7	4 m.	8.0	3.0	0	9.0	8.0	-1.0	13.0	12.0	-1.0	19.5	18.0	-1.5	18.0	18.0	0	Essential thrombopenic purpura
8	5 y.	3.0	3.0	0	7.0	8.0	+1.0	11.5	12.0	+0.5	15	16.5	+1.0	16.5	16.5	0	Pleuritis
9	13 y.	3.5	4.0	+0.5	10.5	11.0	+0.5	14.0	14.5	+0.5	15.5	16.0	+0.5	15.5	16.0	+0.5	Pulmonary apex infiltration
10	2 y.	0.5	0.5	0	1.5	0	0	2.5	2.5	0	4.0	3.5	-0.5	4.0	3.5	-0.5	Heine-Medin's disease
11	6 y.	12.0	8.5	-3.5	16.0	15.0	-1.0	21.0	18.0	-3.0	22.0	21.0	-1.0	22.0	21.0	-1.0	Pleuritis
12	6 y.	16.0	14.0	-2.0	18.0	17.0	-1.0	22.0	22.0	0	23.5	25.0	+1.5	25.0	25.0	0	Pulmonary infiltration with pleuritis
13	10 y.	5.5	5.5	0	7.0	7.5	+0.5	10.0	12.0	+2.0	15.0	16.0	+1.0	16.0	16.0	0	Bronchitis chronica
14	9 y.	3.0	2.5	-0.5	9.0	7.5	-1.5	11.0	9.5	-1.5	13.0	12.5	-0.5	13.0	12.5	-0.5	Lues congenita (cured)
15	4 y.	6.5	6.0	-0.5	12.5	12.0	-0.5	18.5	17.0	-1.5	19.5	19.0	0	19.5	19.0	0	
16	14 y.	8.0	8.0	0	14.0	14.0	0	16.5	16.5	0	18.0	18.0	0	18.0	18.0	0	Pulmonary tuberculosis
17	8 y.	15.5	15.0	0	20.0	20.0	0	24.0	25.0	+1.0	25.5	26.0	+0.5	26.0	26.0	0	Pulmonary tuberculosis
18	3 y.	5.5	4.0	-1.5	12.0	11.0	-1.0	16.5	16.0	-0.5	19.5	18.5	-1.0	19.5	18.5	-1.0	Pertussis bronchitis
19	10 y.	4.0	4.0	0	6.0	6.5	+0.5	8.0	8.5	+0.5	9.5	10.0	+0.5	10.0	10.0	0	Otitis media (cured)
20	6 y.	2.0	2.0	0	4.0	3.5	-0.5	7.0	7.0	0	9.0	9.0	0	9.0	9.0	0	Influenza
21	7 y.	1.5	1.5	0	3.0	3.0	0	7.0	7.5	+0.5	13.5	15.0	+1.5	13.5	15.0	+1.5	Chronic bronchitis
22	8 m.	1.0	1.0	0	2.0	2.0	0	4.0	4.0	0	8.0	9.5	+1.5	8.0	9.5	+1.5	Dyspepsia
23	2 y.	3.0	3.0	0	6.0	6.0	0	14.0	14.0	0	19.0	21.0	+2.0	19.0	21.0	+2.0	Bronchitis with lymphadenitis icolli
24	3 y.	10.0	6.0	-4.0	22.0	21.5	-0.5	24.0	23.0	-1.0	25.0	25.0	0	25.0	25.0	0	Typhus abdominalis
25	7 y.	4.0	4.5	+0.5	8.5	10.5	+2.0	13.0	15.0	+2.0	17.0	18.5	+1.5	17.0	18.5	+1.5	Bronchitis with abdominal tuber- culosis
26	6 y.	4.5	4.5	0	9.5	9.5	0	13.0	13.0	0	14.5	14.5	0	14.5	14.5	0	Erythema nodosum
27	5 y.	5.0	6.0	+1.0	16.0	14.0	-2.0	20.0	21.5	+1.5	24.0	24.0	0	24.0	24.0	0	Syphilis
28	9 y.	1.0	1.0	0	3.0	3.0	0	4.0	4.0	0	5.5	5.5	0	5.5	5.5	0	Latent tuberculosi
29	4 y.	1.0	1.0	0	3.0	3.0	0	4.0	4.0	0	6.0	6.0	0	6.0	6.0	0	Influenza
30	11 y.	3.5	2.5	-1.0	9.0	7.5	-1.5	16.0	12.0	-4.0	18.0	15.0	-3.0	18.0	15.0	-3.0	Pulmonary tuberculosis
31	7 y.	3.0	3.0	0	6.0	6.0	0	8.0	8.5	+0.5	9.0	9.5	+0.5	9.0	9.5	+0.5	Chronic diarrhea

8 y.	7 m.	1.0	1.5	+0.5	4.0	4.0	0	6.5	6.5	0	9.0	9.0	0	Bronchoadenitis tuberculosa	
2 y.	3 m.	0.5	0.5	0	1.5	1.5	0	2.0	2.0	0	3.0	3.0	0	Influenza	
8 y.	8 m.	4.0	3.5	-0.5	8.5	8.5	0	12.0	12.5	+0.5	14.5	15.0	+0.5	Pulmonary tuberculosis	
5 y.	8 m.	10.5	9.5	-1.0	21.5	21.5	0	24.5	24.5	0	26.5	26.5	0	Chronic bronchitis	
9 y.	1 m.	10.0	10.0	0	19.0	19.5	+0.5	21.0	21.5	+0.5	23.5	24.5	+1.0	Phthisis pulmonum tuberculosa	
10 y.	9 m.	3.0	3.0	0	12.0	7.0	-5.0	17.0	13.0	-4.0	18.5	16.0	-2.5	Bronchitis	
6 y.	7 m.	0.5	0.5	0	6.0	5.0	-1.0	7.0	6.5	-0.5	11.5	10.0	-1.5	Latent tuberculosis	
5 y.	6 m.	3.5	3.5	0	7.0	7.0	0	11.0	12.0	+1.0	13.0	15.0	+1.5	Bronchitis	
3 y.	6 m.	1.0	1.0	0	2.0	2.5	+0.5	3.5	5.5	+2.0	4.0	6.5	+1.5	Healthy	
9 y.	4 m.	1.0	1.0	0	2.5	2.5	0	3.5	3.5	0	5.5	5.5	0	Healthy	
3 y.	3 m.	16.0	16.0	0	23.0	23.0	0	25.0	26.0	0	27.0	27.0	0	Abdominal typhus	
4 y.	2 m.	1.0	1.0	0	11.0	11.0	0	14.5	14.5	0	19.0	18.5	-0.5	Pleuritis	
4 y.	8 m.	1.0	1.0	0	5.0	5.0	0	8.0	8.0	0	10.5	10.5	0	Anorexia	
7 y.	1 m.	1.5	1.0	-0.5	2.5	2.5	0	4.5	5.0	+0.5	6.5	7.5	+2.0	Adenoide vegetation	
10 y.	4 m.	4.0	3.0	-1.0	10.0	7.0	-3.0	14.5	11.0	-3.5	16.5	14.5	-2.0	Bronchpneumonia	
12 y.	4 m.	15.0	15.0	0	21.0	19.5	-1.5	26.0	25.5	-0.5	30.0	28.5	-1.5	Pleuritis exsudativa	
8 y.	10 m.	12.0	12.0	0	18.0	19.0	+1.0	20.0	20.0	0	22.5	22.5	0	Lymphadenitis submaxillaris puru- lenta with Pleuritis	
3 y.	1 m.	1.0	1.0	0	2.5	2.0	-0.5	6.0	3.0	-3.0	8.0	4.0	-4.0	Influenza	
11 y.	4 m.	5.0	5.0	0	9.0	9.0	0	13.0	13.0	0	19.0	18.0	-1.0	Pulmonary tuberculosis	
5 y.	9 m.	1.0	1.0	0	2.0	1.5	-0.5	5.0	4.0	-1.0	10.0	9.5	-0.5	Latent tuberculosis	
4 y.	5 m.	3.0	2.5	-0.5	4.5	6.0	+1.5	9.0	9.0	0	15.0	15.0	0	Bronchopneumonia	
10 y.	8 m.	1.0	0.5	-0.5	3.0	2.5	-0.5	4.0	4.0	0	6.0	5.5	-0.5	Pleuritis, Pertussis pneumonia	
2 y.	5 m.	20.0	22.0	+2.0	26.0	28.0	+2.0	28.0	30.0	+2.0	29.0	31.0	+2.0	Pertussis bronchitis	
4 y.	1 m.	1.5	1.0	-0.5	6.5	6.0	-0.5	10.5	10.5	0	12.0	12.0	0	Syphilis	
23 y.	6 m.	6.0	5.0	-1.0	10.5	10.0	-0.5	15.0	14.5	-0.5	20.5	20.0	-0.5	Carcinoma ventriculi	
49 y.	3 m.	8.5	7.5	-1.0	14.5	14.5	0	18.0	18.0	0	20.5	20.5	+0.5	Syphilis	
30 y.	4 m.				17.0	17.0	0			0	20.5	20.5	0	Syphilis	
21 y.	5 m.				4.0	4.0	0			0	8.0	8.0	0	Healthy	
25 y.	6 m.	2.0	2.0	0	3.5	3.5	0	6.0	6.0	0	8.0	8.0	0	Healthy	
2 y.	10 m.	2.0	2.0	0	5.5	5.0	0			0	11.0	10.0	-1.0	Influenza	
6 y.	7 m.	12.0	12.0	0	19.0	19.0	0	24.0	24.0	0	30.0	29.0	-1.0	Otitis media acuta	
62	19 y.				7.0	7.0	0			0	10.5	10.5	0	Dystrophia adiposo-genitalis	
63	14 y.				9.5	9.5	0			0	17.0	17.0	0	Pulmonary infiltration	
64	3 y.	2 m.	6.0	6.0	0	14.0	14.0	0			17.5	17.5	0	Hilitis tuberculosa	
65	3 y.	1 m.	3.0	3.0	0	7.0	8.0	+1.0	11.5	12.0	+0.5	15.5	16.5	+1.0	Pleuritis
66	6 y.	5.0	6.0	+1.0	10.0	10.5	+0.5	14.5	15.0	+0.5	20.0	20.5	+0.5	Pneumonia	
67	6 y.	1.0	1.0	0	4.0	4.0	0	6.0	6.0	0	7.5	7.5	0	Hemophilia	
68	10 y.	4.0	4.0	0	6.5	7.0	+0.5	8.0	9.5	+1.5	11.5	12.5	+1.0	Typhus abdominalis (cured)	
69	4 y.	1.5	1.0	-0.5	6.0	6.0	0	11.0	11.0	0	13.0	13.5	0	Scarlet fever	
70	11 y.	9.0	9.0	0	20.0	22.0	+2.0	24.0	24.5	+0.5	25.0	25.5	+0.5	Pleuritis exsudativa	
71	Average			+0.4		±0.6				±0.7		±0.7			

TABLE II.

Comparison of the results of author's method and Westergren's method.

Nos. of cases	Time	Blood sedimentation, m. m.		Age. Sex. Diagnosis	Nos. of cases	Time	Blood sedimentation, m. m.		Age. Sex. Diagnosis
		Authro's micro-method	Wester-gren's Macro-method				Authro's micro-method	Wester-gren's Macro-method	
1	15'	7.5	15.0	14 y. 5 m. Pulmonary tuberculosis	9	15'	3.0	4.5	7 y. 4 m. Bronchitis
	30'	15.0	28.0			30'	9.0	13.0	
	45'	18.0	35.0			45'	14.0	24.0	
	60'	19.0	53.0			60'	19.0	37.0	
	75'	20.0	67.0			90'	22.0	55.0	
	90'	21.5	72.0			120'	24.0	68.0	
	105'	22.5	76.0						
	120'	23.5	79.0						
2	15'	2.0	2.0	23 y. Healthy	10	15'	2.5	6.0	11 y. Pleuritis
	30'	3.0	7.0			30'	7.5	14.0	
	45'	5.0	12.0			45'	12.0	26.0	
	60'	7.5	18.0			60'	15.0	41.0	
	90'	10.0	23.0			90'	17.5	53.0	
	120'	13.0	28.0			120'	18.5	59.0	
3	15'	2.0	1.5	28 y. Healthy	11	15'	3.0	4.0	12 y. Pulmonary tuberculosis
	30'	3.0	7.0			30'	7.0	13.0	
	45'	7.0	12.0			45'	13.0	27.0	
	60'	11.0	20.0			60'	16.0	38.0	
	90'	14.0	21.0			75'	19.5	48.0	
	120'	17.0	38.0			90'	20.0	53.0	
4	15'	2.0	4.0	30 y. Menstruation	12	105'	22.0	60.0	7 y. Chronic bronchitis
	30'	6.5	12.0			120'	23.0	63.0	
	45'	11.5	20.0						
	60'	15.5	40.0						
	90'	18.0	52.0						
	120'	21.5	68.0						
5	15'	7.5	6.5	49 y. Carcinoma ventriculi	13	15'	1.5	1.5	12 y. Pulmonary tuberculosis
	30'	14.5	21.0			30'	3.0	4.0	
	45'	18.0	32.0			45'	7.0	11.0	
	60'	20.5	47.0			60'	10.5	21.0	
	90'	23.0	63.0			90'	13.5	29.0	
	120'	25.0	75.0			120'	17.0	51.0	
6	15'	3.0	2.5	3 y. 1 m. Bronch-pneumonia	14	15'	2.0	2.0	6 y. 2 m. Latent tuberculosis
	30'	8.0	10.5			30'	4.0	3.0	
	45'	12.0	19.0			45'	7.0	6.5	
	60'	15.0	29.0			60'	9.0	8.5	
	90'	19.0	46.0			90'	13.0	13.0	
	120'	20.0	61.0			120'	17.0	27.0	
7	15'	0.5	2.0	23 y. Influenza	15	15'	2.5	4.0	9 y. Pulmonary tuberculosis
	30'	3.0	5.0			30'	6.0	12.0	
	45'	5.5	8.5			45'	11.5	26.0	
	60'	9.0	15.0			60'	13.5	32.0	
	90'	14.0	32.0			75'	14.5	40.0	
	120'	18.0	45.0			90'	14.5	40.0	
8	15'	2.0	2.5	10 y. Diphtheric angina	16	120'	18.0	56.0	12 y. 1 m. Pleuro-peritonitis
	30'	7.5	10.0			15'	1.5	3.0	
	45'	11.0	17.0			30'	4.0	6.5	
	60'	14.0	21.0			45'	10.0	22.0	
	90'	18.0	35.0			60'	16.0	50.0	
	120'	21.0	43.0			90'	19.0	72.0	
						120'	20.0	87.0	

TABLE III.

Blood micro-sedimentation in different cases.

Nos. of cases	Age	Blood micro-sedi- mentation, m. m.				Clinical Diagnosis
		15'	30'	45'	60'	
1	6 y. 2 m.	14.0	17.0	22.0	25.0	Pulmonary tuberculosis and pleuritis
2	2 y. 10 m.	2.0	6.5	10.0	11.0	Influenza
3	8 y. 5 m.	1.0	4.5	7.5	10.0	"
4	4 m.	2.0	4.0	5.5	7.0	Infantile dyspepsia
5	4 y. 5 m.	9.5	20.0	22.5	24.0	Pleuritis
6	1 y. 10 m.	8.5	12.5	20.5	23.5	Influenza
7	6 y. 3 m.	10.0	16.5	22.0	24.0	Pulmonary tuberculosis
8	6 y. 9 m.	3.5	13.0	16.0	18.0	Bronchopneumonia
9	10 y.	2.5	7.5	12.0	16.5	Scarlet fever in convalescence
10	8 y. 5 m.	2.0	5.0	8.5	10.5	Anemia
11	2 y.	1.5	3.5	5.5	7.0	Influenza
12	4 y. 4 m.	1.5	4.0	4.0	6.0	"
13	3 y. 10 m.	1.0	3.0	4.0	5.0	Obstipation
14	9 y. 6 m.	5.5	11.5	15.0	17.0	Latent tuberculosis?
15	5 y. 2 m.	2.5	5.5	7.5	12.5	Erythema nodosum?
16	4 y. 10 m.	2.0	3.0	6.5	7.0	Latent tuberculosis
17	8 y. 2 m.	3.0	6.0	9.5	11.5	Pleuritis (recovered)
18	10 y.	6.0	7.0	11.0	14.0	Pulmonary tuberculosis (cured)
19	2 y.	5.0	13.0	18.0	22.0	Empyema thoracis
20	2 y. 5 m.	19.0	24.0	27.0	27.5	Pertussis Pneumonia Subcutaneous abscess
21	2 y. 1 m.	15.0	23.0	24.0	26.0	Whooping cough pneumonia
22		8.0	8.5	11.0	13.0	Strophulus and enuresis
23	7 y. 6 m.	1.0	2.0	6.0	7.5	Hemophilia
24	9 m.	4.5	9.5	11.0	15.0	Angina acuta
25	4 m.	1.0	2.5	4.0	7.0	"
26	27 y.	1.0	4.0	7.0	8.5	Influenza?
27	25 y.	1.0	3.0	4.0	7.5	Healthy
28	23 y.	1.5	7.0	8.0	12.5	Pharyngitis
29	4 y. 6 m.	19.0	24.0	27.0	27.5	Subcutaneous abscess
30	20 y.	5.0	10.0	18.0	20.5	Pleuritis
31	5 y.	1.5	4.0	8.0	10.0	Bronchitis
32	6 y.	5.0	13.0	19.0	24.0	Intestinal tuberculosis
33	10 y.	3.5	7.0	13.0	17.0	Pulmonary tuberculosis
34	9 y.	15.0	20.5	23.5	25.5	Peritonitis
35	8 y. 5 m.	8.0	13.0	18.5	21.0	Pleuroperitonitis
36	5 y. 10 m.	14.0	19.0	22.5	25.5	Bronchopneumonia, Pleuritis
37	6 y. 4 m.	12.0	23.0	27.0	30.0	Pleuritis
38	9 y. 2 m.	3.5	9.5	14.0	19.0	Peritonitis
39	6 y.	8.0	12.0	18.0	21.5	Pleuritis
40	7 y. 1 m.	6.0	22.0	26.0	28.0	Peritonitis, Pulmonary tuberculosis
41	9 y.	1.0	5.0	10.0	15.0	Nephritis
42	5 y. 2 m.	6.0	11.5	15.5	23.0	Otitis media acuta
43	23 y.	0.5	1.5	2.5	4.5	Healthy
44	14 y.	1.3	4.0	6.5	8.5	Influenza
45	1 y.	1.5	2.5	4.5	7.0	Dystrophia
46	16 y.	1.0	1.5	2.5	4.0	Healthy
47	24 y.	1.5	4.5	9.5	11.0	Keratitis parenchymatosa
48	9 y.	12.0	23.0	26.0	28.0	Pulmonary tuberculosis
49	4 y. 8 m.	4.0	16.0	22.0	26.0	Pleuritis
50	7 y. 8 m.	2.0	9.0	16.0	18.0	Pulmonary tuberculosis
51	4 y. 4 m.	1.5	4.0	7.0	10.0	Latent tuberculosis

Nos. of cases	Age	Blood micro-sedi- mentation, m.m.				Clinical Diagnosis
		15'	30'	45'	60'	
52	3 y. 9 m.	8.0	17.0	20.0	21.0	Bronchopneumonia
53	1 y. 5 m.	2.0	6.5	13.0	17.5	Pneumonia
54	10 y.	9.0	14.0	18.0	21.0	Pleuroperitonitis
55	9 y.	1.0	3.0	6.0	8.0	Influenza
56	8 y. 4 m.	3.3	15.5	23.0	25.5	Scarlet fever

TABLE IV.

Blood micro-sedimentation in different cases.

Nos. of cases	Age	Sedimentation, m.m.		Clinical diagnosis
		30'	60'	
1	6 y. 9 m.	6.0	12.0	Hilus tuberculosis
2	11 y.	5.7	11.0	Traumatic pleuritis (recovered)
3	7 y. 3 m.	11.0	17.5	Pleuritis
4	2 y. 10 m.	5.0	10.9	Latent tuberculosis
5	2 y. 1 m.	5.5	14.0	Conjunctivitis phlyctenulosa
6	7 y. 8 m.	3.5	8.0	Healthy
7	5 y. 2 m.	3.0	7.0	"
8	13 y.	6.0	11.5	Apicitis tuberculosa?
9	11 y. 5 m.	5.0	10.0	Latent tuberclosis
10	8 y. 2 m.	15.5	22.5	Phthisis pulmonum tuberculosa
11	12 y.	23.0	26.5	Pulmonary tuberculosis
12	9 y.	7.0	18.5	Pleuritis
13	9 y. 6 m.	4.0	11.5	Bronchoadenitis?
14	5 y. 9 m.	2.5	5.5	Healthy
15	8 y.	2.5	5.0	Spondylitis tuberculosa?
16	8 y. 5 m.	17.5	23.0	Pleuritis
17	12 y. 3 m.	1.5	4.0	Anorexia nervosum
18	10 y. 8 m.	21.5	25.5	Pulmonary tuberculosis
19	8 y.	2.0	8.0	Gastroptosis
20	12 y. 8 m.	16.5	25.0	Pleuroperitonitis
21	3 y. 4 m.	6.0	20.0	Chronic bronchopneumonia
22	6 y. 6 m.	10.0	16.5	Chronic bronchitis
23	7 y.	3.5	7.5	Rhinitis
24	3 y. 7 m.	2.0	6.5	Cystitis?
25	2 y. 11 m.	5.5	10.5	Chronic dyspepsia
26	7 y. 11 m.	11.5	20.0	Endocarditis
27	5 y.	12.0	24.5	Pleuroperitonitis tuberculosa
28	4 y. 9 m.	11.0	17.5	Pulmonary tuberculosis
29	3 y. 6 m.	6.0	11.5	Latent tuberculosis
30	5 y. 2 m.	7.0	17.0	Lymphadenitis colli
31	9 y. 4 m.	18.0	26.0	Pleuroperitonitis
32	3 y. 8 m.	7.0	15.5	Enuresis, Hilitis tuberculosa
33	11 y.	3.0	8.0	Hyperventilation
34	5 y. 4 m.	3.5	8.5	Latent tuberculosis
35	8 y.	8.5	15.0	Brohchitis acuta
36	2 y. 6 m.	21.0	24.5	Pulmonary tuberculosis
37	2 y. 5 m.	9.0	16.5	Chronic bronchitis
38	7 y. 10 m.	5.5	12.0	Hilitis tuberculosa

Nos. of cases	Age	Sedimentation, m. m.		Clinical diagnosis
		30'	60'	
39	6 y. 1 m.	3.5	10.0	Enuresis nocturna
40	10 y. 5 m.	14.5	21.0	Typhus abdominalis
41	7 y. 10 m.	9.0	16.0	Chronic bronchitis
42	5 y. 8 m.	3.0	15.5	Anorexia
43	12 y.	26.5	29.0	Pulmonary tuberculosis
44	5 y.	11.5	20.0	Chronic bronchitis
45	8 y. 5 m.	7.0	15.5	Pulmonary tuberculosis
46	8 y. 3 m.	6.5	13.5	Syphilis
47	6 y. 10 m.	7.0	12.5	Peritonitis
48	3 y. 8 m.	6.0	11.0	Cardiac disease
49	9 y. 8 m.	13.0	21.0	Pleuropneumonia tuberculosa
50	3 y. 1 m.	18.0	23.0	Tuberculeuse intestinal stenosis
51	5 y. 1 m.	3.0	6.5	Traumatic neuralgia
52	5 y. 9 m.	5.0	9.5	Bronchoadenitis tuberculosa
53	5 y. 7 m.	5.0	11.5	Pulmonary affection.
54	10 y. 10 m.	18.5	25.0	Pulmo-intestinal tuberculosis
55	8 y. 6 m.	14.5	23.0	Brain tumor, Bronchitis (glioma)
56	8 y. 1 m.	15.0	21.0	Pulmonary tuberculosis
57	8 y.	6.0	12.0	Otitis media chronica
58	1 y. 2 m.	4.0	9.5	Anemia
59	4 y. 3 m.	6.0	15.5	Asthmatic bronchitis
60	3 y. 9 m.	13.0	22.0	Pleuritis
61	5 y. 9 m.	5.6	14.0	Lymphadenitis colli
62	4 y. 7 m.	6.0	13.0	Intestinal tuberculosis
63	3 y.	1.5	4.0	Genuine epilepsy
64	4 y. 11 m.	2.5	4.5	Nephritis impetiginosa
65	10 y.	4.0	7.0	Healthy
66	3 y.	3.0	12.5	Diphtheric postparesis
67	1 y. 8 m.	16.0	21.0	Tracheobronchitis
68	9 y. 8 m.	11.0	18.5	Parotitis epidemica
69	5 y. 8 m.	2.5	10.0	Influenza
70	5 y. 4 m.	8.5	18.5	Enteritis acuta. Cystitis
71	6 y. 3 m.	1.5	4.5	Latent tubercnlosis?
72	8 y. 10 m.	10.5	18.5	Pulmonary tuberculosis
73	6 y. 7 m.	19.5	30.0	Scarlet fever
74	8 y. 4 m.	14.0	22.5	Peritonitis, Lymphadenitis tuberculosa
75	7 m.	2.5	6.0	Avitaminotic dyspepsia
76	10 y. 8 m.	6.0	11.5	Ascariasis
77	10 y. 5 m.	14.0	17.0	Dysentheria
78	6 y. 10 m.	15.0	20.5	Scarlet fever
79	14 y. 9 m.	5.0	9.0	Influenza
80	8 y. 6 m.	9.5	17.0	Thyphoid fever
81	2 y. 4 m.	5.0	15.0	Iridocyclitis
82	11 m.	25.0	28.5	Infantile dyspepsia with atrophia
83	8 y. 10 m.	2.0	9.0	Influenza
84	5 y. 5 m.	1.5	2.5	Pleuroperitonitis with Phthisis pulmonum tuberculosa (before 3 days of her death)
85	11 y. 7 m.	3.0	8.5	Spondylitis cariosa
86	6 y.	6.0	10.5	Morbus Addisonii
87	8 y. 2 m.	16.0	20.5	Pollakisuria
88	7 y. 9 m.	21.0	27.0	Pulmonary tuberculosis with Pleuritis
89	6 y. 2 m.	23.0	26.0	Pleuritis exsudativa
90	10 m.	3.0	7.0	Influenza
91	5 y.	6.5	13.5	Chicken pox
92	5 y. 7 m.	26.5	28.0	Otitis media suppurativa acuta

Nos. of cases	Age	Sedimentation, m. m.		Clinical diagnosis
		30'	60'	
93	4 y. 5 m.	4.5	10.0	Latent tuberculosis
94	5 y. 3 m.	4.5	8.5	Healthy
95	5 y. 8 m.	6.5	16.5	Rheumatism
96	3 y. 2 m.	9.0	19.0	Bronchopneumonia
97	1 y. 5 m.	23.0	28.0	"
98	1 y. 1 m.	2.0	7.5	Poliomyelitis anterior
99	3 m.	6.0	19.0	Bronchopneumonia
100	1.5 m.	18.0	24.0	Hereditary syphilis
101	4 y. 9 m.	4.0	8.0	Influenza
102	9 y. 2 m.	25.0	26.5	Pulmonary tuberculosis
103	10 y. 2 m.	5.0	11.0	Taeniasis
104	8 m.	19.0	23.0	Bronchopneumonia
105	7 y. 10 m.	5.0	16.5	Mastoiditis acuta Intestinal tuberculosis?
106	8 y. 9 m.	2.0	9.0	Intestinal tuberculosis?
107	5 y.	11.5	15.5	Bronchoadenitis tuberculosa
108	18 y.	9.0	11.0	Paroxymale hemoglobinuria
109	8 y. 2 m.	2.0	5.0	Angina diphtherica

Conclusions.

1) A new micro method for hemosedimentation has been described. The method needs only 0.05 c.c. of blood for a sample. The rack is portable anywhere with blood-filled pipettes.

2) This method has an average deviation of ± 0.7 mm. from Langer-Schmidt's micro method.

3) This method is compared with Westergren's micro method and there is a fair parallelism between the two methods.