Intensity of Arakawa's Reaction and Blood Platelet Count; Change of Platelet Count on B-Vitamin Administration.

60th* Report of the Peroxidase Reaction.

By

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In the 47th Report on the Peroxidase Reaction I have stated on the basis of blood platelet count most of the healthy mothers secreting human milk negative to Arakawa's reaction** were in a state of avitaminosis B, and that negative Arakawa's reaction could be an early sign of avitaminosis B in an apparently healthy lactant. This conclusion was deduced from strongly Arakawa-positive and completely Arakawa-negative cases alone: So in the 59th Report²⁾ on the Peroxidase Reaction, I investigated cases of mothers with milk of Arakawa's reaction of intermediate strengths, and came to the conclusion that these mothers or intermediate cases were either in a state of B-avitaminosis or on the brink of B-avitaminosis. In the present paper I desire to report further on the result of the investigation with a larger number of cases, especially of intermediate cases—mothers with milk of Arakawa's reaction of intermediate strengths.

* This is my 3rd report on the relation between avitaminosis B and blood platelet count.

** Arakawa-positive case=strongly or normally Arakawa-positive case
=clinically Arakawa-positive case
=mother with milk with strong or normal
Arakawa's reaction
=mother with A.R. (++)1' or (+++)1'

Mother A.R. (+)1' or A.R. (++)2' for instance, is chemically an Arakawa-positive case, but clinically an Arakawa-negative case.

1) J. Kimura, Tohoku J. Exp. Med., 1934, 23, 494.

2) J. Kimura, Tohoku J. Exp. Med., 1935, 27, 360.

Furthermore, I desire to relate the result of the blood platelet count, or rather the change of the count on an administration of vitamin B in some intermediate cases, which in practical medicine are to be considered** as Arakawa-negative cases.

Method of Experiment.

1. **Materials.** As stated above, mothers with human milk of Arakawa's reaction of different intensities were examined, though strongly Arakawa-positive and completely Arakawa-negative cases were also examined.

All the lactants were "healthy," and of course they had not been taking vitamin B preparations. It should be noted that I excluded mothers who had menses at the time.³⁾

2. **Platelet count.** I used Lampert's method. The ear lobe was cleaned with ether, and a cut was made with Frank's needle. Blood was taken in the "A-thrombit" and diluted with Tyrode's solution. After shaking the pipette for a few minutes, the sixth drop of the contents was examined for blood platelets. Blood taking took place between 10 and 11 A.M., when mothers were in a fasting state.

Result of Experiment.

In the present work I investigated 125 cases, of which the most were lactants with milk of Arakawa's reaction of intermediate strength. As to strongly Arakawa-positive and completely Arakawa-negative cases, there were only a few of them, mainly of the former. Therefore, I made statistics of the cases including those reported in the 47th¹⁾ and 59th²⁾ Report of the Peroxidase Reaction as well as of the cases alone reported in the present paper.

1. **Blood platelet count in strong Arakawa-positive cases.**

There were only 4 Arakawa-positive cases, or cases of mothers with milk strongly positive to Arakawa's reaction. But all these cases showed a blood platelet count under 300 000 per cmm. two of them under 200 000 (Cf. Table I and Table IV).

2. **Blood platelet count in completely Arakawa-negative cases.**

There were 12 cases of mothers with completely or almost com-

3) T. Ootsuka, *Kyotofuritsu Ikadaigaku Zasshi.*, 1932, 6, 2434.

4) H. Lampert, *Verh. Dtsch. Ges. inn. Med.*, 1931, 43, 92.

TABLE I.
Blood platelet count in lactants with milk of strong Arakawa's reaction.

Number of experiment	Month of experiment	Diagnosis of infant	Age of infant m=months y=year	Arakawa's reaction						Mother's blood platelet count per cmm.
				right			left			
				(0') (1' (2' (3' (4' (5'	(0' (1' (2' (3' (4' (5'					
No. 1	June	Rhinopharyngitis and bronchitis	8 m.	(±) (++) (++) (++) (++) (++)	(±) (++) (++) (++) (++) (++)	(±) (++) (++) (++) (++) (++)	190,000			
No. 2	July	Dyspepsia	6 m.	(+) (++) (++) (++) (++) (++)	(+) (++) (++) (++) (++) (++)	(+) (++) (++) (++) (++) (++)	280,000			
No. 3	"	Whooping cough	3 m.	(±) (++) (++) (++) (++) (++)	(±) (++) (++) (++) (++) (++)	(±) (++) (++) (++) (++) (++)	280,000			
No. 4	February	Influenza	2 m.	(±) (++) (++) (++) (++) (++)	(±) (++) (++) (++) (++) (++)	(±) (++) (++) (++) (++) (++)	190,000			

TABLE II.
Blood platelet count of lactant with completely (or almost completely) Arakawa-negative milk.

Number of experiment	Month of experiment	Diagnosis of infant	Age of infant m=months y=year	Arakawa's reaction						Mother's blood platelet count per cmm.	
				right			left				
				(0') (1' (2' (3' (4' (5'	(0' (1' (2' (3' (4' (5'						
No. 1	April	Infantile beriberi	1 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	670,000
No. 2	May	Influenza and dyspepsia	4 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	620,000
No. 3	"	Congenital cardiac defect	1 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	850,000
No. 4	"	Paralysis of left hand	1 y. 2 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	850,000
No. 5	July	Bronchitis and syphilis	6 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	620,000
No. 6	October	Infantile preberiberi	1 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	810,000
No. 7	November	Atrophy	1 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	500,000
No. 8	January	B-avitaminotic dyspepsia	1 y. 5 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	620,000
No. 9	"	Melena neonatorum	half m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	600,000
No. 10	"	Atrophy	1 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	680,000
No. 11	"	Rhinopharyngitis	4 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	590,000
No. 12	"	Infantile preberiberi	1 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	710,000

pletely negative Arakawa's reaction. 3 cases of these showed a count over 800 000 per cmm, and the case with the smallest count was 500-000. It will be seen that in regard to the blood platelet count there is a very wide margin between Arakawa-positive and-negative cases (Cf. Table II and Table IV).

3. Blood platelet count in cases with Arakawa's reaction of intermediate strengths.

There are as many as 109 cases with intermediate Arakawa's reaction. Of these not a single case showed a platelet count under 200 000, and in only 8.3% of all the cases the count was between 200-000 and 300 000. If the normal fluctuation is between 100 000 and 400 000, then only 45.9% of all the 101 cases came within this range, while the majority of them—54.1%—were beyond that range. But not a single case showed a higher count than 700 000. And there was only 6.4% of all the cases which came between 600 000 and 700 000. A glance at Table IV (A) and Table IV (B) will show very clearly the relation between Arakawa-positive, -negative and intermediate cases.

The relation given in Table IV will present itself in another form, if the average of the platelet counts in each group of cases is shown (Cf. Table V).

4. Blood platelet count in 325 cases.

In this paragraph the result of all the 325 cases including all the cases reported in the 47th¹⁾ and the 59th²⁾ Reports on the Peroxidase Reaction will be stated. As is shown in Table VI (A), of 65 Arakawa-positive cases, the majority (59.7%) came under the column 200 000—300 000; of 153 intermediate cases the largest percentage (35.9%) under the column 300 000—400 000; and of 105 Arakawa-negative cases the largest percentage (34.3%) came under the column 500 000—600 000. A more precise distribution will be seen from the Table (Cf. Table VI A).

A simpler distribution than was shown in Table VI (A) will be shown in Table VI (B), from which one can conclude that almost all the cases of Arakawa-positive cases are of the blood platelet count of 100 000—400 000, that almost half the number of intermediate cases are of 200 000—400 000 and the other half are of the count 400 000—700 000, and that the majority of Arakawa-negative cases are of the count 400 000—700 000. Further, one can see that there is not a single instance among Arakawa-positive or intermediate cases that is of the count 700 000—1 000 000, but more than 20% of Arakawa-negative cases are of the count 700 000—1 000 000.

TABLE III.
Blood platelet count of lactants milk of Arakawa's reaction of intermediate strengths.

Number of experiment	Month of experiment	Diagnosis of infant	Age of infant m = months y = year	Arakawa's reaction										Mother's blood plate- let count per cmm.	
				right					left						
				(0')	(1')	(2')	(3')	(4')	(5')	(0')	(1')	(2')	(3')	(4')	(5')
No. 1	February	Rhinopharyngitis	9 m.	(-)	(-)	(-)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 2	"	Atrophy	3 m.	(-)	(-)	(-)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 3	April	Hypotrophy	1 m.	(-)	(-)	(-)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 4	"	Dyspepsia	10 m.	(+)	(+)	(+)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)
No. 5	"	Hypotrophy	9 m.	(-)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 6	"	Dyspepsia	6 m.	(+)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 7	"	Rhinopharyngitis	10 m.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
No. 8	"	Obstipation and hypogalactia	5 m.	(+)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 9	"	Lymphadenitis	2 m.	(-)	(-)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 10	"	Infantile preberiberi	4 m.	(-)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 11	May	Eczema	8 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(+)	(+)	(+)	(+)	(+)
No. 12	"	Rhinopharyngitis	7 m.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
No. 13	"	Infantile preberiberi	4 m.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
No. 14	"	Hypotrophy	10 m.	(-)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 15	"	Dyspepsia	1 y. 3 m.	(+)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 16	"	Congenital syphilis	1 y. 2 m.	(+)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 17	"	B-avitaminotic dyspepsia	3 m.	(-)	(+)	(+)	(+)	(+)	(+)	(-)	(-)	(-)	(+)	(+)	(+)
No. 18	June	Atrophy and dyspepsia	1 y. 1 m.	(-)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 19	"	Rhinopharyngitis	9 m.	(-)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
No. 20	"	Infantile preberiberi	3 m.	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)	(+)
No. 21	"	Dyspepsia	1 y. 5 m.	(-)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 22	"	Congenital syphilis and B-avitaminotic dyspepsia	3 m.	(-)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 23	"	Polimyelitis anterior	2 y. 4 m.	(-)	(+)	(+)	(+)	(+)	(+)	(-)	(+)	(+)	(+)	(+)	(+)
No. 24	"	Icterus neonatorum	1 m.	(-)	(+)	(+)	(+)	(+)	(+)	(-)	(-)	(-)	(-)	(-)	(-)

No. 25	"	Acute Rhinopharyngitis	3 m.	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(-)	(
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Number of experiment	Month of experiment	Diagnosis of infant	Age of infant m = months y = year	Arakawa's reaction						Mother's blood plate- let count per cmm.
				right			left			
				(0') (1' (2' (3' (4' (5'	(0') (1' (2' (3' (4' (5'	(0') (1' (2' (3' (4' (5'				
No. 59	August	Hypogalactia	5 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	500,000			
No. 60	"	Dyspepsia	1 y. 1 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(±) (±) (±) (±) (±) (±)	380,000			
No. 61	September	Icterus neonatorum	1 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	450,000			
No. 62	"	Infantile dyspepsia	5 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	410 000			
No. 63	"	Furuncle	7 m.	(+) (++) (++) (++) (++) (++)	(+) (++) (++) (++) (++) (++)	(+) (++) (++) (++) (++) (++)	250,000			
No. 64	"	Rachitis	1 y. 2 m.	(+) (±) (±) (±) (±) (±)	(+) (±) (±) (±) (±) (±)	(+) (±) (±) (±) (±) (±)	270,000			
No. 65	"	Eczema	4 m.	(+) (++) (++) (++) (++) (++)	(+) (++) (++) (++) (++) (++)	(+) (++) (++) (++) (++) (++)	360,000			
No. 66	"	Paralysis of both legs	2 y. 1 m.	(±) (±) (±) (±) (±) (±)	(±) (±) (±) (±) (±) (±)	(±) (±) (±) (±) (±) (±)	380,000			
No. 67	"	Acute angina	7 m.	(±) (±) (±) (±) (±) (±)	(±) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	440,000			
***** No. 68	"	Acute angina	1 y. 2 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	540,000			
No. 69	"	Dyspepsia	6 m.	(+) (++) (++) (++) (++) (++)	(+) (++) (++) (++) (++) (++)	(±) (±) (±) (±) (±) (±)	330,000			
No. 70	October	Enteritis	1 y. 10 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	430,000			
No. 71	"	Acute pharyngo- tracheitis	8 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	400,000			
No. 72	November	Bronchitis	5 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	550,000			
No. 73	"	Milk vomiting	1 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	690,000			
No. 74	"	Rhinopharyngitis	4 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	440,000			
No. 75	"	Infantile preberiberi	2 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(±) (±) (±) (±) (±) (±)	360,000			
No. 76	"	B-avitaminotic dyspepsia	3 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	440,000			
No. 77	"	Dyspepsia	11 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	440,000			
No. 78	"	Rachitis	1 y. 1 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	450,000			
No. 79	"	Dyspepsia	3 m.	(+) (++) (++) (++) (++) (++)	(+) (++) (++) (++) (++) (++)	(+) (++) (++) (++) (++) (++)	350,000			
No. 80	"	Infantile perberiberi	3 m.	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	(-) (±) (±) (±) (±) (±)	620,000			

TABLE IV (A).

Distribution of A r a k a w a-positive, -intermediate and -negative cases according to the blood platelet count.

Blood platelet count	Strongly A r a k a w a-positive cases (4 in all)	Cases with inter- mediate A r a k a w a's reaction (109 in all)	Completely (or almost completely) A r a k a w a-negative cases (12 in all)
100,000- 200,000	50% (2 cases*)	0	0
210,000- 300,000	50% (2 cases*)	8.3% (9 cases)	0
310,000- 400,000	0	37.6% (41 cases)	0
410,000- 500,000	0	30.3% (33 cases)	0
510,000- 600,000	0	17.4% (19 cases)	25% (3 cases)
610,000- 700,000	0	6.4% (7 cases)	41.7% (5 cases)
710,000- 800,000	0	0	8.3% (1 cases)
810,000- 900,000	0	0	25% (3 cases)
910,000-1000,000	0	0	0

* Cf. Table VI (A), as in this table (Table IV) strongly A r a k a w a-positive cases are only a few in number.

TABLE IV (B).

Distribution of A r a k a w a-positive, -intermediate and -negative cases according to the blood platelet count.

Blood platelet count	Strongly A r a k a w a-positive cases (4 in all)	Cases with inter- mediate A r a k a w a's reaction (109 in all)	Completely (or almost completely) A r a k a w a-negative cases (12 in all)
100,000- 400,000	100% (4 cases)	45.9% (50 cases)	0
410,000- 700,000	0	54.1% (59 cases)	66.7% (8 cases)
710,000-1000,000	0	0	33.3% (4 cases)

TABLE V.

Average of blood platelet counts according to A r a k a w a-positive, intermediate and -negative cases.

	Strongly A r a k a w a-positive cases (4 in all)	Cases with inter- mediate A r a k a w a's reaction (109 in all)	Completely (or almost completely) A r a k a w a-negative cases (12 in all)
Blood platelet count	237,000	430,000	678,000

TABLE VI (A).

Distribution of Arakawa-positive, -intermediate and -negative cases according to the blood platelet count.

Blood platelet count	Strongly Arakawa-positive cases (67 in all)	Cases with intermediate Arakawa's reaction (153 in all)	Completely (or almost completely) Arakawa-negative cases (105 in all)
100,000- 200,000	17.9% (12 cases*)	0	0
210,000- 300,000	59.7% (40 cases*)	9.1% (14 cases)	3.8% (4 cases)
310,000- 400,000	19.4% (13 cases)	35.9% (55 cases)	8.6% (9 cases)
410,000- 500,000	1.5% (1 case)	30.1% (46 cases)	16.2% (17 cases)
510,000- 600,000	1.5% (1 case)	18.9% (29 cases)	34.3% (36 cases)
610,000- 700,000	0	5.9% (9 cases)	15.2% (16 cases)
710,000- 800,000	0	0	8.6% (9 cases)
810,000- 900,000	0	0	10.5% (11 cases)
910,000-1000,000	0	0	2.8% (3 cases)

TABLE VI (B).

Distribution of Arakawa-positive, -intermediate and -negative cases according to the blood platelet count.

Blood platelet count	Strongly Arakawa-positive cases (67 in all)	Cases with intermediate Arakawa's reaction (153 in all)	Completely (or almost completely) Arakawa-negative cases (105 in all)
100,000- 400,000	97% (65 cases)	45.1% (69 cases)	12.4% (13 cases)
410,000- 700,000	3% (2 cases)	54.9% (84 cases)	65.7% (69 cases)
710,000-1000,000	0	0	21.9% (23 cases)

TABLE VI (C).

Average of blood platelet count according to Arakawa-positive, intermediate and -negative cases.

	Strongly Arakawa-positive cases (67 in all)	Cases with intermediate Arakawa's reaction (153 in all)	Completely (or almost completely) Arakawa-negative cases (105 in all)
Blood platelet count	265,000	430,000	573,000

As to the average count of each group, the following will show a rough proportion (Cf. Table VIc and Figure).

Arakawa-positive case		Intermediate case		Arakawa-negative case
1	:	1.6	:	2.2
or mnemo-technically 1	:	1.5	:	2

Fig. 1. Distribution of Arakawa-positive, -intermediate and -negative cases.

5. Change of blood platelet count according to change of Arakawa's reaction of medication of vitamin B in one and the same lactants.

As was shown in the last paragraph, the blood count varies not so much according to lactants as according to Arakawa's reaction of the lactants. Now Arakawa's reaction is, as Arakawa's experiment⁹⁾ shows, made from negative to positive on administration of vitamin B, though the amount of this is

different according to cases. The experiment in human cases has been, and is, daily going on in our Department. Takamatsu's⁵⁾ paper verifies this. Now, almost all B-avitaminotic lactants seen in daily practice are not acute cases, of course, and a daily administration of vitamin B in a not very large amount cannot easily make Arakawa-negative case Arakawa-positive, but when mothers with Arakawa-negative milk are taking vitamin B, the milk is losing in its toxicity or its content in glyoxal-like substances, even if it still remains negative to Arakawa's reaction all the same. This is what was shown by Takamatsu.⁵⁾

It was difficult to examine mothers for a long time, because as soon as their infants had recovered they stopped visiting our dispensary. But I was able to follow 17 cases with the result shown in Table VII.

Most of the 17 cases given in Table VII showed an improvement of Arakawa's reaction on a daily administration of vitamin B, and all the cases showed a decrease in the blood platelet count. In Cases No. 12 and No. 17 Arakawa's reaction did not improve at all, as far as the reaction during the first five minutes was concerned. Yet vitamin B must have decreased the toxicity of each milk, with the platelet count showing a decrease too. Only in Case No. 17, not vitamin

5) A. Takamatsu, Tohoku J. Exp. Med., 1934, 23, 46.

TABLE VII.
Change of blood platelet count on administration of vitamin B in lactants.

[illegible]

Number	Case	Date of experiment	Arakawa's reaction		Blood platelet count per cmm.	Administration of vitamin B	Remark
			right (0') (1') (2') (3') (4') (5')	left (0') (1') (2') (3') (4') (5')			
6	Atsumi	18. VI	(-)(-)(-)(-)(-)(±)	(-)(-)(-)(-)(-)(±)	650,000	Paranutrin (3 grms.) subcutaneous every second day.	Yakriton 1/2 R.A.U. subcutaneous from 23. VI every second day.
		23. VI	(-)(±)(+)(+)(+)(+)	(-)(-)(-)(±)(±)(±)	570,000	Oryzanin (1 grm.) subcutaneous from 23. VI every second day.	
		2. VII	(-)(+)(+)(+)(+)(+)	(-)(±)(±)(+)(+)(+)	450,000		
7	Nishita	23. VI	(-)(-)(-)(-)(-)(-)	(-)(±)(±)(+)(+)(+)	410,000	Paranutrin (3 grms.) subcutaneous every second day.	Yakriton 1/2 R.A.U. subcutaneous injection every second day.
		27. VI	(-)(-)(-)(-)(-)(-)	(±)(±)(+)(+)(+)(+)	390,000		
		4. VI	(-)(±)(±)(+)(+)(+)	(-)(-)(±)(±)(±)(±)	350,000		
8	Kitsunai	25. VI	(±)(+)(+)(+)(+)(+)	(-)(±)(±)(+)(+)(+)	410,000	Oryzanin (1 grm.) subcutaneous every second day.	
		2. VII	(±)(+)(+)(+)(+)(+)	(±)(±)(±)(+)(+)(+)	380,000		
9	Tobe	19. IX	(-)(-)(-)(-)(-)(-)	(-)(-)(-)(-)(-)(-)	900,000	Berberol (15 grms.) per os daily.	per os
		25. IX	(-)(±)(+)(+)(+)(+)	(-)(-)(-)(-)(-)(-)	750,000	Oryzanin (5 grms.) per os from 25. IX daily.	
		2. X	(-)(-)(±)(+)(+)(+)	(-)(-)(±)(±)(+)(+)	480,000		
10	Nishiei	6. X	(-)(-)(-)(-)(-)(-)	(-)(-)(-)(-)(-)(-)	480,000	Berberol (10 grms.) per os daily.	per os
		18. X	(-)(-)(-)(-)(-)(-)	(-)(-)(-)(-)(-)(-)	430,000		
11	Hashimoto	6. X	(-)(-)(-)(-)(-)(-)	(-)(-)(-)(-)(-)(-)	510,000	Oryzanin (5 grms.) per os daily.	per os
		13. X	(-)(-)(-)(-)(-)(-)	(-)(±)(±)(+)(+)(+)	430,000		

12	Ooshiro	8. XI 13. XI	(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-) (-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)	910,000 880,000	Oryzanin (1 grm.) subcutaneous every second day.
13	Adachi	10. XI 16. XI	(-)(-)(-)(±)(±)(±)(±)(±)(-)(-)(-)(±)(±)(±)(±) (-)(-)(-)(±)(±)(±)(±)(±)(-)(-)(-)(±)(±)(±)(±)	520,000 480,000	Berberol (3 grms.) subcutaneous every second day.
14	Munegata	9. XI 18. XI	(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-) (-)(±)(±)(±)(±)(++)(++)(-)(++)((+)((++)(++)(+++))	670,000 410,000	Berberol (10 grms.) per os daily.
15	Suzuki	1. XII 6. XII	(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-) (-)(-)(-)(-)(-)(-)(-)(±)(-)(-)(-)(-)(-)(±)	460,000 400,000	Oryzanin (30 grms.) per os daily.
16	Suto	25. II 28. II	(-)(-)(-)(-)(+)(±)(+)(+)(-)(-)(-)(-)(-)(-) (-)(±)(±)(+)(+)(+)(+)((+)((-)(-)(±)(+)(+)(+))	350,000 320,000	Oryzanin (10 grms.) per os daily.
17	Sugi	31. X 18. XI 8. XII	(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-) (-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-) (-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)(-)	500,000 610,000 530,000	Cod-liver oil (10 grms.) per os daily for one week and diarrhoea from 11. X. Berberol (10 grms.) per os from 18. XI daily.

B, but cod liver oil was given at first, and the blood count did not become smaller, but larger. Then cod liver oil was stopped and vitamin B administered daily, the result of which was a decrease of the count. In Cases No. 2, No. 4, No. 6 and No. 7 yakriton was also used for a better mobilization of vitamin B (Cf. Takamatsu's⁶⁾ paper).

This experiment on an improvement of Arakawa's reaction with a simultaneous decrease of platelet count on an administration of vitamin B has much in common with the experiments of Nakamura⁷⁾ and of Kooda,⁸⁾ who both saw a decrease of the platelet count following vitamin B administration in beriberi cases.

Summary.

In the present paper I reported on the blood platelet count in mothers with milk of Arakawa's reaction of intermediate strengths between strongly positive and completely Arakawa-negative reactions. And I made a statistical investigation of all the cases reported in the 47th and the 59th Report on Peroxidase Reaction as well as in the present paper.

Arakawa⁹⁾ of our Laboratory has shown that rabbits milk negative to Arakawa's reaction is from a B-avitaminotic body. Human milk negative to the reaction is from a B-avitaminotic body. A mother with Arakawa-negative milk is already in a state of avitaminosis B, as has been shown on the basis of the blood platelet count. And, as has been shown again on the same basis, mothers with Arakawa's reaction of intermediate strengths are generally either in a state of avitaminosis B or on the brink of B-avitaminosis. This was further confirmed by the present paper.

Besides, I was able to make the platelet count smaller in cases of negative or weak Arakawa's reaction by administering vitamin B to them, which fact shows again that Arakawa-negative cases are already in a state of B-avitaminosis.

Conclusions.

On the basis of the blood platelet count it is shown—1. that Ara-

6) A. Takamatsu, Tohoku J. Exp. Med., 1934, 23, 372.

7) N. Nakamura, Nippon Naikwagakukwai Zasshi., 1925, 13, 31.

8) S. Kooda, Jika Zasshi., 1935, 607.

9) T. Arakawa, Tohoku J. Exp. Med., 1930, 16, 118.

ka wa-positive cases show mostly a physiological blood platelet count, that weakly Arakawa-positive cases show generally a larger platelet count, and that Arakawa-negative cases show the largest count, and—2. that mothers with weak or negative Arakawa's reaction show a decrease of platelet count on administration of vitamin B. 3. It is further confirmed that "healthy" mothers with weak or negative Arakawa's reaction are already on the brink of avitaminosis B, or in a state of avitaminosis B.