In that case the cathode discharge is (to use a figure of speech) drawn through, rather than forced through the tube. Their bearing on lightning protection may also be of importance.

FRANCIS E. NIPHER

A PRELIMINARY REPORT OF A NEW BLOOD PICTURE

THE fact that the white blood cells and particularly the neutrophiles of the blood react to certain bacilli and certain toxins in such a definite way is of great assistance to the differential blood count either in diagnosis or in prognosis.

Arneth[1] first showed something of this in his papers upon tuberculosis where he showed that while blood of a normal person contains neutrophiles which have nuclei from one to five lobes, that of a tubercular person contains neutrophiles whose nuclei have only one, two or three lobes.

A study of the neutrophiles of normal blood shows that they can be divided into five groups according to the number of the lobes of the nucleus, *i. e.*, Group I., those neutrophiles which contain a single lobed nucleus; Group II., those which contain two lobes and so on up to Group V., which contains those neutrophiles which have five lobes to the nucleus. The number of neutrophiles in these different groups, where one hundred neutrophiles have been counted, forms what may be called the differential neutrophile count, and this is practically constant for all normal blood.

	I.	II.	III.	IV.	V.
100 neutrophiles	5	20	48	22	5

To make this as simple as possible, in order to chart it, a proportion between the two types of neutrophiles can be made as was suggested by Bushnell and Treuholtz,[2] that is, between those neutrophiles which have the fewer lobes, or Group I., Group II. and half of Group III. and those neutrophiles which have more lobes, or Group V., Group IV. and half of Group III.

[1] Arneth, "Die Lungenschwindsucht am Konig Juliuspital," Wurzburg, 1905.

[2] C. E. Bushnell and C. A. Treuholtz, *Medical Record*, March 21, 1908.

Since in normal blood the proportion is usually even, one can thus see at a glance to which side the number of pieces of the nucleus has shifted.

	I.	II.	III.	IV.	V.	
Blood from normal person	5	20	48	22	5	= 49:51
Blood from person with tuberculosis	20	32	40	8	0	= 72:28
Blood from person with infection ..	2	8	40	30	20	= 30:70

The results from my experiments seem to prove that the neutrophile reacts to changes in its environment by some change, probably metabolic, which involves the nucleus and that the state of the nucleus, together with the differential blood count, can be used as a guide as to the condition of the body.

Experiments where guinea pigs were inoculated with tuberculosis bacilli show that the neutrophile first reacts by a rapid increase in the number of lobes of its nucleus and then, later when the guinea pig reaches a state of definite tuberculosis, the neutrophile contains a nucleus of but one, two or three lobes.

Experiments of different sorts show that this same increase of the number of lobes of the nucleus can take place in blood outside the body in such a short time as five or ten minutes.

All the slides I have examined in the opsonic work show this same increase in the number of lobes of the nucleus and I might mention here that it seems a mistake to test certain serum with normal neutrophiles as is done in Wright's opsonic work, since the neutrophiles of the patient may have an entirely different ability to react, from those of the normal person.

Some toxins, especially snake toxin, has the same effect upon the neutrophiles and causes a great increase in the number of lobes of the nucleus.

Observations in the hospital, together with these experiments, seem to prove that the neutrophiles first react to the presence of bacilli or a toxin by some metabolic change, which is shown by increase in the number of lobes of the nucleus; these reacted cells then break down or are used up in the blood followed by

a leucocytosis, which brings in the younger neutrophiles, *i. e.*, with one or two lobes, from the bone marrow. If there is enough toxin or bacilli present, these neutrophiles react even with a leucocytosis and, in all such cases, pus has been shown to be present. As the infection disappears, the neutrophiles cease to react and the number of white blood cells drops until the blood picture is again normal. A good prognosis in such an infection as pneumonia would be a high white blood cell count together with a large proportion of the neutrophiles having the smaller number of lobes to the nucleus, for in this case the neutrophiles which react are being used up and new ones brought into the blood to take their place.

The following are a few typical blood pictures:

Normal

Differential Blood Count		Differential Neutrophile Count	
W. B. C.	8,000	I. 5	
Neutrophiles	65	II. 22	
Large lymphocytes	23	III. 48	48:52
Small lymphocytes	12	IV. 26	
Eosinophiles	0	V. 5	
Basophiles	0		

Tuberculosis

W. B. C.	10,000	I. 20	
Neutrophiles	64	II. 40	75:25
Large lymphocytes	28		
Small lymphocytes	6	III. 30	
Eosinophiles	1	IV. 10	
Basophiles	1	V.	

Pneumonia

W. B. C.	20,000	I. 30	
Neutrophiles	80	II. 40	80:20
Large lymphocytes	15		
Small lymphocytes	5	III. 20	
Eosinophiles	0	IV. 10	
Basophiles	0	V.	

Pus Case

W. B. C.	24,000	I. 4	
Neutrophiles	80	II. 14	
Large lymphocytes	12	III. 18	
		IV. 32	27:73
Small lymphocytes	6	V. 21	
Eosinophiles	1	VI. 9	
Basophiles	1	VII. 2	

The differential blood count is necessary to determine the different kinds of blood cells present in the blood, but the state of the neutrophile is also of great assistance in making the diagnosis and especially the prognosis.

A paper which gives in detail these experiments, which were carried on in the laboratory of Dr. Max Hartmann, in Berlin, will appear shortly; also the hospital observations made in connection with Dr. James Alexander Miller at the Bellevue Hospital will be reported in a paper with Dr. Miller in May.

Margaret A. Reed

NOTES ON THE FOOD OF A KING EIDER

A female king eider (*Somateria spectabilis*) was captured on Seneca River, N. Y., November 26, 1909, by Mr. J. T. Lloyd. After preserving the bird for the Cornell University Museum (No. 5332), the enteron was opened and examined for its food contents. In view of the scarcity of accurate notes dealing with the food of our wild ducks, the material examined would seem to justify the presentation of the data which follow:

CONTENTS OF THE CROP AND STOMACH

Pisces—1 specimen *Boleosoma nigrum olmstedi*, johnny darter.

Amphibia—2 specimens *Rana pipiens*, leopard frog.

Insecta—3 specimens *Gyrinus*, whirligig-beetle.

Crustacea—67 specimens *Gammarus fasciatus*, fresh-water "shrimp."

Mollusca—1 specimen *Planorbis*, small, 2 mm. in diameter.

CONTENTS OF THE GIZZARD

Amphibia—Bones of at least one frog.

Insecta—2 specimens, *Gyrinus*.
2 specimens, *Corisa*, water-boatman.

Crustacea—5 specimens, *Gammarus fasciatus*.
1 specimen, *Asellus*.

Mollusca—3 specimens, *Physa*.
1 specimen, *Limnœa*, small.
1 specimen, *Planorbis*, small, 1 mm. in diameter.
Several pieces of the shell of some large bivalve.

Vegetable—2 small seeds not identifiable.
3 small pieces of the leaves of some aquatic plant.