On the barograph points A to H have been designated, which correspond to periods when the leukocytic count was increasing and these letters have been carried down to the individual leukocyte curves. Of course, not every curve reflects the change to the same degree nor at quite the same time. These periods of stimulation are associated with many other evidences of general stimulation of the organisms, a mechanism which must be dealt with in subsequent papers.

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Meteorological Influences on Leukocytic Partition.

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In the preceding note we have called attention to certain periodic leukocytic fluctuations which occur simultaneously in all normal individuals as well as patients.

If we analyze the differential count the leukocytic partition reveals even more clearly the periods of stimulation, both in the increase in the number of polymorphonuclear leukocytes as well as the striking periodicity in the appearance of the eosinophiles. In the normal individual this eosinophilia is limited to 2 or 3% of the total count, in the vegetatively stigmatized group of individuals, however, the count may reach 15% on such days of stimulation with a complete disappearance the following day. It is, of course, well known that the periods of stimulation apparent in the patient with pernicious anemia are heralded by a similar increase in the eosinophile count.

In the graphic presentation of the same 4 normal subjects discussed in the preceding note, a barographic tracing has been carried across the chart for each individual subject (heavy line) and the daily percentage of polymorphs is indicated in a light solid line. The number of eosinophiles is indicated by the small crosses below the barograph and basophiles are indicated by the letter B. They were only observed in subject No. 2.

It will be noted that (1) subject No. 4 has the lowest proportion of polymorphonuclear leukocytes and in this individual the periods of stimulation and recovery are of longer duration and of somewhat greater magnitude. (2) The periods of stimulation occur

synchronously in all the individuals. (3) That these periods are associated with the appearance of eosinophiles so that these, too, occur simultaneously in all individuals.

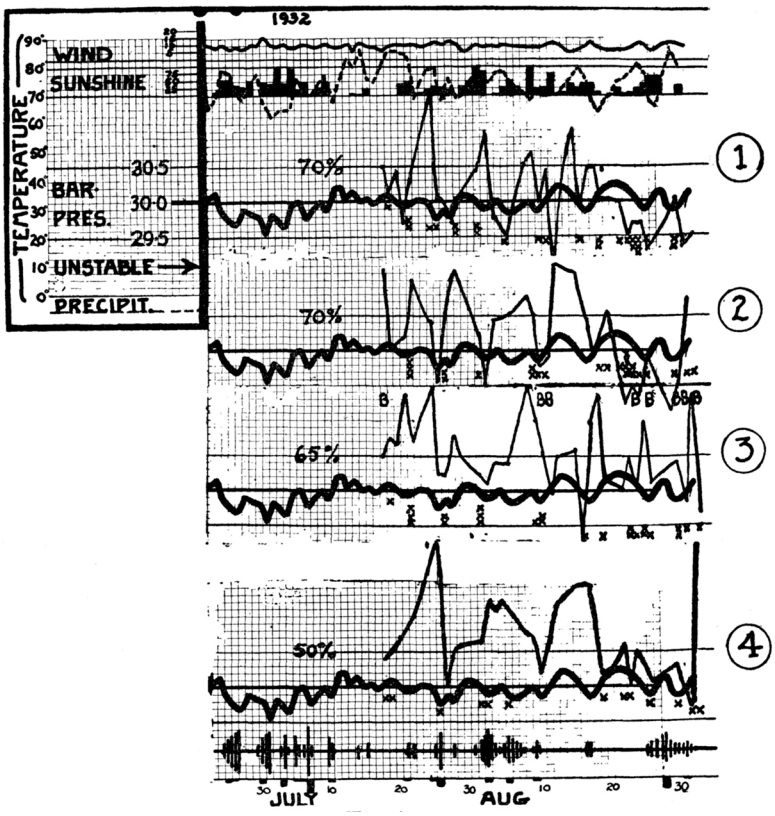

FIG. 1.

Graph illustrating relation of barometric fluctuations to the differential count. Increase in polymorphonuclear leucocytes follows the point of low barometric pressure, *i. e.*, periods of anorexemia. Points marked x indicate appearance of eosinophiles, points marked B indicate appearance of basophiles in the blood smear.

So far as we have been able to observe in the literature, only Franke[1] has noted this association of eosinophiles with weather changes.

Individual differences in the curves of the individuals here portrayed are indicative of differences in the functional condition in the hematopoietic system, with summation and fatigue more pronounced in subject No. 4. Persons of this constitutional habitus are more susceptible to the development of leukocytic pathology including the exhaustion picture of agranulocytosis or the irritation

[1] Franke, Kurt, *Strahlentherapie*, 1932, **43**, 517.

picture of leukemia. These clinical conditions will be discussed elsewhere.

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Determination of Serum Total Base.

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Practically all the modern methods of determining serum total base are modifications of Fiske's[1] procedure for total base in urine. The modification proposed by Stadie and Ross[2] has until recently received the widest use. In this method, the serum is ashed directly without removal of phosphate, and the base in the ash, which is present as sulfate, is analyzed by the indirect titration method of determining the sulfate as benzidine sulfate. A correction is added for the amount of base present as metaphosphate.

Recently Peters and Van Slyke[3] have published a method combining the procedures of Fiske and of Stadie and Ross. The objection to the original method of Stadie and Ross is chiefly that the results obtained are too low and too variable because sulfates are not completely precipitated in the presence of phosphate and because the method of correcting for base bound to phosphate by adding the number of milliequivalents of inorganic phosphate in the serum is not accurate. Peters and Van Slyke's procedure avoids this difficulty by a preliminary removal of the phosphate as ferric phosphate by addition of ferric alum and then ammonia to precipitate the excess iron.

In the author's experience, Peters and Van Slyke's method has a number of objectionable features. First, the procedure is tedious and time-consuming. As described, a single determination requires 24 hours or longer. Secondly, the technique is so difficult and so liable to errors by loss of material that it could not be entrusted to the average hospital technician. Thirdly, the blank is high and variable. Finally, an error is produced by a precipitation of from 1 to 2

* This investigation was begun when the author was a National Research Council Fellow in Medicine at Rush Medical College.

[1] Fiske, C. H., *J. Biol. Chem.*, 1922, **51**, 55.

[2] Stadie, W. C., and Ross, E. C., *J. Biol. Chem.*, 1925, **65**, 735.

[3] Peters, J. P., and Van Slyke, D. D., Quantitative Clinical Chemistry, Vol. II —Methods, Baltimore, 1932.