digestion of cellular proteins accelerated by combination of formaldehyde with the protein-split products. It occurred in the case of 5 meningococcus strains of 7 investigated, one gonococcus of 5 examined, and a catarrhalis strain. It was not observed in the case of a single strain each of Pneumococcus (rough), Type III Pneumococcus (smooth), Staphylococcus, nor *Streptococcus hemolyticus.*

6695

Meteorological Influences on Leukocyte Curve.

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When leukocyte counts are made at short time intervals (5 or 10 minutes) in human subjects or in experimental animals the fluctuations afford an excellent index of the autonomic balance of the splanchnoperipheral system.[1] In addition to this tide, the general leukocytic level will reflect the functional status of the bone marrow and the lymphatic system.

In the course of observations on various constitutional types and their reactions to the environment, we have made daily leukocyte counts under morning basal conditions. These revealed several interesting facts. First, that the leukocytic level is rather characteristic of the constitutional type, the pyknic in general having the most deficient bone marrow and the higher leukocytic levels.

Second, that the fluctuations in the level occur simultaneously in all individuals. While the pyknic may react more vigorously, the leptosome and the asthenic show a synchronous increase or decrease in the level, although the fluctuations may be of minor degree in such persons as might be anticipated from their general somatic reactivity.

Third, that these fluctuations are meteorologically conditioned. Inasmuch as the meteorological environment in its many components offers many individual factors that influence the organism (temperature, humidity, pressure, ionization, etc.) an arbitrary identifica-

[1] Petersen, Wm. F., Müller, E. F., and Boikan, Wm., *J. Infect. Dis.*, 1927, **41**, 405; Petersen, Wm. F., and Müller, E. F., *Arch. Int. Med.*, 1927, **40**, 575; Arquin, S., PROC. SOC. EXP. BIOL. AND MED., 1927, **25**, 97; Müller, E. F., Petersen, W. F., and Hölscher, R., PROC. SOC. EXP. BIOL. AND MED., 1930, **27**, 544.

tion of any one might be premature, but we note the association of change in the barometric pressure as particularly striking to the change in the leukocyte count.

It would appear that periods of stimulation and recovery of the bone marrow are characteristic events in our latitude. The inference might follow that we may have too much or too little of such stimulation for certain types of individuals. The clinical pictures that might follow therefrom are readily demonstrable and will be discussed elsewhere.

The appended graph illustrates the daily leukocyte count in 4 normal young men. No. 1 was a pyknic, No. 2 a mixed athletic type, No. 3 a slender leptosome strongly sympathicotonic, No. 4 a leptosome of rather unstable type.

The upper portion of the chart is made of a meteorograph. It illustrates the daily weather conditions during July and August, 1932. (1) The top line represents the daily mean wind velocity. (2) The amount of cloudiness (black bars). (3) The average daily temperature (dotted line). (4) The barograph (heavy line).

Below, labeled 1, 2, 3, and 4, are extended the leukocytic curves. It will be noted that the curve of No. 1 is the highest while the curve of No. 4 is the lowest in actual count.

Below these 4 leukocyte curves is a horizontal line with vertical bars. These indicate "weather instability" as designated by the Director of the Chicago Station Weather Bureau. Precipitation is indicated by black bars extending down just above the dates.

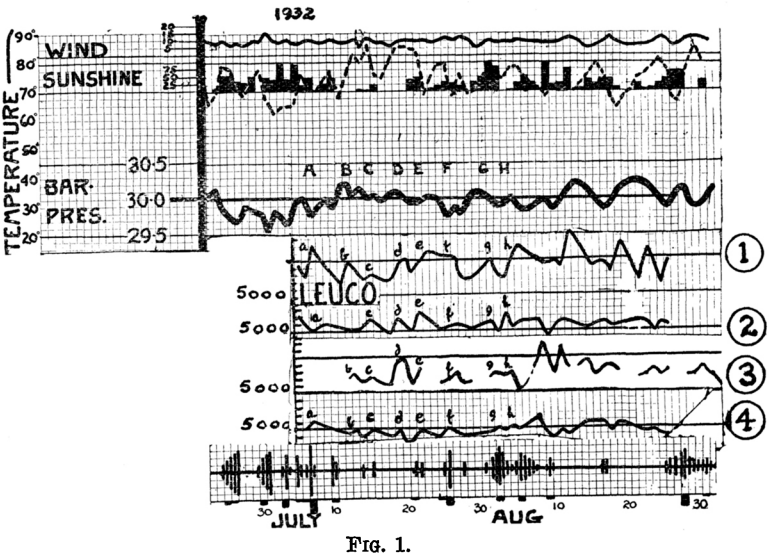

FIG. 1.

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