

5118

Seasonal Variation in Efficiency of New Orleans Sunshine and Skyshine in Promoting Growth and Preventing Leg Weakness in Chicks.*

HENRY LAURENS AND H. S. MAYERSON.

From the Laboratory of Physiology, School of Medicine, Tulane University of Louisiana, New Orleans.

Groups of 2-week-old chicks, fed a leg weakness-producing diet, were exposed daily for 6 weeks to different amounts of sunshine and skyshine between 10:00 A. M. and 1:00 P. M. Growth was followed by weekly weighings. As judged by appearance, attitude, roentgenograms and blood calcium and phosphorus, an average daily exposure to sunshine of 4 to 5 minutes from October, 1929, through March, 1930, and of 2 to 3 minutes through April, 1930, prevented leg weakness. An average daily exposure to skyshine of 62 minutes protected the chicks from October, 1929, to the middle of February, 1930, 28 minutes sufficed from that time through March, 1930, and 23 minutes during April, 1930. We are confident that smaller amounts of radiation would have been effective. Better growth was obtained in the skyshine than in the sunshine animals from October 16 to January 10, indicating that the exposures to direct sunshine were, perhaps, too long.

5119

Classification of the Anemias on the Basis of Differences in the Size and Hemoglobin Content of the Red Corpuscles.

M. M. WINTROBE. (Introduced by J. H. Musser.)

From the School of Medicine, Tulane University of Louisiana, New Orleans.

From determinations of the number of red corpuscles, the quantity of hemoglobin, and the relative volume of packed red cells in any sample of blood it is possible to calculate the mean volume and the hemoglobin content of the red corpuscles of the sample.¹ The constants derived by these calculations are spoken of as mean corpuscular volume, mean corpuscular hemoglobin and mean corpus-

* This work was made possible through the generosity of Mr. J. S. D'Antoni.

¹ Wintrobe, M. M., *Am. J. Med. Sci.*, 1929, clxxvii, 513; *J. Lab. and Clin. Med.*, (to be published).

cular concentration. Mean corpuscular volume is expressed in cubic microns. Mean corpuscular hemoglobin refers to the actual amount of hemoglobin contained in the average red corpuscle and is expressed in micromicrograms. Mean corpuscular concentration refers to the hemoglobin contained in the red corpuscle in proportion to its volume. In the determination of this constant the red corpuscle is presumed to contain an aqueous solution of hemoglobin the concentration of which is calculated and expressed in per cent.

Some 400 accurate blood determinations have been carried out in 140 patients suffering from anemia produced by a large variety of causes. On the basis of differences in the size and hemoglobin content of the red corpuscles observed in these cases, 4 distinct classes have been differentiated:

I. The first and most obvious group, which can be called *macrocytic*, includes the cases of pernicious anemia, sprue, and a case of pernicious anemia of pregnancy. The noteworthy characteristic of this group is an increase in the mean size and hemoglobin content of the red corpuscles. The increases in corpuscular volume and in corpuscular hemoglobin are proportional and thus the normal hemoglobin concentration of the cells is not disturbed. The increases in size and hemoglobin content vary more or less inversely with the red cell count but this correlation is not entirely strict.²

II. The second class, which may be called "*normocytic*," is distinguished by a reduction in the red cell count without any change or at most only a slight increase in the size and hemoglobin content of the red corpuscles. Corpuscular concentration in this group is likewise normal. This class includes cases of anemia resulting from acute blood loss, malarial infection, and several cases of anemia of the aplastic or semi-aplastic type.

III. The third class, which I have termed the "*simple microcytic*" type of anemia includes the most commonly observed forms of anemia. When the reduction in the number of red corpuscles is only slight, no alterations in the size or hemoglobin content of the cells are observed in this class. When the anemia is more marked there is a slight reduction in mean corpuscular volume and in mean corpuscular hemoglobin. When the anemia is severe, the reduction in volume and corpuscular hemoglobin becomes more marked but at no time is this decrease as great as is the reduction in the number of red corpuscles. No matter what the degree of anemia in this class the corpuscular concentration remains normal or only very slightly reduced. The anemia associated with chronic infections and intoxica-

² Wintrobe, M. M., (to be published).

tions, such as bronchiectasis, pulmonary abscess, unresolved pneumonia, typhoid fever, cardiovascular renal disease, and carcinoma, when no blood loss was associated, was found to be of this type.

IV. The fourth class is distinguished by a marked reduction in the volume of the red corpuscles and a decrease in their hemoglobin content which is even more marked than the decrease in size. Even when the number of red corpuscles is not lowered a distinct reduction in their volume has been found in this group of anemias. The reduction in size in this class is even more marked than that observed in class III. The lowest values for mean corpuscular volume have been found in this group.

Even more characteristic than the reduction in the size of the cells in this type of anemia is the alteration in their hemoglobin content. The reduction in corpuscular hemoglobin is even more marked than the diminution in volume with the result that in this group, and apparently in this group alone, corpuscular concentration values significantly and constantly lower than normal are found. For this reason I have called this type of microcytic anemia "*hypochromic*."

The anemias which fall into this hypochromic, microcytic group are largely composed of those resulting from chronic blood loss. Since the cause of the anemia resulting from hookworm infestation is still disputed, it is of especial interest that the anemia observed in hookworm disease has been of this hypochromic type.

Further observations are being made with a view to determining the accuracy and usefulness of this classification, the relationship of the 4 classes of anemia to one another, and the effects of various forms of therapy on the size and hemoglobin content of the red corpuscles.

5120

Mechanism of Nerve Asphyxiation: With a Note on the Nerve Sheath as a Diffusion Barrier.

T. P. FENG AND R. W. GERARD.

From the Department of Physiology, the University of Chicago.

In the absence of oxygen nerve conduction is suspended in several hours, the activity of each fibre becoming gradually less until it blocks. Conduction has been shown to depend on oxidations, and the long persistence of activity with outside oxygen excluded to depend on the existence in nerve of an oxidizing reserve. The rapid recov-