seems not to have been secondary to any excessive haemolysis, but to have been primary in the bone marrow, and I would regard it as a myelogenic form of splenic anaemia of adults, doubtless allied to what French authors have termed "anémie splénique myéloïde." Therefore the case cannot be adduced as an example of pernicious anaemia being followed by or becoming transformed into leukaemia, though it is probable that similar cases have been erroneously supposed to illustrate such a course of events. It is also highly probable that similar cases, owing to enlargement of spleen and liver, have been clinically regarded (in spite of the poikilocytosis) as examples of Banti's disease.

In the German cases, I believe, enlargement of haemolymph glands was not noted.

It is very tempting to suggest that in the present case both the spleen (haemal gland) and the prevertebral haemolymph glands were actively engaged in supplementing the erythrocyte-forming functions of the diseased bone marrow, but I have no conclusive evidence to support such a supposition. From what has been lately written on the subject⁶ it seems that no really satisfactory evidence has been brought forward to show that in adults erythrocytes are produced in the spleen and haemolymph glands either in health or in disease.

NOTES AND REFERENCES.

¹ W. von. Leube, *Deutsche Klinik*, Berlin, 1902, No. 42; and J. Arneith's haematological account of Leube's case in *Deut. Arch. für klin. Med.*, Leipzig, 1901, vol. lxxix, p. 331; also H. Luce, "Ueber Leukanämie," *Deut. Arch. für klin. Med.*, Leipzig, 1903, vol. lxxvii, p. 215. "Leukanæmia" is obviously a term coined out of "leukaemia" and "anaemia," and will, I believe, be found well suited as a clinical term for the present class of cases. ² This comparison of the appearance of very long prevertebral haemolymph glands to leeches has been borrowed from Dr. H. D. Rolleston. ³ I do not use the term "large mononuclear cell" in the limited special sense often attached to it. ⁴ No Prussian blue reaction was obtained by the "long" method employed by Abbott for pieces of tissue which had been lying in formalin (*Vide Trans. Path. Soc. London*, 1900, vol. li, p. 76). ⁵ *Vide* Vaquez and Aubertin, "Nature de l'Anémie Splénique Myéloïde," *Société de Biologie*, Paris, May 14th, 1904. ⁶ See especially "The Pathology of Pernicious Anaemia with special reference to the changes occurring in the Haemolymph Nodes," by Dr. A. S. Warthin, *American Journ. Med. Sci.*, 1902, vol. cxxiv, p. 674.

NOTE ON THE ANTI-HAEMOLYTIC (HAEMOSOZIC) PROPERTIES OF NORMAL URINE.

BY

MARC ARMAND RUFFER, and M. CRENDIROPOULO,
President, Medical Director (1st Class),
Sanitary, Maritime, and Quarantine Council of Egypt.

[From the Port View Laboratory, Alexandria.]

NORMAL aseptic human urine does not, as a rule, dissolve human red blood corpuscles, even when the mixture of urine and red blood corpuscles is kept for many days at the temperature of the room (20° C. to 30° C.). The red blood corpuscles of many pathological urines also sink to the bottom of the vessel and often remain apparently intact, even when no care is taken to secure the asepticity of the urine. In a previous paper we showed the serum of rabbits which had received injection of human urine dissolved human red blood corpuscles in vitro.

We were thus led to inquire whether normal urine contained an antihaemolytic (haemosozic) substance neutralizing the haemolysins present in the sera of animals previously injected with urine.

Experiments showed that a serum markedly haemolytic for sheep's red blood corpuscles is obtained by injecting sheep's urine into rabbits, and that the injection of the urine of the ox produces serum haemolytic for the red corpuscles of the ox. Miss B. Sheldon Amos, working in this laboratory, has found that the injection of small doses of urine produces marked changes in the composition of the blood, and that, occasionally, the injection of so small a quantity as 2 c.cm. of normal urine into a rabbit causes the serum of that animal to become haemolytic.

In connexion with these experiments, it must be remembered that rabbit's serum always dissolves to some extent sheep's red blood corpuscles, and less frequently it haemolyses slightly those of man.

In order to demonstrate the haemosozic property of normal urine, we mixed a given quantity of human red blood corpuscles, previously washed twice in normal salt solution and centrifugalized, with a given quantity of haemolytic serum. In another tube, we added to a similar mixture a certain quantity of freshly passed normal urine. In order to avoid errors

due to greater or lesser dilution, physiological salt solution or normal rabbit's serum was added whenever necessary, so that each tube contained exactly the same quantity of fluid. The following experiment may serve as an example.

EXPERIMENT.—Rabbit (No. 23) received on the first, fifth, and tenth days 3 c.cm. of normal human urine (total 9 c.cm.). The serum was found haemolytic for human corpuscles. The serum of this animal we call Serum 23.

	Serum 23.	Serum normal (rabbit).	Human urine.	Red corpuscles (human).	Result.
Tube I.....	20 drops	o	20 drops	2 drops	+ in 18 hours
" II. ...	20 "	20 drops	o	2 "	++++ "
" III....	10 "	o	30 drops	2 "	∞
" IV....	10 "	30 drops	o	2 "	+++ in 18 hours

(N.B. +++ means complete haemolysis. + means slight haemolysis: that is, red corpuscles remain undissolved at the bottom of the tube, the supernatant serum being slightly tinged with haemoglobin. ++ and +++ are immediate stages. ∞ indicates that no haemolysis has taken place.)

Haemolysis, therefore, was only very slight or totally absent in the tubes to which urine had been added.

Similar experiments made with various samples of haemolytic sera (produced by the injections of urine) always gave the same results.

The haemosozic property of the urine of the same individual varies, for whereas 20 drops of urine passed by one individual at 9 a.m. may prevent the haemolysis of a given quantity of haemolytic serum, the same quantity of urine of the same man passed at 11 a.m. may no longer prevent the haemolysis of the same serum, though all the other conditions of the experiment remain the same.

The red corpuscles remaining in contact for some hours with urine, when removed from the medium, washed and suspended in haemolytic serum are haemolysed just like those which have never been in contact with urine, and the urine in which such corpuscles have been suspended for two or more hours loses none of its haemosozic properties. The red corpuscles, therefore, do not absorb in that time any haemosozic substance present in urine. The haemosozic substance or substances have not been isolated from the urine, but the following properties have been ascertained.

First, the haemosozin is practically destroyed by heating to 120° C. or to 100° C for 30 minutes.

Secondly, the haemosozin is precipitated almost completely by absolute alcohol, but a slight quantity of haemosozic substance is always found in the filtrate. One may argue, either that the haemosozin is slightly soluble in alcohol, or that there are two haemosozins one of which is soluble in alcohol, and the other is not.

Thirdly, the haemosozin is precipitated almost entirely by saturating the urine with ammonium sulphate. The precipitate dialysed until it is entirely free from salts has marked haemosozic properties.

THE DETERIORATION OF VISION DURING SCHOOL LIFE.*

By ETTIE SAYER, M.B., B.S.,

Assistant Medical Officer, Board of Education, London County Council.

THERE are nearly a million children attending the Board schools in London and such a large number of these had obvious defects of vision that two years ago the Board decided thoroughly to investigate the condition of the children's eyesight. The children in our schools are divided into three departments:

1. Boys between 8 and 14 years of age.
2. Girls " 8 " 14 "
3. Infants " 4 " 8 of both sexes.

The work was carried out on purely scientific principles. A child was taken to have normal vision who distinguished objects subtending an angle of one minute, this being determined by the ability to recognize letters 9 millimetres square from a distance of six metres. Only children in the boys' and girls' departments were to be included in the test, and it may

* Paper read at the International Congress of School Hygiene at Nuremberg, 1904.