SICKLE-CELL ANÆMIA

INVESTIGATIONS into sickle-cell anæmia in Nigerian children by R. G. Hendrickse, of University College, Ibadan, shows significant differences from experiences recorded by American research workers (*Central African Journal of Medicine*, 6, No. 2; February 1960).

In Africa the age at onset of severe symptoms is earlier; anæmia tends to be more severe; the incidence of splenomegaly is higher, and spleens seem to be larger; gross hepatomegaly and evidence of hepatic dysfunction generally occur at an earlier age; limb swellings, especially those involving the hands and feet, are common in the early years of life, whereas they are rarely reported by American authors; radiological evidence of bone involvement is more frequent and the ultimate prognosis appears to be worse.

These differences in general reflect the more rigorous conditions under which children live in Africa, but certain features of the disease may be attributed to specific environmental factors. Spleen sizes are probably related to endemic malaria, and the earlier onset of liver dysfunction may be related to dietary protein deficiency. The characteristic swellings in the hands and feet of African infants may well result from the customary manner in which African mothers carry their babies. The child is placed astride the mother's back, its legs encircling her waist. The position is maintained by a wrapper which covers the child and is tied in front of the mother. In this position the child's limbs are pinioned to the mother and subjected to steady pressure which probably slightly impairs the peripheral circulation. Such impairment, while of no consequence in normal children, may be sufficient in sickle-cell anæmia to provoke intravascular sickling in the extremities, with resultant capillary blockage and reactionary swelling.

While differences in the clinical picture of sickle-cell anæmia in Africa and America may be attributed to environmental factors, the apparent difference in the severity of the disease in different parts of Africa cannot be readily explained in the same way. Differences in the age incidence in the Belgian Congo and Nigeria are of particular interest. In the Belgian Congo more children show signs of the disease between the ages of three months and one year than at any other period. It has been shown that for infants in hyperendemic malarial areas the mean parasite-rate rises from about 2 per cent at three months to 80 per cent at one year. In the Belgian Congo, therefore, it appears that the period during which children acquire their first infection with malaria coincides with the age during which sickle-cell anæmia is most frequently diagnosed. This suggests that malaria should be considered as a possible factor determining the age at which sickle-cell anæmia presents in the Belgian Congo. Another possible explanation of these age relationships is that some of the cases in the Belgian Congo were examples of primary malarial anæmia in persons with the sickle-cell trait. The clinical and hæmatological findings in such cases can closely simulate those encountered in sickle-cell anæmia. None of the cases reported from the Belgian Congo by the Lambotte-Legrandes was confirmed by electrophoretic studies of the hæmoglobin.

The apparent differences in the clinical manifestations of sickle-cell anæmia in different parts of Africa merit closer study. There are no grounds at present for contending that these differences have a genetic basis, though this possibility should be borne in mind.

ORIGIN OF TEKTITES

Solar Furnace Glass

TO explore the suggestion that tektites are formed by fusion of terrestrial material we have fused some rock samples in a solar furnace. These samples were collected from the regions where tektites have been found in Texas and Georgia in the United States. The Texas sandstone was taken from a stratum in the Wellborn formation in which embedded tektites reportedly had been seen. The black top-soil was taken from a location where tektites had been found in Grimes County, Texas. The Georgia sandstone was collected immediately below the top soil near a place where several tektites were discovered.

The sediments were fused in the solar furnace of the U.S. Army Quartermaster and Engineering Center, Natick, Massachusetts[1], made available to us through the courtesy of Mr. Eugene S. Cotton. At the time of the experiment, November 20, 1959, 1000 a.m., E.S.T., the flux of energy at the focus was 83 calories $cm.^2$ $sec.^{-1}$, as determined from the rise in temperature of a blackened metal disk. Each specimen was placed in a graphite crucible in the form of a plug. To make the plug the material was crushed, mixed with water, moulded and then baked at a temperature of approximately 150° C. We added 5 per cent by weight of ferric oxide to samples 2 and 3. Sample 1 weighed 100 gm., samples 2–5 weighed 50 gm.

The exposure time of the samples varied from 59 to 240 sec., the Georgia samples being heated for a longer period of time than those from Texas. Immediately after the water-cooled shutter of the solar furnaces opened, vapour could be seen rising from the sediment, while the front surface of the material became luminous and reached white heat in approxi-

Table 1

Sample	Exposure (sec.)	Weight loss (per cent)	Weight glass (gm.)	Fusion (erg/gm.)
(1) Texas sandstone	59	11·1	20·9	$1·9 \times 10^{11}$
(2) Texas sandstone	72	13·6	14·9	$1·7 \times 10^{11}$
(5) Texas topsoil	70	11·6	10·2	$2·3 \times 10^{11}$
(3) Georgia sandstone	120	20·6	14·6	$2·9 \times 10^{11}$
(4) Georgia sandstone	240	20·4	28·2	$2·9 \times 10^{11}$