the three academic forms for their age group. The commonest offences were lateness and talking.

The eight girls unaffected by menstruation were described by the headmistress as "problem girls requiring careful handling and understanding." Seven of the eight had a personal stress problem, one girl being described as "the most unfortunate girl in the whole school." Their general level of intelligence was below the average, and five of the eight were in the lowest form for their age. Disobedience and rudeness were the commonest offences in this group.

The intermediate group of six girls whose behaviour was possibly influenced by menstruation was correctly described by the headmistress as midway in characteristics between the other two groups. These girls were intermediate as regards the proportion of stress situations and the general level of intelligence.

This suggests that two types of naughtiness can be differentiated among schoolgirls. Firstly, naughtiness due to the hormonal changes of the menstrual cycle, which tends to occur among the brighter and well-adjusted girls. Secondly, naughtiness due to psychological stress, which is not affected by menstruation. The three groups were comparable with regard to height, weight, maturity, and size of families, but the group affected by menstruation tended to be younger, although not statistically significant.

There were 11 prefects among the sixth form girls, aged 16 to 18 years, who were permitted to punish girls for misbehaviour. An interesting and important feature is seen in Fig. 3 in that they gave significantly more punishments during their own menstruation, while their standards tended to rise at each menstruation and then fall gradually during the cycle. This raises the point whether the same is true of women generally, especially teachers, magistrates, and others in authority.

Summary

In schoolgirls there is a significant increase in misbehaviour during menstruation, particularly offences such as unpunctuality, forgetfulness, and avoiding games. The offences during menstruation are especially increased among naughty girls.

Two types of naughtiness could be distinguished. Firstly, that occurring predominantly during menstruation. These girls were free from psychological stress and tended to be the more intelligent. Secondly, that occurring evenly throughout the cycle, in girls with recognized psychological problems.

The administration of punishments by the prefects is significantly influenced by menstruation.

I thank the headmistress for permission to analyse her books, and for her kind co-operation in all stages of this investigation; Dr. P. Armitage for his statistical advice; and Dr. E. W. Dunkley for his wise criticism of the script.

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HYDROPS FOETALIS WITH A FAST-MOVING HAEMOGLOBIN

BY

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The clinical picture of hydrops foetalis is well known, and the most important cause of this disease is thought to be incompatibility between the mother's blood and the foetal blood.

During a study of the haemoglobin of premature and stillborn infants we came across a premature infant who clinically showed the symptoms of hydrops foetalis, with hepato-splenomegaly and anaemia, and who carried an unusual fast-moving haemoglobin in the blood. This case drew attention to the possibility of a faulty haemoglobin metabolism as another cause of this well-known clinical picture.

Case Report

A married woman aged 24 was admitted to hospital because of vaginal bleeding during pregnancy. She was about 34 weeks pregnant. This was to be her second child. Her first child, a boy, was born prematurely at the age of about 36 weeks. After about two weeks in hospital she was delivered of a premature female infant by breech, who showed gross abnormalities. The infant was hydropic, weighed 2,630 g., and had a body length of 42 cm. Oedema was marked and generalized. The child looked anaemic. The head appeared relatively small, while the extremities were rather short. The spleen and liver were greatly enlarged. The placenta looked very abnormal. It was greatly enlarged and very thick and oedematous. Its weight was about 2 kg., and it was anaemic and friable. On microscopical examination Dr. Sutomo Tjokronegoro, professor of pathology, found that the stroma of the chorionic villi was oedematous and loose, with here and there hyperplasia of the stroma cells. The capillaries contained numerous normoblasts and erythroblasts, of which many were young (see Fig. 1). The picture was compatible with that found in cases of erythroblastosis foetalis.

Routine haemoglobin analysis carried out on the cord blood showed it to be unusual. By the paper electrophoretic method of Smith and Conley (1953), at pH 8.6, two haemoglobin spots were seen. One had the mobility of haemoglobins A and F, while the other was a fast-moving haemoglobin which was much faster than normal haemoglobin A but definitely slower than haemoglobin H. At pH 6.5 it was more anodal than haemoglobin A, but more cathodal than haemoglobin H, and had the same mobility as haemoglobins Fessas and Papaspyrou (1957). It could easily be distinguished from haemoglobin J at this pH, because at pH 6.5 haemoglobin J did not separate from haemoglobin A, while the above-mentioned component was clearly separated from haemoglobin A. It is a pity that we did not have available for comparison the Bart's haemoglobin, which was described by Ager and Lehmann (1958) as migrating between haemoglobin A and haemoglobin H and as being slightly faster than haemoglobin J and haemoglobin Fessas and Papaspyrou. The unusual

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An Institute of Thoracic Diseases has been established at the Royal North Shore Hospital, Sydney, Australia. The aim is to model the Institute on the Institute of Diseases of the Chest associated with the Brompton Hospital and the London Chest Hospital, and as it develops it is hoped to organize extended courses to which Asian students will be welcome. (*Med. J. Aust.*, October 1, 1960.)

component in our hydropic infant formed the major component (see Fig. 2), contrary to what has been found up to now in all of the cases of newborn infants carrying a fast-moving type of haemoglobin (Lie-Injo, 1959). The amount of alkali-resistant haemoglobin examined by the method of Singer *et al.* (1951) was found to be 44.3% of the total haemoglobin.

Unfortunately, no haematological study of the blood could be done, as the infant, which died shortly after birth, was taken away by the family. However, the numerous

FIG. 1.—Capillaries of the chorionic villi in the placenta filled with nucleated red blood cells, many of which were young.

FIG. 2.—Paper electrophoresis at pH 6.5 of the haemoglobin of patient with hydrops foetalis compared with Haemoglobin H and Haemoglobin Fessas and Papaspyrou (F and P). Note the large amount of unusual component in the foetus with hydrops.

normoblasts and erythroblasts present in the capillaries of the foetal placenta indicated that there was severe erythroblastosis of the foetal blood.

Both parents were physically normal except that the mother looked slightly anaemic. The spleen and liver in both parents were not enlarged. Study of the blood of the mother revealed that she was of blood group A, N, Rh positive, genotype CDe/CDe. No abnormal circulating antibodies and no potent anti- β haemolysin could be found in the mother's blood. The Wassermann and Kahn reactions with her blood serum were negative. One month post-partum she had a slight anaemia of 10.6 g./100 ml., which was clearly microcytic and hypochromic. The red blood cell count was 5,660,000/c.mm., P.C.V. 38%, M.C.V. 67.1 cubic microns, M.C.H. 18.7 μ g., M.C.H.C. 27.9%. The number of reticulocytes was 0.2%. The resistance of

the erythrocytes to hypotonic saline solutions was slightly increased. No pathological haemoglobin could be detected in her blood, while the amount of alkali-resistant haemoglobin was within normal limits.

The father was of blood group B, MN, Rh-positive, genotype CDe/cDE. He had no anaemia, his haemoglobin being 14.8 g./100 ml. However, there was a clear microcytosis and hypochromia. The red blood cell count was 7,250,000/c.mm., P.C.V. 50%, M.C.V. 69.0 cubic microns, M.C.H. 20.4 μ g., M.C.H.C. 29.6%. The reticulocytes were not increased. The resistance of the erythrocytes to hypotonic saline solutions was slightly increased. Also, there was no pathological haemoglobin in his blood. The amount of alkali-resistant haemoglobin was within normal limits.

We were not allowed to examine the first child in this family, who was 11 months old.

Comment

From the above findings it seems possible that the hydrops foetalis with accompanying severe anaemia, hepato-splenomegaly, and erythroblastosis of the foetal blood was not caused by antagonism between the mother's and the infant's blood, leading to the formation of antibodies against the infant's erythrocytes (extracorporeal factor), but that it was caused by a faulty haemoglobin metabolism (intracorporeal factor), leading to excessive destruction of erythrocytes, and this again leading to the symptoms found in the foetus and in the placenta, which closely resembled those found in hydrops foetalis caused by antagonism between mother's and infant's blood. If so, this is a new and interesting aspect of the problem of hydrops and erythroblastosis foetalis, and is deserving of further study.

We would like to thank Professor Sutomo Tjokronegoro for permission to quote his findings; Dr. Lie Hong Gie for his interest and co-operation; and the nurses of the obstetric department of the Jang Seng Ie hospital for their kind help.

ADDENDUM.—Since the completion of this communication we have been able to obtain the Bart's haemoglobin by the courtesy of Dr. H. Lehmann and Dr. J. A. M. Ager, of London. We found that the fast-moving mass of haemoglobin had the same mobility as Bart's haemoglobin. Whether a small amount of haemoglobin H was present could not be established with certainty.

In the meantime we have found three other severe cases of hydrops and erythroblastosis foetalis associated with the same fast-moving haemoglobin. Two of these cases were twins. That the greatest part of the fast-moving pigment in these cases was Bart's haemoglobin was confirmed by Drs. Ager and Lehmann. In addition, a small amount of haemoglobin H was present in these three cases. Meanwhile, Dr. Fessas has reported that he is of the opinion that Bart's haemoglobin is identical with his original Fessas and Papaspyrou type of haemoglobin (*Brit. med. J.*, 1959, 2, 886).

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"It ought to be more widely known than it is, that in this country the yearly number of registered deaths from suicide alone is 5,000; this exceeds the numbers due to pulmonary tuberculosis or road accidents." (Professor Martin Roth at London Medical Exhibition, November 14.)