The glassy matrix itself, however, does not give a well-defined pattern, since it is a true glass, and the alkali halide in this vitreous phase is a part of the random structural arrangement. A complete discussion of the theory of the participation of fluorides and other compounds in the glass network will soon be published elsewhere. I wish, however, to dispute the general statement that alkali halides dissolved in glass are present as crystallites.

With regard to the halide – boric oxide systems, I have found no evidence for the presence of a crystalline phase except when, as stated above, the amount of halide was greater than the particular limiting composition of the system.

H. Cole

Research Laboratories,
Pilkington Brothers, Ltd.,
St. Helens, Lancashire.
May 9.

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Determination of Bilirubin in the Umbilical Blood as an Aid in the Early Diagnosis of Hæmolytic Disease in the Newborn

The bilirubin content of the blood is increased in hæmolytic conditions, as can be demonstrated by the indirect quantitative reaction of Van den Bergh. It seems probable, therefore, that the presence in the umbilical circulation of increased bilirubin, demonstrated by the indirect reaction, might be interpreted as early diagnostic evidence of hæmolytic disease of the newborn.

The bilirubin content of fœtal blood is not dependent on bilirubin of maternal origin, since bilirubin does not pass through the placental barrier[1]. The determination of the normal range of bilirubin in umbilical blood at birth is, however, extremely difficult, since this value varies widely and the fluctuations are associated with a series of factors[2].

In a series of 119 quantitative determinations of bilirubin in the umbilical blood by Van den Bergh's indirect method, we found values varying from traces to 3·6 mgm. per cent. Included in this series were only such cases in which both mother and fœtus were either *Rh*-positive or *Rh*-negative. In 42 of these cases, mother and fœtus had incompatible blood groups, so that immunization of the mother by fœtal erythrocytes was possible (for example, mother in group *A* and fœtus in group *B*, etc.). In this group of cases, 12 (28·5 per cent) had more than 2 mgm. per cent bilirubin in the umbilical blood.

In the remaining 77 cases, the mother and fœtus belonged to the same or to different but compatible blood groups (mother and fœtus both in group *A*, or mother in group *A* and fœtus in group *C*, etc.). In this group bilirubin in the umbilical blood exceeded 2 mgm. per cent in 9 cases (11·6 per cent).

A detailed report on the relationship between the bilirubin value in umbilical blood and the titre of maternal blood antibodies against fœtal erythrocytes will be reported elsewhere.

In 9 additional cases, the mothers were found to be *Rh*-negative, while their fœtuses were *Rh*-positive. In these cases there were from 0·8 to 2·4 mgm. per cent bilirubin in the umbilical blood. Congenital hæmolytic diseases of the newborn did not develop in any of them.

On the other hand, in three cases of *Rh*-negative mothers (two of whom had previously delivered at least one erythroblastotic fœtus) the bilirubin-levels in the umbilical blood were respectively 4·9, 8·1 and 6·2 mgm. per cent. Although the low titre of *Rh* antibodies (agglutinating, blocking and conglutinating) found in the maternal serum in these three cases seemed to indicate that no intensive immunization had taken place, all three newborn infants developed severe hæmolytic disease within 2–36 hours after delivery. Two of them, in whom the bilirubin values in the umbilical blood were 6·2 and 8·1 mgm. per cent respectively, died 38 and 96 hours after delivery. In the first case, the blood count made shortly before death was: erythrocytes 5,160,000 and Hb—17 (Sahli); and at autopsy, kernicterus was found. In the second, the blood count revealed: erythrocytes 1,360,000, Hb—6½ (Sahli). In both, the diagnosis of erythroblastosis fœtalis was confirmed at autopsy. The third (4·9 mgm. per cent of bilirubin in the umbilical blood) recovered from a very severe anæmia after repeated transfusions of *Rh*-negative blood.

Since jaundice and anæmia severe enough to cause death shortly after delivery may develop in infants apparently normal at birth, and since the antibody titre of the maternal blood did not always serve as an indication of the hæmolytic process in the fœtus, we consider a high value of bilirubin in the umbilical blood to be an indication of hæmolytic disease of the newborn. The presence of high bilirubin in the umbilical blood may, therefore, permit the early diagnosis of erythroblastosis fœtalis (anæmia neonatorum, icterus gravis and kernicterus).

These observations are considered to be preliminary, and a more extensive study is in progress.

A. Sadowski
Y. M. Bromberg
A. Brzezinski

Obstetric-Gynæcological Department,
Rothschild Hadassah University Hospital,
Jerusalem.

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Relative Activities of *l*- and *dl*-Thyroxine

We have compared the biological activities of *l*- and *dl*-thyroxine in rats receiving 4-methyl-2-thiouracil by determining the 'thyroxine requirement' as defined by Griesbach and Purves[1]. This method consists of finding the amount of thyroxine which will prevent the pituitary basophil changes, resulting from the thyroxine deficiency produced by the blockage of thyroxine synthesis by the methyl thiouracil. The thyroxine samples used were: (1) *l*-thyroxine presented by Dr. C. R. Harington, and prepared by the iodination of *l*-di-iodothyronine[2]; (2) *l*-thyroxine presented by Dr. E. P. Reineke, and prepared by acid hydrolysis of iodinated casein[3]; (3) *l*-thyroxine prepared in this laboratory from *l*-di-iodotyrosine by the method of Harington and Pitt Rivers[4]; (4) *dl*-thyroxine presented by Burroughs Wellcome and Co., and prepared by alkaline hydrolysis of thyroid substance.

The 'thyroxine requirement' of the rat was found to be 2·3 micrograms of *dl*-thyroxine per 100 gm. per day. The equivalent value for *l*-thyroxine was 1·5 micrograms per 100 gm. per day, the same value being obtained for all three samples within the error of estimation, which we judge to be ± 5 per cent.