Fig. 1. Ouchterlony analyses of: *A* and *B*, normal γ_{1A} -globulin (γ_{1A}) and two myeloma proteins of group *A* and group *B* using antiserum to $7S$ γ -globulin in centre well; *C*, three myeloma proteins of each group using antiserum to γ_{1A} -globulin; *D*, two group *A* myeloma proteins (top and bottom) and Bence Jones proteins group *B* (left) and group *A* (right). Antiserum to $7S$ γ -globulin in centre; *E*, two group *B* myeloma proteins (top and bottom) and Bence Jones proteins group *B* (left) and group *A* (right). Antiserum to $7S$ γ -globulin in centre

tion with the same antigenic class as the parent protein.

The antigenic similarities noted between the 2 classes of γ_{1A} -globulins and Bence Jones proteins as well as with certain parts of $7S$ and $19S$ γ -globulins suggest that all may contain certain common polypeptide chains of a similar type⁷. The genetic control of these is now being investigated⁸.

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Hæmoglobin Bart's in Italy

CONTINUING our investigations, already reported¹, we have found 9 cases of hæmoglobin Bart's out of 3,556 samples of cord blood. In 7 of these, re-examined after several months, the abnormal hæmoglobin had disappeared. In 4 babies, aged from 5 to 10 months, an evident microcythæmic (or thalassæmic) hæmatological picture appeared; in three others, still very young, the hæmatological characters were still uncertain with regard to microcythæmia (or thalassæmia). Examination of the parents, carried out in 8 families, has revealed, in all, the absence of abnormal hæmoglobins; however, in 7 families, one of the two parents showed the hæmatological characters, either pronounced or slight, of microcythæmia; only in one family were the hæmatological characters normal, with the exception of very slight erythrocytic morphological alterations in the mother. In our previous communication, we had observed this family only and another one, in which the mother showed rather slight deviations and therefore, we thought that we could exclude the existence of any relationship between hæmoglobin Bart's and microcythæmia; however, it must now be that such a relationship exists.

The most characteristic observation is that the parents, carriers of microcythæmia, and the sons with hæmoglobin Bart's, re-examined after several months, have never revealed a high portion of hæmoglobin A_2 . This fact, which has also been reported by others^{2,3}, recalls the similar one of families of carriers of hæmoglobin H in which all microcythæmic members and the same carriers of hæmoglobin H always have a normal fraction of hæmoglobin A_2 .

The hypothesis may be made that hæmoglobin Bart's and hæmoglobin H appear in the same families in which microcythæmia is present without increase of hæmoglobin A_2 , and that is, according to the hypothesis of Ingram and Stretton³, α -chain microcythæmia.

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PATHOLOGY

Deoxyribonucleic Acid Measurements on Buccal Cell Nuclei in Megaloblastic Anæmias

MEGALOBlastic anæmias, as their name indicates, are characterized by enlargement of the red cell precursors. This enlargement affects both nucleus and cytoplasm. Some other types of cell are enlarged as well, particularly the immature myeloid cells ('giant band cells') and the squamous epithelial cells of the buccal mucosa. Other epithelial cells are sometimes affected, but the changes are inconstant¹.

Interpretations of these findings in terms of the molecular structure of the nuclei are still a matter of speculation. Barnard and Lewson² have proposed that vitamin B_{12} deficiency results in increased polymerization of DNA, and that this causes nuclear enlargement and hypochromasia. Nothing is actually known about the biochemical difference between an affected cell and a normal one. Examination of the 'biochemical lesion' in deficiency of vitamin B_{12} and of folic acid has shown that these substances play a part in numerous metabolic processes, not only concerned with nucleic acid metabolism^{3,4}. The idea that the nuclear changes are due to defective DNA synthesis is not supported by auto-radiographic data⁵.

It is not even known whether premitotic megaloblast nuclei contain the same amount of DNA as the corresponding normoblasts. Measurements of DNA in interphase nuclei obtained from bone marrow are affected by the proportion of cells which are synthesizing. In order to get comparable figures it would be necessary to perform estimations on cells actually in mitosis, and it would not be possible to identify the dividing cells.

These difficulties do not apply to the nuclei of buccal epithelial cells. Buccal cells are very easy to prepare without the admixture of other cell types, and