

leave no room for doubt that a serious alteration in its structure, and a return in adult life to its embryonic state, may profoundly influence the composition of the blood, producing anæmia and death. It must be borne in mind that the red marrow in the short bones of an adult probably equals in bulk the constituents of the spleen, and structurally is very similar to that organ and to the lymphatic glands. In the long bones it is largely replaced by fat, but traces of it still remain. Now, granting that the marrow is a tissue which shares in the blood-making functions, it is quite as reasonable to suppose that, if hyperplasia of the elements of the spleen can lead to serious disturbance in the composition of the blood, producing the splenic form of leukæmia or pseudo-leukæmia, according as the colourless corpuscles of the blood are increased or not, so a general increase of the constituents of the marrow may induce similar conditions. For it is to be remembered that, in a general hyperplasia of the marrow, the actual amount of lymphoid tissue in the osseous system equals or perhaps exceeds, that of an enlarged spleen. Why a simple hyperplasia of this tissue should interfere with the elaboration of the blood, altering in the one case the mutual proportion of the corpuscles, and in the other simply reducing the total number; we do not know, but we are just as ignorant why an enlarged spleen and lymphatic glands should produce in the one case leukæmia, and in the other not."

When the paper was published, from which I have read you these extracts, a systematic investigation into the condition of the bone marrow, in various diseases, had not been made; but since then a number of observers have found this hyperplasia of the medulla in many chronic diseases, particularly in phthisis and cancer. In a considerable number of examinations, I have also met instances of red marrow in the long bones in chronic wasting disease, but not so frequently as Litten and Orth,\* or Blechmann.† In only two instances have I found such intense and universal hyperplasia of this tissue as in the three instances of pernicious anæmia, which I have had an opportunity of examining. On the other hand, in

eight cases of phthisis, and in two of cancer, (œsophageal and pyloric) I have found the marrow of the long bones fatty. I think that we have still a good deal to learn with reference to the bone marrow. I am not quite disposed to give up the view that some instances of pernicious anæmia may be of myelogenous origin. The similarity of the clinical features to leukæmia and pseudo-leukæmia, and the transition in Litten's case, from pernicious anæmia to leukæmia, suggest a close relationship.

Such a profound anæmia, as in the case before you, might result from one of two causes: 1st. A faulty formation of blood corpuscles—anhæmatisis, or loss of blood, either by hæmorrhage, chronic discharges or excessive destruction of the coloured cells—hæmophthisis.

Very many of the reported cases of this disease do not come strictly under the definition as given by Addison; but there have been various causes at work, productive of hæmophthisis. Dr. Howard holds that "all the various forms of anæmia, *i.e.*, forms, determined by the conditions, under which they occur, may occasionally take on progressive and pernicious characters." And this is the view taken by Quincke.

Dr. Howard further maintains that there is not a distinct variety of anæmia having an etiology and pathology peculiar to itself, and it is upon this point, particularly, that more light is wanted. The cases require sifting; and, for my own part, I would insist, with Immerman, "that no case should be accepted as belonging to this disease, unless, besides being an instance of extreme and fatal anæmia, it is also impossible to account, either rationally or empirically, for the progressive course of the anæmic symptoms."\*

The *prognosis* is most unfavourable; all of our Montreal cases have died. Of the sixty-four Zurich cases, given in Müller's monograph, only seven recovered. Of Quincke's thirty-one cases, eleven are stated to have recovered; but you must remember, with reference to many of these Switzerland cases, that they come more properly under the head of inanition anæmia.

\* Quoted by Hartshorne in his article on "Prog. Pernicious Anæmia," in the American edition of Reynolds's System, Vol. III.

\* *Berliner Klin. Wochenschrift*, 1878. † *Archiv. der. Heilkunde*, 1878.