reported the occurrence of a lymphatic leukemia in one mouse and myeloid leukemia in a second out of a total of fifty-six subjected to repeated cutaneous applications of a tar and benzol mixture. The observations of Bernard and Laplane upon rats which had received injections of tar into the femur bone marrow are of equally doubtful significance. In one experiment they obtained persistent leukocyte increases up to 100,000 cells, usually accompanied by erythrocytes up to 14,000,000 cells. The reactions, in several instances, were purely myeloid in nature, while in others, of the erythro-leukemic type. In these animals the viscera did not contain any myeloid foci, indicating that the blood reaction was purely the result of an excessive bone marrow stimulation. Thomsen and Engelbreth-Holm injected tar into the bone marrow of sixty-two chickens every five days for two to three months, and found in nine fowls a myeloid hyperplasia of the marrow and a blood picture resembling that of a myeloid leukemia. Among nine tumors (sarcomas) of different types, obtained in twenty-one chickens injected with tar, McIntosh observed one leucosarcoma. Brandt painted the ear of a rabbit for a period of over a year with a pitch tar dissolved in benzol. At death there was a diffuse neoplastic infiltration of all the internal organs by a very immature type of white blood cell, which he related to the retothelial cells or the stem cell. Brues and Marble observed the occurrence of leukemia in Bagg albino mice after prolonged painting with tar.

These numerous experimental observations suggest that aromatic substances other than benzol may play an etiologically important role in the development of leukemia in man.

b. Physical Agents

1. Roentgen-rays and radioactive substances

Hematological Reactions. Roentgen-rays and radioactive substances, which are sources of radiating energy, are well-known for their injurious action upon the blood and blood-forming tissues. They have been the cause of numerous cases of serious and often fatal leukopenia and aplastic anemia (Mottram; Koelsch; Laborde; Lavedan; Amundsen; deLaet; Kaplan and Rubenfeld; Goodfellow; Engelbreth-Holm; Reiter and Martland; and Brandt and Lange.

Clinical and experimental evidence accumulating during recent years indicate that these physical agents may produce leucocytotic, leukemoid, and leukemic reactions of the blood as well as hyperplastic and leukemic proliferations of the hematopoietic organs. The number of published articles on this subject, during the last fifteen years, indicate that these blood dyscrasias are becoming constantly more important as disease reactions after occupational exposure to roentgen-rays and radioactive substances. This development becomes more significant as the incidence of cancerous reactions, following prolonged occupational exposure to these types of radiating energy, has decreased