roses, there were apparently primary degenerative changes of the tumor cells present, which were independent of the hemorrhagic effect and also occurred in the absence of hemorrhages. The cancer cells were hydropic and showed vacuolization. Apitz concluded that these local, nonspecific *hyperergic*, intratumoral reactions, which can only be elicited by Shwartzman active substances, cause, in addition to primary circulatory disturbances restricted to the tumor area, primary parenchymatous regressive changes in the tumor.

Duran-Reynals attributed the intratumoral vascular reaction, which has also, according to him, the general characteristics of the Shwartzman phenomenon, to two sets of factors: an intrinsic one, depending upon the sensitivity of the tumor itself; and an extrinsic one, depending on the activity and quantity of the bacterial toxin administered. He believes that the newly formed vessels of a malignant tumor, either as a consequence of excessive permeability or some other cause, are peculiarly sensitive to blood carried bacterial toxins, and that this vulnerability is responsible for the regression of the tumor. These observations were confirmed by Rogg as well as Jacobi, who obtained by similar procedures similar intratumoral, necrotizing and hemorrhagic reactions not only in tumors of mice (sarcoma 180), rats (Flexner-Jobling carcinoma and Walker carcinosarcoma 256), and chickens (Rous sarcoma) sensitized to various bacteria (B. typhosus and B. proteus), but also in a breast carcinoma of a woman complicated by axillary metastases. The results of these investigations suggest that cancer tissue behaves like or is an allergic tissue.

Chemo-Immunological Relations

The evidence presented thus far concerning the possibility of allergic-carcinogenic interrelations is obviously more or less circumstantial and open to criticism. Similar objections may be raised against the statement of Bernstein, that all the facts supplied by a statistical analysis of the experimental data obtained from Lynch; the Crocker Institute; and Loeb and Lathrop are consistent with the conception that cancer is an allergic disease. Boyland and Warren claimed from the results of a statistical evaluation of neoplastic responses obtained in mice, following the injection of single and repeated doses of methylcholanthrene, that the carcinogenesis is of the nature of a drug reaction and that it is improbable that carcinogenesis is an allergic reaction. Martin suggested the possibility of an allergic genesis of rectal carcinomas, while Grynkraut proposed a corresponding causal mechanism for the development of actinic cancers.

It is fortunate, therefore, that the proper correlation of some immunologic and clinical observations made with certain organic compounds, which have allergic and carcinogenic qualities and have been extensively produced and used for commercial and medicinal purposes, seems to supply a few of the missing links needed for strengthening the above concept.