

Over 2,000 cases of cancer of the thyroid in fishes have been collected by Murray. Although cancer is universal in vertebrate animals escaping the effects of many chronic forms of irritation affecting man, its occurrence is frequently associated with other external irritants and it may not merely be the ease with which lesions on the surface are observed, which has led to the accumulation of our knowledge of the skin cancers. As in man, so in animals, no one form of external agency is constantly associated with cancer. The fundamental common factor is the peculiarity of the living cell to exhibit malignant growth under the action of the most diverse agencies in different forms of life. The wide zoological distribution of malignant growths, while affording the completest answer to the myriad speculations on the etiological association of conditions peculiar to mankind with the incidence of cancer, cannot be expected to furnish other than the most general indications of the essential factors in its development.

Among the tumors of animals which afford special interest are the cancers of mice and rats which lend themselves so well for experimental purposes. Some thousands of these mice cancers have been observed and studied, and it is found that the laws governing their growth and effects are comparable to those found in man. Considerable criticism has opposed the study of spontaneous tumors in animals. These, such as the denial of metastases of Jensen's mammary mouse cancer, are no longer possible. It has been shown that the inoculated tumors do give metastases when observed for a sufficient length of time.

*Experimental Cancer Studies.*—The mammary cancers of the mouse have served the greatest usefulness for the study of experimental transplantation. Aside from these cancers various other malignant and benign tumors have been observed in the mouse. Inoculation experiments are usually made into the abdominal wall and into the peritoneal cavity. Besides the local development of the cancer, metastases develop most commonly in the lungs but also in the glands and other organs. The lung metastases apparently develop from cells transferred by way of the blood stream.

Comparable to the human mammary cancer the matrix of the tumor may undergo various changes. In some instances a sarcomatous tissue replaces the usual connective tissue stroma, while again in other instances the matrix develops a framework of bone or cartilage. In one instance Murray observed the development of 142 spontaneous tumors in the same animal.

In some instances a metaplasia is noted in the mouse cancers. Tumors of a purely adenomatous character may develop squamous-celled cancers,