

tram; and Teutschlaender, on the other hand, reported that mice kept in the dark had a higher incidence of tar cancers than mice exposed to sunlight. Other investigators (Büngeler; Findlay; Vlès and de Coulon; Dormanns; and Schorr and Ssoblewa) asserted that exposure to solar or ultraviolet rays hastens the appearance of tar cancer. It appears, from the evidence available, that this claim reflects conditions actually existing in this respect. It is conceivable that the hastening effect of solar and ultraviolet rays represents either the result of an additive carcinogenic action of these rays or is nonspecific and caused by the hyperemia and capillary hyperplasia, accompanying an actinic erythroderma. This is accentuated by chemical photosensitization through tar, and creates nutritive conditions in the skin favorable for cellular proliferation. Excessive actinic reactions, on the other hand, may set up environmental conditions in the tissues, such as necrosis and exudation, which impede the carcinogenic action of tar and delay the appearance of tar cancers.

*Roentgen-Rays and Radioactive Substances.* Similar relations apparently exist in regard to the action of roentgen-rays and rays from radioactive substances upon the development of tar tumors in animals. It is well known from clinical experience that roentgen-rays and radioactive rays inhibit the development of tar cancer in a skin containing precancerous tar and pitch lesions, and, also, destroy malignancies of this origin (London Letter; and Watson).

Certain experimental observations made during recent years suggest, however, that a general irradiation of tarred mice with small doses of roentgen-rays (160 to 1,440 r) may increase the yield and malignancy of the resulting tar cancers, and may hasten their appearance (Reinhard and Thibaudeau; London letter; Castiglioni; Domagk; and Cirio and Balestra). Similar observations were made by Mayneord and Parsons in regard to the formation of subcutaneous sarcomas, when mice injected with 1:2:5:6-dibenzanthracene-9:10-alpha-beta succinate were exposed to 550 r.

Maisin, and Ledecq and Estas noted that intravenous injection of ionium into tarred mice and rabbits caused an accelerated induction of tar cancers, and increased the incidence of metastases (60 to 70 per cent instead of 30 to 35 per cent in the controls, which were only tarred). Maisin claimed, moreover, that introduction of ionium prevented the spontaneous regression of tar cancers in rabbits which is, often, observed following the cessation of tar applications, i.e., the procedure brought about a change from a "histological malignancy" to a "physiological malignancy." It is believed that exposures to radiating energy of this type, given in suitable doses, break down the natural resistance of the organism against a neoplastic growth.

Contrasting results were reported by Stolz and Vanysek, who noted that the development of hyperkeratoses and papillomas in the tarred ears of rabbits was delayed, and quantitatively reduced, after the intravenous injection of radium emanation. Similar inhibitory responses were recorded by Maisin and Picard, when uranium and thorium were introduced into tarred animals. The