

VIII. CAUSATIVE MECHANISM

During the early years following the discovery of interrelations between the vesical schistosomiasis and epithelial overgrowth of the bladder mucosa, the actual malignant character of these proliferative manifestations was not always recognized. Fabre-Doumergue contended in 1898 that the epithelial proliferations were not genuine carcinomas, but represented merely epithelial thickenings resulting in the development of an "epitheliomatosis" of the bladder mucosa unrelated to cancer. A similar opinion was held by Wolff in 1907. The demonstration of invasive growth into the adjacent organs, as well as of metastases to remote organs (Ferguson), did not leave any doubt that these cellular overgrowths of the bladder were malignant neoplasms. The controversy in regard to these tumors has revolved from then on mainly around the question, whether these cancers were the result of a direct specific or nonspecific action of metabolites or degradation products of the worms or their ova, or represented simply the ultimate outcome of a nonspecific secondary chronic irritation of the bladder tissues in which non-parasitic factors played the main role.

A direct specific carcinogenic action of the worms upon the bladder mucosa is regarded as the cause of the vesical tumors by Lewin as well as by Albarán and Bernard. A similar conception is apparently held by Pfister and Diamantis, as both investigators claim that the cancerization of the bladder depended upon a repeated infestation with *Schistosoma haematobium*. Diamantis, however, adds a modifying provision by stating that the reinfection must act upon a bladder containing calcified ova, being evidence of a schistosomiasis of long standing. The alleged absence of Bilharzia cancer of the bladder in Europeans is explained by Pfister with the contention that reinfections, which are in his opinion essential for vesical cancerigenesis, do not occur among Europeans. This reinfection theory of Diamantis and Pfister is directly contradicted by a statement of Hueckel, who asserts that a Bilharzia cancer of the bladder may follow upon a single infection. While the existence of a specific carcinogenic metabolic or degenerative parasitic product is a matter of pure speculation, there exists reliable evidence supporting the contention that the worms as well as the ova exert a direct injurious effect upon the tissue adjacent to them. Clinical as well as experimental evidence indicates that the live worms excrete or secrete a toxic substance causing generalized systemic disturbances. Whether these products are capable of producing localized cellular damage near the worms is doubtful, however, if credence can be given to a statement of Shaw and Ghareeb, who claim that the live worms located in the pulmonary vascular system are innocuous, while the dead worms give off a highly toxic product causing vascular necrosis and localized pneumonia.

The action of the live ova on surrounding tissue is mechanical as well as