Contents

Foreword .................................................. vii

Introduction .............................................. ix

Co-workers and Associates. .............................. xiii

1. Measurements on Microscopic Images ................. 1
   a) Morphometry of arteries on microscopic images .......... 1
   b) Morphometry of airways — what part of bronchial tree constricts in
      asthmatic attack? ............................................. 12
   c) Standardized morphometry of airways in normal and diseased lungs .... 18

2. Stereology and Its Application to Pathology ............ 25
   a) Evaluation of paraquat-induced atelectasis .................. 26
   b) Langerhans islets of the pancreas in diabetics ................. 30
   c) Morphometry of metastatic tumor nodules in the liver .......... 37
   d) Alveolar surface area of normal and emphysematous lungs .... 42
   e) Remodeling of alveolar structure in paraquat lung .......... 47
   f) Changes of bone trabeculae in osteoporosis — a cylindrical model ...... 54
   g) The mean radius of hepatic lobules — another cylindrical model .... 60
   h) Problems that cannot be solved by stereology ................. 66

3. The Basic Structure of Human Liver from the Viewpoint of Vascular Architecture 69
   a) The unitary structure — different concepts ...................... 69
   b) The microvasculature of human liver and its functional significance .... 74
   c) Quantitative expression of vasculature pattern .................. 82
   d) Why does the vascular pattern differ among the organs? .............. 87
   e) Pathogenesis of hepatic failure in cirrhosis ................. 93

4. Three-D Structural Analysis. Method and Examples of Application ...... 97
   1) Preparation of serial sections ................................. 97
   2) Abstraction of 2-D images from serial sections ................. 98
   3) Manual reconstruction ........................................ 101
   4) Computer-assisted reconstruction .............................. 103
   5) Examples of 3-D reconstruction ............................... 105
      a) The vasa vasorum of aortic wall ........................... 105
      b) Three-D mapping of vascular lesions of lungs in pulmonary hypertension 108
5. The Structure of Adenocarcinoma and the Structural Differentiation ........... 153

6. Morphogenesis of Cirrhosis from Chronic Hepatitis ............... 171

7. Some Other Topological Problems in Microscopic Pathology ............ 195
   a) Changes of pattern from chronic hepatitis to cirrhosis .............. 195
   b) Two types of glandular tumors: papillary and tubular .............. 202
   c) Hepatocellular carcinoma: two different types .................. 208
   d) The pattern of zonal hepatocellular necrosis: Is the acinar theory tenable? 210

8. The Adequate Classification of Form in Pathology ..................... 225
   a) Adequate classification of liver cirrhosis .......................... 227
   b) Adequate classification of carcinomatous and precarcinomatous cells .. 235
      i) Adenocarcinoma of lung and its precursor ...................... 235
      ii) Carcinoma and dysplasia of the pancreatic duct .............. 240

Appendix ....................................................... 249

Literature ................................................... 257

Acknowledgment ............................................. 265