

from city to city, and by 1877–1880 he was spending most of his time speaking on religious subjects and selling his own apocalyptic theological tracts. In 1880 he became a political enthusiast, and he annoyed various Republicans first with offers of service and then with demands for reward. On 2 July 1881, after considerable thought, he shot the president. Garfield died on 19 September. Guiteau was indicted for murder and convicted after a trial lasting from 14 November to 5 January. On 30 June 1882, he was hanged.

Guiteau's only significant defense was the plea of insanity, and the trial offered a public forum for two opposing views within medicine concerning the nature of mental illness and the responsibility of a person for his actions. John P. Gray, an experienced clinician and superintendent of the Utica Asylum in New York, spoke for most psychiatrists of the day. He believed that insanity was a physical illness that could be detected by changes in character; in his view, chronically bad behavior like Guiteau's was a sign of moral lapse, not illness but sin. Another group of physicians, most vociferously represented by a New York neurologist, Edward C. Spitzka, were influenced by recent European advances in scientific medicine, especially neuroanatomy. Spitzka was cautious in his opinions concerning the nature of the disease of insanity; he was willing to believe that a pattern of life might be a sign of mental illness. He also believed that insanity was usually—and demonstrably—inherited, a matter about which Gray, in his turn, was cautious if not skeptical.

Spitzka and Gray had, as leading advocates of competing views within the medical profession, already clashed repeatedly during the 1870's. It was remarkable that the two should show up as principal expert witnesses at the trial of Guiteau. Gray, consistent in his beliefs, defended the M'Naghten rule to the effect that the defendant had to be bereft of the ability to distinguish right from wrong at the time of his crime in order to be considered innocent of wrongdoing. Spitzka maintained that a person might perform actions as a result of mental illness even though he might be able intellectually to make moral distinctions.

By the end of chapter 3 of Rosenberg's book the reader has been acquainted with these facts of the case and its conclusion and has been treated

to a thorough discussion of the legal and psychiatric issues involved. He has every right to wonder what more a rehearsal of the details of the trial, to which two-thirds of the book is devoted, could contribute. As in classical tragedy, however, the interest lies not in the predestined fate of the assassin but in the details of the process by which he met his end. Each of the several experts called was not only a principal in a drama but, as it turned out, unpredictably individual in his views in one way or another. The exploration of these views permits Rosenberg to show vividly what the expert opinions meant in practice.

Whatever one's occasional quibble with the author, the book is both sound history—in unusual depth—and good theater. The story is a true one, and the issues are still very much alive. Guiteau believed that God had commanded him to kill the president. "The responsibility," as he put it, "lies on the Deity." Where, indeed, do passion and belief and judgment end and mental illness begin? Rosenberg observes, "In some ways, the psychological medicine of the twentieth century has served merely to reformulate rather than resolve the continuing social dilemma created by the possibly insane criminal." In Guiteau's trial great philosophical as well as medical questions acquired at one troubled point in time flesh-and-blood representation.

JOHN C. BURNHAM

*Department of History,  
Ohio State University, Columbus*

## Neurological Handbook

**The Human Brain in Figures and Tables.** A Quantitative Handbook. SAMUIL M. BLINKOV and IL'YA I. GLEZER. Translated from the Russian edition (Leningrad, 1964) by Basil Haigh. Basic Books, New York; Plenum, New York, 1968. xxxiv + 482 pp., illus. \$25.

How many nerve cells are there in the cerebral cortex? What are their dimensions? What is the weight of the brain at different stages of ontogeny? How many fibers are there in the optic nerves of different animals? These are the kinds of questions that this book is designed to answer. As is noted by Lindsley in the foreword and accented by Yakovlev on the jacket, it is the first book of its kind to appear in the neurological literature. The authors

have done a great service for investigators of the nervous system by reviewing a large body of scattered material and publishing in one volume a condensation of quantitative findings on the gross and fine structure of the brain and spinal cord. At the same time, the book has provided them with the opportunity to present many of their own observations. Blinkov, the senior author, is head of the Laboratory for the Study of the Structure and Function of the Central Nervous System, Institute of Neurosurgery, Academy of Medical Sciences of the U.S.S.R. Many of his publications deal with the cerebral cortex. Glezer is a member of the Institute of Psychiatry, Academy of Medical Sciences of the U.S.S.R. He has given particular attention to the ontogeny, evolution, and ultrastructure of the brain.

For the sake of the general reader with an interest in portraiture of the brain, it should be noted early in this review that the word "figures" in the title refers to numerals and not to illustrations. Actually, there are only 11 illustrations, and all are graphs or line drawings, with none showing a picture of the brain. As the title would indicate, this is primarily a workaday handbook. Neither the general reader nor the specialist will want to sit down and read it through for pleasure. This does not mean that it will not provide interesting browsing, as one can hardly pick it up to look for one piece of information without stumbling on something else that catches the eye. The absence of an index is certain to be a handicap and an irritation to users of the handbook, and it seems inconceivable that the publishers allowed a work of this kind to be printed without one.

The text of 273 pages is buttressed by 305 tables, which are bound together in the succeeding 170 pages. There are approximately 1100 references, some dated as late as 1966. Most of the 15 chapters deal with such expected topics as the neuron, spinal cord, cranial nerves, brainstem, cerebellum, basal ganglia, and cerebral cortex. Comparative data are given under appropriate paragraph headings. There is an introductory chapter on techniques, and the three last chapters deal respectively with "analyzers and motor apparatuses," the neuroglia, and the blood supply of the brain. In using information from a compendium of this kind, the reader will want to go to the source material to learn for himself

about technical limitations and the reliability of the measurements.

While this book was on my desk for review, I handed it to colleagues in various neurological disciplines for their first-hand impressions. Each invariably turned to something in his own specialty that he found to be of particular interest. There were relatively few negative reactions. One reader noted immediately that only 10 of the 12 cranial nerves were included. Another expressed surprise at finding the amygdala included under the basal ganglia, and another told me later that he was led astray by one of the references. The general impression, however, was that this book would provide an excellent starting point for anyone beginning to search the literature for quantitative data on some particular structure. As there is no immediate threat that computers will make passé the information contained in this book, it promises to be a reference that will be around for quite a while.

PAUL D. MACLEAN

*Laboratory of Neurophysiology,  
National Institute of Mental Health,  
Bethesda, Maryland*

## Experimental Carcinogenesis

**Tobacco and Tobacco Smoke.** Studies in Experimental Carcinogenesis. ERNEST L. WYNDER and DIETRICH HOFFMANN, with chapters by others. Academic Press, New York, 1967. xiv + 730 pp., illus. \$29.

This book is based on the premise that cigarette smoking is the major cause of lung cancer. Its justification is indicated in the preface as follows: "Here then lies the major task at this time: the effective achievement of an experimental reduction or elimination from tobacco smoke of tumorigenic constituents and of compounds that enhance their effect." The elimination of potentially hazardous constituents is one objective with which I believe most can agree, from those who are responsible for the prevention of disease to those who produce and sell products that are claimed to cause disease. If the search is successful, then all can rejoice. If it is unsuccessful, judged with the guidance provided by available biological models, then either the models are inadequate or the real major cause lies elsewhere. The dramatic decline of stomach cancer in recent years is unexplained, but obviously

a similar happening in lung cancer would be welcome, explainable or not.

The authors have made a fine contribution in presenting in one volume references to much of the pertinent literature and a great deal of their own work. The chapter by Wolf on tobacco production and processing represents an excellent summary of the multiplicity of variables which occur or can be controlled in preparing tobacco for at least temporary enjoyment by man. This includes not only cigarette tobacco but also cigar, pipe, and chewing tobacco and snuff.

In recent years the tobacco industry has made increasing use of reconstituted tobacco sheets, and Moshy reports in his chapter that 15 percent of the tobacco used in American-blend cigarettes (1964) is in this form. (He does not mention cigar tobacco, although reconstituted tobacco sheets have found acceptance in cigar manufacture also.) This is a chapter on the technology involved in the utilization of fragmented tobacco or tobacco dust to make sheets by five basic processes, namely, the dust-impingement process, the slurry process, the impregnation-of-web process, the paper process, and the extrusion process. As Moshy says, "The very real possibilities of making specific physical-structure modifications in reconstituted tobacco sheet and of adding chemical ingredients to affect the nature and degree of combustion of reconstituted sheet have not been adequately investigated. The implications of these added tools in fabricating smoking materials that meet technical as well as consumer requirements are technologically and scientifically appealing."

Chapter 5, "Some characteristics of tobacco smoke," gets off to an unfortunate start as follows: "During tobacco smoking, as in most combustions, organic matters burn incompletely. A complete combustion, if such would occur, would form no smoke, but only carbon dioxide and water." Despite this lapse (as the authors know as well as you and I that tobacco contains more than carbon, hydrogen, and oxygen), this chapter provides a good general description of the properties of cigarette smoke and of a variety of machines used to produce and collect it. One will not, however, find described the machine adopted in 1967 by the Federal Trade Commission to provide information on the tar and nicotine content of various cigarette brands.

Chapter 6 deals with selected laboratory methods in tobacco carcinogenesis. It presents in considerable detail the methods in use in the authors' laboratory, which include both short-term and long-term mouse-skin painting, assays of cilia toxicity in clams, and chemical analysis for "tar," nicotine, and numerous other constituents of tobacco smoke and smoke condensate. A graph for the mouse-skin painting experiments indicates that the number of mouse-skin tumors produced by cigarette smoke condensate has decreased between 1954 and 1963 by more than one-half.

Chapter 7 contains a 56-page table summarizing various published attempts to produce cancer in animals with smoke or smoke condensate and its fractions. The inhalation route has been unsuccessful in producing bronchogenic carcinoma, but mouse-skin tumors have been produced in many laboratories. The difficulties that apply to inhalation techniques are described at length. The production of pulmonary carcinoma *in situ* by the Leuchtenbergers early in their experiments is mentioned, but the fact that this was not followed by the development of carcinoma even though the animals were exposed for long periods thereafter is not mentioned. The experiment by Rockey is cited in several places in the book, at times, as on page 150, to indicate that invasive carcinoma resulted after 11,000 tar applications and five years' study, although on page 195 it is correctly indicated that only one invasive carcinoma was found in this study and that it was found only 11 days after the start of the experiment.

Chapters 8 and 9 contain an extensive summary of tobacco and smoke components that have been identified and an attempt to assess their biological properties. There are also two excellent chapters on filtration and selective filtration by Kiefer and Touey and by George and Keith, respectively. Had the Columbia people had the section on pressure drop on page 563 to read last spring, the revolutionary-breakthrough-cigarette-filter press conference of last July would presumably not have occurred.

The major authors have pressed some observations or interpretations to fit their preconceived ideas, but the book as a whole is an objective presentation of the state of the art of tobacco technology and experimental