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THE ELECTRONIC CLINICAL BRAIN ATLAS, VERSION 1.0 (CD-ROM)

This new atlas, created by Wieslaw L. Nowinski, Ph.D., R. Nick Bryan, M.D., Ph.D., and Raghu Raghavan, Ph.D., is a truly unique accomplishment that marks a new stage in clinical neuroanatomy. This interactive guide to the human brain is based on two atlases by Jean Talairach and Pierre Tournoux, and that by Georges Schaltenbrand and Waldemar Wahren, which have become classics in the field and serve as the basis for modern stereotaxy. The limitations of printed atlases—their two-dimensional illustrations, their inability to accurately reproduce the radiographic images of real patients, the difficulty of transforming coordinates into understandable images—moved the authors to combine information from different sources, process it, and create an entity that may set a new standard.

The disc's subtitle—"Multi-Planar Navigation of the Human Brain"—excellently describes its purpose and structure. The various sections of the printed atlases were digitized, referenced, labeled, and collected into an interactive clinical and scientific tool that allows one to display and manipulate various parts of the brain, find their names through extensive labeling, and print out the images in a variety of sizes and dimensions. Especially useful is the cross-referencing of all the atlases with each other, and the ability to resize any part of the image to fit the appearance of an individual patient's brain. Color coding of all deep brain structures and different Brodmann's areas simplifies the images. At the same time, the user can comprehend the complexity of the project based on the fact that 16,000 objects had to be labeled for complete anatomic coverage.

Labels appear in both full-text and abbreviated formats, and can be called up by changing the label window or by clicking on the structure of interest. A separate window with a more complete explanation of the anatomy can also be called up on request.

I will not get into the details of the computerized modeling and cross-referencing that were used in the development of this CD. Interested readers may find this information in the article by Nowinski et al, "Multiple brain atlas database and atlas-based neuroimaging system" that appeared in *Computer Aided Surgery* (1997;2:42-66).

Thieme Medical Publishers and the Center for Information-Enhanced Medicine should be congratulated on this innovative development. The researchers from the Institute of Systems Science in Singapore, who specialize in virtual reality and multimedia design, and the medical experts from Johns Hopkins University did an excellent job of combining the modern computer technology with the best neuroanatomy sources, creating a long-awaited interactive brain atlas that may be used not only in stereotactic circles, but eventually in all the neurosciences.

The foreword to the CD-ROM was written by Dr. Jean Talairach (available in English or his native French), one of the fathers of modern stereotaxy. Given his historical perspective, the clinical importance of this new atlas becomes even more obvious.

The extensive glossary is taken from W. W. Orrison's *Atlas of Brain Function* (1995). In a future edition, the publishers plan to link all glossary terms to their images in the atlas. Also planned is the addition of the *Atlas of Cerebral Sulci* by M. Ono, S. Kubik, and C. D. Abernathy (1990) and its integration with other atlases and three-dimensional images.

The CD-ROM is compatible with both PC and Macintosh; it is simple to install and very easy to navigate. It is available from Thieme Medical Publishers (U.S. \$349.00; DM 600.00), phone 1-800-782-3488, fax 212-779-9020, e-mail custserv@thieme.com. Technical support is available for authorized users at 1-888-427-9538, e-mail ecba@iss.nus.sg or ECBA@rad.jhu.edu.

A warning on the disc states, "This atlas is not designed for use in surgical procedures." This is correct—the CD is an education and reference tool. But that's for today; tomorrow, virtual reality and computerized robotics will use this and other atlases in surgical planning and for guiding electrodes, needles, and sensors through the depth of the human brain, fully integrating basic scientific knowledge with clinical medicine.