Contents

I. In	troduction
II. F Mor	Basis of the Parkinson Syndrome: phology, Physiology, Biochemistry, and Pathology 2
1.	Afferent Inputs of the Extrapyramidal Motor Nuclei
1.1.	Putamen and Caudatum (=Striatum)
1.2.	Pallidum
1.3.	Nucleus Subthalamicus
1.4.	Nucleus Ruber
1.5.	Substantia Nigra
2.	Connections Within the Extrapyramidal System and the Functional
	Significance of Individual Nuclei
2.1.	Putamen and Caudatum (=Striatum)
2.2.	Pallidum
2.3.	Nucleus Ruber
2.4.	Substantia Nigra
2.4.1.	Synapses of the Striato-Nigral Circuit and Their Transmitters 16
2.4.2.	Mode of Action of the Anticholinergic Drugs Against Parkinson Symptoms 24
2.4.3.	Efferent Pathways of the Substantia Nigra
2.4.4.	Neuropathology of the Substantia Nigra
2.4.5.	Anatomical Differential Diagnosis of the Parkinson Syndrome
2.4.6.	Localization of the Various Signs in Parkinsonism
2.4.7.	Experimental Lesions in Substantia Nigra
2.4.8.	Stimulation of the Substantia Nigra
2.5.	Other Neuronal Systems Linked to the Extrapyramidal System 39
2.5.1.	Nucleus Lateropolaris (L.po or VA)
2.5.2.	Nucleus Ventro-oralis anterior (V.o.a) or Anterior Part of the Ventral Half
	of the Nucleus Ventralis Lateralis (VL)
2.5.3.	Nucleus Ventro-oralis posterior (V.o.p) or Caudal Part of the Ventral Half
	of VL
2.5.4.	Nucleus Ventrointermedius (V.im)
2.5.5.	Nucleus Ventrocaudalis (V.c.e=VPL and V.c.i=VPM)
111 /	Nicial and Dathanharialania Findings Dalated to Automa Data
	Clinical and Pathophysiologic Findings Related to Autopsy Data ses of Parkinsonism Operated on by Stereotaxis
in Ca	•
1.	Methods
2.	Case Histories
IV. C	Correlations
1.	Remarks on the Accuracy of Reaching the Target
2.	Comparative, Radiologic, and Anatomical Evaluation of the Cerebral Reference Lines



X

2.1.	Sagittal Reference Line or Baseline	150
2.2.	Vertical Reference Line	151
2.3.	Reference Line in the Frontal Plane	151
3.	Anatomical Accuracy of Our Stereotaxic Procedure for Reaching the Target	151
3.1.	Discussion of Accuracy	157
4.	Correlation of the Effects of Stimulation During the Operation with the	
••	Anatomical Substrates	158
4.1.	Method of Stimulation	158
4.2.	Increasing the Tremor	162
4.3.	Blocking of Tremor	164
4.4.	Slowing of Rhythm of Tremor	164
4.5.	Acceleration of Tremor	164
4.6.	Jerks at Rate of Stimulation	165
4.7.	Change in Speed of Movement	166
4.8.	Change in Counting	167
4.9.	Ocular Effects	167
4.10.	Vegetative Effects	170
4.11.	Psychological Effect of Stimulation	170
5.	Correlation of the Electrophysiologic Findings with the Anatomical	
<i>J</i> .	Substrates	172
6.	Correlation of Coagulations of the Anatomical Structures with Functional	
0.	and Therapeutic Effectiveness	176
6.1.	Physical Parameters and Size of Coagulated Area	176
6.1.1.	Methods of Inactivation	176
6.1.2.	Used Methods of High-Frequency Coagulation	177
6.1.3.	Anatomical Determination of the Size of Coagulation and the Consequent	
0.1.5.	Alterations	178
6.2.	Correlation of Parkinson Symptoms with the Coagulated Structures	183
6.3.	Correlation of Rigidity	183
6.3.1.	Thalamotomy	183
6.3.2.	Significance of the Pallidothalamic Systems for the Production	
	of Rigidity	191
6.4.	Correlation of Tremor	196
641	Thalamotomy	196
6.4.2.	Pallidotomy	199
6.4.3.	Influence of Different Parts of the Internal Capsule on the Effect on the	
	Tremor	200
6.4.4.	Significance of the Dentato-thalamocortical System for Mechanism	
	of Tremor	200
6.5.	Correlation of Akinesia, Neglect, and Festination	204
6.5.1.	Discussion of the Concept of Akinesia and Hypokinetic Signs	204
6.5.2.	Correlations of Hypokinetic Signs	206
6.5.3.	Relevance of Extrapyramidal Systems to Akinesia and Hypokinetic Signs .	209
6.6.	Correlation of the Vegetative Symptoms with Inactivated Structures	213
6.7.	Correlation of Side Effects with the Damaged Structures	216
6.7.1.	Reduction of Expressive Facial Movements	217
6.7.2.	Voluntary Weakness of the Facial Nerve	219
6.7.3.	Reduction of the Postural Tone of the Arm	220
6.7.4.	Deviation During Walking	221
6.7.5.	Hemiparesis	223
6.7.6.	Dysphagia	223
6.7.7.	Aphonia	223
6.7.8.		223

	Postoperative Binocular Deviation
6.7.11.	Myoclonic Hyperkinesia
6.8.	Correlation of Postoperative Psychological Disorders with the Damaged Structures
6.8.1.	Disorders of Initiative
6.8.2.	Experience of the Double (Doppelgänger)
6.8.3.	Negativism with Mutism or Vigil Coma
6.8.4.	
6.8.5.	Confusional Syndrome
0.6.5.	Impairment of Consciousness
V Fi	ndings Regarding the Functional Anatomy
	lividual Diencephalic Systems
1.	Lesions in Forel's Bundle H ₁ (Fasciculus Pallido-thalamicus)
2.	Change of Speed of Movement and Laughing Caused by Localized Stimula-
	tion
3.	Loquaciousness
4.	Functional Organization of the Internal Capsule Corresponding to the Neigh-
	boring Ventral Nuclei of the Thalamus
5.	Dependence of the Improvement of Tremor on Additional Coagulation of
	the Nucleus Lateropolaris and Neighboring Parts of the Internal Capsule . 233
6.	Contribution to the Problem of Efferent Connections of the Substantia Nigra. 233
7.	Impairment of Consciousness Due to Bilateral Lesions in Nonspecific Nuclei
	of the Thalamus or in the Pallidothalamic System
VI. (Conclusions
1.	Determination of the Target Point in the Individual Patient
2.	High-Frequency Coagulations
3.	Check by Stimulation
4.	Further Checks on the Accuracy with which the Target Structure is Reached 238
5.	Special Indications for Therapeutic Results
5.1.	Rigidity of Parkinsonism
5.2.	Akinesia and Hypokinesia
5.3.	Tremor at Rest
6.	Pathophysiology of Parkinson Syndrome
6.1.	Tentative Interpretations of Parkinson Symptoms: a) Disorders of Nigro-
	striatal Circuit Function and
	b) Antagonism of Descending Nigral and Pyramidal Impulses in Anterior
	Horn Apparatus
6.2.	Tremor
6.3.	Rigidity
6.4.	Akinesia and Festination
6.5.	Vegetative Symptoms
6.6.	Bradyphrenia
6.7.	Pathomorphologic Differential Diagnosis of the Different Etiologic Forms
	of Parkinsonism 246
6.8.	Are the Described Cases Representative?
6.9.	The second secon

XII		Co	ontents			
Atlas	of the Basal Ganglia in Parkinsonism		. 249			
1. 2. 3. 4. 5.	Architectonic Differentiation and Methods of Staining		. 251 . 252 . 254			
Refer	ences		. 291			
Subje	ct Index		. 309			
Abbre	Abbreviations of Thalamic and Hypothalamic Structures (Foldout)					