Drug Dosage
The authors and the publisher have exerted every effort to ensure that drug selection and dosage set forth in this text are in accord with current recommendations and practice at the time of publication. However, in view of ongoing research, changes in government regulations, and the constant flow of information relating to drug therapy and drug reactions, the reader is urged to check the package insert for each drug for any change in indications and dosage and for added warnings and precautions. This is particularly important when the recommended agent is a new and/or infrequently employed drug.

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Preface

The task confronting the editors of a multiauthored book is notoriously difficult. They find themselves caught between two partners who have, at least at times, divergent interests. At one end is the publisher, eager to publish and sell as many books as possible. At the other is the author invited to present an overview of a broad topic proposed by the editors. The author's charge is less attractive. Writing an up-to-date and interesting overview requires experience, and is usually a difficult and cumbersome project because of the need to do a thorough search of the literature. The author must incorporate not only his own views and results of his own research, but also differing opinions – all of which must be presented clearly and with respect for the fundamental difference between a review paper and a report of personal research.

At first, an invitation from the editorial board of Progress in Neurological Surgery to write a review paper may be appealing to the author. Authors, like the editors of this series, receive no honorarium for their contributions. They do the work in part because of the honor, and in part to keep production costs as low as possible so that the books can be made attractive and affordable for neurosurgeons in training.

Despite authors' best intentions, however, sooner or later other commitments interfere. There are no compelling pressures to produce their review quickly, as there are in such matters of priority as reporting research results. Procrastination ensues and, almost invariably, delivery of the manuscript is delayed. A nearly completed book may have to wait for prolonged periods of time because a single chapter is not delivered. Such delays may make it necessary to update the reference lists, and even the content, of chapters that were delivered on time. Some chapters may prove to be unsuitable for the volume because of content or style, and may have to be rewritten. Sometimes it becomes necessary, at last, to approach a different author to write the chapter. At the worst, a book may have to be abandoned if several authors fail to deliver their contributions despite repeated summons, or if chapters on critical aspects of the book are not delivered. The ultimate frustration for the editor is that he has no
power to goad an unreliable author into action, or to reward authors who fulfill their obligation on time.

This volume is the product of such a regrettable situation. A book planned by a member of this editorial board could not be realized. While some chapters had to be returned to the authors because their content did not fit the volume or did not meet the standards of Progress in Neurological Surgery, the editor was left with a number of very valuable and interesting manuscripts. These chapters were resubmitted to their authors for updating of their contents and references, and have been assembled in a new volume under the title, Intensive Care and Monitoring of the Neurosurgical Patient. This volume has been published rapidly so as not to lose additional time. It is, therefore, interposed in the series of volumes describing Complications in Neurosurgery. Further volumes related to complications in our field of interest are currently in preparation.

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Dedication

Hugo Krayenbühl

Hugo Krayenbühl

1902–1985

Hugo Krayenbühl, the son of a psychiatrist, was born on December 3, 1902, in Zihlschlacht, Switzerland. He studied medicine at the Universities of Geneva, Kiel, Paris and Zurich and was graduated from the medical school of the University of Zurich in 1928. Dr. Krayenbühl took his residency in a variety of medical specialities in several medical institutions. After first working in the Department of Pathology under Prof. H. von Meyenburg and the Department of Psychiatry under Prof. H.W. Maier at the University of Zurich, he went to Berlin for training in neurology at the renowned Charité in the department of Geheimrat Karl Bonhoeffer. There he had the opportunity to meet Prof. Otfrid Foerster, the pioneer neurosurgeon in Germany. When he returned to Zurich, he was employed in the Neumünster Spital as an assistant to Dr. Th. Tobler in
general surgery. Sir Hughes Cairns, a former pupil of Harvey Cushing, was Hugo Krayenbühl's teacher in neurosurgery during the subsequent 2 years which he spent at the London Hospital. In 1936 he returned to Zurich, where the Chairman of the General Surgery Department of the University, Prof. P. Clairmont, appointed him to perform neurosurgery.

Hugo Krayenbühl began this venture under difficult circumstances. It was 1936, the time of the Great Depression. Switzerland, with a population of about 4 million people, was at its culmination of unemployment, and 124,000 people were without a job. For his first year, Dr. Krayenbühl worked without pay. He bought the radiology equipment and most of his surgical instruments himself. His first operating table was a donation of the Rockefeller Foundation. As no personnel experienced in this new surgical field were available, he trained his scrub nurses and intensive-care nurses himself. He had to teach them even the most basic techniques, such as the correct positioning of a paralyzed patient. He performed all his patients' physical examinations, including the plotting of the visual fields on a Bjerrum screen. Medical students assisted in the surgical procedures. The intraoperative pathological diagnosis of brain tumors was made by Dr. Krayenbühl alone, and later by a few of his co-workers, using cytological smear preparations — a technique he had learned from Dr. Dorothy Russell at the London Hospital. The first brain tumor was operated on July 19th 1937, the first herniated disc in 1940.

In Switzerland at that time, only a few general surgeons had performed any neurosurgical operations. Two other surgeons in Zurich had tried to focus their practice on neurosurgery, but both had failed. One of Hugo Krayenbühl's most important tasks, therefore, was to demonstrate — not only to his fellow surgeons, but particularly to general practitioners, internists, neurologists, ophthalmologists, and psychiatrists — that neurosurgery was not a meaningless, fancy surgical speciality but that, in the hands of the expert, neurosurgery could offer patients tremendous benefits. Hugo Krayenbühl did this brilliantly. He established not only the first neurosurgical department in Switzerland, but also its largest, and one of the finest and best known in Europe and the entire world.

The department grew steadily. Hugo Krayenbühl became the first Professor of Neurosurgery in Switzerland in 1945. In 1948, his department became independent from the Department of General Surgery. The 20,000th neurosurgical operation was performed in 1966. On April 15, 1973, upon his retirement from academic life and active neurosurgery, his clinic had grown from 12 beds in 1937 to 70 beds, with a team of 16 doctors and with 2,000 patients admitted annually.

He soon gained an international reputation as a neurologist, neuroradiologist,
and neurological surgeon. He trained two generations of neurosurgeons from Switzerland and from other countries in Europe, Africa, Asia, and North and South America. Most of the Swiss neurologists spent some time in his department, as did many internists, ophthalmologists, and psychiatrists. He was invited for a long tenure as visiting professor by Harvard University at the Massachusetts General Hospital in 1966, and by the Medical Faculty and Royal Infirmary of Edinburgh in 1970. He participated actively in the training programs of these two institutions, discussed problem cases, and assisted the trainees in surgical procedures. His international reputation brought him many honorary memberships in medical societies, and he was often called abroad for medical consultations and operations.

Hugo Krayenbühl's great contributions were possible only because of his deep personal commitment to the assignment he had chosen and his humanism. The patient, the human being needing his help, was always his primary concern. He was particularly concerned about children who suffered from neurosurgical diseases, and he believed that they deserved the best treatment available. He personally followed the progress of his patients, particularly the children, for many years after their operations, and continued to call them by their first names even after they had grown up. He also called the assistants he liked most by their first names, a sign of distinction. He operated on those patients who could hope to profit from the surgical intervention, and he aided those who were incurable to face death with dignity.

Dr. Krayenbühl's second concern was the teaching and education of undergraduate students and assistants. He felt that the most important and most difficult task is that falling to the university professor because it requires a commitment to convey medical knowledge but also to install in students a reverence for the ethical principles of the medical profession. A frank admission of errors was an integral part of this philosophy. In one of his clinical lectures which about 150 students attended, one student made a basic mistake in his conclusions in a seemingly easy case that was presented. Prof. Krayenbühl criticized the student in front of the entire audience. But at the beginning of his next lecture, Prof. Krayenbühl started by presenting a large box of chocolates to this student, informing the audience that surgery had shown that his own diagnosis was wrong, as well. It was not unusual for the Professor to bet with his assistants about a diagnosis. The usual price to be paid by the loser was either a cake or ice cream, from the best confectioner's shop in Zurich, to be shared by for all the assistants. He usually won the bet – but he paid the sweets as well. He always operated with 2 assistants. His first assistant was the most advanced assistant at the clinic, who cared for Prof. Krayenbühl's private
patients while receiving the 'final touches' on his training. This was an extremely fruitful but rather stressful period in our education. The second assistant was either a medical student or the youngest assistant at the clinic. It was a tremendous experience for undergraduate students to assist this famous man.

Hugo Krayenbühl was interested in the entire field of clinical neurosurgery. He consistently introduced the newest neurosurgical and neuroradiological techniques in his department, and he participated actively in their refinement and further development. Neuroradiology, and especially angiography, were of particular interest to him. His book about cerebral angiography, co-authored by M. G. Yasargil, remains a classic text in this field. He introduced into Zurich the technique of intubation anesthesia, which at that time was done blindly through the patient's nose. The first penicillin to be used in Switzerland – a gift of Sir Hughes Cairns who, as an officer of the British Army during the campaign in northern Italy, spent a short furlough in Zurich at the home of his former pupil – saved the life of a patient who otherwise would have died from meningitis. Hugo Krayenbühl XII

Krayenbühl knew well that malignant gliomas could not be cured by surgery and/or radiation therapy. Therefore, he stimulated research concerning the possibilities of cytostatic treatment. Speciality laboratories for electroencephalography and clinical neuropsychology were established for scientific and clinical purposes in 1948 and 1960, respectively. They were staffed by co-workers who were specialists sent abroad for training in well-known centers. He also created facilities to be used by his co-workers for research and clinical applications in microneurosurgery, neurophysiology, stereotaxic and functional neurosurgery, and electron microscopy. The combination of clinical work and basic research was extremely stimulating, and created a fruitful environment for further developments. Hugo Krayenbühl not only stimulated research in his own clinic, however. He was also engaged actively in the founding of the Brain Research Institute of the University of Zurich, an institution devoted to anatomical, physiological, and chemical investigation of the brain.

Despite his contributions to research, Hugo Krayenbühl was primarily a clinical neurologist and a meticulous neurosurgeon. He hated working in a bloody surgical field and became rather irritated when he could not achieve prompt and complete hemostasis. His surgery was extremely elegant – and surgery, at that time, was performed without magnification in a darkened operation theater with the aid of a head light. His neurological examinations were painstakingly exact. However, he always emphasized that the interpretation of findings had to be made with a reasonable amount of circumspection. He used to tease assistants whose interpretation of a clinical case depended too much on a single elusory symptom that they had 'heard the fleas cough'.
He authored more than 250 scientific publications covering the entire field of neurosurgery. Most of them focused on cerebral angiography, intracranial tumors, thrombosis of cerebral vessels, and the diagnosis and treatment of aneurysms. He was a member of the Advisory Board of the Journal of Neurosurgery. He edited the neurological and neurosurgical section of the Schweizer Archiv für Neurologic Neurochirurgie und Psychiatrie and founded and edited two series of books. The first one, Progress in Neurological Surgery, which first appeared in 1966 and was intended to provide a review and critical appraisal of the flood of new reports and papers relevant to neurosurgery; the reviews were written by invited, internationally known authors of great personal experience in a particular field. The initial volume of the second book series Advances and Technical Standards in Neurosurgery appeared in 1974. This series, later edited under the auspices of the European Association of Neurosurgical Societies, was primarily considered a means for training young European neurosurgeons because of, as Hugo Krayenbühl wrote, ‘a lack of any organized common European postgraduate training system for young neurosurgeons’, a topic that was always of greatest concern to him.

Hugo Krayenbühl founded the Association of Swiss Neurosurgeons in 1954, and served as its first president. As president of the Société de Neurochirurgie de Langue Française, he organized, in cooperation with Prof. P.Röttgen, President of the German Society of Neurosurgery, the first European Congress of Neurosurgery which took place in Zurich in 1959. This was the first official postwar meeting of French and German neurosurgeons, and it was attended also by neurosurgeons from other European countries. The congress ultimately led to the founding of the European Association of Neurosurgical Societies in 1971 in Prague. For the services he had rendered to the European neurosurgical community, Hugo Krayenbühl was honored with the honorary presidency of the Sixth European Congress of Neurosurgery in Paris in 1979. Many honors were bestowed on Hugo Krayenbühl. The Universities of Geneva and Lausanne conferred on him the honorary degree of Doctor of Medicine. In 1972, he was elected Honorary Academician of the Academia Lancisiana of Rome. He was awarded the Otto Veraguth Medal in 1956, and the Otfrid Foerster Medal in 1973. In 1966, he was Honored Guest of the Congress of Neurological Surgeons, and the American Association of Neurological Surgeons elected him Honorary Member in 1974. The Fifth International Congress of Neurosurgical Societies in Tokyo elected him Honorary President of the World Federation of Neurosurgical Societies. But all these honors did not change him. He remained sincere, modest, kind, and devoted to his commitment to his patients.
The arts played an important role in Hugo Krayenbühl's life. He was devoted not only to the medical art in the Hippocratic sense, but also to music and to the figurative arts, painting and sculpture. For many years he supported the Collegium Musicum. His collection of modern paintings and sculptures, among them one of Marino Marini's horsemen, was remarkable.

In April 1973, Prof. Krayenbühl retired from academic life and from active neurosurgery, leaving behind a flourishing, internationally renowned neurosurgical department. Retirement, however, did not mean inactivity. He continued to see patients – few were new, but the majority were patients whom he had followed for years, even decades. He had the immutable conviction that the neurosurgeon's assignment was not finished with the last skin suture, but that close follow-up was equally important for the benefit of the patient and the further development of clinical neurosurgery. He continued also to work as editor of his two-book series and frequently visited his former collaborators in the department, giving us advice in both our technical and personal problems.

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The last half year of Prof. Krayenbühl's life was overshadowed by the death of his beloved wife, the former Elsa Gross, who bore him 4 children and who helped him to form a family in which existed a deep appreciation for human culture and art. Her death broke his will to live. He died peacefully on January 9, 1985 after an illness of about 1 month's duration.

Hugo Krayenbühl must be regarded as a true homo universalis, a universal man in the sense of the renaissance. He had obtained many gifts from a kind destiny. However, he knew how to use them for the benefit of mankind. The combination of these gifts with his irresistible zeal for excellency made it possible for him to achieve outstanding results, not only in his profession as a physician and surgeon, but also as a man of culture. He set an exemplary ideal for us to follow.

Alex M. Landolt

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