

# On the History of Pharmacology at the University of Uppsala

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## Scheme of the history of the Chairs at the Department of Pharmacology at the University of Uppsala

### *Med. Fac.'s 'Secundus prof.'*

Joh. Chesnecopherus 1626-35

Petrus Kirstenius 1636-40

Olaus Stenius 1648-60

Olof Rudbeck sr. 1660-92

### *'Med. et Botanices prof.'*

Olof Rudbeck jr. 1692-1730

Nils Rosén v. Rosenstein 1740-42

Carl v. Linné 1742-77

Carl v. Linné jr. 1777-83

Carl. P. Thunberg 1784-1828

Göran Wahlenberg 1829-51

### *'Botanicus demonstrator'*

Carl v Linne 1730-35

Carl v Linné jr. 1759-1777

Carl P Thunberg 1777-1784

Adam Afzelius 1785-1812

G. Wahlenberg 1814-1828

### *Prof. 'Materia Med. et Dietetica'*

Adam Afzelius 1812-37

*Prof. of botany (phil. faculty)*  
1851

### *'Chemiae med et physiol prof.'*

Elof Wallquist 1853-1857

### *Adj. 'Natural hist and chem.'*

Aug Almén 1860-1862

Robert Fristedt 1862-1877

*Prof. 'med. and physiol. chemistry'*

### *Prof. 'pharmacol. and natural hist.'*

Robert Fristedt 1877-93

### *Prof. 'general and exp. pharmacodyn. and pharmacognosy'*

Henr. Viktor Rosendahl 1894-94

Mårten Elfstrand 1898-1924

E. Louis Backman 1925-48

Ernst Bárány 1949-77

### *Prof. 'pharmacology' 1958*

Nils-Erik Andén 1978-86

Lars Orelund 1986-

Additional chair of **Pharmacology** (1948): Torbjörn Edlund (1950-1967), Per Wistrand (1968-1994), Pekka Männistö (1994-)

Chair of **Medical Behavioural Science** (1983): Bengt Meyerson ([1968-]1983-)

Chair of **Molecular Cell Biology** (1995): Dan Larhammar (1994-)

### *Introduction*

Pharmacology, which is often taken to be synonymous with pharmacotherapeutics, has throughout the history of medicine been one of its most important corner-stones. Two other terms, which often appear in conjunction with pharmacology, and actually represent sub-disciplines within the field, are 'pharmacodynamics' and 'pharmacognosy'. Pharmacodynamics generally deals with the mechanisms of drug action, whereas pharmacognosy involves the knowledge and recognition of plant species, animals or minerals used in the preparation of drugs. Well into the 19th century, pharmacognosy was the most important part of pharmacology while during the last century pharmacodynamics has become almost synonymous with pharmacology. In addition, very early on and often overlapping with pharmacology, another special field within the area of drugs, 'pharmacy', was developed in which 'pharmacopoeias' (recipes mainly for the pharmacists in the preparation of drugs) played a dominant roll. The history of pharmacy and of the pharmacopoeias in Sweden and Uppsala has been dealt with elsewhere.

### *The time before Johan Franck*

Until the 17th century, the notion, put forth by Hippocrates and Galen, was that drugs, derived primarily from plants, but also from the organs and the excrement of animals, had inherent medicinal powers which in the correct proportions could cure disease. Disease, as such, was claimed to arise from an imbalance in the four bodily humors (blood, yellow and black gall, and phlegm), and thus treatments which reset this delicate balance would be curative. Knowledge pertaining to the raw materials, which were very often used in unaltered form in various compositions (*Materia Medica*), represented the major form in which medicine was exercised at that time. Consequently, medicine had an obvious connection with botany, but also other disciplines within natural history. Botany was, towards the end of the middle ages, synonymous with the knowledge which had been accumulated in 'herbariums', which apart from offering a detailed description of various plant species, also described exhaustively the medical properties of each plant and the diseases which they could treat and cure. Such were also the conditions in Uppsala at the time of the beginning of medicine at Uppsala University. The University was founded in 1477, but the Faculty of Medicine has its roots in the appointment by Johan III of the former personal physician of king Erik XIV, Benedictus Olai (Bengt Olsson) as lecturer in medicine in 1571. In 1578, Olai produced the first printed medical book in Swedish entitled 'Een Nyttigh Läkare-Bok' (A Useful Medical Book), which upon closer inspection actually proves to be a hand-book in pharmacotherapeutics. Other early Swedish manuscripts or prints of primarily pharmacological content are one written by monks in Nådendal's monastery in the 15th century, Peder Månsson's 'Läkarebok' written in 1522 in Italy and G. Lemnis' thesis 'Emot Pestilente' written in 1572). The first professor in medicine, with the title of 'professor physiologiae', Johannes Chesnecopherus, whose mother incidentally was the sister of Benedictus Olai, managed to entertain a wide range of interests (mineralogy, physics, meteorology, and philosophy). Chesnecopherus presided over Sweden's first two theses in botany (1621 and 1625), naturally motivated by his interest in medicinal plants.

### *The medical professorship is divided in 1626*

In 1626, during the time of Chesnecopherus, the chair of medicine was divided into two. The first, entitled 'primus professor', is the direct predecessor of the contemporary professorships in

medicine, but from it are also derived positions in anatomy, surgery and physiology. The second, entitled 'secundus professor', came later to be divided into a chair of botany appointed by the Faculty of Philosophy and a combined position in physiological chemistry and pharmacology (see below). At the division in 1626, Chesnecopherus was appointed secundus professor.

#### *Johan Franck - Sweden's first pharmacologist*

Despite expectations, it was Chesnecopherus' successor as primus professor, Johan Franck (professor 1624-1661), instead of his contemporaries as secundus (Petrus Kirstenius 1636-1640 and Olaus Stenius 1648-1660), who most whole-heartedly maintained the tradition of natural history or 'materia medica' within the medical faculty in Uppsala. It may also be mentioned that Franck's colleague Kirstenius wrote, when less occupied with his main interest, oriental languages, a purely pharmacological paper entitled "Tractus de vero usu et abusu medicinae" (On the true use and abuse of medicine). Johan Franck was born in Stockholm in 1590. His parents were M. Franck, a businessman, and A. Rostorpia (born in Mecklenburg). In order to avoid the plague, which had taken root in Stockholm at the beginning of the 17th century, Johan was sent, after 7 years of formal schooling, to his relatives in Rostock where he entered the university in 1610. With the exception of a few short visits to Sweden, Franck spent the major part of his youth at various universities in Germany (Rostock, Königsberg, Helmstädt, Leipzig, and Wittenberg) until the plague again forced him away in 1622. This time, however, he returned to Sweden, where the threat had subsided considerably. During his time in Germany, Franck wrote a work entitled 'Signatur', which contained a thorough description of roots, leaves, flowers, seeds, fruits, etc. and their medicinal properties seen from a Paracelsic point of view (i.e. influenced by mysticism and astrology). This work cast a shadow on Franck's reputation as a scientist for several hundred years despite the fact that it was an experimental document with an approach which was in no way reflected in his later work. In 1624, Franck was appointed to the chair of 'Botanices et Anatomiae (Medicinae)' at the faculty of medicine in Uppsala. After some 20 years his health progressively deteriorated but he held his position for a total of 37 years. When relieved from his post on the 9th of April, 1661 he was 71 years old. He died in October of the same year from 'obstruction'.

Franck appears to have excelled both as an anatomist and as a botanist. He produced 7 anatomical theses and among his pupils were, apart from Olof Rudbeck, also Hofvenius and Bröms, all of whom were well respected anatomists. As a botanist, Franck was considered by both Carl von Linné and Elias Fries to be "The best within his field as a scientist" (E. Fries. Bot. Not. 1858). In all, Franck presided over 22 dissertations of which 4 can be characterised as pharmacological. One of them, entitled 'De praeclaris Herbae Nicotinae s. Tabaci virtutibus' from 1633 is considered by some to be Sweden's first pharmacological monography. In connection with the establishment of an apothecary in Uppsala in 1636, Franck wrote a pharmacopoeia which is assumed to be Sweden's first. The first official Swedish pharmacopoeia is 'Pharmacopoeia Holmiensis Galeno-Chymica' which was published in 1686. Franck's 'Speculum botanicum' was considered by Linné to be Sweden's first flora but is in reality merely a compilation of those medicinal plants which he recommended. During the 1870's, the current professor in pharmacology in Uppsala, Robert Fristedt (see below) discovered a well concealed manuscript in the university library by Franck entitled 'Botanologia Franckenii', on which he later based several

of his own writings. Franck's work, which was considered to have a 'pharmaco-dynamic' content (here in the sense that it described the contemporary view on the medical effects of the plants), was written in the 1640's and his reputation as Sweden's first pharmacologist is based on it. In the famous inaugural speech of P.J. Bergius at the Royal Academy of Science in 1758 "Om Stockholm för 200 år sedan och idag (About Stockholm 200 years ago and today)" where he delivered a detailed account of the history of medicine beginning with the time of Gustav Vasa can be read that Johan Franck "entered church with boots, spurs and sword. Was also shrouded just as he was dressed, in coat and boots. His own hair, tall man, dry and sinister". At the time, Bergius held the position of professor of 'Historiae naturalis et pharmaceutices' in the 'Kirurgiska undervisningsverket (College of Surgery)' at the 'Collegium Medicum' in Stockholm, which later (1810) became the Karolinska Institute. In 1778 Bergius produced a work entitled 'Materia medica e regno vegetabili', but he is perhaps better known for his garden 'Bergianska trädgården', which he donated to the Academy and which still exists today.

#### *Olof Rudbeck sr. and jr. and the Linnean period*

One of Olof Rudbeck Sr.'s (secundus professor 1660-92) main interests, being a renowned eclectic, was botany. He founded the botanical gardens in Svartbäcken in the 1650's and worked for over 40 years on an extensive description of various plant species entitled 'Campus Elysii', which was lost in the fire which swept through Uppsala in 1702. His son, Olof Rudbeck jr., who succeeded his father as secundus professor (1692-1730; now called 'Medicinae et botanices professor'), also possessed a strong passion for botany and had a particular interest in medicinal plants. His botanical-pharmacological interest was also shared by his colleague Lars Roberg (primus professor 1697-1740) as well as the four professors medicinae et botanices who followed, Nils Rosén von Rosenstein (1740-42, primus professor 1742-56), Carl von Linné sr. (1742-1777), Carl von Linné jr. (1777-1783), and Linné Sr.'s pupil Carl Peter Thunberg (1784-1828). Rosén v. Rosenstein is probably best known for the introduction of pediatrics in Swedish medicine, but is perhaps more well known from a pharmacological perspective as the one who introduced quinine bark to Sweden to treat malaria.

#### *Carl von Linné (Linneus)*

Linné made his most important contributions in the field of botany, but of the various medical disciplines, it was pharmacognosy and pharmacodynamics, or as these fields were earlier described, 'materia medica', which he occupied himself most with. Among the over 185 academic theses which he produced, 26 were within the field of 'materia medica'. Linné attempted to make extensive corrections and modifications to the Pharmacopoeia Holmiesis which from the year 1688 had become the accepted guide for the production of pharmaceuticals by Swedish apothecaries (full of recipes involving the use of faeces etc.). In light of his disappointment with this trend, Linné produced his own 'catalogue' entitled 'Materia Medica, Liber I. De plantis'. There are those however, who make the claim that Linné's contributions to medicine were in fact mediocre when compared to his caliber as a botanist. One of the most symbolic and meaningful steps in Linné's career was made when he was offered the opportunity to substitute for Rudbeck as a botanical demonstrator during the summer of 1730. Linné was then 24 years old. Rudbeck had already in 1720 been relieved of the responsibility and various substitutes had been given the duty during the ten years which followed. Linné was a success and held this position for several

years despite attempts by Rosén to take over, which generated a fierce tension between the two. Rosén and Linné managed to reconcile their differences and in 1742 they exchanged positions (Rosen had in 1740 been appointed the post of professor in botany (*secundus*) and Linné had been given the title of professor in medicine (*primus*). During the latter half of the 1730's, Linné was away from Uppsala and the botanical gardens deteriorated. On his return in 1742, after receiving his appointment as professor and moving into the house of the head, where Rudbeck had lived, he quickly returned the gardens to their original grandeur.

#### *Carl von Linné jr.*

Carl von Linné jr., was appointed, in 1759, at the age of 17, to the position of 'botanicus demonstrator', i.e. the same post which his father had held in the botanical gardens. It seems that Linné sr. had created this position for his son, which had earlier been part of the duty of the professorship. In 1763, Linné jr. received word from the king that he would be given his father's position as professor when it became free. Linné jr. did not seem to possess the stately and jovial personality of his father, rather he had a reputation of being a dandy and he was seldom admired by his students. The unfair favouritism of his father had created jealousy and animosity towards him, not at least among the Stockholm botanists (e.g. Bergius), who although being pupils of Linné sr. probably at the same time were competitors. Furthermore, he was on poor terms with the well-respected head gardener of the botanical gardens. He held the position of professor for a mere 6 years (1777-1783) before his death at the age of 43, most likely due to jaundice, which he contracted in London. His time as a professor was not a happy one for the reasons already mentioned and on top of that he entered into a long-lasting conflict with his successor as botanicus demonstrator, Carl Petter Thunberg. On several occasions Linné jr. refused to hand over the key to the gardens to Thunberg which resulted in his inability to perform his duties as a demonstrator (probably of economical importance). When it comes to Linné jr.'s scientific merits, varying opinions exist. For some time, he was considered to lack the competence necessary to maintain the reputation of his father's position. Sten Lindroth however, has compiled more contemporary analyses which have given rise to a more progressive opinion. Included in his achievements are the detailed and systematic characterization of palms and lilies much in the spirit of his father, as well as the development of a new system for the classification of various grasses.

#### *Carl Petter Thunberg*

Carl Petter Thunberg was *Secundus* professor, or as it was called at the time 'medicinae et botanices professor' from 1784-1828. Thunberg, who was often called the Linné of Japan, continued in the footsteps of his mentor Linné sr. with the characterization of the earth's flora (ex. *Flora Japonica* 1784, *Flora Capensis* 1807-1823), with the search for medicinal plants as his primary goal. From 1770-1779, Thunberg travelled extensively in among other places, Europe, South Africa, Japan, Java, Ceylon, and on his return had managed to accumulate 18 cases of herbs, 13 cases of insects, and 11 with mussels and snails etc. The tales of his travels are among the most internationally acclaimed Swedish writings from the 18th century. In the interest of preserving his specimens, Thunberg succeeded in convincing the king, Gustav III, to donate land for the creation of a new botanical garden in the castle park in Uppsala. In August 1787, the king laid the first stone and at the turn of the century, the remaining plants from the old botanical garden were transferred to the new location. The gardens were complete in 1807, ripe for the celebration

of Linné's centennial birthday. Thunberg was rarely considered by his colleagues to be a genius, but nonetheless he was an extremely active pupil of Linné, who in his lifetime, succeeded in describing more plant species (approx. 2000) than any other botanist ("God created, Linné organized, Thunberg described" as it was said). Towards the end of his career, Thunberg was the only Uppsala professor with an international reputation.

*The First Professor in Pharmacology - Adam Afzelius is appointed Professor in 'Materia Medica et Dietetica' in 1812*

Adam Afzelius succeeded Thunberg as 'botanices demonstrator'. He was born in Larf (Västgötland) on the 8th of October, 1750, son of a vicar, Arvid Afzelius, and Katarina Brisman. He went to school in Skara and came to Uppsala in 1768, where he studied philosophy, oriental languages, and natural history. Both his brothers, Pehr and Johan, also went on to become reputed scientists. Adam had considered a career as a humanist and was appointed docent in oriental languages in 1777. However, after attending lectures by the then elderly Linné and becoming a close friend of Thunberg, he began collecting material for the revision of Linné's *Flora Svecica*. This led to his appointment in 1785 as 'botanices demonstrator' after Thunberg, but after complaining about his health, he left Sweden for London where he worked successfully with the Swedish flora and continued to study the Linnéan herbariums. However, Afzelius was a restless and romantic character and in 1792 he traveled to Sierra Leone, where he was given the task of taking an inventory of the English colonies' natural resources. It is assumed that he was influenced in particular by Swedenborg's concept of an African who had been won for the 'light of God'. His Botanical and zoological collections became well known internationally, but at the same time he was struck by misfortune. He became ill on the African Guinea coast and his home was plundered in Sierra Leone. When, at the turn of the century, he finally returned to Uppsala, he took upon himself the task of establishing the Linnean Institute.

Later on, Afzelius held some of Thunberg's public lectures and in 1812, became extra ordinary professor of 'Materia medica et dietetica' in the medical faculty, a post which was assumed to be created solely for him and which he held until his death in 1837. *Materia medica et dietetica*, if an adequate translation of its meaning at the time is applied, reflects most nearly today's concept of pharmacology. Afzelius' career has been described with the following words, "Again in London, returned to Uppsala at the turn of the century where he became professor in pharmacology, occupied himself with his African collections but published essentially nothing. Most renowned for his edition of Linné's autobiographies" (1825).

The main responsibility for theoretical pharmacology after Afzelius, should have returned to the professor of medicine and botany ('*Medicinae et botanices professor*'). When the position became free in 1828, after the death of Carl Petter Thunberg, it was taken over by Göran Wahlenberg, who was the last to have the title as it was dissolved in 1851. Before Wahlenberg was appointed, he had, since 1814, held the post of 'botanices demonstrator', where he also succeeded Afzelius. It was here Thunberg, as has already been described, came into conflict with his professor, Linné jr. Several decades later, the relationship between Wahlenberg and Thunberg was spoiled, this time due to both more earthly matters and to differences in scientific viewpoints. Wahlenberg, a stubborn man, was, in his application of Linné's system so dogmatic that he was

soon isolated from Thunberg, who was easily the most profound of the Linnéan pupils. Wahlenberg wrote both 'Flora Lapponica', 'Flora Uppsaliensis' and his greatest works 'Flora Suecica' and 'Flora Carpatorum Principalium' (in the Carpathian mountains, a lake is said to have been named after Wahlenberg). Wahlenberg was an exceptional scientist, but his reputation was soiled due to his embracement of the teachings of homeopathy.

*The Chair of Medicine and Botany is in 1851 divided into two: Medical chemistry-Pharmacology and Botany*

As described above, a special professorship with the title of 'Materia medica et dietetica', was created for Adam Afzelius in 1812, which, in its essence, was the beginning of an independent pharmacological discipline at a medical faculty in Sweden. After the death of Afzelius in 1837, the subject was returned to the tutelage of the resident professor of medicine and botany, Wahlenberg. However, after Wahlenberg's death in 1851, the former Linnéan chair in medicine and botany was divided and botany removed from the medical to the philosophical faculty and the chair within the medical faculty was described as dealing with pharmacognosy, pharmacy, physiological and pathological chemistry with the title 'Chemiae medicae et physiologiae' professor.

*Olof Wallquist (professor 1853-1857)*

Mention of the word 'pharmacology' was neglected in the appointment of 1851, but 1853, when Olof Wallquist was granted the position, is regarded as the formal establishment of a professorship in combined pharmacology and medical chemistry. Olof Wallquist was born in Kuddby on the 14th of November, 1797, the son of a clergyman, Seth Wallquist, and Kristina Eleonora Strang. Wallquist became a student in Uppsala in 1812, pursuing the fields of mathematics, mineralogy, and chemistry, and graduated with the degree of fil. kand. (Bachelor of Science) in 1820. In 1823 he was elected to the position of assistant in chemistry, and after studying abroad 1825-1826, he worked avidly as a practical lecturer at the university's chemistry laboratory. In 1838, he was given the honour of holding public lectures in 'parts of chemistry, which for medicine are essential, and to perform examinations for the medical degree', and at that time he was also given the title of professor of chemistry. In 1841 he was awarded an honorary doctors title in medicine, and in 1853 he was appointed to the newly created position of professor in 'Chemiae medicae et physiologiae'.

Although Olof Wallquist had an astute capacity for the teaching of pharmacognosy and pharmacy, his lectures in pharmacology were considered subordinate to his excellence within the field of medical chemistry. In the words of his colleagues, 'He possessed uncommon wisdom within certain areas and maintained well his knowledge. On his word one could depend, and equally so one could with trust count on his help and altruism when it was needed. He devoted his time and patience to his students. He was modest and simple despite a considerable fortune from which he donated 15000 Swedish crowns to the academic hospital.'

*Lectures in Pharmacology are held by assistants (1857-1877)*

After the death of Wallquist in 1857, i.e. 4 years after his appointment as professor, lectures in pharmacognosy, pharmacy, and pharmacology were, in the absence of an obvious replacement, held by assistants until 1877 when a special professorship in pharmacology and natural-history

was established. The position of assistant, which was created in 1858 in the area of natural history and chemistry for the preservation of pharmacology, had its roots in the position of 'botanices demonstrator', both with regard to financial sources and with regard to duties. Thus, this office remained unaltered within the medical faculty, even after 1852, when the botanical gardens were placed under the supervision of the newly appointed professor of botany. In 1860 the position of assistant was taken by August Almén who was more a pharmaceutical chemist than a pharmacologist (Almén contributed to the development of a system for the determination of urine sugar levels). Thereafter, Almén worked extensively with the Swedish pharmacopoeia. Almén, who in 1861 was appointed professor of medical and physiological chemistry, was succeeded as assistant in 1862 by Robert Fristedt, who, several years later, was given the post of professor of 'pharmacology and natural history', whereby pharmacology was definitively rooted in Uppsala.

*Professorial Titles and a short account of the development of experimental pharmacology in Uppsala and Scandinavia*

After the death of Fristedt in 1893, the professorial title in pharmacology was changed to professor of 'general and experimental pharmacodynamics and pharmacognosy', which serves as an indicator of a newly acquired interest and emphasis on the mechanisms of the action of drugs. Synonymous positions at the University of Lund and at the Karolinska Institute were given, i.e. the titles of professor in pharmacodynamics and professor in pharmacodynamics and pharmacognosy, respectively. The particular circumstances leading to the absence of a 'pharmacognosy' title in Lund was investigated by Ahlgren in connection with the appointment of Bárány in 1948; 'the title of professor in pharmacology is given in 1907 in Lund, whereas Uppsala and Stockholm, being more ancient, should include pharmacognosy.' In Uppsala the professorial title in the subject was finally changed, in 1955, to professor of 'pharmacology', with the argument that pharmacognosy no longer interested students of medicine, only students of the pharmaceutical faculty. The return to 'pharmacology' from 'pharmacodynamics' probably has its basis in that, at the time, pharmacodynamics was so widely accepted that its emphasis in the field was in many respect redundant. The "birth" of experimental pharmacology 'pharmacodynamics' is rightly considered to coincide with the appointment of Rudolph Buchheim as professor of pharmacology in Dorpat (Tartu) in 1846. Buchheim's successors in Dorpat during the coming half century were all foreground figures within pharmacology, but his pupil Oswald Schmiedeberg, who in 1872 moved to Strassburg, was to become the teacher of almost all important pharmacologists in the next generation. Thus, both successors of Fristedt in Uppsala, Rosendahl (1893) and Elfstrand (1898), the first professor at the Karolinska Institute in Stockholm, Santesson (1895), as well as their Scandinavian colleagues Sundvik in Helsinki (1886), Grams (1891) and Bock (1900) in Copenhagen and Poulsson in Kristiania (Oslo) (1895) were for some time trained in Dorpat or by Schmiedeberg in Strassburg.

*A Summary of the events leading to the establishment of the pharmacological discipline in Uppsala*

It can be said, based upon the above background, that the chair of pharmacology in Uppsala, together with the professorship in medical chemistry, have their roots in the 'secundus' chair in medicine. This began with Chesnecophoros in 1626 and was thereafter converted to 'medicinae et botanices', which was held by Rudbeck jr. in 1692, later called the Linnean professor after Linné

sr. who held the position 1742-1777. After the death of Wahlenberg in 1851, the title was changed to 'Chemiae medicae et physiologiae professor' (including pharmacology in the instructions) and botany was created an independent discipline within the philosophical faculty. The appointment of Fristedt in 1877 led to the creation of a professorship in pharmacology, independent from medical chemistry. However, the professorship also has its roots in the position of curator of the botanical gardens, which was the origin of the assistant position ('adjunctur') which Afzelius had until he was appointed professor in 'materia medica et dietetica' (pharmacology) in 1812, and which also Fristedt had when he, in 1877, was made professor of pharmacology.

*A Summary of the events leading to the establishment of the physiological discipline in Uppsala*

The discipline of physiology has a separate history inasmuch as that when the faculty's primus professor, Carl von Linné, and its 'medicine et botanices' professor Nils Rosén, in 1742, divided the medical subjects between themselves, physiology and anatomy were to belong to the primus professor, which Rosén became, while Linné acquired the other position. In 1788, a professorship in anatomy and surgery was branched from this line in which physiology was included. In 1837 this professorship was divided into two separate positions, one in surgery, and one in anatomy and physiology. Physiology became an independent discipline in 1863.

*The location of the Department of Pharmacology and its early development*

The basis of the collection of drugs (plants, seed, barks etc.), which at the time was considered to be an integral element of the field, was emphasized by the last holder of the Linnéan professorship, Göran Wahlenberg. The collections were first housed at the Institution of Anatomy (in central Uppsala), which was built in 1850, and which at the time was the faculty's only scientific institution. When the chemistry building, the house with the tower close to the botanical garden, was built in 1860-61, the collections were transferred there. A dispute over the ownership was to be tried in the courts before the valuable collections could be considered the property of the university. For the care of the collections, 200 Swedish crowns per year were allotted, which was increased to 400 crowns in 1885, a sum which was maintained until 1907. Donations, gifts, and Fristedt's continued research, contributed to the collections. In particular, it can be mentioned that The Vega expedition (a Swedish expedition sailing with the bark 'Vega' for the first time through the North-East passage from the Atlantic to the Pacific Ocean) brought with it an abundance of new specimens. From having been kept in a small room in the cellar, the collection expanded to two adjacent rooms when space constraints were relieved with the construction of the main university building in 1887 and its new lecture halls. The rooms were located on the second floor directly next to the newly renovated medical chemistry auditorium, which had earlier been part of the professor's (medical chemistry) home. These two rooms also served as the main office of the professor of pharmacology. The old cellar was converted to a study room for medical students and contained a smaller assortment of drugs, plants, and extracts. Fristedt had consequently, no specific research rooms, nor any location for pharmacodynamic studies. Concern over this fact increased, but it was first after the death of Fristedt in 1893 that the professorial title was changed to include 'experimental pharmaco-dynamics and pharmacognosy', where the assumption must be made that 'experimental' referred to a growing realization that the present state of research was to

be changed. Some experimental pharmacological research seems to have been carried out during 1894 when Carl Gustaf Santesson (see below) temporarily held the position, however in some rooms put at his disposal at the department of physiology. Practical laboratory exercises for students were essentially lacking until 1897. In addition to lectures, 'twice a week, demonstrations of more important parts of the collections for the students, as so required' were held. The first experiments should have been studies on the frog heart, since this both was Santesson's interest at that time and also since such an equipment was bought in 1898 (the first set of equipment should have been 'home-made'). In 1899 the department had access to 3 rooms at the department of physiology but virtually no equipment. In 1902, however, the faculty supplied 4000 Sw. Cr. for that purpose and new equipment (e.g. a chymograph) was delivered in 1904. The situation was further improved when teaching in medical chemistry was moved to the new building erected that year and pharmacology got its own laboratory facilities. In 1906 the department got its first animal house when a small house close to the chemistry building, used as a hydrogen sulphur house, became the home of laboratory rabbits. In 1909 this was supplemented with a room for frogs in the cellar of the main building. Experimental activity was, however, low until E. Louis Backman succeeded Fristedt in 1925 (see below). Backman managed to keep an impressive activity (10 research assistants of whom 3 were foreigners already during his first year) in spite of cramped and old-fashioned facilities. The Department of Pharmacology remained in the 'old Chemicum', together with the Department of Medical Chemistry and Geology, until its move to a new building close to the hospital, which was erected for pharmacology and medical chemistry. This building was completed in 1946 and is now part of the 'Archive centre'. In 1968-70, the Department was moved to its present location at the new Biomedical Centre (BMC). BMC is a campus for the biomedical departments from all faculties at the University as well as from the University of Agricultural Sciences.

#### *Professors of the Department of Pharmacology*

Adam Afzelius held the position of professor in 'Materia Medica et Diaetetica' from 1812-1837 with a seat and voice in the faculty and university council. Afzelius was however, never part of a department of pharmacology and was therefore presented above with the title of 'The first professor of pharmacology - Adam Afzelius is appointed professor of Materia Medica et Diaetetica 1812.'

Olof Wallquist was appointed 1853 to the position which would include pharmacognosy, pharmacy, physiology, and pathological chemistry and was given the title of 'Chemiae Medicae et physiologiae professor'. Wallquist held this position until his death in 1857. Wallquist also maintained his position in the absence of an established pharmacological department and was presented above under the heading 'The establishment of an independent pharmacology discipline in Uppsala'.

Robert Frederik Fristedt was born in Stockholm on the 19th of June, 1832 and died in Uppsala on the 16th of February, 1893 (61 years of age, apparently after a long illness). His parents were the grocer Gustav Frederik Fristedt and Christina Charlotta Wahlberg. Already in his twenties (1852), Fristedt paid a visit to Torneå Lappmark for botanical studies and the following summer, he travelled, sent by the great botanist, Elias Fries, to the west of Sweden

(Härjedalen) where he collected seeds and plants from the mountain area for the botanical gardens.

After receiving his fil. kand. (bachelor's degree) in Uppsala in 1856, Fristedt travelled to Ångermanland, where, during the summer he carried out a detailed geographical, botanical analysis of the area which resulted in his achieving a Fil. Dr., he defended his thesis in 1857. During the summer, he continued to analyse the botanical disposition of Ångermanland, but returned to his studies as a medical student and in 1859 received his degree as a med. kand. He completed his med. lic. in 1861, and finally became an M.D. in 1862 with a thesis entitled "Studies in general pharmacognosy". In 1862, Fristedt was appointed to the position of assistant in 'Medical natural history and chemistry' at the University of Uppsala. In the same year he received the Hwasser's scholarship and travelled to Germany for medico-botanical and pharmacological studies. His primary goal was Berlin, where he visited the botanical gardens, but was disappointed in that most of the professors were on vacation. Despite this, he acquired several gifts from the German drug companies, which he donated to the pharmacological museum in Uppsala. His next visit was to Breslau, which was considered by many to have the most magnificent gardens in Europe, second to Kew gardens of London. After six weeks in Breslau, Fristedt continued to Vienna, where professor Schroff had gained an international reputation through pharmacodynamic experiments which he had performed on himself and his students. Schroff had recently fallen ill and insisted on continuing his experiments which he now performed solely on himself. Among other things, Fristedt was offered the opportunity to observe while Schroff conducted experiments using the newly discovered drug, cocaine. However, Fristedt was disappointed with Schroff's inability to conduct lectures in pharmacodynamics, and instead spent most of his time studying the splendid pharmacological museum. In Austria, pharmacognosy had an even stronger foundation than in Prussia. Fristedt's homeward travels took him through Munich, Wurtzburg, Darmstadt, Marburg, and Göttingen. He consistently managed to acquire drug specimens for his museum, primarily from the larger drug companies (i.e. Merck in Darmstadt).

After his return to Uppsala, Fristedt wrote his most complete work entitled 'Sveriges farmaceutiska växter med farmakologiska upplysningar (Pharmaceutical plants of Sweden with pharmacological informations)', published in 8 volumes 1863-72, and became chief editor of 'Upsala Läkarförenings Förhandlingar' (now Upsala Journal of Medical Sciences), which he presided over for some 25 years until his death. During those years, he contributed 83 articles to the journal. Among Fristedt's other publications (approx. 50 titles), may be mentioned: 'Lärobok i organisk Farmakologi (Textbook in Organic Pharmacology)' (his most important work), 'Om cocabladen såsom njutnings- och läkemedel. (On the Coca plant as a recreational and medicinal drug)', 'Om hampan i medicinskt hänseende (On hemp from a medical perspective)', and 'Om Stormhatten i medicinskt hänseende (On Aconitum from a medical perspective)'. In 1873, Fristedt travelled again to the main European continent. In September of that year, he left Uppsala for the world fair in Vienna, where, among other things, were displayed a collection of several hundred opium specimens from Turkey, and an exhibition of colonial quinine and plants from Holland. The winter months of that year were spent in Breslau and in January, Fristedt left for Italy. After studying pharmacological collections in Venice and Padua, he made his way to Florence, where he, in February, hoped to engage himself in botanical studies outdoors. Spring, however, came

very late that year so he continued to Rome, Naples, and Perugia, and after his return to Florence in the middle of April he could finally study those species of flowers which had blossomed in his absence. On his way home through London, he examined the tremendous quantities of opium and quinine barks which were stored at the Jobst factory in Stuttgart. The short stay in London was the pinnacle of his trip. Kew Gardens and London's botanical and pharmacological museum were magnificent, and for the Uppsala museum, he purchased no more than 70 'beautiful' specimens of quinine barks.

In connection with the celebration of Uppsala University's 400th anniversary, Fristedt was appointed to the chair of 'Pharmacology and Medical Natural History' without having to apply for the position. It seems obvious that he had no competitor in his field in the country. After ten years of dedicated engagement 'in teaching, the medical associations and public service', Fristedt again, in 1873, made his way out into the world with the help of the Regnellska scholarship. One of the objects of the trip was to see the enormous medicinal plantations which he had heard of in Germany. He was, however, disappointed to learn that no one plantation existed, but instead various select plants were cultivated in different regions. The other primary goal of the trip was to observe developments in pharmacology at the renowned educational facilities of Germany. Probably to his surprise, he discovered that most of Germany's medical faculties had distanced themselves from both pharmaceutical chemistry and medical botany. These subjects were now placed under the supervision of the pharmaceutical faculties. By a pharmacological department, the Germans understood 'A physiology institution where one can study i.e. experimental pharmacodynamics' (Schmiedeberg now had worked for one year in Strassburg and the Dorpat department had already trained a number of experimental pharmacologists who had initiated the new era at several German universities). This, however, did not hinder Fristedt from reestablishing old contacts with colleagues within pharmacognosy in Göttingen, Wurtzburg and Strassburg. Again, he succeeded in acquiring several rare plant species and among other things, a living leech cocoon from G.F. Stölter & Co in Hildesheim.

Fristedt remained a pharmacologist in the traditional sense of the word. From the extensive portrait by one of Fristedt's most illustrious pupils, Karl Hedbom, in 1892, we can quote: 'According to Prof. Fristedt, pharmacology encompasses both pharmacognosy and pharmacodynamics in the most intimate way. In his entire being, as a medical botanist, he embraced even pharmacodynamics with the most vibrant interest.... Even so, he could never reconcile the decision in Germany to remove completely pharmacognosy from the medical faculty. Thus, even pharmacognosy should fall within the grasp of medical students. This was a conviction which Prof. Fristedt could never abandon.' Fristedt appears to have been very popular among his students and to have lived for his work and for the Uppsala Medical association. From the beautiful eulogy by Olof Hammarsten on the 24th of February, 1893, and in the verses 'By Fristedt's grave', and 'Song by Fristedt's grave', both written by Frithiof Holmgren on the 22nd of February, 1893, we get the picture of a mild, modest, and loyal man, who, without argument, performed his duties as a dean and an editor. The history of the Medical faculty, published in conjunction with the jubilee of 1977, and without a reference to the source a quote: "As a teacher, Fristedt was meticulous in his speech, extraordinary and pedagogical in his presentation, kind and just to his students and therefore faithfully followed. His rare ability as a lecturer, also gave him

the joy of witnessing the arrival of great numbers of students, who were attracted by the richest of illustrations and other educational aids. He was modest and unselfish.”

Henrik Viktor Rosendahl was born in Filipstad on the 12th of December, 1855 and died on the 11th of August, 1918. He began his studies as a pharmacist (degree 1879), and continued to study medicine in Lund (med. kand. 1883 at the Karolinska Institute, and med. lic. 1886 also at KI).

Among other things, it can be mentioned that Rosendahl was the district doctor of Gällivare from 1888-1892. In 1894, he received his M.D. and became a docent in pharmacology (rather pharmacognosy) at the Karolinska Institute. He was awarded the title of professor in pharmacology in Uppsala the same year after his only competitor, Carl Gustaf Santesson, docent in physiology, also from the Karolinska Institute, had withdrawn his application. After two years he returned to Stockholm, in 1896, to being a lecturer in 'Natural History and Pharmacognosy' at the Institute of Pharmacy in Stockholm (thereafter, professor in botany and pharmacognosy from 1901). However, there exists little evidence which supports the idea that he was ever actively engaged in research in Uppsala. After 1895, he not only continued as a lecturer, but also maintained a private clinic in Stockholm which specialized in sexually transmitted diseases.

As an author, Rosendahl's works were comprised mostly of textbooks, and botanical essays. Thus he wrote a textbook in pharmacognosy (1895-1897) and he also produced a series of essays on the medical effects of iron and copper. The title of his doctoral thesis was 'Farmakologiska undersökningar beträffande Aconitum septentrionale (Pharmacological investigations into the effect of Aconitum septentrional)' (Nordic monk's-hood). Septentrionalin was used, according to reports, as a replacement for curare in analgesia and during vivisections. He also wrote 'Statistiska förhållanden bland Sveriges nomadfolk (The statistical disposition of Sweden's nomadic peoples)', 'Lärobok i botanik (Textbook in botany)' (1902-1903) and 'Bidrag till Sveriges ormbunksflora (Contribution to Sweden's fern flora)' (1-3, 1909-1916).

*The appointment of a professor after Rosendahl 1897-1898- a conflict over the importance of pharmacognosy*

Already after the death of Fristedt in 1893, the chair of 'pharmacology and medical natural history' was reorganized and given the title of professor of 'General and experimental pharmacodynamics and pharmacognosy', whereby it was emphasized that 'pharmacodynamics was by far the more important' (cited during Hedbom's appeal). The applicants were Mårten Elfstrand and Karl Hedbom, both of whom were 37 years of age.

Mårten Elfstrand completed his high-school diploma in Östersund at the age of 24 in 1883. He studied medicine in Uppsala and became med. lic. in 1893. He completed his M.D. and became docent in pharmacognosy in 1895. During his time in Uppsala, Elfstrand conducted extensive botanical studies apart from his medical studies. During the summer of 1895, he lectured as an applicant to the position of teacher in natural history and pharmacognosy at the Department of Pharmacy in Stockholm, but was not awarded the position, which was instead given to Rosendahl. The subjects for his lectures were 'Systematic summary of Officinellus leaves'

(assigned lecture) and 'On the plant cell' (freely chosen topic). In 1896, in order to be able to compete for the professorship, during the months of Nov.-Jan., Elfstrand travelled to Dorpat for studies in pharmacodynamics (Prof. Kobert), whereby he initiated his studies on blood toxins in Croton seeds, which laid the foundations for his coming dissertation entitled 'Ueber Giftige Eiwiessse, welche Blutkörperchen verkleben'. The Croton studies continued in Strasbourg under the guidance of Prof. Schmiedeberg from Jun.-Aug. in 1896, and in Leipzig with Prof. Boehm Dec.-Jan. 96-97 so that his dissertation was nearly complete at the time of his application for the position of professor. This work was, however, to be Elfstrand's only pharmacological work of a pharmacodynamic character. The other applicant, Karl Johan Hedbom was born in 1859 in Sala and completed his high-school diploma in Uppsala in 1879. He studied botany and zoology for three years in Uppsala and became part of the medical faculty in 1884. He served as 'Wahlenberg assistant' (a stipend) from 1885-1888 at the Department of Pharmacology in Uppsala and was awarded marks of excellence in pharmacology. After 6 years with the medical faculty (1890), Hedbom became a med. kand. and then a licensed physician in 1894. From November of 1895 to May of 1897, Hedbom conducted research at the Karolinska Institute under the tutelage of Profs. Tigerstedt and C.G. Santesson and in 1897 he received his M.D. in Stockholm. At the time of his application, he had also applied for the position of docent at the Karolinska Institute. His only real pharmacodynamic work was, as with Elfstrand, his doctoral thesis, which was entitled 'Farmakodynamiska studier å det isolerade och öfverlevande däggdjurshjärtat' (Pharmacodynamic studies on the isolated and surviving mammalian heart). Hedbom had, in the summer of 1881, cultivated his botanical interest in Norway and in the spring of 1883, he left on a 'recreational trip to southern France where he continued his botanical studies'.

#### *The Decision of the council*

Among those appointed to the University council to elect a new professor were Prof. Gustaf Santesson (Prof. in pharmacology since 1895 at the Karolinska Institute), Prof. Poul Edv. Poulson from Oslo (pharmacologist), Prof. Magn. Gust. Blix from Lund (physiologist and embryologist, educated in Uppsala), and Prof. Rudolph Boehm from Leipzig (one of the leading experimental pharmacologists at the time).

Santesson's decision was rather extensive. He gave Elfstrand's botanical prowess his approval. Elfstrand was a well renowned hierarchiologist (Heiracium is one of the two groups of hawkweeds). With regard to pharmacodynamics (the Croton studies), Santesson was particularly critical although admitting "a diligence of iron". "It had, without a doubt, been better if the author had, under the tutelage of a qualified teacher, thoroughly investigated one or two characteristics of the studied poison, instead of, which is the case now, left us with such uncertain and underdeveloped results." Santesson goes further to state that Elfstrand has proven talent for botany and pharmacognosy, but is unqualified as a pharmacodynamicist. Elfstrand is therefore considered competent for the position but with serious reservations. Santesson clearly has a positive opinion of his pupil Hedbom. As a botanist, Hedbom had discovered a new hybrid form of an orchid, and had rediscovered *Lactuca Quercina* (Karlsösallat), which grew only in the vicinity of the 'Karlsöarna' and had been unseen since Linné had described them some 149 years earlier. With regard to his progress with the survival of the mammalian heart, he had used the method of Langendorff's and approximately 80 hearts had been prepared for his thesis. It is clear

that these studies were the first in which the Langendorff's technique had been applied in a large scale for pharmacodynamic studies. Santesson admires the pioneering research, but maintains the reservation that it was in fact somewhat simple in that only one technique was applied. Santesson concludes that Hedbom is vastly superior to Elfstrand in the field of pharmacodynamics, whereas Elfstrand holds the upper hand in the areas of botany and pharmacognosy. On the basis that 'medical botany and pharmacognosy are, for the time being, less important in the present state of science and pedagogy' Santesson strongly recommended Hedbom before Elfstrand. Poulsen's decision is much more brief. He places Elfstrand above Hedbom with regard to his works on 'de alpine Hieraciers vanskelige område (the problematic group of the alpine Hieraciers)' and 'Studierna öfver alkaloidernas lokalisation, företrädesvis inom familjen Loganiaceae (Studies on Alkaloids' localization, primarily in the Loganiaceae family)'. Blix also chooses Elfstrand over Hedbom, with the motivation that his education is more wide-reaching as a result of his many voyages. Boehm expresses himself briefly and carefully. It is apparent that he harbours a certain disappointment in that Hedbom has been so reserved in his conclusions as to the Langendorff's experiments, and so desperate that they would agree with previous reports. He commends Elfstrand, who had performed experiments in his own laboratory for a short time, but the outcome is that he places the two as equals.

After the judgments of the committee are handed in, Elfstrand reacts in a controversial and somewhat callous fashion. He publishes a sharp critique which is delivered to the members of the medical faculty a mere two days before their final meeting. Santesson receives the document one day later and responds quickly, refuting the accusations point for point in a 44 page essay. On the morning of the 16th of February, 1898 (the day of the final deliberation), Elfstrand withdraws the document from the members of the committee and wires a telegram to Santesson, who is in Stockholm, instructing him to ignore the paper. The document is not mentioned after the committee has convened. On the 16th of February, 9 of 11 professors recommended Elfstrand to the position. Hedbom makes an appeal to the government. He maintains that because, after the death of Fristedt, the position was adapted from pharmacology and medical natural history to experimental pharmacognosy and pharmacodynamics, where pharmacodynamics was by far the more important, that he was the most suited. The criticism brings to light the fact that Elfstrand, who has been a docent in pharmacognosy, has earlier received very poor criticism in his application to the post of docent in pharmacodynamics on the 6th of February, 1897, by his opponents Hammarsten (a leading blood-protein chemist) and Öhrvall. A considerable public interest surrounds Santesson's response to Elfstrand, dated June 1898. After an extensive, and by modern standards accurate and crushing, critique of Elfstrand's comments, Santesson brings to light the developments which could result from Hedbom's work on the isolated mammalian heart. His comments can be said to be slightly biased (Hedbom received his M.D. from Santesson's laboratory in Stockholm), but they are reasonable, seen from a scientific point of view. Santesson continues, 'I have been isolated from the other committee members, and that the academic authorities have not been able to attach value to my comments, is understandable.' His point is though, that he has been present at both Hedbom's and Elfstrand's disputations, and therefore is the only one capable of judging the two accurately. However, his aversion to Elfstrand and feeling of isolation in the committee seems strange. Santesson should, with his background in physiology, have known Blix and when it comes to Boehm, he had from time to time been in his

laboratory in Leipzig and with Schmiedeberg in Strassburg, i.e. the same path which Elfstrand had followed 1896-1897. In the end, however, both the medical faculty and the University council, although with very even votes, recommended Elfstrand for the position.

#### *Late commentaries to the appointment of Elfstrand*

History cannot be changed, and it is easy to understand the deliberations of the committee in February 1898. Despite this, it seems likely some 100 years later that Hedbom's work, if he had been allowed to continue as a professor in Uppsala would have been more far-reaching than Elfstrand's. The effects of adrenaline on the heart were well described, and physostigmine was shown to reduce pulse some 3 decades before Loewis' classical experiments demonstrating the existence of 'vagusstoff' and the significance of neurotransmitters in the conduction of impulses to target cells. However, Hedbom's advances should perhaps not be so exaggerated. The physiology of the isolated heart was, at the time, an area of research being actively pursued by many researchers in Europe. It seems obvious that Santesson set up the Williams method for the frog heart in Uppsala following his travels to Strassburg during the summer of 1892 before his move to Stockholm in connection with his appointment there in 1895. Elfstrand conducted his lectures and research well, but from his publications it can be seen that the largest portion of his time was spent in referring to previous pharmacognostic studies, and to the collection of drugs for the pharmacological museum. Thus, an experimental approach in pharmacodynamics would be delayed one quarter of a century until E. Louis Backman, trained as a physiologist, ascended to the chair. From the documents of the deliberation, it becomes clear that Santesson had an intellectual and modern approach towards pharmacology, which was reflected in his own research. A tense relationship, as it was, had taken root between Santesson and Elfstrand, which lasted for many years. This manifested itself in the criticism by Santesson of Elfstrand's pharmacognostic approach, 'Läkemedelslära med särskild hänsyn till svenska farmakopéen (Textbook of pharmacology with particular reference to the Swedish pharmacopoeia)' (Hygiea, vol. II, 1906). Santesson's criticism was met by a 23 page essay (Shultz, Uppsala, 1906), with the title 'Svar till professor C. G. Santesson med anledning af hans "anmärkningar" mot min läkemedelslära (Answer to Professor C.G. Santesson with regard to his "comments" on my textbook in pharmacology)'. The general tone in both articles is one of irritation and anger. The question is if Elfstrand is coherent when he writes, 'He (Santesson) attempts to twist and misinterpret the content of my comments, by stating that I have avoided saying what I in fact have said, and by attempting to make true that I have made the comment which I have never made...'. However, it is also easy to understand that Santesson felt frustrated by the relatively conservative attitude towards pharmacology held by Elfstrand.

Mårten Mårtensson Elfstrand was born in Undersåker on the 29th of May, 1859 and died in Uppsala October 10th, 1927. His parents were Mårten Olofsson and Anna Maja Jönssdotter, both farmers. Elfstrand completed his lower education in Östersund, and later studied medicine in Uppsala (med. lic. 1893, med. dr. 1895). He was given the position of docent in pharmacognosy in 1895 and was an assistant at the Department of Pharmacology 1895-1896. He completed his doctoral thesis in 1897 in the field of pharmacodynamics, after which he was appointed docent in the subject. In 1898, he succeeded Rosendahl as professor. In tight competition for that title, Elfstrand succeeded in attaining the position, based primarily upon his botanical interests, where

the definitive decision originated from a several hundred years old tradition of pharmacognosy within the faculty.

Elfstrand retired from his position in 1924, at the age of 65. He travelled widely during his years as a botanist to, among other places, the Swedish and Norwegian mountains, the Swiss and French Alps, The Sudet mountains and Tatra. Botany was, even in his youth, his most cherished subject. For many years, he maintained a private clinic in Uppsala for the treatment of gastrointestinal diseases. Elfstrand completed his first doctoral thesis in 1895 entitled 'Studier öfver alkaloidernas lokalisering (Studies on the localization of alkaloids)', and in 1897, in order to attain the position of docent in pharmacodynamics, his second thesis entitled 'Ueber giftige Eiweisse, welche Blutkörperchen verkleben'. The majority of his articles could be classified as studies of e.g. 'Brasilianska och paraguayiska droger, medicinal- och hushållsväxter beskrifna (Brazilian and Paraguayan drugs, medicinal and household compounds)'. In 1908, after three years of work, Elfstrand published, in two volumes, 'Läkemedelslära med särskild hänsyn till svenska farmakopéen (Pharmacology, with a special emphasis on the Swedish pharmacopoeia)'. The work was criticized vehemently by C. G. Santesson (see above). A complete list of Elfstrand's publications can be found in the register of Uppsala University, autumn term, 1926. In 1912, Elfstrand married Matilda Schwalbe (born 1877). Their first and only child was born in 1910 and given the name of Hilda Margareta.

Eugène Louis Backman was born in Reijmyre on the 11th of July 1883 and died in Uppsala on the 28th of November 1965. His parents were Alfred Backman, an army doctor and Ida Nyberg. In E. Louis Backman's scientific publications an interest in widely different fields can be seen, giving the impression of a searching vitality with an enormous inquisitiveness and productivity, which with a greater measure of concentration might have led to results of more far-reaching significance.

Backman's collected works fill six volumes at the BMC library. His appointment to the chair in 1925 was most likely undramatic in that he was the only applicant. In 1918 already, Backman had applied for the position of professor of physiology, in competition with G. Göthlin and though he was declared fully competent it was Göthlin who was appointed. Extensive biographical data have been assembled by Backman's niece, Christina Backman. In Uppsala Louis Backman was well-known as a cultural personality, debater and speaker. He was the *inspector* of Kalmar nation 1925-1948. E. Louis Backman and his identical twin Gaston (professor of anatomy in Lund) were an eccentric pair about whom many anecdotes are told.

After school in Kalmar, Louis Backman became a student at Uppsala university in 1901, taking his med. fil. degree in 1902, med.kand. in 1907, med.lic in 1912 and defending his doctoral thesis in the same year, 1912. He worked as amanuensis at the Department of Physiology in Uppsala 1904-1905 and in 1910, was *locum tenens* for several short periods in Kil and Ransäter 1911 and elsewhere 1919-1922. At the mental hospital in Uppsala he held various posts 1911-1916. In 1919 he sailed as ship's doctor on board the "Stockholm", an inexpensive means of travelling to the United States! During the chaos of the First World War, he was attached to the Swedish legation in Petrograd in 1917 and was able to make a tremendous humanitarian

contribution: he set up hospitals, asylums, sanatoriums, public kitchens etc for German and Austro-Hungarian civilian prisoners as he travelled through the provinces of Simbirsk, Kazan, Orenburg, Ufa and Saratov. He then continued to plan similar arrangements for the rest of the country and, together with the Red Cross, provided hospitals with trained nurses, medicine and instruments. For his achievements he was honoured with many decorations and medals which attracted a great deal of attention on festive academic occasions.

Backman was *docent* in physiology at the University of Uppsala 1912-1918 and was on several occasions temporary *laborator* (assistant professor) in experimental physiology and medical chemistry being appointed *laborator* in experimental physiology and medical physics in 1918. He was a substitute for the professor in general and experimental pharmacodynamics and pharmacognosy for several short periods 1923-1925 in which year he was appointed to the chair. Within the philosophical faculty, he assisted with the teaching and examination of physiology students 1925-1930 during which time he also lectured in pharmacological economics to medical students doing their military service.

When Uppsala University celebrated its 450th birthday in 1927 he was the medical faculty's *promotor* at the festive conferment of doctorates having first persuaded the faculty to honour no less than three women with honorary doctorates, a considerable achievement at the time (one of these was Elsa Brännström known as "Siberia's Angel" for her work there in 1917). He impressed his colleagues by reverting to the traditional form for the conferment of doctorates and his interest in university tradition is reflected in several publications on the ceremonies at the conferment of doctorates and the defence of a thesis.

Backman was dean of the medical faculty in 1926-1927 and again in 1946-1948. In 1924 he embarked on a career in adult education and in his spare time toured Sweden as a lecturer. He acted as president of the Medical Student's Union and the Union of Students at Stockholm's University in 1909-1910. He had visited most European countries as well as the United States. His twin, Gaston, was elected professor of anatomy and histology at the newly founded University of Riga in the young state of Latvia. In recognition of the vast amount of material, including books and scientific instruments that Louis had been able to obtain as donations to the Department in Riga, he was created Med. Dr. hon.c there in 1924. Backman was awarded Hwasser's prize in 1906 and 1911, the Anders Retzius scholarship in 1917. He was a member of Vetenskaps societeten (the Society of Scientists) in Uppsala, the Société de Thérapie de Paris, Société de Médecine de Paris, Société de Médecine, Chirurgie et Pharmacologie de Toulouse and the Akademie der Naturforscher, Halle. He is the author of a large number of publications in the fields of pharmacology and physiology. Louis Backman's interest in cultural history, in particular folk medicine, is reflected in "The Religious Dance in the Christian Church and in Popular Medicine" (1945, English version 1952; On the medieval dance epidemics) as well "Jungfru Maria Nyckelpiga" (1947, Virgin Mary Ladybird).

*The appointment of a Professor after E. Louis Backman 1948 - a complicated story*

After Backman's retirement in 1948, the chair was pronounced vacant and there were four applicants; Ernst Bárány, Håkan Rydin, Nils-Olof Abdon, and Leonard Goldberg. Those

appointed to the electoral committee were Gunnar Ahlgren (professor in Lund), retiring professor Backman, Göran Liljestrand (professor in Stockholm). Bárány had, aside from studies at a technical faculty, worked for several years at the laboratory of the othologic clinic, been an eye doctor for 3 1/2 years, and from time to time researched at both the Department of Physiology and the Department of Pharmacology. Bárány's work encompassed, in part, pure technical subjects, but he also produced articles in the fields of sensory physiology and anti-epileptics. All of the members of the committee were in agreement as to his lively intellect and creative nature. A few complaints about the difficulty in following Bárány's mathematical papers were heard. Håkan Rydin had been Backman's student (docent in pharmacology 1935), and was the candidate which most assumed would be awarded the position. Rydin moved to the Karolinska Institute in 1942, where he was appointed director of the state pharmaceutical laboratory, a position which became a professorship in 1947. Apart from pharmacology, Rydin had also studied physiology, both in Uppsala and abroad. His expertise in research encompassed anesthetics, respiratory physiology, nicotine, the influence of temperature on physiological systems, neurology, vitamins ('On the value of ascorbate in the prevention of the common cold', 1942), hormones, and standardization within pharmaceuticals. The general profile which is produced can be likened to an opposite of Bárány's, an individual with somewhat less fantasy, conventional, but with solid objectivity. Abdon had been trained primarily as a pharmacologist in Lund. His work dealt primarily with studies revolving around creatine phosphate and ATP, especially in smooth muscle, as well as work on acetylcholine and choline. Abdon produced relatively little, but was considered to be independent and original, although somewhat lacking in carefulness. Goldberg was also trained as a pharmacologist, but at the Karolinska Institute. His work covered primarily studies on the effects of alcohol. The criticism offered him by the committee was kind, without an emphasis on good or bad characteristics, an approach, which had not been the case for any of the other applicants.

Ahlgren ranked Abdon 1st, while he excluded Bárány entirely. He motivated his rejection of Bárány's application with the argument that he was in fact not a pharmacologist ('a prominent physics oriented physiologist'). It can be noted that Ahlgren, already three years earlier (1945), had declared Bárány, Uvnäs and Zotterman as unfit for the position of professor of physiology and pharmacology at the Veterinary College (the position was then divided into both a chair in pharmacology and one in physiology). Backman, in a 156 page report, placed Rydin 1st and Bárány 3rd. Rydin was considered by Backman to be superior on the basis that the position was in pharmacology and that Rydin's activities in the standardization of drugs at the pharmaceutical laboratory were a decisive merit. Liljestrand placed Bárány 1st and Rydin 4th. When the matter was taken up by the medical faculty on the 21st of October, 1948, a flurry of varying opinions was generated by the representatives. After deliberation and voting, Bárány was ranked first by 9 representatives, Rydin by 6, and Abdon and Goldberg were ranked first by 2. Opinions on the placing at positions 2,3, and 4 were highly variable. It was said that the newly appointed dean, Prof. Robin Fåhræus, played a decisive role in the battle between Bárány and Rydin, even though he did not vote. The first voting session was followed by a strenuous and extensive period of appeals. The conflict was oriented around, besides common misinterpretations and misjudgments as usual, to what degree pharmacology was independent of physiology and to what degree pharmacognosy was relevant - an extremely interesting debate, where Bárány's final appeal

appeared, as was a custom, in printed form ( in the Council protocol 1948). The deliberations reflect an academic fighting will and vitality, which in retrospect appears impressive, especially in the light of the absence of word-processors. Even the question of Bárány's permission to be absent from his examination lecture because of his stay in the US, was the subject of some contention. The former dean, Backman, claimed that he had not given Bárány leave, but the faculty's positive response to his request must be seen as an affirmation. Appeals appeared from all applicants except Goldberg. When the matter was finally brought to the table of the Council (*Consistorium*) on the 27th of November, 1948, a preliminary vote was taken in which Bárány was placed first by 14 representatives, Abdon by 6, and Rydén by 6. After a final vote, Bárány was placed first by 14 representatives (i.e. a majority), and at that point the decisive card had been dealt.

Ernst Bárány was born in Vienna on the 8th of August, 1910, and died in Uppsala on the 17th of June, 1991. His father was Robert Bárány, who received the Nobel prize in physiology and medicine in 1915 for his studies on the vestibular apparatus, and his mother was Ida Berger. As an army doctor, Robert Bárány was taken prisoner in Russia and after being released, he moved to Sweden where he collected his prize and became professor in otho-rhino-laryngology at the University of Uppsala.

Ernst Bárány began, after completing his lower education, studying at the Technical College of Stockholm, but was soon persuaded by his father to study medicine in Uppsala. As a matter of fact his father is said to have secretly instructed a teacher at the College to tell student Ernst that his prospect would be better as a student of medicine. He completed his M.D. in physiology in 1938 in the field of acoustics (his opponent was Hannes Alfvén, later Nobel laureate in physics), and became a docent at the Department of Physiology in 1940. During 1942-45, Bárány practiced as an eye doctor, while performing his duties as a docent, but on the 1st of May, 1949 he was appointed to the chair of pharmacology which he held until his retirement in 1977. As he often, even some months before his death, visited the department, many of us have fond and rich memories of him. His scientific papers are collected in a 3 volume series which is kept by the department. Bárány was married to Margit Boman in 1938, with whom he had three children, Sven, Anders, and Eva.

Below follows an excerpt from an obituary in SvD on Ernst Bárány dated 7/1/1991. 'Despite many interests, eye research would continue to be his main subject until his passing. Within the medical faculty in Uppsala, Ernst was possibly the most respected representative, through his comprehensive knowledge in different fields, his clarity, his ability to formulate himself, and his generous attitude. He participated actively in many matters and was considered by many to be the faculty's 'central conscience'. He served as dean and played a central role as the faculty's representative on the Medical Research Council. Ernst Bárány considered research to be his highest priority. He could often be found wandering and contemplating his problems and ideas, and often came to us younger researchers for discussion. His door was always open for advice and discussions and many sought help from him before they wrote their theses or other publications. His own department blossomed and several prominent scientists, who later became professors or doctors within various disciplines, received their educations under his tutelage.

They entered various scientific fields, such as muscle research, neurophysiology, rhythmicity, kidney function, behavioural research, analgesia, eye research among other subjects. Ernst Bárány's own research came to focus on the production of fluids in the eye, and thus the regulation of inner eye pressure. He became the world's leading authority within the field. One area in which he deserves much acclaim, is that dealing with ethical questions related to animal research. He was, for several years, the president of the Medical Research Councils Animal Research Division, and became naturally a leading figure in the animal research and ethical committees which were formed in 1976."

"Ernst Bárány held throughout his life, a radical view of human life, based upon biological premises. He strove early for better sexual education and he took part in the award of honorary doctorate to Elsie Ottesen-Jensen in Uppsala. He cooperated with Ingemar Hedenius in the conclusions of 'The right to your own life'. He could, as few others, in a simple way, describe scientific problems and was a popular radio personality in the talk shows of the 50's. At symposiums and international meetings, he was usually the dominating personality, with his richness of ideas and ability to integrate new knowledge into larger biological systems."

After Ernst Bárány's retirement in 1977, Rolf Håkansson from Lund, was given the title of professor but chose to stay at his present position.

Nils-Erik Andén, after a new round of applicants were processed, was awarded the position of professor in 1978. Andén was born in Gothenburg on the 30th of October, 1937. His parents were Birger Andén, a head master, and Anna Werling. Andén completed his lower education in Gothenburg in 1956 where he continued to study medicine. He received his doctoral degree in 1964 and was from 1967-1969 the lector of the Department of Pharmacology in Gothenburg. From 1969-1970, he was professor of pharmacology at the pharmaceutical faculty of Uppsala University, and from 1971-1978, he held the post of associate professor at the same department in Gothenburg. During the years 1978-1986, he held the position of professor in pharmacology in the medical faculty in Uppsala. From 1986 to his death on the 5th of August, 1990 at the age of 52 (brain tumour), he was professor of pharmacology at the Karolinska Institute.

Andén's work is at present readily available from various databases, and below follows a biographical excerpt from SvD dated 8/21/90 in connection with his death. "During the 60's Nils-Erik Andén participated, together with researchers at the Karolinska Institute, in the original mapping work of the most important nerve pathways in the brain which contain monoamines (i.e. neurotransmitters). He realized immediately the fundamental significance of these discoveries in relation to the possibility of applying these results to functional studies, and it was here that he made his, perhaps most central, contributions to the field. His studies on the nigrostriatal dopaminergic system in the brain deserves special mention. By manipulating only one hemisphere of that neuronal system, he and his colleagues could determine whether its receptors were stimulated or blocked by certain substances.

In this way, Andén obtained the first evidence that the known neuroleptics (drugs used in the treatment of psychoses) blocked the receptors for dopamine in the brain. The model had

tremendous significance for the development of drugs for the treatment of schizophrenia and Parkinson's disease. In other studies, he and Kjell Fuxe, at the Karolinska Institute, demonstrated that LSD stimulated serotonin receptors in the central nervous system.

Nils-Erik Andén's prolific scientific activity was characterised by solid engagement, systematic and careful analyses, and a strong sense of what was biologically relevant. By generously sharing his knowledge with others, he contributed to the education of a generation of both Swedish and foreign research students. His reputation and integrity as a researcher contributed to his often being selected to represent various committees. He was a representative of the Medical Research Council where he had numerous duties. Nils-Erik Andén was also modest, friendly, and helpful, and had, behind his somewhat passive surface, a tremendous capacity for humour and warmth. He was a resilient and genuine researcher. Through his scientific prowess, he contributed to the recognition of Swedish neurological research on a competitive international level. His achievements within the field of monoamine research, constituted an integral part of the development of modern neuroscience, where pharmacology and its tools came to play a central roll."

Andén's position was filled, after his resignation, by Lars Orelund in the autumn of 1986.

*Establishment of an Associate Professorship - Converted thereafter to Full Professor.*

In connection with the rapid increase in resources which the medical faculty had accrued after the end of the second world war, it was decided that a position as an associate professor would be established at the Department of Pharmacology in 1948. The position was sought by Abdon and Bárány, but Abdon withdrew his application. Bárány was therefore the only applicant and was given the position at the same council meeting in which he was awarded the chair (11/27/1948). This came to pass despite Ahlgren's appeal to reject Bárány even at this position. On the basis that Bárány had received the professorship, Torbjörn Edlund, a medical candidate, was given the title of substitute associate professor on the 1st of July, 1949, and the vacant position was advertised again. Four individuals applied for the vacant post; Torbjörn Edlund (Uppsala), Paul Kallos (Helsingborg), Folke Serin (Lund) and Arvid Wretling (Stockholm). The latter three withdrew their applications, thus leaving Edlund alone whom the council then went on to recommend to the government in April 1950.

Torbjörn Edlund was born on the 28th of February, 1920 in Umeå, the son of the first provincial doctor, Karl Edlund, and Nanny Maria Eriksson. He completed his lower education at Lundsberg in 1938, became a docent in pharmacology in March 1950 and became professor in 1950. He came from the Department of Physiology, and was only 30 years old at the time of his accession. His list of publications was quite short, encompassing only 12 articles and a few short reports. His colleagues had been Lennart Juhlin (later, professor of dermatology) and Håkan Linderholm (professor of clinical physiology). His thesis was entitled 'Studies on the effects of Salyrgan on the absorption of water and colloid (hemoglobin) from joints'. The election committee (Ahlgren, Bárány, von Euler) considered him quite young, but vital and tenacious, in short promising, but his competence lay on the border of what was acceptable. It was generally considered, in agreement with his opponent (Öbrink) that his thesis was 'exceptionally difficult to

read, dependent upon the author's obvious difficulties in conveying ideas clearly.' Ahlgren even made it known to Bárány that he was thankful for his help in understanding what it dealt with. Edlund was afflicted, after having been employed for several months at Astra, with disease. He remained however, at his position until his death in 1967.

Per Wistrand was born on the 26th of October, 1927, and succeeded Edlund as associate professor on the 1st of May, 1968. The position was later converted to a full professorship. Wistrand was a former pupil of Ernst Bárány continuing the tradition of eye research, which lead him to studies on the enzyme carbonic anhydrase.

Pekka Männistö (professor of pharmacology, Helsinki University) was awarded, after Wistrand's retirement in 1993, the professorship which he acceded to on the 1st of December, 1994.

*A professorial position in Medical Behavioural Science is added to the department*

In 1983, a professorship in medical behavioural science was established at the Department of Medical Pharmacology. With the introduction of a biomedical sciences major in Uppsala in 1968, a lectureship in pharmacology was established. The position was filled by Bengt Meyerson., a former pupil of Ernst Bárány. The lectureship was later converted into an extra ordinary chair in 'Medical Behavioural Sciences' and was supported by various funds from the University. One aim of the faculty with the chair was to incorporate into preclinical medical education current knowledge on the neurobiological basis of behaviour, which also has become increasingly important in relation to braches of pharmacology such as behavioural toxicology and laboratory animal sciences. Four years later, via a decision by the government, the position was made permanent (supported by the state), and Bengt Meyerson was formally appointed on the 11th of June, 1987. Meyerson was the vice dean of the medical faculty 1982-1988.

*A professorship in Molecular Cell Biology is added to the department*

As a result of rapid developments in molecular biology during the 1980's, the medical faculty elected to establish a professorship in molecular cell biology, which from the 1st of October, 1994, is held by Dan Larhammar. The position was, from the 1st of March, 1995, permanently affixed to the Department of Medical Pharmacology.

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