

# The oldest drug collection at the Royal Frederick University in Christiania, Norway

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*Professor of public health Frederik Holst (1791–1871) taught pharmacology at the Royal Frederick University in Christiania in the years 1824 to 1865. An important part of the curriculum dealt with medicinal plants used for therapeutic purposes. To avoid the cumbersome borrowing of drugs from pharmacies in the city for his teaching and examination sessions, Holst prepared his own medicinal plant collection. In the last years of his professional career, Holst categorized and catalogued the collection according to the current scientific system. He split up the material into 18 categories, or “classes”, as headlines for each group. In most cases, Holst also indicated the provenance of each specimen, where it had been bought or who had donated it, and when it had been added to the collection. Holst taught both medical students and pharmacy apprentices, and we learn which items from the collection were used to examine the future pharmacists. The catalogue shows Holst’s extensive network of colleagues from around the world who provided him with medicinal plants.*

Since its founding in 1811 all the way until 1946, the Royal Frederick University was Norway’s only university. Since then, the academic environment has both changed and been relocated a number of times, but a great deal of history remains in cabinets and drawers all around the various institutes. This book is devoted to two sources: the catalogue of the university’s oldest drug collection, and what is left of the old drugs themselves.

Some years ago, a number of old glass cases containing drugs turned up at the Department of Pharmacy, Faculty of Mathematics and Natural Sciences. Inside the cases lay neatly written labels that identified the drugs and carried the imprint *Museum pharmacologicum*.

In 2019, the Museum of University History (MUV) received an enquiry from the Department of Pharmacology at the Institute of Clinical Medicine,

Faculty of Medicine, asking them to assume responsibility for the old drugs. The items included several small glass cases and other old containers. Berit Smestad Paulsen of the Department of Pharmacy and Anne Vaalund of MUV were excited by the discovery. Their excitement was further heightened when it came to light that a catalogue of the collection existed, handwritten by its founder, Professor Frederik Holst (1791–1871), and completely updated until he retired as a professor in 1865. Medical historian Øivind Larsen quickly got hold of the catalogue and photographed it. The collaboration that eventually resulted in this book was underway!

What is so intriguing about some old drugs and a catalogue? Holst taught both medical and pharmaceutical students in the field of pharmacology, using the drug collection for demonstration purposes. Hence, these old drugs are part of the history of interdisciplinary collaboration. Botanists, chemists, physicists and medical professionals taught the doctors and pharmacists of the future. It is fascinating to see how old plant materials provide the source for the early history of our university. The drugs and their systematic cataloguing by Holst are a piece of educational history and show that there was a sliding transition between teaching and science at a time when the collection of materials was central to a number of university subjects.

The earliest study collections are important sources because they allow us to take a closer look at the teaching process. In Holst's time, teaching was by far the most important part of a professor's work. However, the pharmacological collection in question grew far beyond its original intentions and ended up as a major scientific collection. Therefore, the catalogue represents an important source in that it also sheds light on Frederik Holst and his work. Pharmacology, which initially seems to have been a teaching requirement, developed into a fascination, especially towards the end of Holst's career.

In 1824, when he was appointed professor of medicine, Frederik Holst was thirty-three years old and in charge of pharmacology, toxicology and hygiene. His professorial chair had recently been established and was the fourth such position at the Faculty of Medicine. Holst was a generation younger than his medical colleagues. "Hygiene" corresponded to the academic field that would later be called social medicine. Holst approached his professorship with a strong interest in the importance of medicine to society and society's importance to public health.

Building up a Norwegian university was a prestigious political process. With simple means, the Faculty of Medicine would be able to offer a full-fledged medical education. In the introduction to his catalogue of pharma-

cological specimens, Frederik Holst describes this time in the history of the faculty:

*During the first 10 years (1814–1824), the medical faculty consisted of only 3 members, namely Professors Michael Skjelderup<sup>1</sup> and Nils Berner Sørenssen,<sup>2</sup> who were appointed professors of medicine without any specific instruction as to the disciplines on which they were to lecture, as well as Magnus Andreas Thulstrup,<sup>3</sup> who was appointed professor of surgery and obstetrics. Skjelderup took on the same subjects he had lectured on for many years at Copenhagen University, namely anatomy and physiology, to which furthermore forensic medicine was added, and Sørenssen took on general pathology and therapy, clinical medicine and pharmacology. The small number of instructors could not be considered but a beginning in order to be able to commence lectures on the most important disciplines of medical science; ... therefore, the faculty took under consideration the subjects I was to take on, and when it was found that Sørenssen had the heaviest load, I was assigned pharmacology, including toxicology and hygiene, the latter two not having been taught until now.*

The subject of pharmacology was assigned to Holst's professorship on the basis of resource management and pragmatism. Nevertheless, he approached the field with great commitment.

### **Pharmacology education for medical students**

Pharmacology is the study of the effect of drugs on the body. Instruction was preclinical – from the lectern. But not only medical students followed the lectures. Future pharmacists were able to participate in university studies and were examined by university professors, even though they were not officially students at the time. The course material consisted of drugs – raw materials from flora and fauna used to manufacture medicines. The drugs were an important part of both the curriculum and the exams.

For his classes, Holst had to borrow medicinal plants from the city's pharmacies. Since this was quite cumbersome, he began to build up his own collection of drugs. At the university's 50th anniversary in 1851, Holst looked back on those days:

*When I entered into my position at the university in 1824, there was no pharmacological collection. Professor Sørensen [sic], who for 9 years before me had lectured on pharmacology, had to borrow specimens from the state pharmacies for each of his lectures, mostly from the Elephant [Pharmacy]. Thus, when*

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1 Michael Skjelderup (1769–1852).

2 Michael Skjelderup (1769–1852).  
Nils Berner Sørenssen (1774–1854).

3 Magnus Andreas Thulstrup (1769–1844).



Figure 1. *The House of Anatomy.* (Photo: Øivind Larsen 2021)

*the medical faculty upon my appointment decided that I should take over the lectures on pharmacology, I proposed to the Academic Council in a letter of 26 May 1824 that of the university's funds the sum of 300 speciedaler be allotted to the acquisition of such a collection with containers and cabinets for safe-keeping.*<sup>4</sup>

It is difficult to get a clear impression of the size of the collection at the time Holst was granted these funds for the purchase of drugs, repositories and storage cabinets. His descriptions of the basic financial conditions make it clear, however, that the new university had modest means.

The drug collection was placed in *Anatomikammergården*, also known as *Anatomigården*, House of Anatomy. The small building, Oslo's oldest half-timbered house, is located at Rådhusgaten 19 and was rented by the university for medical training, including lectures and dissections. It also housed the surgical instrument collection and a collection of anatomical specimens.

<sup>4</sup> *Fremstilling af det pharmakologiske Museums Tilbliven og Udvikling* (Meddelt af Prof. Dr. Holst, den 30te April 1861), in *Det Kongelige Norske Frederiks Universitets Aarsberetning 1861* (Annual Report of the Royal Frederick University, 1861), pp. 93–95.

The pharmacological drug collection was installed in the medical faculty's staff and assembly room, which furthermore served as a study for the prosector and lecturer in anatomy. Additionally, it functioned as the faculty meeting room, dressing room and joint office. All of these various functions did not exactly facilitate an expansion of the collection, which therefore consisted only of drugs that were essential to lectures and exams. The drugs had been selected with a particular view to the current *Pharmacopoeia Danica* from 1805,<sup>5</sup> the official overview of the drugs pharmacists were required to keep in stock and their specifications.

In 1834, ten years after Holst became a professor, the collection had grown to 649 samples. That year, only ten samples were added, showing that the material grew on a sporadic basis. By then it had become obvious that a lot of work was required to maintain the collection, since Holst wrote in the university's annual report that "a great deal has to be discarded as it is spoilt and unusable."<sup>6</sup> So many spoilt drugs had to be thrown away that the collection had actually decreased by 30 specimens in 1840. That year, 32 chemical plant and animal samples were added. "By the end of the year, the collection consisted of 28 samples from the animal kingdom, 463 from the plant kingdom, and 189 from the mineral kingdom, totalling 680 samples."<sup>7</sup>

Some years, the collection did not grow. In 1845, pharmacist Møller contributed 38 samples – roots and bark from exotic plants, including various Chinese types of bark that had recently been taken into use by the medical profession.<sup>8</sup>

After two decades, the drug collection had begun to suffer from age. A firm, concluding sentence in the annual report about the collection reads: "Over the years, a great deal of spoilt specimens have furthermore been discarded and replaced with fresh and healthy samples." Being in charge of a major drug collection may have felt like a Sisyphean task.

When the monumental university complex on Karl Johans gate, Oslo's main thoroughfare, was completed in 1852, conditions improved considerably. In the introduction to his catalogue, Holst writes that "thus, the collection may be divided into two periods, one from 1824 to 1851, the other from 1852 to the present, an important observation because its development has been quite different in each period."

At the time, the central building was called *Museum Naturale* and was to house the museums of natural history, as well as physics, chemistry and

5 *Pharmacopoea Danica, Regia autoritate a Collegio sanitatis regio medico-chirurgico Hafniensi conscripta*. Hafnia, Brummer, 1805.

6 *Annual Report of the Royal Frederick University, 1833–1834*.

7 *Annual Report of the Royal Frederick University, 1840*.

8 *Annual Report of the Royal Frederick University, 1845*.

medicine. The latter was located in the east wing of the building together with zoological and zootomical collections. The connection between medicine and zoology had been a deliberate choice in the planning process. Christian Boeck (1798–1877), a physician who was also in charge of veterinary medicine, was the only university professor on the building commission. Comparative anatomy was to be the connecting link between medical studies and natural science. Medical students were to study the anatomy of both humans and animals.

The pharmacological collection was allocated a small room between two auditoriums on the 2nd floor, namely Auditorium 15 for medical lectures and Auditorium 14 for zoology. The architectural drawings show that it was to house the collection and function as an exam room. In practice, it was also used as an office for the senior lecturer. Nonetheless, conditions improved significantly for the collection.

The drugs were used in lectures and group instruction. The new premises furthermore allowed Holst to offer students and other interested parties access to the drug collections for self-study, subject to agreement.<sup>9</sup> Holst writes that he wanted to establish regular opening hours, just like the other educational collections and university museums. For practical reasons, however, this was not possible, even though the premises had been improved. All the same, Holst admitted that there had not been many requests to visit the collection: “(...) since the general public hardly has particular interest in viewing a collection of pharmaceutical raw materials and specimens used as medicaments.”

The new university complex made it possible for Holst to expand, and many new drugs were added during the following decade. During the same year he moved into the new premises, the collection increased by 200 samples. Holst's accounts for the university's annual report tell us that starting in 1855 he travelled abroad during the summer holidays and traded in or received drug samples from chemical factories, pharmacies, and pharmacological museums. In the anniversary report of 1861, Holst describes the rapid growth of the collection:

*The largest part of the collection has been acquired through purchase from allocated funds; but several hundred specimina, thereamong some rather valuable ones, have been donated by pharmacists here in the city, as well as chemists and chemical factories abroad, with whom I have established relations on my annual travels when the university had summer holidays. Particular mention*

9 From 1856 on, the study catalogue listed the drug collection together with the other publicly available university collections.



Figure 2. *Domus Media*. (Photo: Øivind Larsen 2021)

*among the museum's more significant donors must be given to chemists Gebe & Co. in Dresden, Hauffman & Lampe in Berlin, Professor Th. Martius in Erlangen, and the French Colonial Ministry, which recently despatched a considerable collection of plant-derived drugs from the French Colonies. The Dutch Colonial Ministry has promised a similar gift from the Dutch Colonies.*<sup>10</sup>

Not only the storage conditions had changed. In his catalogue, Holst points out that the field of pharmacognosy was rapidly evolving. This had led to an increase in the number of drugs in pharmacological collections elsewhere as well. Beginning in 1856, Norway had its first own official listing of medicinal drugs – *Pharmacopoea Norvegica*. A pharmacopoeia is an officially authorized book describing the drugs that are in regular use in the country. Chemical substances, drugs or preparations described in the pharmacopoeia were to be stocked by all pharmacies and be identical in composition throughout a given country. The particular drug requirements and the number of officinal drugs varied from country to country. The pharmacopoeia specifies the quality requirements for the drugs and specifies methods to analyse them. Therefore, it was important to develop a Norwegian pharmacopoeia as a replacement for the Danish one from 1805.

<sup>10</sup> *Fremstilling af det pharmakologiske Museums Tilbliven og Udvikling* (Meddelt af Prof. Dr. Holst, den 30te April 1861), in *Annual Report of the Royal Frederick University, 1861*, pp. 93–95.

Holst was part of the committee that compiled the new Norwegian pharmacopoeia. He does not mention this project as the reason for acquiring new drugs, but it would seem likely that the new pharmacopoeia influenced the curriculum.

The large amount of new drugs quickly led to space problems, and several cabinets were installed in the adjacent auditorium. A few years later, these cabinets, too, were jam-packed.

While Holst was preparing his catalogue, a university committee reviewed the storage needs for all of the university's collections. Holst was not particularly confident that conditions would improve in the near future.

Pharmacology was a major subject for medical students at the time. In Holst's day, the subject was not taught according to a particular curriculum, and the lecture catalogue tells us that students were not necessarily taught the same from one year to another. In 1850 and 1851, Holst lectured on "the pharmacology of salts, fluids, and unweighable substances". In 1852, it was "the toxicology of metals, followed by general pharmacology". Eventually, Holst's lecture plans became more detailed. He was teaching six days a week, and in 1853 his schedule was as follows: "Monday, Wednesday and Friday, lecturing on hygiene; Tuesday and Thursday, pharmacology; Saturday, preparing examinations on selected parts of pharmacology and toxicology."

In the years that followed, we see different variations of this teaching schedule. Most of Holst's time was dedicated to general pharmacology. Alternately, he also lectured on toxicology and hygiene, less frequently on the pharmacology of "metals and fluids". On Saturdays he often arranged presentations and inspections of the drug collection. Thus, we can see that the drug collection was an integral and comprehensive part of the curriculum. And it was not only medical students who benefited from it.

### **Pharmaceutical apprentices**

Pharmacists were not mentioned in the university statutes of 1824. Throughout the 19th century, scholars debated how much theoretical knowledge ought to be required of a pharmacist. If academic requirements became too strict, many feared it would be difficult to find apprentices for pharmacies. In 1836, a new law on pharmaceutical exams was passed. After an apprenticeship and practical training in a pharmacy, it now became common to sit in on university classes for some of the training period.

The future pharmacists attended lectures in natural history, physics, chemistry and pharmacology. This was followed by an exam, prepared by the professors in the relevant subjects and a pharmacist. The exams commenced with a six-hour test on "a subject of pharmacology that would not



be expected to be unfamiliar to those who submit themselves to a pharmaceutical examination, nor could be answered directly on the basis of a book committed to memory.” Next was a practical exam consisting of three assignments – two analytical and one synthetic. The exam was held in the university’s chemical laboratory and stretched over the course of one or two days. Then the candidates underwent an oral exam with the exam committee: the natural history instructor examined zoology, botany and mineralogy; the physics or chemistry instructor examined physics and chemistry; the pharmacology instructor examined pharmacognosy, reading of prescriptions, and “the national legal provisions with regard to powerful drugs”; the pharmacist examined pharmaceuticals, knowledge of pharmaceutical goods and trade, and the assessment of prescriptions. All this took place in the course of two morning and two afternoon sessions.

Instruction and exams took place at the university but were not formally part of the curriculum. This hybrid solution is a good example of the interaction that has always existed between universities and society. Not until 1931 did pharmacy students formally qualify for enrolment at the university.

In 1855, the advisory medical committee proposed to establish a separate teaching position in pharmacy. The university’s professors of medicine were quite negative about the proposal. Frederik Holst, Christen Heiberg (1799–1872), Christian Boeck and Wilhelm Boeck (1808–1875) believed that a new teaching post was not advisable. Although it would serve to boost the field of pharmacy, in their experience the knowledge gaps among pharmaceutical candidates were not related to a lack of pharmaceutical expertise. Wilhelm Boeck argued that the problem was their poor education, not the training itself. The proposal was rejected.

At the same time, a proposal from the pharmaceutical exam commission was also up for debate. The commission wanted to raise the level of prerequisite knowledge among the pharmacy candidates. The candidates had worked as apprentices at a pharmacy before they came to university, and there was little control over what the pharmacist had taught them.

Discussions about the admission requirements and curriculum for the study of pharmaceuticals came and went throughout the second half of the 19th century. Demands for more prerequisite knowledge were first voiced and rejected in the 1850s, then again in the 1890s. In the 1850s, the examination commission suggested that greater priority be given to quality assure of the apprenticeship in pharmacies, but the proposal was not adopted. Pharmacist Møller suggested that the relationship between pharmacist and disciple “must be just as private as that between a craftsman or merchant and his apprentice.”

There was widespread concern that stricter requirements for a basic education would lead to a lack of candidates in the profession. Public discussion was divided between two different views of pharmacy apprentices. On the one extreme, he was seen as a capable student on his way into a profession that required expertise. At the opposite end of the scale, the pharmacy apprentice was seen as a poor wretch who from childhood on had learned what it takes through practical work in pharmacies.

### **From collection to museum**

As the theoretical basis of medicine rapidly changed throughout the 19th century, so did the hierarchical division of plants and drugs. Therefore, the teaching collection demanded continuous revision, a task Holst himself carried out during the forty-one years it was in his care. When Holst retired in 1865, it had grown into a large scientific collection consisting of 3237 different samples, and was named *Museum pharmacologicum*.

Before retiring, Holst catalogued the entire collection in meticulous handwriting. In his *Catalogus Musei pharmacologici* he divided the drugs and other specimens into 18 categories. Thus, the collection had started as a purely educational tool in order to avoid the extra work of borrowing samples from the pharmacy for every teaching session. In the course of Holst's time as a professor, the collection was further developed and redefined as a research collection, and finally a museum.

The larger the collection grew, the more difficult it became to use in regular medical teaching. Besides, drugs were – and are – perishable. Since the 1820s, there had been many rounds of replacing “spoiled and unusable” drugs, but the oldest collection showed clear signs of age nonetheless. Holst's successor, Professor Ernst Ferdinand Lochmann (1820–1891), saw the need for a smaller collection adapted to the needs of the students, and Holst's collection was no longer actively used.

For several years, Holst had visited pharmacological museums throughout Europe, and in 1861, the same year he recorded its history for the university's 50th anniversary, began to designate the collection as a “museum”. The name change also implied a raise in status, but Lochmann did not maintain the museum label.

### **Recreating the collection**

Parts of the drug collection were found at the Department of Pharmacy, others at the Faculty of Medicine, specifically the Department of Pharmacology. The collection may have been split up when the subject of pharmacy finally got its own institute in 1931 with a new, beautiful building at Blindern.



Figure 3. Examples from the class *Oleosa*, meaning drugs containing oil. These are typical appetite stimulating drugs and are used as spices today. (Photo: Øivind Larsen, 2021)

Perhaps parts of the collection were retrieved from the medical school in the centre of Oslo to be used for pharmacognosy classes in the start-up phase?

The Department of Pharmacy quickly built up a new collection of drugs. Today, the collection is located in the so-called “drug room” on the 2nd floor. At one point, Holst’s drugs were stored away, only to be recovered many years later in different parts of the basement. Some were kept in cabinets belonging to the Department of Pharmacognosy, others in cabinets of the Department of Galenic Pharmacy.

At the Department of Pharmacology, Institute of Clinical Medicine at Gaustad, Heidi Tømmerdal had ensured that old collections and other historical artifacts be taken along from Blindern when they moved in. In the late 1960s, the pharmacology department moved from the city centre to the building for preclinical odontology at Blindern. As of today, we do not know whether the collections were used for teaching at Blindern. At Gaustad they had been displayed in glass cabinets to decorate the corridors.<sup>11</sup>

Sometimes it only takes a few “gatekeepers” to save historical values. The fact that the catalogue, too, was preserved, promptly increased the value of the collection.

The different parts of the drug collection were assembled and registered by MUV and Smestad Paulsen. Then, Smestad Paulsen compared the drug labels with the information in Holst’s catalogue. Here, Holst had noted why he put together the collection, where the different samples came from, and from whom. He also described how he had employed the drug classi-

<sup>11</sup> Today *Georg Morgenstiernes hus*.

Holsts designation	Description	Number
Classis I. Mucilaginea	Mucilaginous drugs	72
Classis II. Amylacea	Starch drugs	88
Classis III. Gelatinosa	Gelatinous drugs, animal	41
Classis IV. Albuminosa	Albumin drugs	4
Classis V. Saccharina	Carbohydrates	91
Classis VI. Oleosa	Oils	
A. Pinguolea	Fatty oils	
	A.a. Animal	35
	A.b. Vegetable	140
B. Aetherolea	Essential oils	
	B.a. Animal	36
	B.b. Vegetable	364
C. Pyrolea	Tar like drugs	
	C.a. Animal	5
	C.b. Vegetable	7
	C.c. Mineral	33
Classis VII. Resinosa	Resins and balm	305
Classis VIII. Acria	Acidic/ irritant drugs	
	A. Animal	25
	B. Vegetable	291
Classis IX. Amara & astringentia	Bitter and adstringent drugs	
	A. Animal	5
	B. Vegetable	557
Classis X. Narcotica	Narcotics	212
Classis XI. Aethylica	Liquids containing ethyl	21
Classis XII. Metalloidea	Metalloids	50
Classis XIII. Acida	Acids	58
Classis XIV. Alkalia	Bases	218
Classis XV. Terra	Soil materials	131
Classis XVI. Metalla	Metals	403
Classis XVII. Saponos	Soaps	14
Classis XVIII. Balneologica	Bath products	22

*Table 1: Overview of the collection.*

fication system in use at the time. The labels he had placed in each case included information about the plant taxonomy of most of the drugs.

In the 19th century, drugs were classified according to other principles than today. Since less was known about the various constituents and pharmacological properties, the systematization was based on concepts related to taste and physical properties.

Holst divided the 3237 samples into 18 different groups. The groups varied greatly in size, and they are distributed as shown in Table 1.

Table 1 shows the 3237 numbered items in the catalogue. Actually there were many more, because many items consisted of several specimens (any-

**Classis VI. Oleosa**

341 Oleum Cera empyreuticum. Specimen practicum in examine pharmaceutica Maji 1862 paravit Th. Damtrek.

404a Oleum lini sulphuratum. Specimen practicum in examine pharmaceutica maji 1862 paravit Pedersen.

847a Extractum valeriana aethereum Ph. Norv. Specimen practicum in examine pharmaceutica Nov.br. 1861 paravit. Foss.

847b Extractum valeriana aethereum Ph. Norv Sp. Pr. in exam ph. Novbr. 1862, paravit. T. Ring.

**Classis XII Metalloidea**

2361 Sulphur praecipitatum. Specimen practicum in examine pharmaceutico Novbr. 1861 paravit J.B. Eeg.

2362 Sulphur praecipitatum. Specimen practicum in examine pharmaceutico Maji. paravit P.L. Jentoft.

**Classis XIII Acida**

2390 Acidum sulphuricum dilutum - Ph. Examine pharm. Dcbr. 1863 paravit J.Rein

2394 Acidum hydrochloricum concentratum. In exam. Pharm. Dcbr. 1863 paravit T.O. Alstad

2412 Acidum aceticum concentratum. Specimen practicum in examine pharmaceutico Maji 1860 paravit J. Aas.

2413 Acidum aceticum concentratum. Specimen prctacticum in examine pharmaceutico Maji 1861 paravit J.B. Eegs.

2429 Acidum benzoicum sublimatum. Specimen practicum in examine pharmaceutia Maji 1860 paravit mid delton.

2441 Acidum hydrocyanicum alcoholisatum 2,3%. In exam pharm Novbr. 1863 paravit A. Johnsen.

2442 Aqua amygdalarum amarum. Specimen practicum in examine pharmaceutica Maji 1862 paravit Agerborg.

**Classi XIV Alkalia**

2502 Hydras kalicus susus. Specimen practicum in examine pharmaceutica Novbris 1861 paravit Thorkildsen.

2503 Hydras kalicus susus. Specimen practicum in examine pharmaceutica Maji 1862 paravit Troje.

2511b Bicarbonas kalicus. In Examine pharmaceutica Maji 1864 paravit O. Johnsen.

2533 Iodetum kalicus Specimen practicum in examine pharmaceutica Maji 1857 paravit Franc Peter Moeller.

2536 Brometicum kalicum. Specimen practicum in examine pharmaceutica Maja 1860 paravit B.H.J. Habel.

2544 Persulphoretum kalicum Ph. Norv. Specimen practicum examine pharmaceutica Novbr. 1861 paravit D.H. Hilmers.

2572b Cyanetum kalicum. In examine pharmaceutica Maji 1864 paravit A. Johnsen

**Classis XVI Metalla**

2824 Oxydum zincicum praecipitatum. Specimen practicum in examine pharmaceutica Novbr. 1860 paravit Maschmann

2845 Valerianas zincicus. Specimen in examine pharmaceutica, Novbr. 1856 paravit Stillesen

2975 Subnitras bismuthicus. Specimen practicum examine pharmaceutica Maji 1863 paravit. C. Bömhoff

2982 Oxydum stibicum. Specimen practicum in examine pharmaceutica. Maji 1860 paravit Jahn.

2983 Oxidum stibicum. Specimen practicum in examine pharmaceutica Maji 1861 paravit Thorkildsen

3169 Fila & crystallisata nitratis argentinica ad modum Grassex Liebach. Specimen practicum in examine pharmaceutica Maji 1861 paravit A.H.M. Lunde

3180 Chloretum aurico-natrium crystallisum - Specimen practicum in examine pharmaceutica Novmbr 1868 paravit M. Bjerken.

*Table 2: Overview of the catalogue items used in the exams for pharmacy students.*

where from two to four). Therefore, the number of samples Holst registered is greater than the number of the last registered item specified in the catalogue.

At the end of the catalogue, Holst registered 38 samples that are neither classified nor numbered. He recorded the information included with the plants upon their receipt, and writes that they were not registered with the rest of the collection because he was sceptical about the information, whose quality he had not yet been able to assure. The catalogue also has a register that makes it easy to find drugs of particular interest.

In addition to the drugs at the Faculty of Medicine, Holst's catalogue listed other chemical substances and preparations employed in the manufacture of medicines. The drugs belong to the first ten groups, up to and including number 2318. Following this, Holst registered various chemicals used in teaching and research. This included alcoholic fluids, acids, alkaline solutions,

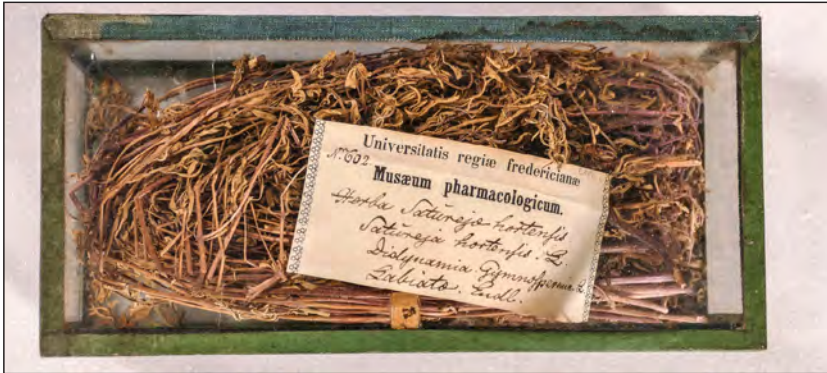


Figure 4. The labels are also important sources. This is dried summer savory. In the catalogue Holst has written *Herba Satureja hortensis*, but the label has included the botanical classification of that time: *Satureja hortensis*, *Didymia Gymnospermia*, *Labiata* Endl. (Photo: Øivind Larsen 2021)

and salts in addition to a group called *terra*, or soil products, metals, and not least soaps and mud bath products. In the 19th century, the latter two were often used in a medical context. Baths were common in a number of treatment institutions throughout Europe, where, among other therapy options, the body was covered with mud. The *Museum pharmacologicum* covered everything a pharmacopoeia could be expected to cover, and much more.

### Specimens used in the practical exam for pharmacy students

Professor Frederik Holst taught both medical and pharmaceutical students in the subject of pharmacology, and the collection was important for demonstrative purposes. Several of the drugs and chemicals in the collection were used in the practical exams for pharmacy students. Table 2 shows the collection items used in the practical exam for pharmaceutical students between 1856 and 1868. Each entry is numbered with reference to Holst's catalogue and includes the name of the pharmacist who acted as examiner. There are no records of the particular tests the students were to take. The first Norwegian pharmacopoeia, which only lacks two items from the collection (nos. 2536 and 3169), was published in 1854.

However, the overview of drugs and other specimens that were used provides little information about how the exam for pharmacy students was conducted. What we know from other sources is that the future pharmacists went through several days of practical exams, and that they were expected to have a solid understanding of all products used in the manufacture of medicines, and all products sold at pharmacies.



Figure 5. These drugs have two sets of labels. Some of the drugs were used at least a generation after Holst retired. (Photo: Øivind Larsen 2021)

### Quantitative information for some of the samples in Holst's catalogue

Holst's catalogue lists several of the imported specimens by weight. These weight amounts are handwritten, like the rest of the catalogue, and have not been easy to decipher.<sup>12</sup> For the contents of Table 3, please refer to the digitized version of the catalogue made available by the University Library in Oslo.<sup>13</sup> The weight units in Table 4 are taken from *Pharmacopoea Norvegica*, 1854.

The issue of different standards of weights and measures has been an extremely important one in the history of science, not least in medicine and pharmacology. For example, in order to assess the effect of a given medicine on a patient, one must know the exact amounts used. Comparisons over time, such as by means of hospital records which in Denmark-Norway date back to the mid-18th century, depended on knowledge of specified amounts, as did international comparisons and the use of medical literature. Thus, it is problematic to transpose the measurement units of the time to the ones

12 Schwarz 1963.

13 Search Oria or other search portals of the Oslo University Library for "Catalogus Musei pharmalogici Universitatis Regiæ Fredericianæ". Berit Smestad Paulsen has managed to decipher many, but not all of the symbols for weight, an undertaking that may be continued by others. Some of the interpretations arrived at to date may be erroneous, and several of the specified quantities were not possible to interpret.

Page in Holst	Number	Name	Amounts as interpreted from the catalogue	Translated to
36	209	Pepsinum germanicum	ʒj _ 1 lb 5 Sgr.	1 drachme, 1 pound, 5 solid grain
36	210	Pepsinum germanicum	ʒj _ 1 fl. 12 x??	1 drachme, 1 bottle, 12?
36	211	Pepsinum cum amylo acid	ʒβ _ 1 fl. 30 ??	½ ounce, 1 bottle, 30?
51	387b	Cortex seminum theobrobatum contusis. Cocoa. Thea cacao	ʒj	1 ounce
51	387c	Semina theobromatum, pinguolea orbata & pulverata "Pulvis Cacao"	ʒj	1 ounce
110	1118	Resina pistacia lentisci Serail.	ʒβ	½ ounce
123	1274	Colchicinum	ʒβ - 3 fl. 45g	½ drachme – 3 fl. 45g
131	1394	Emetinum purum	ʒj _ 1 lb 17 Sgr. 7	1 drachme,
131	1395	Emetinum coloratum	ʒβ _ 6 Sgr.	½ drachme, 6 sol. grain
145	1562	Semina simaba cedronis	ʒjij _ ?? 0.6.4	3 drachme
154	1644	Cinchoninum purum crystallisatum	ʒj	1 drachme
154	1647	Chinoidinum purum	ʒjj	2 drachme
154	1648	Chinidinum purum crystallisatum	ʒj	1 drachme
154	1650a	Acidum chinovicum	ʒj	1 drachme
155	1653	Sulphas chininicus	ʒj	1 drachme
155	1654	Sulphas chininicus neutralis	ʒj	1 drachme
155	1656	Hydrochloras chininicus	ʒj	1 drachme
155	1658	Hydrochloras chininicus	ʒj	1 drachme
155	1659	Phosphas chininicus	ʒj	1 drachme
155	1660	Arsenicus chininicus	ʒj	1 drachme
155	1661	Hydriodas chininicus	ʒj	1 drachme
155	1662	Acetas chininicus	ʒj	1 drachme
155	1663	Citras chininicus	ʒj	1 drachme
155	1664	Citras ferrosa-chininicus	ʒj	1 drachme
155	1665	Tartras chininicus	ʒj	1 drachme
155	1666	Tartra ferrosa-chininicus	ʒj	1 drachme
156	1667	Tanna chininicus	ʒj	1 drachme
156	1668	Valerianas chininicus	ʒj	1 drachme
156	1669	Hydroxyanas ferroso-chininicus	ʒj	1 drachme
156	1670	Lacta chininicus	ʒj	1 drachme
156	1671	Sulphas cinchoninicus	ʒj	1 drachme
156	1672	Sulphas cinchoninicus	ʒj	1 drachme
156	1673	Hydrochloras cinchoninicus	ʒj	1 drachme
156	1674	Sulphas chinidinicus purus	ʒj	1 drachme
156	1675	Sulphas chinidinicus	ʒj	1 drachme
156	1676	Nitras chinidinicus	ʒj	1 drachme
156	1677	Chinas calcicus	ʒj	1 drachme
199	2144	Papaverinum	2 grm. 3 fr. 60c.	
199	2145	Meconium	2 grm. 3 fr. 60c.	
203	2218	Sulphas atropinicus	ʒβ - 2 fl. 45g??	½ drachme – 2 fl. 45g
203	2219	Valerianas atropinicus	ʒβ - 2 fl. 45g??	½ drachme – 2 fl. 45g
262	2753	Aluminium	¼ lb. ?? 1.0.0. 1/4 U. Fl. 1.0.0.	¼ pound,
262	2754	Aluminium in fila	1?? lb. 10gr. 1 Lod IX 10gr	
262	2755	Aluminium in files cubo	9?? 2 ?? lb. 11.5 9 qvt. 2.cnt. Trh. 11.5	
262	2756	Aluminium in lamina	7 – 6. lb. 4.3 7 - 6. Trh. 4.3	
273	2846	Valerianas zincicus	ʒjj _ 8 Sgr.	2 drachme, 8 sol. grain
273	2849	Cyanetum zincicus	ʒjj _ 3 Sgr.	2 drachme, 3 sol. grain
296	3185	Palladium purum	ʒj _ 41/3 lb.	1 drachme, 4 1/3 pound
296	3190	Iridium	ʒβ 2 ½ lb.	½ drachme, 2 ½ pound
296	3191	Osmium	Gr. iiiβ 20 Sgr	Gr. 21/2, 20 sol. grain
296	3192	Tellurium	Gr. xxij 3lb.	Gr. 21 ½,
297	3196	Wolframium	ʒj 4lb.	1 drachme, 4 pound
297	3198	Oxydum tantalicum	Gr. Xjj 12/3 lb.	Gr. 12, 12/3 pound
297	3199	Acidum tantalicum	Gr. lj 1 ½ lb.	Gr. 2, 1½ pound

Table 3: Measurement units for samples in Holst's catalogue.



Sign	Designation	Approximate weight	Other information
ʒ	drachme	~ 3,7g	60gr
ʒ	ounce	~ 29,8	8 ʒ
lb	pound	~ 357g	12ʒ
Gr	grain	~ 65mg	
Sgr	Solid grain	~ 62mg	solid
β	1/2		This given after a number means ½, dvs 3β is ½ drachme
i or j	1		Number of i means units, i.e. 2 or 3 units. j is put as the last to avoid falsifications of the amount.

Table 4: Overview of the symbols and their corresponding measurements from the *pharmacopeia of 1854*.

we use today. The weight unit pounds, for example, varied from one country to the next, as did ounces.

The source country of Holst's catalogued samples is not always specified, but the labelled weight referred to the source country's weight standard. In the European countries, the weight of one pound ranged from 350 g to 500 g. This can clearly be seen in the list from *Pharmacopoea Norvegica*, 1854 (Table 3).

### Surviving drug samples from Holst's collection

Holst's catalogue is of particular interest because a number of drugs from the *Museum pharmacologicum* still exist. Three hundred and three drugs survive in small rectangular glass cases, while 114 more sizeable drugs are stored in other containers.

This book includes a full transcription of Holst's overview of the *Museum pharmacologicum*,<sup>14</sup> as well as an overview of the drugs still in existence.<sup>15</sup> The overview is particularly interesting because the labels inside the containers provide more information about the medicinal plants than the catalogue.

In addition to the names of the drugs, the catalogue lists their botanical classification. This 19th-century classification system largely uses the nomenclature adopted by Carl von Linné (1707–1778). Holst's classification can be found in professor William Withering's late 18th-century work on botany, *A systematic arrangement of British plants*. Professor William Withering

14 Holst F. "Catalogus Musei pharmacologici Universitatis Regiæ Friedericianæ – Tables". *Michael* 2021; 18; Supplement 27, pp. 75–205.

15 Paulsen, B.S., "Universitetets eldste drogesamling i 2021". *Michael* 2021; 18; Supplement 27, pp. 206–17.

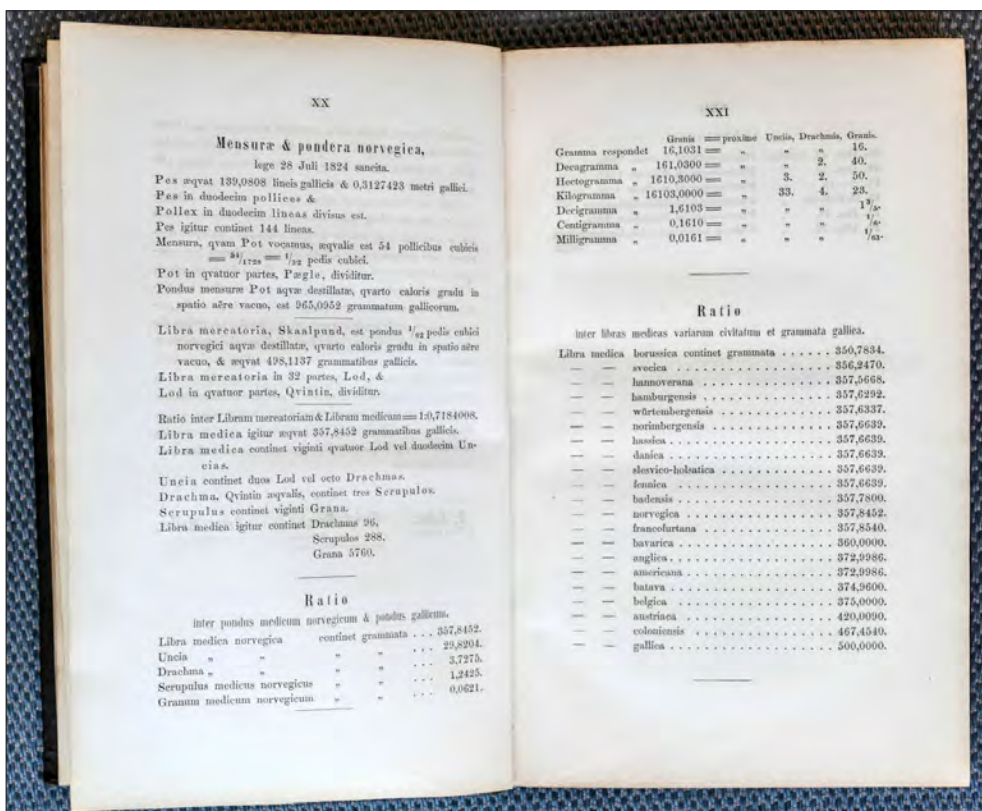


Figure 6. Measures and weights in the pharmacopoea of 1854. (From the library of Oslo cathedral school)



Figure 7. Quinin derivatives. The weight in each glass is one drachme. (Photo: Øivind Larsen 2021)

*Classis VII. Olea.*

Numerus generalis.	Nomen classis.	Nomen.	Sedes in systemate historiae naturalis.	Unde acceptum.	Annus, quo in museum receptum.
		<i>B. d. Olibroba vegetabilis.</i>			
X 694.		<i>Somera Myrsifera myrsifera</i>	Myrsifera		
X 695.		<i>Somera Myrsifera myrsifera</i>	—		
X 696.		<i>Ficus Myrsifera patula J. dactyloides (Schroffii J. agrifolia)</i>	—	Don. Urban. Gronov.	1854
697.		<i>Ficus Myrsifera patula J. dactyloides (Schroffii J. agrifolia)</i>	—	Don. Schimper.	1839
698.		<i>Ficus Myrsifera patula J. dactyloides (Schroffii J. agrifolia)</i>	—	Don. Schimper?	1862.
699.		<i>Urtica Ficus Myrsifera myrsifera</i>	—		
700.		<i>Urtica Ficus Myrsifera myrsifera</i>	—		
701.		<i>Ringulium Laminaria Myrsifera myrsifera</i>	—		
X 702.		<i>Ringulium Laminaria Myrsifera myrsifera</i>	—		
703.		<i>Ringulium Laminaria Myrsifera myrsifera</i>	—	Don. J. Sch.	1861.
704.		<i>Ringulium Myrsifera Bivalve ad officinalem. In parte fidele Laminaria epistola adfusa.</i>	—	Don. T. Sch.	1861.
X 705. a. x.		<i>Althorobus Althorobus Myrsifera myrsifera. Cl. Macialis</i>	—		
705. b.		<i>Carya Althorobus myrsifera</i>	Monimiacae	Don. Schimper.	1862.
X 706.		<i>Ficus Epidendri Vanilla (sp. Vanillarum.)</i>	Orchidaceae		
X 707.		<i>Ficus Vanillarum</i>	—		
X 708.		<i>Ficus Vanilla-Laguaira</i>	—		
X 709.		<i>Ficus Vanilla-javanensis</i>	—	Don. Van Lenthof.	1858
710.		<i>Folia Onopordi fragrantis. (Folium. Thui herbaceae) C. Laminaria</i>	—	Don. Warming. Hol. fr.	1861.

Figure 8. Frederik Holst neatly logged the name of the samples, donators and date of accession. (Photo: Øivind Larsen 2021)

(1741–1799) was a member of the Linnéan Society of London.<sup>16</sup> Schroff's 1853 textbook on pharmacognosy was another important source.<sup>17</sup> Along with the information about plant classification, the catalogue frequently indicates where the plant material came from and who donated it.

It is important to note that many of the Latin plant and drug names used in Holst's catalogue are no longer valid today. This also applies to numerous plant families. Therefore, the catalogue cannot be used as a modern reference work.

16 We have used the 4th edition, published by Withering's son in 1801 (Withering 1801). Professor William Withering was a physician, botanist, geologist and chemist, and made the discovery that *Digitalis purpurea*, foxglove, could be used to treat dropsy. This is the origin of its use as a heart medicine.  
 17 Schroff 1853.

## Where did all the drugs come from?

In the introduction to his catalogue, Holst describes how he acquired the various drugs. Between 1863 and 1865 he also gave several lectures at the Norwegian Medical Society on some of the drugs he had received for his collection. In these lectures, he described the specimens he had been given, where they came from, what they were used for, and in some cases he compared them with other drugs familiar to him<sup>18</sup>.

Holst had an extensive network of professionals who furnished him with drugs. They included colleagues and pharmacists in several countries, drug suppliers and manufacturers who produced some of the pure drugs he obtained. He also had contact with the French Ministry of Algerian Affairs and other French colonies.

Holst's collection is impressive. The drugs came from far away, including Latin America and the West Indies, particularly from the island of Réunion, from Brazil and India. All of this is described in Holst's introduction to the catalogue, which holds a myriad of fascinating information for further study<sup>19</sup>.

*English translation: Thilo Reinhard*

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<sup>18</sup> Holst in *Norsk Mag Lægevidensk*, 1863–1866.

<sup>19</sup> Holst F. "Catalogus Musei pharmacologici Universitatis Regiæ Friedericianæ – Frederik Holsts egen innledning" (Frederik Holst's own introduction). *Michael* 2021; 18: Supplement 27, pp. 51–74.

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