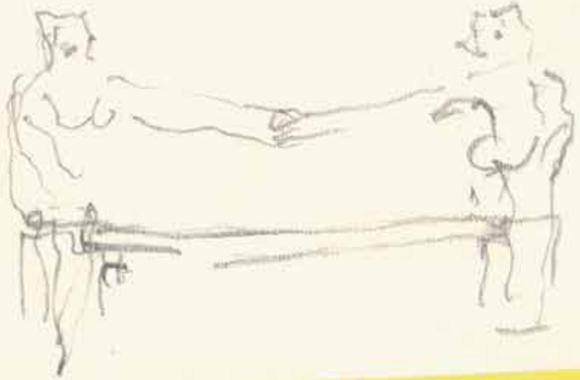
Pontus Kjerrman

Moulding and Casting

Stucco- and Sculpture techniques

BILLEDKUNSTSKOLERNES FORLAG



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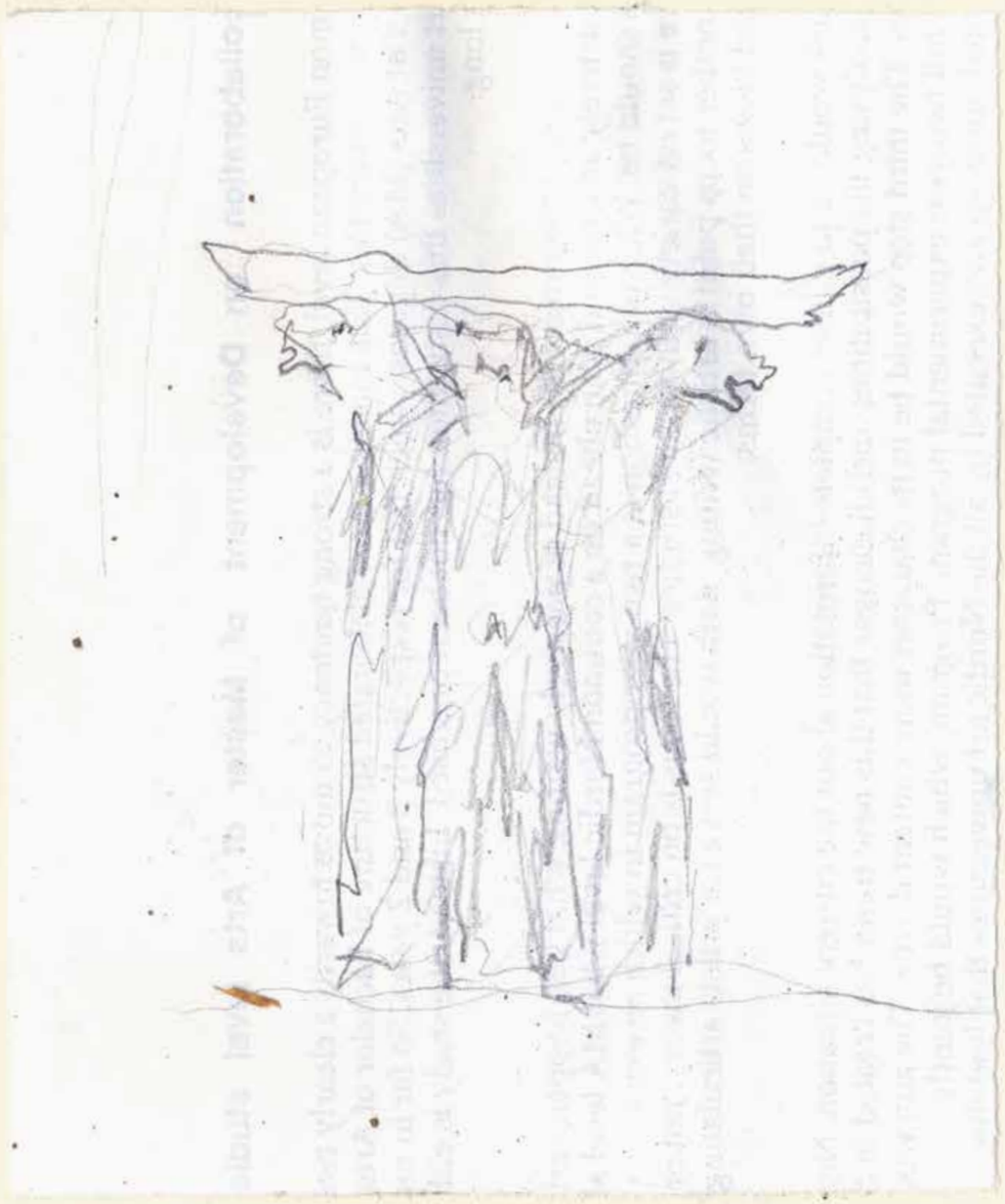

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Moulding and Casting, Stucco- and Sculpture techniques

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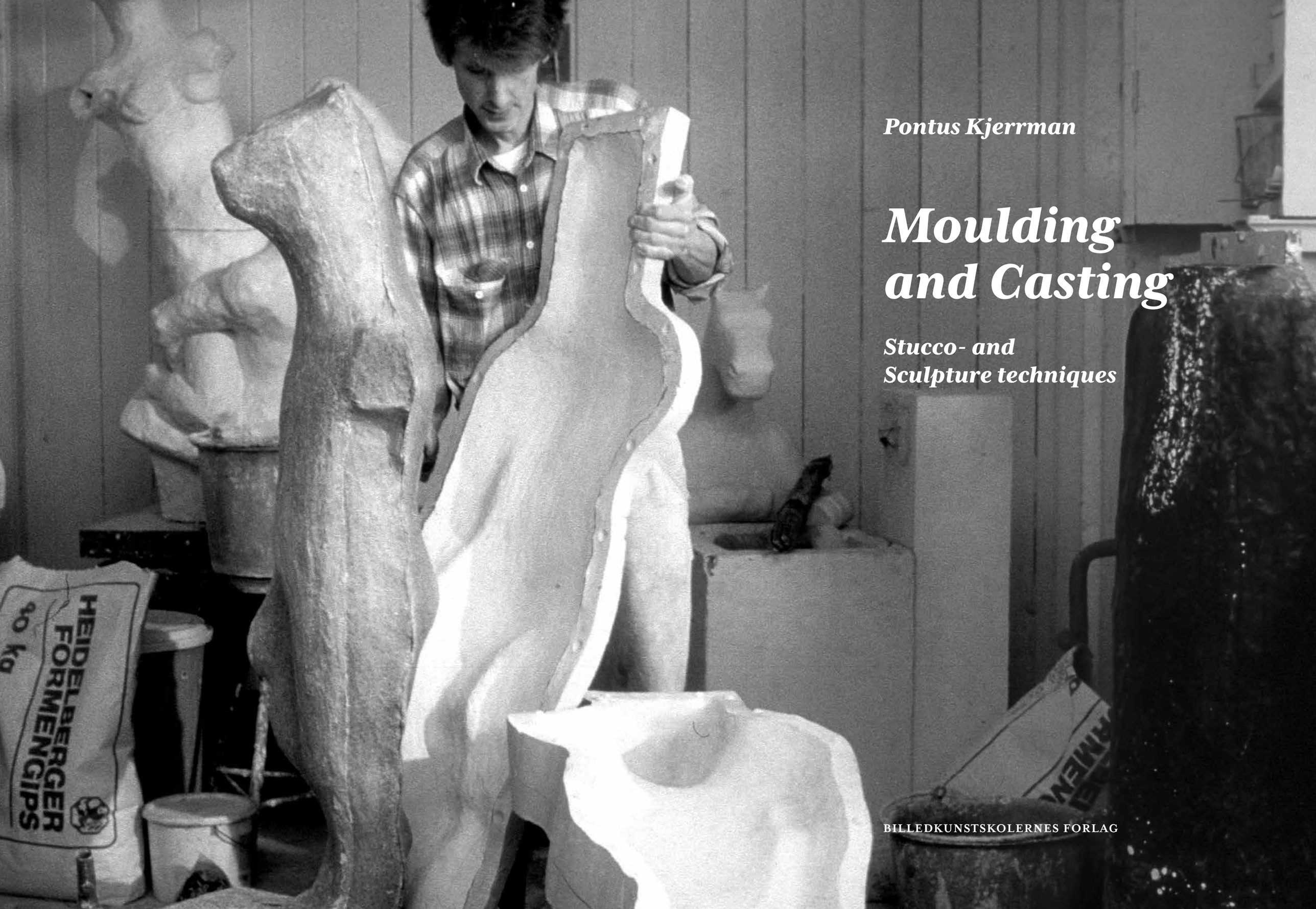

Pontus Kjerrman

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BILLEDKUNSTSKOLERNES FORLAG

Preface

Sanne Kofod Olsen
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The book "Moulding and Casting. Stucco and Sculpture Techniques ", written and designed by Pontus Kjerrman, is not an ordinary book. It is a book that deals with sculptural techniques as well as other artists' works, personal stories about a life with plaster, art historical insight and Pontus Kjerrman himself. It is also a book that has been created during the 35 years Pontus has worked at the Royal Danish Academy of Fine Arts as a lecturer in plaster, and where he has interested great numbers of new students in the technical and artistic work with plaster as a primary material.

The book reflects all the years Pontus Kjerrman has spent at the Royal Danish Academy of Fine Arts, first as a student and later as a teacher. Focusing on plaster and plaster techniques, the book gives an in-depth insight into what, and in particular how, students and teachers work at the Royal Danish Academy of Fine Arts, but the book also gives a general picture of how to work as an artist in close dialogue with the materials and the works of art.

In 1979, when Pontus himself started at the Royal Danish Academy of Fine Arts, the place was something different than it is today. Then artistic techniques in many different media had both more space and more staff to teach the specialized techniques. Later followed years, perhaps even decades, when interest in the material practices declined, and in step with the constant changes of art, the focus shifted from techniques to concepts. At least for a period of time. All those years, Pontus kept the sacred fire burning as a lecturer in plaster at his laboratory, which for many years was attached to the Sculpture School at Charlottenborg. And even during the time when concept art dominated the Royal Danish Academy of Fine Arts, there was something interesting to do in the plaster workshop.

In recent years, interest in the material practices and thus also the more classical techniques has flourished again. The generation of artists who are now attending the Royal Danish Academy of Fine Arts, grew up in the digital age and have little experience with craftsmanlike practice during their early schooling. With these students we can see a great quest for not only the material but also the craft. This happens side by side with theoretical interests, development of artistic research (which can also relate to material) and other of the currents presently characterizing art.

For many years, the art education, not only at the Royal Danish Academy of Fine Arts but in Europe as a whole, has been characterized by a conceptual paradigm that has been artistically expressed in conceptual or contextual works. The artistic practice and process has been defined as "post production", which means that the artist herself (of course) plans her works, but works with craftsmen or other artists to realize them if they involve a material representation.

An artist I know describes herself as a "laptop" artist, a term descriptive of this conceptual artist role which is quite common today. During the past 20 years, the art educations have been structured according to the conceptual artist role when it comes to content and architecture, and in some places it has led to the disappearance of workshop facilities. This, however, has not happened at the Royal Danish Academy of Fine Arts, where many workshops are preserved and staffed, though reduced significantly since the 1980s.

In this book you can see examples of both types of artists and their works in plaster. The plaster workshop and the sculpture workshop have both been able to teach the students the artistic techniques, as well as contribute in the production of the works of other artists - and with a learning potential for the students. It has always been like that. After all, the classical sculpture only transforms from plaster to bronze through the process of post-production. This may be the reason why the plaster workshop and the sculpture workshop, with their basic sculptural techniques, have survived all these years. They can both teach classical artistic techniques, and educate through participation in post-productions and thus also in an artistic production form that is current to many artists. They can give students a basic knowledge of the material, which ultimately also determines their ability to design something aesthetic.

Through his work in the plaster workshop (and in his own art in general), Pontus has maintained this both artistic and craftsmanlike approach to the design techniques, which are basic in any art education. It does not stand alone, but is part of an educational complex - a higher education where one must be able to create, think and reflect; processes which apply to the work of any work of art.

With the growing interest in material and craftsmanship, the demand for workshops and technical knowledge in art education is once again increasing. Furthermore, several new, mostly digital, techniques have been added. The conceptual and material trends need not be contradictory. Actually, it is necessary that they co-exist on any art school today, so that students can acquire the knowledge needed to achieve a professional life as an artist. After all, you may read Wittgenstein and be interested in language theory and at the same time work in clay, plaster and bronze. It's no contradiction.

Plaster's materiality

Pontus Kjerrman
Sculptor, Stuccocraftsman and Ass. Professor at the Royal Danish Academy of Fine Arts' Schools of Visual Arts, 1985 - 2019.

In a lecture on "Stoflige Virkninger" [Material Effects] which was held at The Royal Danish Academy of Fine Arts in 1919, architect, ceramist and professor Carl Petersen had this to say the about plaster of Paris (gypsum):

"What is physically unfortunate about plaster – and this applies, indeed, as long as it's new – is this: that it's somewhat transparent in the surface. Even if we cannot account for what is amiss, the eye perceives it as a discomfort that the light penetrates into the substance, the surface of which thereby becoming uncertain and unsteady."

It's as though the open surface of plaster devours or eats the light. Should you happen to rub it with your hand, however, you close up some of the surface and it takes on a little bit of lustre. If, then, using a soft brush, you powder it with talc, you get a fine surface, which better receives the light. If, however, you first moisten the surface with a brush that is moist (not wet!) with soap oil and then brush it with talc powder, you can actually obtain a surface that looks like ivory.

Many old plaster castings have been dusted off and brushed by hand or with a soft broom or brush, with the result that they've taken on a grey-coloured semi-matte surface, which can often be a little uneven in colour. So many people ask me: "How can I get my plaster to turn completely white again?" And I always try to convince them to let it be. It's hard to clean plaster without destroying its delicate surface, and if you finally manage to do so, what you obtain is a completely matte, drab surface without any materiality; then the plaster castings lose their soul and their story. If there's some place that appears to be too bright on an old plaster casting, try to dissolve dust with a bit with water and, with a soft watercolour brush, "move" it around, that is to say, try 'to paint' with the dust in order to cover any over-luminous white spots. You can also use slightly diluted tea or watercolour paints for this purpose.

Today laser technology exists, with which you can successfully remove the dust from plaster castings. Reportedly, employing such methods is not supposed to destroy the surface. But the examples that I have seen are terrible. The laser technique doesn't remove all the dust, but the sculpture turns white with a number of grey splotches, and it takes on a drab, matte surface. And it responds to the light in a boring way, exactly as Carl Petersen described it. Moreover, I cannot understand that one would even want to remove the beautiful dust and marks of wear, which certainly tell the unique story of this particular casting.

It's as if people today are losing their sensitivity to plaster as a material. This is one of the reasons that I have wanted to write this book.

The universe of stucco- and sculpture as I have experienced it

A story about teaching in Stucco- and Sculpture techniques at The Royal Danish Academy of Fine Arts

The plaster workshop, where I have been teaching for 35 years, is located in the the Sculpture Garden.
The building was built in the late 1800s, but was not used for teaching the craft of creating sculpture with plaster, until the early 1960s.
Before that time, the plaster workshop was located in the Charlottenborg Castle in a room that is today being used by the Laboratory of Serigraphy, accessed with an entrance from the Italian staircase.
Beside the building stands a very large ash tree which is more than two hundred years old. In the year 1801, when this garden was functioning as Copenhagen's Botanical Garden, some living plants were obtained from Paris, including a specimen of the narrow-leaved ash Fraxinus angustifolia, which was planted just beside what was then called the Lion Pond, the very spot where the plaster workshop is situated today.

Stucco craftsman and associate professor Palle Damsholt (1917-81) and I, photographed at The Sculpture School in 1979. Palle was teaching plaster casting at The Sculpture School from 1973 until 1981.

A universe where art and artisanship converge and serve to improve each other, reciprocally, is the space I like best. It is this meeting that has fascinated me for most of my life. I have run into this world in my activities with stucco workers and sculptors, and also in my exchanges with teachers and students at The Sculpture School at Charlottenborg Castle, a department of The Royal Danish Academy of Fine Arts.

In Denmark, what is irrefutably fabulous is that there exists an art academy that has been open and operating for more than 250 years in the very same place, inside the very same buildings. That The Royal Danish Academy of Arts has often been perceived as conservative goes without saying: it is, of course, also part and parcel of this institution's mission to preserve and to hand down time-honoured expertise. But every now and then, it has also been, an innovative and groundbreakingly creative academy, which has played a prominent role in the ongoing debate about the artist's role in society.

My first encounter with The Sculpture School in 1979 was nothing short of a revelation. I walked into a secret palace garden, luxuriant and untamed, replete with old, overgrown building facades and various sculptures dispersed around an ancient column. This was the site of Copenhagen's former botanical garden, which happened to be located in the backyard of Charlottenborg, the old baroque castle that has housed the Royal Danish Academy of Fine Arts since the year 1754.

One side of the garden is surrounded by the Billedhuggerlængen [Sculptors' Wing] - which is what remains of King Christian IV's ropewalk, where tow ropes for the navy's ships were made from the 17th century – with rust-ochre coloured walls, whitewashed with iron vitriol, lighting up the Billedhuggerhaven [The Sculpture Garden]. And here lie The Sculpture Garden's two exquisite and light-suffused studios, with north-facing skylights that face the garden. On the other side of the building, on the south side between the Sculptors' Wing, with its yellow wall, and the back of The Royal Theatre, runs an alleyway from Heibergsgade and into the entranceway under the yarn magazine of the old ropewalk - a tall building with sky-lit studios at the top, those that we call 'the bird cage'. From here, you walk on further through Thorvaldsen's yard, through "the Italian stairwell", and you end up standing in the castle yard of Charlottenborg. When I started out as a student at The Sculpture School, the entrance was through the small door in the yellow wall in the alley. Above this door a lion's head in marble by Johannes Wiedewelt had been plastered in. Johannes Wiedewelt (1731-1802) served as sculptor professor at the Royal Danish Academy of Fine Arts in 1761 and also served as its director in several long intervals, from 1772-95.

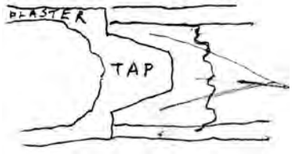
This lion's head has always been an inspiration to me.

Initially, I was a student here from 1979 to 1985. And since 1985, I have been working as an associate professor at The Sculpture School. I would venture to guess that in the almost 35 years I have been working here at The Royal Danish Academy of Fine Arts, I have met thousands of students.

In March 2019, my extensive and long-standing activities at The Royal Danish Academy of Fine Arts will come to a close when

Palle Damsholt

Bronzesculpture by Rudolph Tegner, which has assembled with tenon and mortice, the through-going screwes have never been cut off, and the extra bronze has not been beaten together.



Joint of two parts of a plastercast, made with tap and collar, reminds of the so-called mortise and tenon joints used in wood.

I retire and devote myself fully to my own work, making sculptures. For this reason, I am anxious to tell about the people that I've met here and to tell about the experiences in which I've taken part – experiences and items of knowledge from which future generations of students can hopefully derive some benefit in their personal work with making art.

There are most certainly, at The Royal Danish Academy of Fine Arts, many stories about power struggles and rivalry but I think that it's important to focus on the good stories. Much has been written about the various professors' ways of teaching. In this book, though, I want to focus on the laboratories and on the artisan/crafts-based instruction.

Palle Damsholt —— My teacher at The Royal Danish Academy of Art, plaster-casting master, stucco worker and lecturer Palle Damsholt, used to tell us, his students: "Remember, the whole thing has to do with process". When Palle uttered this, it sounded entirely philosophical.

And yes, to a certain extent, plaster does have to do with process. The plaster can be liquid, as workable as whipped cream, or it can be as hard as wood or limestone. If Plaster were a person, he or she would certainly be the humble type who would lend him/herself to being used for all purposes, in all situations. Palle was truly this kind of person. He simply did not have, for that matter, any particular need to prove that he was right. But you could just feel that he enjoyed being available and that he enjoyed being able to help the students along on their ways.

His great interest in both craft and sculpture was probably inspired by the fact that Palle's father, Helmig, was a stone mason. Helmig worked with carving the stone monuments at Blågårds Plads (in the Nørrebro section of Copenhagen), monuments that were designed by the sculptor, Kai Nielsen (1882-1924).

When I told Palle that I came from Gothenburg, he told me that he had been working there in the 1930s, twenty years before I was born. He worked for a stucco firm that was called Palmqvist. Above and beyond making ordinary building stucco, this firm made hollow ventilation ducts, in plaster, for construction. Palle had gone to Gothenburg with his good friend, the stucco worker Anker Nielsen, with whom I also became acquainted later on. They were both newly educated stucco workers, and at that time in Denmark there were not many jobs in this line. At Palmqvist, however, there was a lot of work that needed to be done – and there were jobs to be had.

At the end of the 1930s, Palle was employed at Rasmussen's Bronzestøberi [Bronze Foundry], which was located in Nørrebro, out on Rådmandsgade. Here, he put taps in the arms and other protruding elements on the plaster figures, which were eventually to be cast in bronze. The craftsman would, for example, saw off one arm and then go about modelling a faceted tap, which could fit exactly into a corbel on the other section. By filling up the other section with plaster and pressing the two sections together, one would obtain a collar that fit the tap precisely. It resembles the way you join wood, the so-called tenon- and mortise joint, tenon is the tap and mortise is the collar or the hole, the tap fits into. Before it became possible to weld the bronze elements, the artisan would have to perform this meticulous task with every single joining, which was then cast in bronze, so that the parts could be pushed into one another. And with through-going bronze screws, they could be firmly fixed, resulting in a strong and precise joining. (You always had to take care that there was a little extra bronze, which could then be hammered, in order to hold the parts together. This is why you can see a very thin dark line, on many old bronze pieces right where the joining was made). Many large plaster casts were also assembled in this manner, so that they could be transported more easily.

Palle also made plaster models that were used for making (alphabetical) letters in bronze, On this account, Palle earned a great deal of respect from the other craftsmen, since the modelling of letters is something that requires a lot of skill. He made many piece-moulds and glue-moulds of sculptors' pieces. Among other things, he made glue-moulds of one of Sonja Ferlov Mancoba's sculptures, a sculpture that was rather large and simple, although the modelling of this particular piece was of great importance and it was especially difficult to get the joinings to fit together.

At the end of the 1950s, Palle's services were lent out from Rasmussen's Bronzestøberi to stucco worker Victor Moth, who had been entrusted with large-scale assignments involving the preparation of castings of facade decorations at Amalienborg.

Stucco craftsman Jørgen Bau, who was an apprentice at Moth's workshop in the period 1953-57, says that: "When they carried plaster in through the front house and down the stairs to the workshop in Toldbodgade 9, I saw him [Palle] carrying fifty kilogrammes on his back, as well as bags under each arm. And Moth bawled him out and said he shouldn't be doing that!" Jørgen, who was a young apprentice at that time, was not carrying in any plaster himself: "Moth, who had previously been the chairman of the workers' union, maintained that apprentices must not be carrying heavy loads before they were fully matured."

In 1967, Rasmussen's Bronzestøberi closed down, and Palle was asked to work at a number of different places, including Agnbak Stuk [Agnbak Stucco], under the direction of Per Thostrup, for whom I would later come to work as an apprentice. Per has told me that they were assigned the task of creating a coat of arms for the Royal Life Guards' entrance on Gothersgade. While the building manager of Det Kongelige Livgarde [The Royal Life Guards] was busy negotiating the price for this job, Palle stood behind the building manager's back and eavesdropped on the negotiations. He was busy making signals to Per with his thumb pointed up and smiling, in order to make sure they were getting a good price for their services. This was an assignment that Palle really wanted to spend a lot of time doing properly. The coat of arms still hang on the posts on both sides of the entrance to The Royal Life Guards' barracks on Gothersgade. In the early 1970s, Palle was entrusted with the position of plaster-casting master, and concomitantly as associate professor in plaster casting, at The Sculpture School at The Royal Danish Academy of Fine Arts.

Palle was a splendid teacher and a highly skilled craftsman, and he was also very sociable. Teaching visual artists in the techniques of artisanship and craftsmanship is a very rewarding job. When you help them bring their art projects forth into realization, the students get happy, especially if you are adept at noticing and sensing how much they feel like discussing the artistic content. Of course, this requires an especially playful craftsman, who can not only see a specific way of applying the craftsman's touch but can also figure out the method that would be best suited to the particular needs of the particular artist.

Palle began teaching at the time that Svend Wiig Hansen was the professor at The Sculpture School. I got to know Palle in 1979, after Willy Ørskov had been working as the professor in this same department for one year. Willy was a fascinating artist, for whom we had a great deal of respect, whereas there was a decidedly more down-to-earth ambience prevailing in Palle's workshop. The year before, at Houvedskous Skulpturskole [Houvedskous Sculpture School] in Gothenburg, I had learned a lot about casting, but when Palle was my teacher, I learned how to do this in a much more professional manner. For example, in Gothenburg, we used clay-water as the release agent, with the result that the plaster figures became rustically brownish, but the impression was not turning out particularly well. With Palle, I learned how to use soapy

Victor Moth(1914-1974), teacher of plaster casting (1960-1973), photographed in the plaster workshop together with a number of students. In front – from the left: Jane Grundahl; Thomas (model of Agnete Madsen); Victor; Johannes Cramer Møller; Barbara Shanklin; Professor Svend Wiig Hansen. In the row behind – from the left: sculptor Agnete Madsen; Simon Kristoffersen; René (janitor) and Jette Wohlert. Photo: Lena Jacobsson.

Palle made a plaster model of The Royal Life Guards' coat of arm, that was cast in artificial stone, and still hang on the posts on both sides of the entrance to the barracks at Gothersgade.

water as the release agent, obtaining a much finer impression.

Palle also taught me how to make glue-moulds from melted skin glue (you can also use gelatine for this purpose), wherein you've got such a small percentage of water, that the glue, when it's cold, is as flexible and as strong as rubber. We melted the glue in a basin of water, so that it would become liquid and could then be poured over the model, which was generally a plaster figure.

When you brushed on heated wax inside the glue-mould, in conjunction with *cire perdue* bronze casting, you really had to be circumspect, of course. But if you were also scrupulous and painstaking, you could obtain an excellent impression.

I really wanted to learn how to make rubber-moulds, but Palle had been granted only a very small budget for rubber, so I was only given the chance to make small figures. The gap between capsule and model was only 5 mm, so no more than a few hundred grams of rubber were needed for each half of the moulds. Palle also taught me how to make piece-moulds. Among other things, I made a paper aeroplane that I shellacked, and from which I then proceeded to make piece-moulds, with the upshot that I could cast porcelain down inside the mould.

Palle had suffered a bout of polio. But he was very strong, anyway. At that time, plaster was delivered in sacks weighing 40 or 50 kilos each, which had been loaded onto a truck. At any one time, there might be as much as two tons of plaster being delivered. Palle showed us how the man on the loading dock of the truck could place the sack up onto our backs, and then we were supposed to walk, with our backs straightened, and chuck the sacks onto a pallet in the plaster workshop. Even I, of such slender build, could take part!

Steen Eiler Rasmussen —— One of the sculpture students had contacted Steen Eiler Rasmussen, the renowned architect, urban planner and professor, and had asked him whether we would be welcome to visit him. It was another one of our teachers, Associate Professor in sculpture Poul Holm Olsen, who told us that Steen had been a very gifted teacher when he was working at The Royal Danish Academy of Fine Arts, at the time when architects and visual artists were in close contact with each other. We were a small group of students who headed up to visit Steen in his own house in Rungsted. We had been given the message beforehand that we were supposed to read through the second and third sections of his book, *Om at Opleve Arkitektur* [Experiencing Architecture]. Just reading these sections in his book was a real eye-opener.

Steen Eiler started out by showing us his garden and showing us exactly how he had placed the house so that it would not cast its shadow over the garden. Then he showed us around inside the house, which was very finely designed. His wife served us tea and freshly baked scones in the living room. When we were seated, he asked how many of us had visited Rome. Most of us raised a hand in response. Then he asked how many of us had been to Faaborg. This time around only half a hand was raised, and maybe – hmmm – it was Svendborg, come to think of it. "Well, that's too bad," he said, and showed us a few very fine, square-cropped, black-and-white slides of the art museum in Faaborg, which had been designed by Carl Petersen in a neoclassical style, albeit with a modernist spirit. Carl Petersen had been appointed professor in architecture in 1919, at the same time that Utzon-Frank and Aksel Jørgensen were appointed. And the simplicity and materiality for which Carl Petersen was an exponent came to take on a great deal of importance for Danish architecture at the beginning of the 20th century and came to serve as a vital source of inspiration for both Steen Eiler and his contemporaries.

Then we were led upstairs and we got to see Steen Eiler's drafting studio, replete with a floor where every other floorboard had been coloured in a dark hue; this was an elongated room with only one large window in the south-facing gable. And we could see how the light was beautifully dispersed throughout the room.

When it was time for us to say goodbye, Steen Eiler stood there and pointed at a ceramic monkey's head that he had standing in the entrance. "Do you all know who has created this? It's Jean Gauguin. Every time I walk out this door, I place my hand on this head, in order to sense its form and its materiality."

More about Palle —— Early in the spring of 1980, we were going to cast in bronze. The bronze caster, Leif Jensen, had been operating his own foundry in Søborg. He had originally learned his craft at Rasmussen's Bronzestøberi [Bronze Foundry] and was in possession of many years of experience. In those years, Leif would come to visit the academy every spring to work with the students and he would teach them the technique of *cire perdue* (French for 'lost wax') casting. Later on, Leif's son, Peter Jensen, taught bronze casting at The Royal Danish Academy of Fine Arts.
We were supposed to have moulds ready that could be used for wax casting. We could either make small figures directly in wax, or we could cast wax figures in a plaster piece-mould, or in a glue- or rubber-mould. These wax figures were subsequently retouched and pieced together with inlet funnels and ducts in wax. The entire assembly was then packed into a mould made of plaster and grinded bricks, which was subsequently fired inside a kiln for about a week, as the wax evaporated and left behind a now hollowed-out cavity, into which you could pour bronze or, as the case might be, brass, or even aluminium.

What I eventually figured out was that there was a melting furnace down in the basement of The Sculpture School, where you could melt rubber so that it could be used again, as could be done with glue-moulds. This involved the use of a material that was called "Vinamold", PVC rubber, which melted at a temperature of 180° Celsius. Palle had been using Vinamold a few years earlier, but he now claimed that doing so was fraught with difficulties. The rubber was so hot when you poured it that air pockets, close to the surface of the plaster, could potentially burst from the heat. Moreover, a few years earlier, Palle had come to learn that that the vapours that were emitted when one was busy melting Vinamold were highly carcinogenic. This made him angry, especially because he was of the opinion that the company had known about this danger and had kept it a secret for many years. Palle told us that stucco workers generally became very old, and often lived for more than 90 years, while granite stonecutters rarely lived for more than 60, and this was because granite dust, and also cement dust, have a particular molecular structure that can give rise to silicosis (also known as miner's phthisis, grinder's asthma and potter's rot), whereas lime- and plaster-dust possess a different kind of molecular structure that the body can tolerate more easily. Of course, you must always work in a way that does not give rise to an unnecessary quantity of dust.

As things came to pass, Palle did not make it to the age of 90. At the end of my first year of study, in June 1980, Palle was hospitalized. Some of us, his students, went to visit him at Gentofte Hospital. At that time, he did not yet know what was wrong. A little while later, Poul Holm Olsen returned from a visit with Palle in a profoundly depressed frame of mind: Palle had evidently been told that he was suffering from a galloping lung cancer, and that there was nothing that could be done. Not much time elapsed before Palle passed away. I was profoundly unhappy and couldn't think of anything but all the knowledge and experience that vanished with him and of his wonderful way of sharing and disseminating this knowledge and experience. It seemed so utterly meaningless that a person who lived so meaningfully, by sharing and propagating his talents, could simply be heaved away from life in this way. I found myself moving around inside his fine workshop and doing my very best to keep it in order, as well as he used to. There, I found many plaster piece-moulds that Palle had made – a whole mystery of small plaster pieces that fit neatly into one other – and I tried, myself, to make similar moulds.

Sandor Perjesi —— The following year, we had a substitute teacher, Sandor Perjesi. Sandor had come to Denmark in 1956, as a refugee from Hungary, and had previously worked in Hungary with sculptors and stucco workers. In Denmark, he was educated as a stucco worker at Victor Moth's workshop at Toldbogade 9. In 1960 Moth moved his workshop to Lindgreens allé 6, at the same time as Moth himself was employed as a teacher at The Sculpture School.

Sandor Perjesi acquired Moth's company in the late 60s and bought his house with all the moulds and plaster models of classical sculptures. When I met Sandor in 1980, he was about to hand the house over to another stucco worker, Per Thostrup, who some ten years earlier had taken over the stucco workers' firm, Agnbak Stuk, a company that had been founded by another stucco worker, named Petersen, who actually changed his last name to "Agnbak" solely for the purpose of appearing first on the roster of stucco workers in the phone book.

Agnbak Stuk —— In October 1981, I commenced three years of apprenticeship with Per in Agnbak Stuk on Lindgreens Allè. Every day, I rode my bicycle from Østerbro to Amager. At around half past seven in the morning, we breakfasted on cups of coffee and slices of bread. From then on, we worked until 4 o'clock PM, at which time I rode my bicycle to the Academy and went about working with my own sculptures until late in the evening. And then, after this long day of work, I would ride my bicycle home to Østerbro. Many of the assignments I was sent to work on as a stucco worker's apprentice, under Per Thostrup on Amager, involved repairs that needed to be made inside small apartments in Nørrebro. Typically, some of the piping had been altered and some segment of the stucco cornice was ruined and thus had to be formed again. Typically, we were assigned to take down a piece of the stucco cornice: it might have split into a number of fragments. Back at the workshop, we then placed the fragment-pieces in a basin of water, rinsed them clean of paint and white-coloured lime, and put them on the radiator. They were dry the next day, and now the pieces could be glued together. They were then set into a mould, which was filled with bone-glue. When the glue had cooled the next day, we had a flexible mould, inside which one or two cornices could be cast. Then we could glue the pieces back into place, using plaster of Paris as the adherent.

It was at the beginning of the 1980s that interest in stucco started to be on the rise again. During the 1960s and 70s, a great many stucco ceilings were destroyed or hidden away behind (and above) lowered ceilings.

However, we were also entrusted with a large assignment, inside a large hall, situated in the house at the back of Amaliegade 15 in Copenhagen. Musical instruments and flowers tied with ribbons had been modelled, sometime in the nineteenth century, in every corner of the room. There were also large baskets with flowers on each of the long sides of the hall, and the room's mouldings were garlanded with flowers. Everything had been modelled in plaster. In the 1960s, at a time when a number of small offices were to be installed inside the hall, most of the stucco was destroyed. Only one of the long sides of the ceiling remained intact. We were entrusted with the task of re-modelling the rest.

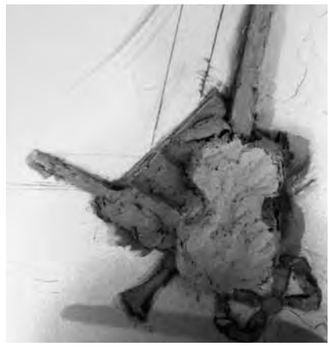
Another assignment was the pediment, the triangular gable, of a classicist house situated across the street from Frihedsmuseet [Museum of the War Resistance] at the end of Amaliegade. Most of the roof construction had to be replaced. The relief on the triangular gable had been modelled in lime-mortar at the time the house was built at the end of the eighteenth century. It has been said that the eminent sculptor Bertel Thorvaldsen was the man who executed the relief, after a sketch created by a painter. We made a plaster mould of the relief. Then we prepared a plaster cast of the entire relief at the workshop. We could then continue modelling this new plaster cast. Finally, we could make bone-glue moulds and piece-moulds on the plaster model.

For the glue mould on the middle part of the relief, which was made as a capsule mould, we melted approximately 40 litres of bone glue. The glue mould was prepared – first – with linseed oil varnish, and – then – smeared with lubricating oil, so that we could cast the relief in concrete, in three large sections, which were then lifted into place by a crane and then screwed tightly in place with stainless steel bolts that were set into the freshly-mortared triangular brick gable.

We were also entrusted with doing a job in the borough of Vesterbro that involved working with a completely stuccoed ceiling, where the client really wanted to have two Cupids in round reliefs, which I was asked to model.

On the neoclassicstic house on Amaliegade 49, a triangular pediment shows a relief that possible has been made by a young Thorvaldsen, in the end of the 18' centurary. In the workshop we modeled the plaster cast of the frontispice, as it had been worn through the time.

Photo from the stucco workshop Agnbak stuk at Lindgreens Allé 6. Casting of plaster cows' heads, for butcher shops.



We modelled the musical instrument directly onto the ceiling with a mixture of lime-mortar and plaster. When this material hardens but is still moist, it's easy to carve and scrape away from.

On the somewhat rough cores, we modelled the figures up with the same mixture of lime-mortar and plaster, mixed up in the form of a weak plaster; we didn't apply this mixture until it had the consistency of whipped cream.

Per was of the opinion that the Cupids I had created looked a little too serious. So every time he walked past, he puckered up his lips at the one of them. What Per wanted, I guess, was that this Cupid should look a bit more naughty. I toned down the smile just a bit. I didn't think that it looked serious enough. Then Per came along and puckered up his lips again, and we just continued bantering back and forth in this way. But in the end, it turned out all right, I'm happy to say.

Poul Holm Olsen —— On October 1, 1984, I started my last year of study at The Sculpture School. Since I had skipped the Basic Education Module (ordinarily, for most students at The Royal Danish Academy of Art, this was the first two years of study), I had only been studying for four years at the academy. For this reason, I decided to apply for one extra year of study: what I was hoping to accomplish was to carry out a model study in life-size, working from a living model. Willy Ørskov had just completed his period of service as a professor. So the only teacher at The Sculpture School that year was, in fact, Poul Holm Olsen, who did everything he possibly could so that we students would have a fruitful year of study. Poul also took care to see that I got my own studio and my own model. Poul showed me how to make an iron armature in one-inch iron pipe for making a model study in life size. For his own part, Poul had learned to do this back in the 1940s, from the sculptor William P. Larsen (1884-1961) at The Sculpture School. We did not have anybody at The Sculpture School who was able to offer instruction in plaster casting. For this reason, many of the other students came along, asking me whether I could help them with their projects. At a department meeting, I declared that I was not happy about the prospect of spending my final year of academy study helping my friends without being compensated in any way for my labours. Poul then chimed in that I could be paid for 10 hours every week, and that I could have my own telephone and my own office. One year later, when Bjørn Nørgaard became professor, the position of associate professor in plaster casting was posted. And on December 1, 1985, I became officially employed, and I subsequently managed to work together with Poul for several years.

Poul was a different kind of person than Palle: not entirely as outspoken and candid. However, the more Poul and I spoke together, the closer friends we became. And I came to discover that Poul had an extensive knowledge about the sculptor's profession, and he told me a lot about the teaching that had been going on at The Sculpture School. Poul was the son of a fisherman from Holbæk and started his apprenticeship as a painter at the age of 14. Later on, he worked in the advertising branch. By and by, he became very interested and absorbed in art. At the age of 27, he was admitted to study with Professor Einar Utzon-Frank at The Royal Danish Academy of Arts' Sculpture School. By that time, Utzon-Frank had been the professor for thirty years!

Very quickly, Poul Holm Olsen became the assistant on several of the teachers' projects. Then he also started to teach. One of the teachers with whom Poul was very pleased was Aksel Theilmann(1905-85). At the end of the 1940s, Theilmann was entrusted with an important assignment: the creation of an altar in wood for Hellerup Church. And Poul was signed on as his assistant. As I have already indicated, I was very fond of Poul, who taught us a whole lot about craft and craftsmanship and also taught us how to experience and how to read sculpture. Poul taught us about the almost architectonic aspect of sculpture, and he also taught us that he we really ought to be able to move beyond this and discover the spiritual aspect, the inner soul-content of the artwork.

There was something refreshingly unsnobbish about Poul's view of art. He was truly searching to find the message that one individual, as an artist, can pass on. As a master-craftsman painter, he was, of course, very interested in crafts and craftsmanship, and especially in the craftsmanship that was necessary for bringing forth the artwork's expression: the affectionate and scrupulous treatment of the material, no matter whether we're talking about the most sophisticated *cire perdue* bronze casting, about ordinary ceramic pieces, or about an altogether simple wooden figure, created someplace in Africa.

Poul also helped me in such a way that I was able, at last, to complete a model study in full-scale. He showed me how I could make a full-size armature-drawing: this was not supposed to be worked up in the manner of a perspective drawing but rather as a technical drawing, viewed from the front and from the side. And by following the dictates of such a drawing, an armature could be bent in 1 inch (25 mm, in the interior diameter) iron pipe, which would then be welded firmly at the bottom onto a square-shaped iron plate (measuring around 10 x 10 cm), with holes in each of the four corners, with the result that the armature could then be bolted firmly to a wooden plate with two or three layers of boards, nailed together in crisscross fashion.

Sculptor and associate professor Poul Holm-Olsen (1920 - 90). Poul was also a collector of Asian and African art. He eventually donated his large collection to the Holstebro Art Museum.

In august 1984 I finished my I apprenticeship as a stucco craftsman at Per Thostrup's workshop, and was accepted as a stucco journeyman by performing a journeyman test judged by the two stucco masters Helge Carsten Jensen and Herluf Carlsen and the two stucco journeymen Anker Nielsen and Aage Leif Nielsen.

In response to the situation that some students wanted to make reliefs, Poul prepared a table illustrating the various types of relief, a subject about which he had been taught, back in the mid-1950s, at the École National Supérieure des Beaux-Arts in Paris. There are the reliefs where one etches faintly, and right onto the surface. This is what we often see in Egypt, where there are faintly etched reliefs, with very low altitude, namely in the *mastabas*. Then there are the obelisques, where creatures and hieroglyphs are carved right into the stone, and notched below the surface. This gives rise to a fantastic effect in the colossally intense sunlight.

Poul warned us against working in the way that many beginners do, beginners who do not understand anything about the relief, he called them "cheese admirers". They think that a relief is a rounded figure, sliced down in the middle, as with a cheese-cutting wire. This means to say the relief itself, that which one actually sees, only moves from the one half to the other.

However, in the successful reliefs, the very fact that that the figure recedes inward – inside and behind the innermost plane of the relief, i.e. inside and behind the relief's bottom – is precisely the point. Accordingly, the figure becomes round and plastic. The figure moves inward, so that the innermost focal point (the outermost points of a spatial form) will emerge behind the base of the relief. Or, to put this more correctly, this is certainly the way you experience the relief! The result of this is that the relief is more internally cohesive.

You can also create the figure, seen from above, in an ellipse-formed manner and allow it to cling to the base of the relief, where the innermost focal point is situated. Here, Poul said, the genuine reliefs begin to emerge, those that are the finest.

When you stand in front of the great reliefs, you can sense where the innermost focal point is situated. You ought to be able to sense the figure's form all the way around. Otherwise, you will never be able to make a satisfying relief. Then you might as well be cutting cookies at a factory.

In this way, we can analyse the reliefs. The finest are those inside the Baptistery in Florence: there are golden bronze doors made by Ghiberti, which are perfectly fantastic. They open up inwards, toward the building's interior, on special religious holidays and are consequently bathed in illumination from the side. The reliefs that Ghiberti has made are illusionist. The effect is similar to wandering around in a forest, far out into the landscape, farther and farther out. He created something that is the exception. He has made his own thing, but he has done so in an incredibly effective way.

Poul took us over to the entranceway (lying in extension of the old ropewalk, which houses the two main studio spaces of The Sculpture School), to see reliefs with a number of horses from The Siphnian Treasury at Delphi. Here, there is also a relief's background surface in the interior, so that there is the faint appearance of a horse here, then the next horse in front of this one, and still one more. There are three relief planes in this relief, and the innermost focal point is perfectly distinct. When the sun is shining on this, it fills it out and imparts form to it.

We were also invited by Poul to examine the Parthenon Frieze inside Festsalen [the Ceremonial/Banquet Hall] at the Academy.

We were also entrusted with doing a job in the borough of Vesterbro, where the client wanted to have two Cupids in round reliefs, which I was asked to model.

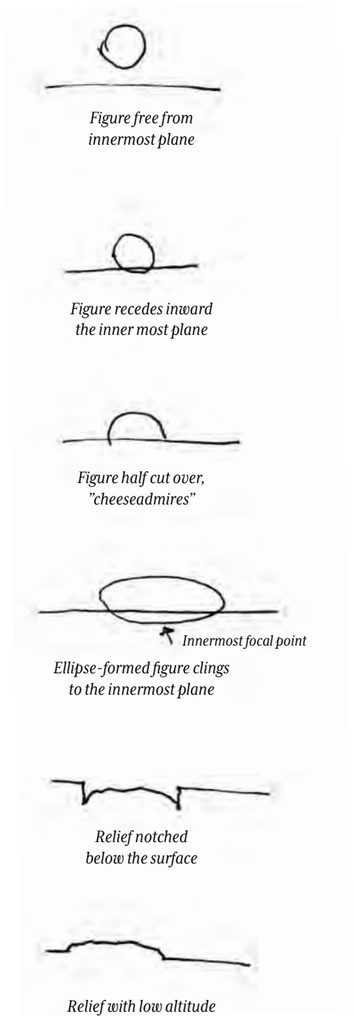


Table of different types of reliefs, seen from above.

Poul also spoke about the Law of Frontality (formulated by Julius Lange 1892) that stands as the antithesis to Realism, which results in snapshots: "In the old Greek-archaic and Egyptian sculptures, everything was perceived frontally. This imparts a more divine expression to the figure. Movement only happened forward and backward, in the same plane, and never sideways. The sculptures are flat, where everything is happening on the surface as relief. The Strangford Apollo [the *Kourus* statue from the island of Anaphe, presently housed inside The British Museum] is cubistically square, and all the musculature reveals itself in what is only faint relief, which is mainly visible in the sidelights that dominate where it now stands in London. This is simultaneously a relief and a sculpture."

Later on, in Greek sculpture dating from the Classical Era, sculpture is to be viewed from all the way around and increasingly takes on the character of being a sequence of snapshots.

Poul told us that we should take notice of the active and the passive. What is so exciting about the human body is, of course, that it's symmetrical. However, the two sides are never entirely identical: the one side is more active, while the other side is more passive. This is something you can see quite clearly when you model after a human being. It is the asymmetricallity that gives life to the figure. You can also see this same tendency in African sculpture. In many African masks, you can notice disparities like this: the one eye can be lifted, and larger, and accordingly more active than the other. On account of this, there's also a greater degree of activity on the opposite side. It's like a musical episode. All that is completely even and equally balanced – that's dead, in the sphere of art. Poul also taught us how to create a patina that can emphasize the artwork's inner soul-content. This is something everybody knows: everybody, that is to say, who has been working in clay and suddenly sees his/her sculpture in white plaster and later on in newly cast bronze. It is a colossal change that happens: an equally great change, indeed, is transpiring in the various colours of the bronze.

Poul was able to encapsulate a good many of these experiences in his book, *Færdiggørelse og patinering af bronzefigurer* [Completion and Patination of Bronze Figures], which was published by Kunstakademiets Forlag.

Claes Baumbach and The Sculpture School – one hundred years ago

There is a large loft space inside the former professor's villa in The Sculpture School's garden. The first things that catch your eye are the skeleton of an Icelandic horse, a number of human skeletons, and parts of different animals – remains left over from the former anatomy school, adopted by The Sculpture School when the anatomy school closed down in 1967 – and when everything was transferred into the possession of The Sculpture School. "But here, the interest is great", as Poul writes on the back of a framed copperplate etching, dating from the 1700s, a faithful copy of Michelangelo's proportion-drawing, which was donated to the Anatomy School by the school's instructor, Hjalmar Friis, who was also an art historian and a veterinarian.

After our eyes had become accustomed to the dim room, we could see all possible kinds of things: old boxes and sculptures. But you couldn't help noticing that water had been dripping into the room. Earlier on, the roofing tiles had been sealed with mortar from the inside, but the roof was no longer tightly sealed. The Academy's building manager, architect Niels Rode-Møller, was poised to find funding for masonry reparations, on the condition that we would be willing to clear out the loft space. Here, there were all kinds of things lying around, left over from the past 40-50 years: old tools, modelling stands, easels, models made in plaster.

And then, suddenly, I chance to discover a very fine plaster relief with a seated angel holding an hourglass in the hand. A label informs that this relief was exhibited, at the Artists' Autumn Exhibition in 1932, by the sculptor Claes Baumbach (1890-1987); and it appears, moreover, that this is actually a plaster model for a relief for a grave for a person named C.L. Schmidt, a grave that was designed by the architect Gunnar Biilmann Petersen. Poul becomes absolutely moved when he sees this piece: "This was our teacher in working with plaster. He was Swedish, like you are. I think he's still alive. Try to find him in the phone book." I find Baumbach's phone number. A high and clear voice, with a distinctly Swedish accent, but otherwise speaking perfect Danish – albeit with all the soft d's pronounced as t's. Claes Baumbach had studied at The Royal Danish Academy of Arts from 1913, at the time that Carl Aarsleff (1852-1918, Professor from 1901) and Julius Schultz (1851- 1924, Professor 1908-18) were professors. Carl Aarsleff lived in the Sculptor's Villa that faces Heibergsgade and had the one studio inside the yellow Sculptors' Wing, almost a villa in itself – the room that we call "the big studio" today. Julius Schultz created, among other things, the conspicuous sculpture of Mercury on Købmagergade, the pedestrian street winding through the centre of Copenhagen; he was the professor for the female sculptors. Schultz had the second large studio, the room that we call the "workshop studio" today. From this studio space, there was access to Schulz's residence – which had been Bertel Thorvaldsen's former residence – by ascending the stairs through the small skylight-illuminated studio and walking into the Garnmagasinet [Yarn Depôt], the small house situated between the Sculptors' Wing and the castle.

Before 1919, the students were taught at Charlottenborg Castle. Women and men worked, albeit separately, from models. The women were taught by Schultz in the studio north of the portal under the Kuppelsalen [Cupola Hall], which later became Aksel Jørgensen's school, and which is, still today, the lithography workshop. The men were taught in the room that we call "the chapel", the hall-sized room situated just south of the portal, that which became a part of Mur- and Rumskolen [The School of Wall and Space] in the 1970s. Back then, no instruction in crafts or craftsmanship techniques was offered to the students. But in 1918, after Utzon-Frank agreed to serve as professor, this situation changed.

Baumbach had been working for sculptors in both Sweden and Denmark before he was admitted to The Royal Danish Academy of Arts in Copenhagen to study. He told me about something that happened when he arrived for the very first time at The Sculpture School. There was a girl who was crying. She was trying to make a relief. But every time she came back to look at the work-in-progress, all the clay had fallen down. "Dear God, isn't there anybody who has shown you how to do this?", he asked her, and went about finding a few nails and some galvanized steel wire, so that the clay could hang in a secure way. And "this," told Baumbach, "said everything that needed to be said about how it was and how it should continue, because after Utzon-Frank took up his post, all was completely changed around, so that craftsmanship was assigned a high priority."

Utzon-Frank had been appointed to serve as professor in 1919, as part of a programmatic attempt to preserve the classical academic tradition at The Royal Danish Academy of Fine Arts. At that time, the average age among the school's professors was running very high, and the academy's rector at the time, architect Martin Nyrop, looked at the new modernist currents in Europe with trepidation and laid out a plan that involved appointing a few young professors who happened to be harbouring classical inclinations. In this way, Nyrop was making his attempt to secure the continuance of tradition at the academy for many years to come.

Initially, the professorship in sculpture had been offered to Kai Nielsen, whose

Christian V's equestrian statue, at Kongens Nytorv, was restored at The Sculpture School in the middle of the 1940s. It had been cast in lead at the end of the 17th century, and over the years, it had collapsed more and more. A mould was made over the original statue and a plaster horse was cast, which was sawn through into several pieces and assembled in a way so that it had the shape of the original statue. These pieces were used to cast a new bronze statue and the equestrian statue was eventually restored to its place on Kongens Nytorv. This process has been depicted in the film, "Hesten på Kongens Nytorv", by Bjarne Henning-Jensen.

popularity was very high at the time. To the invitation, Nielsen responded, "No, thanks" but he encouraged the academy's leadership to ask, instead, his good friend Einar Utzon-Frank, who was even younger than Nielsen, by six years. After thinking it over for a little while, Utzon-Frank said, "Yes", and accepted the professorship.

Utzon-Frank managed to hire a number of teachers who could offer instruction in all the crafts that one ought to be able to master if he/she, as a visual artist, was to work with assignments in the public space. Several of the teachers had actually been among his first students. In collaboration with Joakim Skovgaard, who was the professor at The Decoration School from 1909 to 1921, a Department for Mosaics and Fresco was created, where one of the teachers, Elof Risebye, was put in charge, in the mid-1930s, of carrying out the installation of Einar Nielsen's mosaic ceiling that can be seen from the street when looking up under Stærekassen (lit. «The Starling Nest Box», also called "New Stage" of The Royal Theatre.

Utzon-Frank was aspiring to create a workshop situation just like that which was seen during the days of the Renaissance, where the students would be learning by taking part in large-scale assignments, which either Utzon-Frank himself or other artists had been entrusted to carry out. The students were given the chance to work with their own pieces and they also took part in working with large-scale projects in the public space: for example, Dragespringvandet [the Dragon Fountain], mounted at Rådhuspladsen [Town Hall Square], was created at The Sculpture School, where it was modelled by the Academy's sculpture students (among these being Paul Kiærskou), after a sketch made by Thorvald Bindesbøll and Joakim Skovgaard (who was also a professor at The Royal Danish Academy of Fine Arts).

This is a tradition that has been continued at The Sculpture School. And I have taken part in similar projects myself. In many instances, doing things in this way has generated revenue for the Department that could be used for financing the students' study trips.

What was gathered through all of these assignments was an invaluable body of knowledge and expertise in sculpture techniques that were being amassed at The Sculpture School. Throughout the continuum of these assignments, skilled and engaged sculptors have been employed, in order to ensure qualified and expert instruction in craftsmanship. It was in this way that the foundations for the so-called 'Laboratories' were laid, the laboratories that we still have today at The Royal Danish Academy of Arts'

Claes Baumbach (1890-1987), photographed in Kunsthal Charlottenborg's courtyard, in front of the portico under the Cupola Hall. Baumbach taught plaster casting at The Sculpture School from 1924 until 1962! Baumbach was also trained as ivory cutter and has performed a crucifix in ivory to Aarhus Cathedral.

Grave relief by Claes Baumbach, plaster model shown at Artists' Autumn Exhibition 1932. Model for marble relief for Carl Ludvig Schmidt's tomb at Frederiksberg Cemetery. The grave monument was designed in cooperation with architect Gunnar Biilmann Petersen.

The elongated room in the Plaster Workshop, with the two meter long marble table, which is especially suitable for drawing profiles, has an iron stand that was originally part of the iron armature used for making Christian X's equestrian statue, modelled in plaster at The Sculpture School under the leadership of Utzon-Frank.

Study from the life at Sculpture school 1920, in the Chapel, which was later used by the School of Wall and Space.

Utzon-Frank's equestrian statue of King Christian X, in progress in "the big studio" 1944.

various departments for training visual artists. And it is, among other things, these laboratories that make The Royal Danish Academy of Arts such an unparalleled educational institution for the young artists.

Among other projects that may be mentioned are Utzon-Frank's *Bull,* designed for Kødbyen [The Meat-Packing District, in Vesterbro], in 1933; and the large angel designed specifically for Sondermark Crematorium in 1928.

At this point in our conversation, Baumbach told me how he simply had to reinforce the armature for the large angel that was created for Sondermark Crematorium, as Utzon-Frank had placed significantly more clay on the model than was originally envisioned. We had a very long conversation on the phone, Baumbach and I, on the day I called. And at the end, he said that he was going to ask his son to head over to the Academy and pick up the plaster relief with the seated angel. After some time had passed I called Claes Baumbach again,, and I came to learn that he had just died.

Victor Moth —— I talked a lot with Poul Holm Olsen about all the skilled sculptors and craftsmen who had been teaching at the sculpture school. He told me that Baumbach's successor was named Victor Moth – a qualified and professional stucco worker. Moth had, among may other things, been in the employ of the professor in sculpture, Einar Utzon-Frank, taking on various tasks involving plaster, related to whatever needed to be done in connection with bringing forth Utzon-Frank's equestrian statue of King Christian X, which came to be mounted at Sankt Annæ Plads in Copenhagen. Just after doing this work, Moth travelled to Paris, together with Utzon-Frank's son, Bomand. Here the two men used the money that they had recently earned helping with the equestrian statue, to purchase plaster casts of sculptures and reliefs that they could then re-cast at the workshop they were renting on Toldbodgade 9, where Clausens Kunsthandel was located for a good many years. From this workshop, Moth sold plaster casts, for which there was a considerable degree of interest back then in the 1950s and 60s. There was

The workshop studio at Billedhuggerskolen 1920, where students help in the modelling of the Dragon Fountain; one of the students is Paul Kiærskou To the left of the man at the vice, stands in the dark lab coat Claes Baumbach.

also another shop for plaster casts that was called Stefanis, on Store Kongensgade. In 1960, Moth picked up and relocated his whole workshop to a house in Amager, the address of which was Lindgreens Allé 6. This move was made at the same time Moth was employed to work a teacher in plaster casting at The Royal Danish Academy of Fine Arts' Sculpture School, a position he continued to hold up until the time of his death in the early 1970s. At the end of the 1960s, Sandor took over Moth's company and actually bought the house, including all the fine moulds and plaster models.

The Sculpture School – a papal palace?

—— In a newspaper article, appearing in 1966 in the Danish daily newspaper, *Information,* Willy Ørskov described the Academy as a papal palace, and he specifically mentioned Einar Utzon-Frank, sculptor and professor from 1919-53, as one of those who had lorded autocratically over Danish sculpture and had allowed it to lie fallow. There has been a conception, held by certain people, that The Sculpture School was completely opposed to everything modernist. For my own part, however, I don't think that this captures the essence of the matter.

Sigurjon Olafsson, who studied at The Sculpture School in the period 1928-35, was an assistant that Utzon-Frank employed for many his projects. Olafsson can be seen in Bjarne Henning Jensen's film about the restoration of King Christian V's equestrian statue, a project to which Sigurjon made an important contribution. Utzon-Frank had been very delighted with Sigurjon's work, and this was so even though Olafsson was already working, in the early 1930s, with a modernist idiom, when it came to his own sculptures. At the Artists' Autumn Exhibition in 1936, Olafsson exhibited a sculpture of a soccer player, which was – formally speaking – very simplified: there were no facial features whatsoever. And even so, this sculpture lay in continuation of the highly simplified Jugend idiom that was so much in vogue at The Sculpture School at the time. A little later on, in 1939, Sigurjon created a bit of a scandal in Danish art life by exhibiting a wholly abstract sculpture at Charlottenborg. Nonetheless, Utzon-Frank had a great deal of respect for Sigurjon, who remained one of his favourite assistants all the way until the 1950s.

In the period 1927-32, Henry Heerup studied at The Royal Danish Academy of Fine Arts and actually, for a brief interlude, at The Sculpture School. It has often been said that Heerup was "thrown out" of The Sculpture School. Richard Mortensen recounted things in this way, but when Heerup himself was asked whether he was "thrown out", he responded that he really did want to model – that he really wanted to make sculptures after a living model. But when, from time to time, he brought along his own materials, such as wax, steel wire, wooden pieces, etc. – materials that he used out of considerations of thrift but also because they were inspiring to him – his fellow students gave him such strange looks that he, after a short time, felt like leaving The Sculpture School. In the years that I have been teaching, I have seen similar situations: a group of students harbouring the same attitudes can sometimes crystallise around a given professor, and such a group can frequently appear to be exclusionary. But I don't think that this is necessarily negative: on the contrary, I believe that, in the case cited above, it actually played a role in forming and furthering Henry Heerup in his capacity as a sculptor. The fact that he regarded himself as facing down a classical tradition, where one works primarily with a pure form in clay, only served to strengthen Heerup's own signature conception of sculpture.

Ib Braase studied at The Sculpture School in the period 1949-54. At one time in the 1990s, Ib was at the school, telling the students about his life, his art, and his days of study with Utzon-Frank, who had given Braase a positive response to the stone figures that the student Braase was creating in The Sculpture School's garden at the time.

In 1995, me and my wife, Tine Hecht-Pedersen, moved into a studio house in Lyngby and became neighbours to Bent Sørensen and Sigrid Lütken, both of whom had studied at The Sculpture School in the respective periods 1944-47 and 1936-45. Both of these artists had taken a classical education at The Sculpture School. They were both delighted to hear that we had been modelling from a living model.

The School of Wall and Space, formerly known as The Decoration School

—— Bent and Sigrid also spoke about Elof Risebye (1892-1961), a humble man whom they had spotted kissing the door handle of The Decoration School, where he had, by and by, become the professor. Elof was a very good painter, who had studied under Joakim Skovgaard. He had helped his teacher with many of his projects, including an enormous mosaic in the apsis inside of Lund's Cathedral. He also participated in the restoration of Jørgen Sonne's frieze at Thorvaldsen's Museum. Moreover, Elof Risebye was openly having a relationship with one of Utzon-Frank's former students and trusted employees, Paul Kiærskou, back at a moment in history when having such a relationship was still illegal under the statutes of Danish law; this story is also interesting in light of

Puppet head depicting Victor Moth. It was a part of a traditional puppet theatre play about the professors, teachers and students students made for a christmasparty 1963. The ceramist and sculptor Hanne Erlandsen who was a student at that time told me that Victor´s puppet doll was made by the sculpture student Inger Robertson, that they called Mrs. Robertson, as she at that time was in her 60ies.

Granite sculpture by Ib Braase photographed in The Sculpture Garden, reproduced in the Royal Danish Academy of Fine Arts' Annual Report 1949-52, where Utzon-Frank writes about what has happened in these years.

Domenico Inganni built a fantastic house outside Stockholm, with ornamentations in frescos and mosaic work .

the fact that Utzon-Frank was considered to be very conservative.

After Risebye's death, the name of The Decoration School was 1963 changed to The School of Wall and Space. The newly-renamed department took over the rooms in the castle that had previously been used by The Sculpture School, while The Sculpture School took over the rooms that were previously used by The Decoration School, including one huge room in the ground floor of the exhibition building, with a very big window that faces The Sculpture Garden.

In 1963, Jørgen Bruun Hansen (1927–92), was appointed and employed as an associate professor in mural techniques. "Jørgen Murer" [the Danish word 'murer' means bricklayer], as we called him, was a trained craftsman, but he was also a poet and a visual artist. The very thought of recruiting Jørgen for the job was actually tied in with the objective of bringing more modern techniques into the school. At the same time, under the umbrella of Mur og Rum [The School of Wall and Space], a Laboratory for Plastics, headed by Bertil Sjöberg was set up, as well as a ceramic workshop headed by Kirsten Christensen. These were all teachers with whom I was delighted to work during my days of study at the academy.

Throughout the course of many years, Kirsten had managed to establish an amazing workshop in the room situated to the left of the portal, right where The Sculpture School once offered a space for making model studies – in the hall-sized room that is called "the chapel" today. Kirsten had her own workplace next to the kiln, with a one-square-metre table made of plaster, where she would create her own reliefs.

In the two adjoining rooms, Jørgen Murer taught. Here was a very high wall, white-washed in coarse mortar, where you could make mural pieces directly on the wall. Jørgen taught me a lot about concrete and fibre-reinforced concrete. But he was also interested in mosaics and in the ancient fresco techniques. He had studied fresco techniques in Italy, but he had also studied with Domenico Inganni, the stucco worker and sculptor who had come to achieve nothing short of a legendary status in Sweden. Domenico hailed from the Intelvi Valley in Italy, situated on the border to Switzerland.

Immediately after the end of the First World War, Domenico travelled, with his uncle, to Gothenburg in order to create stucco ceilings inside movie houses, somewhat along the lines of what we can still see today at the Grand Movie Theatre in Copenhagen. As things came to pass, Domenico thrived in Sweden and continued living there for the rest of his life. He assisted Swedish artists with activities like casting in plaster, creating fresco decorations, making mosaics and casting in bronze.

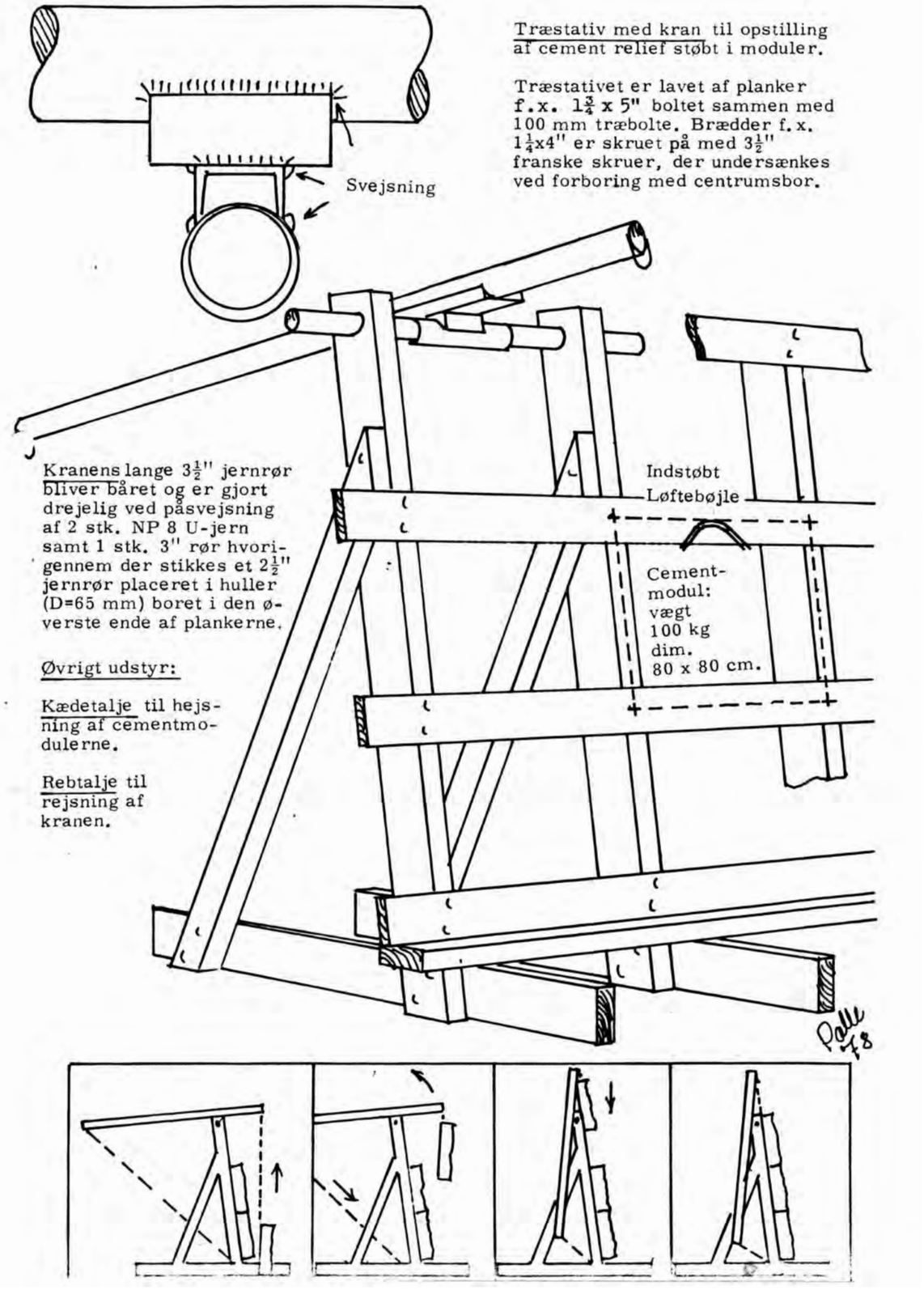
I had met Domenico, in Gothenburg, back at the time I was studying at Houvedskous Kunstskole in the late 1970s. Jørgen Murer spoke frequently about Domenico and his technical prowess. Jørgen died in the early 1990s, and no new lecturer in mural techniques was employed to take his place. So, I took over much of this area of responsibility. Then I reached out to Domenico's son, Luiggi Inganni, who had been teaching in fresco and mosaics for many years at Konstfack in Stockholm. Luiggi came to Copenhagen and held a number of courses in fresco and mosaic for us.

Some reflections on the education of sculptors —— Over a period extending more than 40 years, I have been a part of The Sculpture School. That is about one-seventh of The Royal Danish Academy of Fine Arts' history, which spans 265-years; that is to say, I've been here for one-seventh of a little more than a quarter of a millennium. The art academy has always been situated in the very same place. And, to a certain extent, it has also had pretty much the same organization. But in many ways, it has also embodied and played host to a great deal of development and has seen a great deal of change – a veritable admixture of conservative languidness and groundbreaking innovation.

It was some 2500 years ago, in ancient Greece, that the very notion of 'The Academy' arose, in a small forest outside Athens, where people convened in order to discuss art and science. And to me, The Royal Danish Academy of Fine Arts' Sculpture School is just this: not only have I been privileged to pass along the knowledge. As much as I've been able to do this, I've also been able to devote myself fully to the knowledge, and I have been privileged to take part in developing and propagating methods. At an art academy, typically, instruction in craftsmanship and artisanship is not part of a steady curriculum. But it's not enough to possess technical knowledge. No, it's rather the case that each and every individual artwork calls for its own specific method. What is of great importance is which specific method should be employed in order to bring forth a sculpture that depends on both the content of the artwork and the artist's intentions. 50-100 years ago, there was some degree of consensus about what kind of craftsmanship-related skills a sculptor was supposed to possess and master. But, then again, back at that time – and throughout the entire history of sculpture – each and every work of art has been calling for a choice of method, a choice that needs to be made with a great deal of forethought and adaptation, and today there is such a wide variation in methods that it is difficult for every sculptor to be familiar with all of them. This is why it has been both complex and broadening for me to be teaching at The Sculpture School.

A Sculptor's Manual

Concepts, materials,
methods and tools



This is the only drawing of Palle Damsholt I have found. A very informative description of a wooden stand with crane for erecting cement relief in modules, where the 100 kg heavy cement modules could be lifted in place. The wooden frame was used, at the Artists' Autumn Exhibition 1978, to display a relief by the sculptor Vibeke Glarbo.

A Sculptor's Manual.

Concepts, materials, methods and tools

In the present book, I have focused on the stories of the people that I have met at the Academy and on the experiences that I have become a part of. My aim has decidedly not been to make an exhaustive review of how I have taught through all the years. Rather, I have inserted some examples of my teaching and examples of how I have made use of stucco- and sculpture-methods in my own works, so that they enter into the story as exemplifications of the methods I am describing. And still, what we have, on this account, are but a few selected fragments from many years of activity, which have been pieced together here.

There are many who are scared that old-fashioned craftsmanship is in the process of disappearing. But I am firmly convinced that as long as there are sculptures and as long as there are sculptors, we will always be able to rediscover and re-develop the methods of sculpture.

Palle Damsholt used to tell us, in his own very humble way, that there are many ways to work with plaster. He could, of course, show us one of these ways of working but there were certainly also many other ways that were just as good.

Through all the years, I have done my very best to do my teaching in this spirit, and it is in this spirit that I have written this book.

In fact, my work with bringing forth this book started already back in 1984, when I – operating on my own initiative – started to make explanatory/clarifying drawings for Palle Damsholt's compendium, entitled "Formning og Støbning" [Moulding and Casting](as the present book is titled), which was published by The Royal Danish Academy of Fine Arts in 1977.

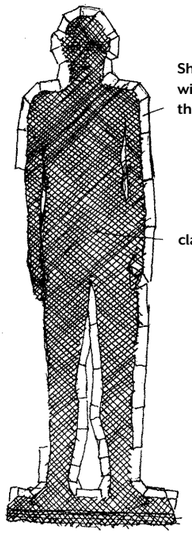
Palle's compendium was like a series of fact sheets, with terse and concise descriptions of the different working methods; these had been ordered in a very systematic way. His compendium was meant to be a supplement to his teaching.

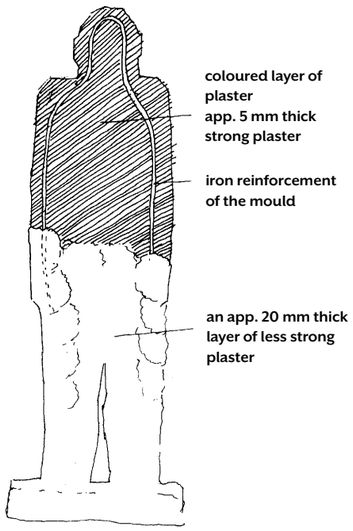
I felt inspired to make something that was even more instructive.

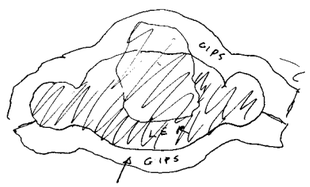
Certain parts of Palle's original text have been retained here, and as I subsequently started to add more and more text, I have constantly tried to keep what I have to say in Palle Damsholt's precise and concise language.

What I am hoping to accomplish in writing this book and in having it published is to make my contribution to preserving knowledge about the time-honoured artisanship and craftsmanship, and I am addressing my message to those who are driven by an urge to keep these qualities alive.

Waste-plaster mould on a clay figure







Seen from above. In the one half-part of the mould, the shape ought to facilitate the eventual removal of the mould-piece.

The sheet metal is inserted directly into the clay figure, just where the mould is going to be separated into pieces. In the one half-part, for example the rear of the figure, the shape ought to facilitate the eventual removal of the mould-piece.

In connection with splitting up the mould, one must keep in mind that the clay has to be dug out from the mould and also that it has to be possible to remove the reinforcing material. Another thing to be kept in mind is that it has to be possible to apply the impregnation and the release agent. If there happens to be a particularly complicated spot for accomplishing all this, one can insert the sheet-metal partitions so that they create a lid, an opening in the middle of a mould-piece. At least one of the mould-pieces has to contain the complete height of the figure. The nuts and pieces of iron are covered with clay. The surface around the figure needs to be lubricated with an application of oil, stearin/rapeseed oil.

In water with coloured powder, the plaster is sprinkled around. After being stirred, this mixture is applied to the figure in a layer of approximately 5 mm in thickness.

When chipping the plastermould away with a chisel and a wooden mallet, the coloured layer will show you how close you are to the sculpture's surface.

Round iron bars, in a thickness of 5-8 mm, are bent and adjusted/ trimmed in length, as reinforcement in the mould-pieces.
A plaster that is less strong is applied in a thickness of 2 cm, with the result that the iron is also covered.

Large moulds are furnished with wooden armatures made of wooden battens. These are plastered firmly with canvas. The plaster is then shaved away from the edge of the sheet metal. Thereafter, key marks for locating the points of separation are cut into the plaster. These are carved in such a way that they run transverse to the edge of the sheet metal and intersect with the plaster. Water is poured along the partition. With a *ziehklinge* (pulling blade), stuck right into the edge of the sheet of metal, the part of the mould that is easy to remove is wriggled – or nudged - off. The clay is dug out of the mould.

With a soft brush and water, the last remnants of clay are carefully rinsed away.

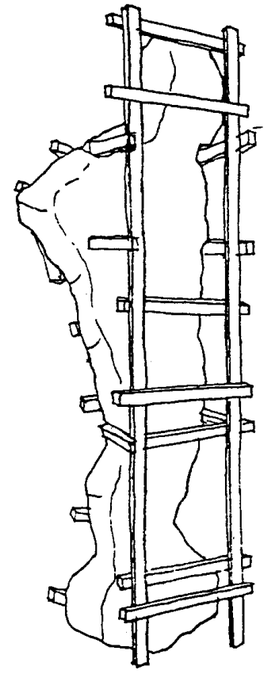
Piece-plaster mould on a moist clay figure —— This application works best with figures that have shapes that are very simple and relatively uncomplicated by too many surface irregularities. The mould is separated into three or more parts, plus a top piece to rest upon. A sheet of metal is stuck right into the clay figure, right where the mould is to be parted up, and the procedure is very much the same as it is for the waste-mould. The aim of using this method can either be that one wants to preserve the moistened clay figure or that one wants to make several castings. However, it will hardly be possible to cast more than three or four examples in the mould. There is also the problem that the re-assembly of the mould is, by nature, fraught with difficulties.

Sheet metal is inserted in the clay.

Plaster tossed upon clay

Opening the mould

The clay is dug out of the mould



Large moulds are furnished with wooden armatures made of wooden battens, which are firmly plastered with canvas.

■ **Splitting up a mould with cord**
Dip a strong, thin cord in water until it is completely saturated with moisture. Once you have laid the first 2-5 mm-thin layer of plaster onto the figure, and once the plaster is about to be firm, place the string right where you want to have the partition. As you're applying the next layer of plaster, refrain from spattering the plaster mixture on top of the string; instead, wait until the plaster becomes as stiff as whipped cream, and build up an edge over the string with a single stroke. When you can sense that the plaster is completely firm but not actually hardened, start to pull on the cord. Hold the other end securely, so that the cord does not simply slip away. Now you can tear open a rift that is commensurate with the thickness of the string, slightly less than 1mm. If you pull on the cord too soon, you'll run the risk that the two sides of the split will coalesce. After the plaster mould has hardened completely, cautiously wriggle your way down into the split, with a ziehklinge, so that it opens up and so that the innermost layer of the desired partition will give, and snap. If you are careful, you can assemble the parts so that you won't have any burrs whatsoever in the split.

Casting plaster in the plaster-mould

■ **Release agent**
Soapy water/oil. The mould needs to be moist. Preferably, it will be thoroughly wet or covered with stearin/rapeseed oil; if one elects to use stearin, it is advantageous that the mould be shellacked beforehand.

The moistened mould is covered with soapy water, to which a bit of oil has been added. A little while later, absorb the excess solution – use a soft brush for doing this. The mould should now be completely moistened. In order to be certain about this, spray the exterior of the mould with water, so that the soapy water will be pushed all the way out to the surface of the interior side of the mould. Another method of making sure that the mould is sufficiently non-absorbent is this: apply shellac to the interior of the mould. When the shellac is dry, smear the mould with stearin/rapeseed oil. If it is a small mould, which can be lifted by hand, gather it together with strips of canvas and plaster. Small statuettes can be cast, in all their mass – and reinforced with (plaster-dipped) galvanised steel wire or round iron bars.

Larger moulds can be hollow-cast, with two or three portions of plaster. One or two layers of canvas strips dipped in plaster can also be used as reinforcement.

For the first layer, the plaster should be tossed with the hand. Canvas pieces of suitable size are dipped in plaster and pressed onto the first layer of plaster. The mould-parts are assembled from the inside with burlap dipped in plaster. The last section is to be glued on/pressed down into the plaster, which has sufficiently hardened until it has the consistency of whipped cream.

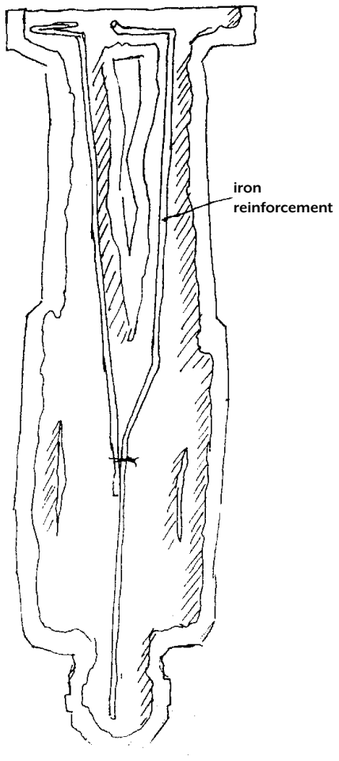
Medium-sized moulds, e.g. portrait heads, can be cast by assembling the mould properly, with plaster and burlap. Then mix a very strong gypsum (much gypsum in the water), fill the mould up to approx. a fourth part, and turn or roll the mould around so that the plaster spreads out into every corner of the mould. This is repeated until the plaster begins to thicken as whipped cream,

Then you place the mould, for a brief moment, the right way so that the plaster does not accumulate furthest up in the crown of the head.

Shortly thereafter, preferably before the first layer has become hard, the mould is filled with a new mixture of plaster, approx. another fourth part up. This gypsum must be somewhat weaker (slightly less plaster in the water). Turn the mould around again so that it is spread all over inside, keep on doing this until the plaster becomes thick as whipped cream, and you can finally build a stronger edge, at the opening of the plaster mould. If you do this correctly, you can cast a portrait head like a app. 10mm thin shell. But it requires a lot of experience. Often the shell thickness becomes thinner in the neck where the plaster runs out and in during the casting. The second round of gypsum should be slightly weaker, otherwise small cracks may appear in the outer layer, because the stronger the plaster is, the more it will expand(up to 0.5%) during the hardening process

If you can get your hand inside the mould, then you can, with advantage, strengthen it with burlap dipped in plaster.

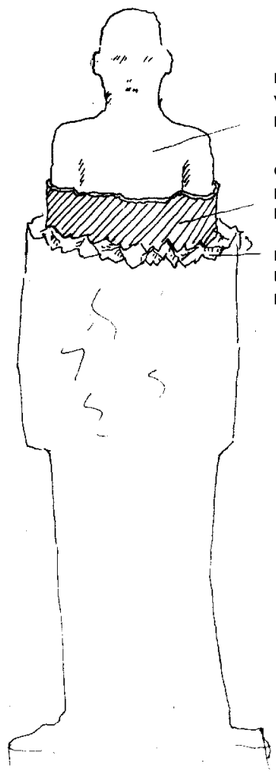
Large moulds are to be cast in pieces. Smear the edges and key marks very carefully. The first time around, the plaster can be tossed onto the figure by hand or with a long-bristled brush. The second portion of plaster must be a little less strong and should also be tossed onto the first layer before it becomes matte. Burlap, made from jute, or some similar material with large mesh (preferably 5 mm holes, so that the plaster will fit in), is sheared into pieces of the appropriate size, then dipped and pressed into the plaster. Remember to scrape the edge. It needs to be cleansed of plaster, and completely! The mould is then re-assembled with strips of burlap and plaster. The assemblies inside the mould are then covered, with plaster and burlap. After it has hardened, the mould can be chipped away with a chisel and a wooden mallet. Begin along the line of partition. After doing this, carve the iron pieces free from the mould. Save the fragile spots on the figure for last.



The mould is smeared with stearin/rapeseed oil.

First time plaster is tossed on by hand. Canvas pieces of appropriate size are dipped in, and pressed onto, the plaster. The mould parts are assembled from the inside with burlap, dipped in plaster. The last section is glued on/ pressed into the plaster which has hardened sufficiently, i.e when it has the consistency of whipped cream.

The figure is chipped free.



Plaster casting in China —— In September 2006, I was fortunate enough to enjoy the possibility of working at CAFA, the Beijing Art Academy's monumental workshop at Xiaoying, situated on the Third Ring Road.

The workshop had the atmosphere of an old Parisian sculpture workshop. The walls were covered with planks so that you could make large reliefs in clay directly on the wall. Large-scale commissioned assignments and immense monuments were being created, frequently by groups of sculptors who were generally being supervised by an senior professor.

They were working rather quickly. Before they started modelling the figures in large sizes, they photographed models wearing the correct clothes, as these had been set up according to the pertinent sketches. Then the sculptors would go about modelling, with the photos in front of them.

Together with his assistant, a Mongolian sculptor named A Biao executed a six-meter-high sculpture of acrobats, standing on top of each other.

Working next to me was an elderly sculptor, Liu Huanzhang(1930-), who was modelling a seated portrait, which was about 3-4 meters tall, of a general wearing civilian clothes, with a sun hat in his hand, so tranquilly and fine, and I came to learn that this sculpture depicted the renowned general, Ye Jianying, who led the conspiracy of generals and Party elders that overthrew The Gang of Four after Mao's demise.

For my own part, I was busy modelling a sculpture of a family of fantasy animals sitting on a stone, about one meter in height. On the Monday, the assistants made an armature and started to build up my sculpture, roughly, in clay. On Tuesday, Wednesday and Thursday, I worked further with modelling the sculpture. On Friday morning at 9 o'clock, two craftsmen showed up in a van and unloaded three canvas bags filled with plaster, one canvas bag full of sheet metal aluminium pieces, one roll of linen fibre, and a bunch of one-meter long strips of wood.

Ten minutes later, they had already split the sculpture into sections, using pieces of aluminium sheet metal, and they started to apply a 4-5 mm thick layer of high-bonding plaster. After doing this, they mixed up an even stronger and thicker plaster. After sprinkling enough dry-plaster powder so that it came all the way up to level of the water's surface, they tossed around some handfuls of plaster and continued to knead it with their hands so that it eventually had a consistency almost as thick as porridge, with the consequence that it could easily be applied in a thickness of 1.5 cm. Instead of waiting until the plaster took on the desired consistency so that the piece could be built up in successive layers, the plaster was applied here in only one layer of suitable thickness, all at once, and what was achieved was a very thin, very strong and very even mould.

In short order – not more than an hour had passed – the entire sculpture was covered with a thin, strong and even layer of plaster.

Then the assistants began to reinforce the mould with wooden strips that were plastered together and fastened to the mould with tow (linen fibres). After two hours of working, they could finally start to open the mould and dig the clay out from the mould. When the mould was totally free of clay, they

The sculptor, Liu Huanzhang, who was modelling a seated portrait, which was about 3-4 meters tall.

dissolved some washing powder in water and sprayed the mould with a flower-atomizer containing the soapy solution. They kept on spraying so that the mould would absorb as much washing powder as possible.

The two halves of the mould were cast as shells. For reinforcement, the assistants used banana leaves with long, brown and rather stiff fibres, which were not so easy to bend around the sharp corners in the mould. The two mould halves were put together and then plastered together from the inside.

The mould was chopped off with the axe-like Chinese vegetable knives, which the sculptors also used when modelling in clay - only for elaborating certain details at the end of the process did they finally take recourse to a chisel and a hammer. The mould fell away in large pieces and there were surprisingly few scars on the plaster casting.

By 7:00 P.M., the plaster cast was completed, and we even had time to share a delicious Chinese meal at the restaurant that was close to the workshop.

One day, I went out to Yuan Ming Yuan, the ruins of the old summer palace, where twelve zodiac animals had once been standing in the middle of the great Chinese/western style baroque fountain, "Dashuifa" (only some of the heads are extant). These animals have inspired me so much, with their naive happiness and their profound wisdom (as I, with my Occidental gaze, regard them).

What can be ascertained in Chinese art are many breakthroughs throughout the ages. However, there is also a continuity, which I find profoundly fascinating.

On the last working day, it was with a feeling of melancholy that I took my leave of the wonderful workshop in Xiaoying.

On my way out through the enormous portal, I smiled at the elderly sculptor, Liu Huanzhang, as he sat at a wooden table with a plaster sketch placed in front of his sculpture.

Waste plaster mould of very large clay model —— I subsequently thought it would be interesting to follow the progress of making the casting, at a sculpture workshop lying outside Beijing, of this very large clay sculpture, measuring approx. 3 x 3 x 5 meters: an enormous recumbent head. It was fascinating to see how the sculptor-craftsmen made some large lids, that is to say, openings in the middle of the upper part of the head, so that they could empty the mould of clay, using these channels, while the mould could simultaneously remain standing in the same place. And then, subsequently, the sculptor-craftsmen would be able to move into the mould, to apply the release agent and then cast it as a shell. In this instance, it was going to be cast as a fibreglass shell. If you simply have to lay very large moulds down prior to casting, for one reason or another, you run the risk of destroying the moulds – that is to say, if they're not reinforced very efficiently. With this technique, one can make very large plaster moulds. Of course, it's not all figures that are suited to this method.

True mould or Piece-plaster mould

A piece-plaster mould is a mould made in several parts, in such a way that several castings can be made.

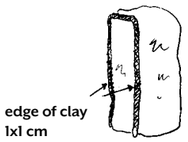
As an impregnation- and release-agent on absorbent surfaces, soapy water/oil can be used. This solution is generously brushed over the entire figure. Then, after some time, the surplus liquid is removed with a twisted brush. Alternatively, one can prepare a thin layer of shellac and use stearin/rapeseed oil as the release agent. On other non-absorbent surfaces, stearin with rapeseed oil can also be used.

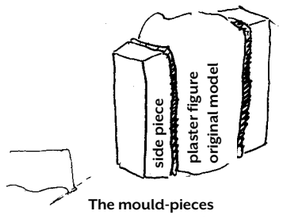
The mould is split up into a few main pieces: for example, a top piece, two side-pieces, a front piece and a back piece. The latter piece can be divided further into smaller units (flaps or wedge pieces).

Rounded iron pieces, in a thickness of 5-8 mm, are bent and adjusted/trimmed in their length, as reinforcement in the main pieces. All of the pieces are removed right after being made, so that any hard edges can be levelled away. Then they are fitted with guide-holes before being attached again. In the places on the figure where the shape is too irregular to be made in one piece, wedge-pieces are made, pieces that have the requisite shape necessary for facilitating the removal of the main piece.(Palle Damsholt)

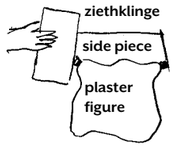
When we say that something "has release", it means that this particular part of the surface of the object(model) has a shape, so that you are able to see every spot of this part of the surface, from one particular vantage- point. It can be a good exercise to use a pencil to draw in an area of the object, and to test how large this area can be when you simultaneously can see all from one particular vantage- point

The term "release" should not be confused with "release agent", which is an oil, soap or stearin mixture or the like which is also necessary for a mould piece to be detachable from the object.

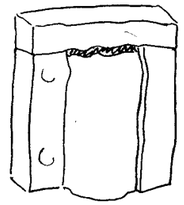




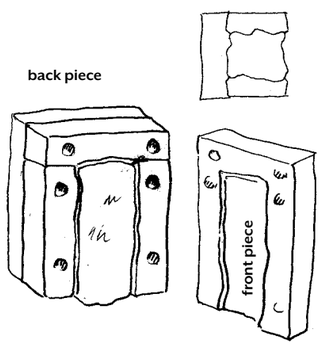
The mould-pieces are removed and cut.



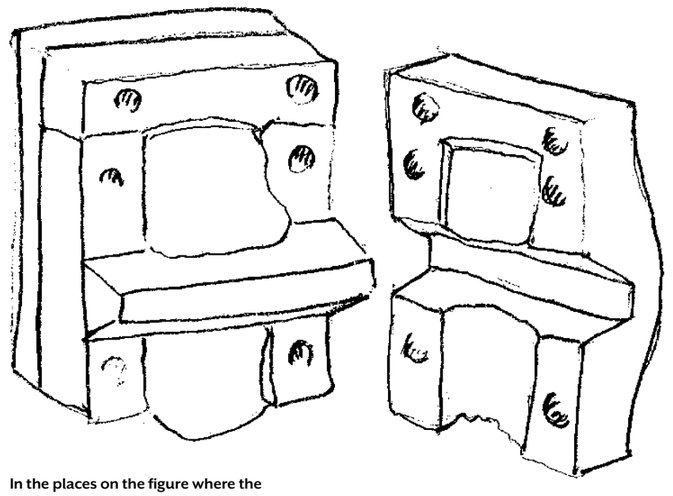
The mould-pieces are successively built up in plaster and subsequently smoothed over with a "ziehkling"(pulling blade) applied in the direction of the clay's edge.



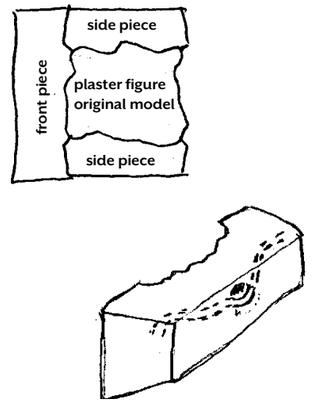
The top piece is successively built up in plaster, applying the plaster towards the plaster figure, which is delimited by the clay's edge. The edges of the clay are smoothed over ...



... as the front- and back-pieces are successively built up in plaster, applied on the side- and top-pieces.

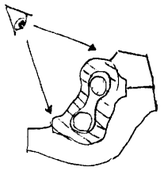


In the places on the figure where the shape is too irregular to be made in one piece, wedge-pieces are made, pieces that have the requisite shape necessary for facilitating the removal of the main piece.



Generally, the eye of a steel-thread is cast into the wedge-pieces, offering the special advantage that later on, during the casting process, through a hole in the main piece, these wedge-pieces can be fastened together with twine.

■ The term "release"
When we say that something "has release", it means that this particular part of the surface of the object(model) has a shape, so that you are able to see every spot of this part of the surface, from one particular vantage- point.



The term "release" should not be confused with "release agent", which is an oil, soap or stearin mixture or the like which is also necessary for a mould piece to be detachable from the object.

The Capitoline Venus —— is a Roman copy made after a Greek original which dates from the 3rd or the 2nd century B.C. it is 198 cm in height. In the 1940s, this exquisite plaster cast was placed in the open portico space under Charlottenborg Palace's Cupola Hall. What happened on several occasions was that the left arm was simply destroyed at times when less well-cultivated persons presumably yearned to see for themselves what Venus might be hiding with her hand. In order to be able to repair the figure in the event that such an unfortunate thing could happen again, Claes Baumbach prepared this fine plaster piece-mould of Venus's arm. In the portico Alos was displayed, the utterly unique Laocoön group, which dates back to the time before the Academy's establishment. Today both plaster casts are on deposit at The Museum of Ancient Art in Aarhus,

"Blue Fluted Skull", porcelain with underglaze, by Jon Stahn (1970-).

"Helle has had enough" porcelain with overglaze, by the artist duo Hesselholdt & Mejlvang, Sofie Hesselholdt (1974) and Vibeke Mejlvang (1976)".

Porcelain casting in plaster piece-moulds —— In 2002, I took part in a very exciting porcelain workshop, in collaboration with Karen Harsbo, who has been teaching for almost a quarter of a century at the Laboratory for Ceramics at The Danish Royal Academy of Fine Arts. Karen had been speaking to a design director from Royal Copenhagen, previously known as The Royal Porcelain Factory, about the need for more contemporary porcelain sculptures.

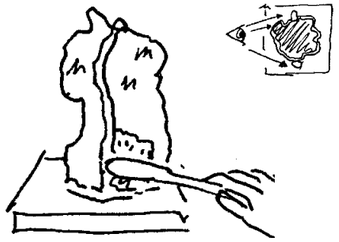
Today, porcelain figures can appear to be somewhat old-fashioned, and it's amazing how very expensive they are. They have enjoyed a high valuation among collectors, but the high price is also bound up with the fact that producing pieces of porcelain in moulds is very labour-intensive, especially because they have to be made in piece-plaster moulds. It is often the case that the figures need to be divided up into several parts so that arms, head, legs and other protruding parts are cast separately and thereafter assembled, retouched and fired at a very high temperature.

The reason why it is possible to make porcelain so thin is that the material can withstand being fired at temperatures as high as 1400° Celsius. The very character of porcelain clay entails that it's "long in it", as the Danish craftsmen are accustomed to putting it, and that it has a tendency to collapse. Porcelain is, quite simply, very difficult to model in, but it does lend itself very nicely to being cast in moulds. The porcelain clay is mixed up in such a way that it is fluid, and soda ash is added so that even if the water content is not high, it will be fluid nonetheless. One pours the mixture into the highly absorbent plaster moulds, and can then decide, depending on how much time passes before it is poured out again, just how thin the shell is going to be. This calls for a piece-plaster mould, made in many sections, since the newly cast porcelain figures are very fragile. However, in this way, it is possible to make lightweight and fine figures that can be glazed so that they take on a very exclusive finish.

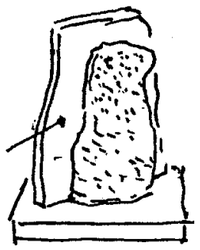
Porcelain figures were developed long before it was possible to make the much cheaper figures in all kinds of plastic materials, and it is probably this that has contributed, also, to the great popularity porcelain has enjoyed.

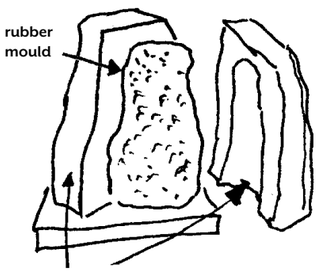
It was very rewarding to me that, for almost a year, I could help 15 students make moulds for porcelain castings and it was fascinating for me that I could experience, at Royal Copenhagen's development workshop, how we could, under ceramicist Bjarne Kielstrup's expert guidance, cast porcelain inside these moulds. All this was happening at a time when the company was still located on Smallegade in Frederiksberg, with thousands of employees. It was like its own little town, where everything revolved exclusively around porcelain.

Spatula-applied rubber-mould with plaster outer capsule (plaster jacket)



The second layer of Vermiculite is applied.





Moistened clay does not need to be treated beforehand. On plaster or other absorbent surfaces, one can use soapy water with oil or, as needed, dishwashing soap as the release agent. Lacquered and non-absorbent surfaces should be treated with wax, dissolved in turpentine.

You can also use stearin with rapeseed oil. But if the surface is too fatty, it can be difficult to smear the rubber on. For many new types of two-component rubber, there is no need for slip. Always make a test first, if you are in any doubt.

The pastose two-component rubber is mixed with a hardening agent and then plastered up, in a thin layer of circa 1-2 mm. Thereafter, one prepares an edge in pure pastose rubber. This edge separates the mould into two or more parts. Remember to make the edge sufficiently wide so that a suitable proper shape can be prepared for the mould, in order to facilitate the removal of each mould piece. You've got to be able to see the outermost part of the edge from some given vantage point.

Later, when first layer is fairly stiff, plaster on a layer of the pastose rubber, which has been combined with the filler material, Vermiculite. First, mix the hardening agent into the rubber. Then, after the rubber and the hardening agent have been mixed very well, mix in the filler material (Vermiculite). Put enough filler in so that you almost cannot see the rubber in between the grains of the filler. This layer does not need to be any thicker than 2 mm. However, at some places, it has to be somewhat thicker, so that there will be the proper shape for facilitating the removal of the pieces. All of the places on one part of the rubber mould must be visible from some given point. With a clean brush or spatula, dipped in either alcohol, dishwashing detergent or soapy water (it's easy to smooth it over with soap, but beware: an additional layer of rubber will not adhere unless one carries out a thorough cleansing), it is possible to smooth out the surface of the rubber in order to attain the best possible shape for facilitating the removal of the elements.

On the following day, a clay-edge, measuring circa 30 mm in width and 10 mm in thickness, is set up around the rubber mould. It has to be placed on the other side of the central line of the rubber edge. If the clay fails to adhere, strike some small nails into the edge. If one is familiar with this routine, the clay edge can be circumvented and one can simply build up

Making the plaster capsule

plaster edges by hand. Then the rubber mould is covered with a layer of plaster, a layer that is about 25 mm thick. It might eventually prove necessary to make one or even both halves of the plaster capsule in several sections. After the plaster has hardened, the one half is loosened. Along the edge of the half that is still attached to the rubber mould, we now draw a distinct pencil mark in the rubber edge. This marks the spot where the rubber mould is going to be cut up with a passe-partout knife.

If the figure has a hole running all the way through it, it's going to be difficult to access it with the knife, so that the mould can be cut up. In such an event, before you apply the rubber with the spatula for the first time, you've got to block the hole off from the one side, with a piece of clay. You can make a track or a mark in the clay that will function as a "lock" between the rubber halves. Then the rubber is to be applied toward the clay. On the following day, remove the clay. Smear parts of the surface with Vaseline, wax or oil. Then apply the rubber – using the spatula – from the other side and across the rest of the figure, as described above. When you pull the two rubber halves apart, it will be easy to separate the sections inside the hole.

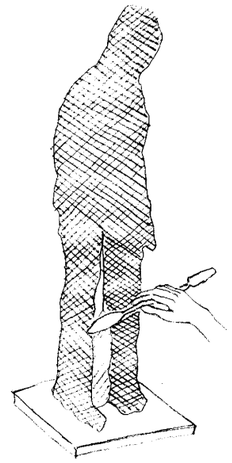
Removing the plaster capsules

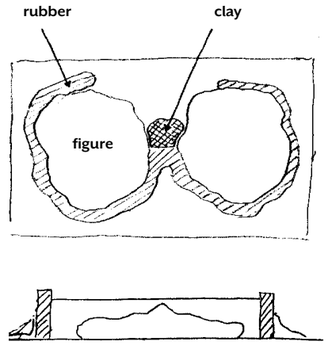
■ Rubber-mould block
The figure (the relief) is placed – or fastened – onto a surface of marble or a chipboard. A frame of wood, clay or zinc strips is fastened around the figure, at a distance of 5-10 cm. The frame has to be at least 5 mm higher than the figure. The frame can be reinforced on the outer side with plaster. The liquid rubber has to be mixed up very thoroughly. Do not use more hardening agent than specifically prescribed, and pour it forth. After the mould has hardened, remove it, and it is ready for casting. If desired, the frame can also be used for supporting the mould.

Preparation:
Clay figure, nothing
Frame, shellac

Release agent:
Clay figure, nothing
Frame, wax /turpentine

Cutting up the rubber mould.





A frame of wood or zinc strips is fastened to the plate surrounding the figure, at a distance of 1 cm.

Spatula-applied rubber mould with lock edge and Jesmonite capsule

In most cases, you cut up spatula-applied rubber moulds into two halves. But you can also model an edge in clay or in plasticine along the line where you want the figure to be split. This is reminiscent of rubber moulds or glue moulds cast in plaster casings, which have been discussed previously. But here, there is the difference that you can prime and fill in the rubber up against a clay edge, where you can make a trail in the clay that delineates a lock edge.

I usually make the clay edge sufficiently wide, approximately 30-40 mm, so that after the first layer of rubber has stiffened, I can make a casing in plaster or Jesmonite. After doing this, I turn the mould around, remove the clay, lubricate the rubber edge and prime and fill in rubber on the other side. On the following day, after the rubber has hardened, you can go about making a plaster- or Jesmonite-casing on the other side. If you are making the casings in Jesmonite, you've got to remember to drill holes through both edges before you open the casings, because by doing just this, while you are tightening the Jesmonite casings with screws and nuts, you will be able to nudge them into an entirely correct fit.

Spatula-applied rubber mould with Jesmonite capsule

When making spatula-applied rubber moulds on large figures, the plaster casings can become large and heavy to wield. Generally speaking, several plaster wedges must first be made before one can go about making a large plaster casing in the full height of the figure. The plaster casing must then be reinforced with strong rounded steel or with a strong wooden armature, as has previously been discussed in connection with making waste-plaster moulds.

Another way of proceeding is to make the casing in fiberglass-reinforced acrylic plaster: "Jesmonite". While you are applying the rubber, make sure that there is release on some suitably large areas. In each of these areas, make a Jesmonite casing-section, which needs to have a collar on all sides. These collars ought to protrude. The collars are made by pressing approximately 20 mm-long, thin nails into the rubber mould along the line where you want to have your partition. Up against these nails, fasten plates, measuring approximately 70 mm in width, that have been cut from milk cartons, with long thin nails on both sides. The cardboard pieces need to be cut and cropped so that they will fit into the rubber mould. At some spots, you can supplement with tape and/or plasticine. After you have placed these plates all the way around a certain area, you can make a Jesmonite shell, using several layers of fibre mats; this shell has to extend all the way up to the outermost edge of the cardboard plates. After the Jesmonite shell has stiffened, remove the cardboard plates and delimit a new area up against what you've just prepared. Right there, where the area in question adjoins the already executed field, lubricate the edge so that you finally get a whole lot of Jesmonite fields/casings with collars that adjoin each other. Before you go about loosening the Jesmonite casings, holes need to be drilled through the collars – at least two or three holes – where two casing parts are going to converge. Later on, when you have to assemble the mould, put screws and nuts into all the holes: in this way, you can assemble the mould correctly. Ordinarily, you will have a mould element in the full height of the figure. With this system, however, you can get the parts assembled so precisely that the shape and the orientation will become completely correct. You obtain a considerably lighter support casing than would be the case if it had to be made in plaster of Paris with a wooden armature made of wooden battens.

Sculptor Hans Pauli Olsen, and his son Elias, helps me making a jesmonite capsule with a method he has developed himself.

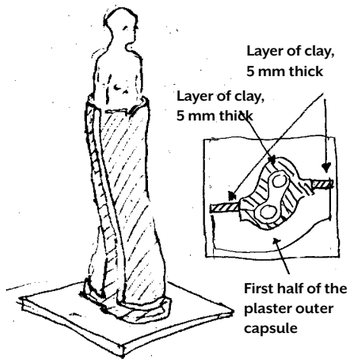
Rubber mould cast in plaster outer capsule (plaster jacket)

For use as a release agent, apply soapy water with oil or dishwashing detergent to the plaster figure. This must be brushed fluidly over the entire surface. The excess liquid must be wiped off with a twisted brush. Small plaster figures must often be moulded standing.
Start by gluing the figure to a wooden board or something similar. Smear the plate thoroughly with release agent: wax diluted in turpentine can be applied to non-absorbent surfaces, while soapy water or dishwashing detergent can be applied to absorbent surfaces. Place silver foil/aluminium foil or plastic around the figure in order to keep it clean. A clay blanket, consisting of plates of clay – 5 mm in thickness – is then placed on the figure and built up, in the form of strips, over the surface of the entire figure.

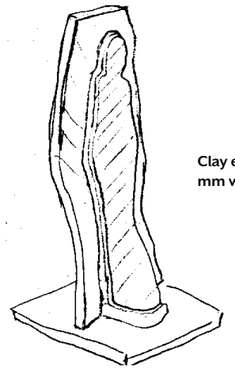
Along the line where one has calculated that the partition between the two rubber halves ought to run, place a rounded ("vulst") moulding, i.e. an edge with a thickness of 5 cm. and a width of 10 cm. Take care to see that the shapes of the two halves are suitable for facilitating the removal of the material. You've got to be able to see every spot on the one half of the mould from one particular vantage point. In some cases, it might be necessary to make the plaster outer capsule on one half – or on both halves – of the figure in several sections. The clay is to be glazed with alcohol, using your fingers, or with a special tool, so that it becomes really smooth.

The first half of the outer plaster capsule —— On the one side of the rounded ("vulst") moulding of the central partition, a 30 mm-wide clay edge is placed. At the top, the edge is flattened, so that the finished plaster mould will be able to stand up by itself. Now, plaster the one half of the plaster outer capsule, up toward the edge of the clay. For larger pieces, it can be beneficial to place a reinforcement of 5 mm rounded iron bars, bent beforehand so that they fit along the edge halfway into the plaster. Large plaster outer capsules can also be reinforced with burlap.

The second half of the outer plaster capsule —— After the plaster has hardened, remove the clay edge. Cut the plaster edge clean. Make key marks and smear the edges with soapy water or stearin. Then you can make the second half of the plaster outer capsule. Should it be necessary in terms of getting the plaster outer capsule off, it is prudent to make the capsule in one or more parts, which can rest in the large plaster outer capsule, in the same manner that you make piece-moulds.

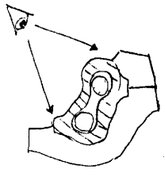


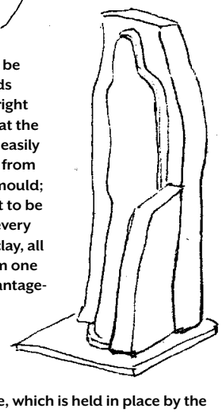
Clay plates placed all over the figure.



Clay edge, circa 30 mm wide

First half of the plaster outer capsule is successively built up with plaster towards a clay edge.





Each part to be treated needs to have the right shape, so that the capsule can easily be removed from the rubber mould; you have got to be able to see every spot of the clay, all at once, from one particular vantage-point.

Wedge-piece, which is held in place by the other half of the plaster outer capsule.

If the base-plate break loose at this time, or if you have decided not to employ such a support, then you can simply make key marks at the bottom of the plaster outer capsules, modelling the clay between the edge and the bottom of the figure. Apply release agent to the whole plaster outer capsule and make a base-plate in plaster, which will then be plastered firmly to the rest of the plaster outer capsule when you fill in the rubber.

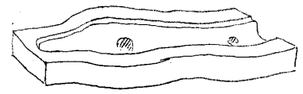
"Lock" between the rubber halves —— Now loosen up the one half of the plaster outer capsule. It is crucial that the figure remains lying inside the second half of the plaster outer capsule. The clay between the figure and the plaster-edge is modelled level with – and close to – the figure. You've got to be very careful to avoid making holes in the clay surface, that splits the figure into two halves, because even the very smallest of holes will result in the rubber finding its way to the bottom half and this won't stop spreading until the rubber mass has hardened.

In the clay, along the edge, make a track that will function as a "lock" between the rubber halves.

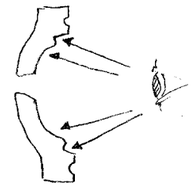
Scrape the inner side of the plaster outer capsule so that it is clean. The clay between the now-loosened half of the plaster outer capsule and the figure corresponds roughly to the volume of the hollow space. For this very reason, it is this amount of rubber that will be used. The inner side of the plaster outer capsule's half is scraped until it is smooth. Take care to see that there is also the appropriate shape so that the capsule can easily be released from the rubber. Also, scrape a track along the edge. Together with the "lock" between the rubber halves, this track will serve to hold the rubber mould in place inside the plaster outer capsule, to get a tight joint and concomitantly provide a minimum of casting-burrs. In the middle of the plaster outer capsule's half, a casting hole of about 10 mm in diameter is to be drilled into the material. This hole should be conical-shaped, so that the plaster outer capsule can be removed. On all the high points where air can be trapped, air holes of circa 5 mm in diameter are to be drilled. Remember to apply release agent to the figure, the inner side of the plaster outer capsule's half, and the edge of the second half of the plaster outer capsule. It is not necessary to apply release agent to the clay edge between the figure and edge. Nor is it necessary to apply shellac to the plaster outer capsules, to the ring, or to the clay edge – but all of these ought to be kept moist.

Filling of rubber into the first half of the capsule: —— Close up the plaster outer capsules and apply plaster along the assembly all the way around. A funnel should now be fastened with plaster on top of the casting hole. A thin clay sausage around the funnel will hold it in place while it is being fastened firmly and will serve to prevent plaster falling down into the hollow space. Now, mix up the liquid silicone rubber and take care that the time of preparation is at least 30 minutes. In order to obtain as high a pressure as possible, you've got to keep the funnel filled all the time. Whenever rubber emerges and juts up from any one of the air holes, such a hole should be closed off with a piece of clay. When all the holes have been closed up, some amount of rubber ought to remain in the funnel, so as to maintain the pressure.

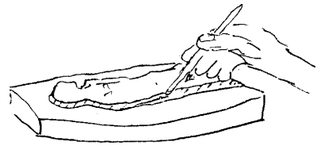
Filling of rubber into the second half of the capsule: —— On the following day, the plaster is carved away from the funnel. The rubber is also to be carved away, close to the plaster outer capsule. Then you've got to pull the two halves of the plaster outer capsule apart. The figure will be lying inside the rubber mould. Remove the clay. Scrape the second half of the plaster outer capsule on the inside. Make the casting hole and the air hole. Apply the release agent to the whole surface. Remember to smear the rubber edge with wax/turpentine, Vaseline or oil. As the situation might call for, it may even be appropriate to apply shellac first. The mould is then closed up and the hollow space is filled up. On the following day, it is opened up again and is ready for use.



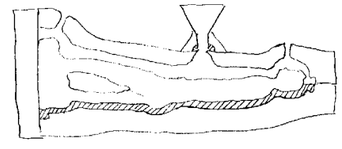
The inner side of the plaster outer capsule's half is scraped until it is smooth; take care to see that there is also the proper shape along the edge for facilitating removal.



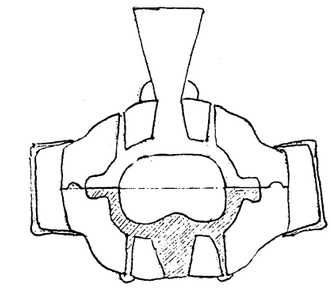
In the middle of the plaster outer capsule half, a casting hole is to be drilled. This hole measures 10 mm in diameter, and must be conical in shape, so that the plaster outer capsule can be removed.

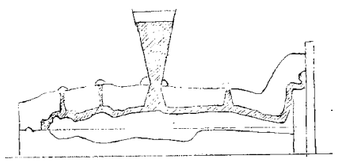


In the clay, along the edge, a track is made, which will function as a "lock" between the two halves of the rubber.



Glue-mould cast in capsule
Moulds of skin glue or gelatine





This is a fine old technique that is, by and large, not being used any longer. It had the advantage that you could use the glue again and again. If you take good care of the material, it just gets better and better the more it is used. After you have finished making your castings, the mould can be sliced up into cubes, which are ready to be melted down in a water bath and can then be used for making the next mould.

You can make castings with fine imprints but this requires that you learn and master the technique. Gaining enough experience to be able to generate good results requires a long period of practice. The technique also has the disadvantage that the process often requires several days, because the castings have to be cast inside the mould a few days after it is made. Otherwise, the mould will dry out. And if it is wrapped up too tightly, it can also rot!

Glue moulds started to come into use in France sometime in the 19th century, and they were used at bronze foundries all the way up into the 1980s to cast figures that were too pretzel-like or otherwise too complicated for preparing piece-plaster moulds. At that time, the wages for labour had increased to the extent that using the more labour-intensive glue moulds was no longer profitable. Suddenly, it became more commonplace to make rubber moulds.

The glue is melted in a water bath. The glue has to have such a low water content that the glue, when it is cool, is as flexible and as strong as rubber. But when the glue is hot, it has to be so fluid that it can be poured over the model, which is generally a plaster figure. You can add app.1/4 liter glycerine to 12-15 litres glue. This glue mould can be used either as an open block mould – especially for making a relief – or in a capsule mould, which is executed in the same way as a *rubber mould cast in capsule*. However, the thickness of the clay has to be somewhat greater, approximately 10 mm. The gap between capsule and model has to be at least 10 mm, so that the glue will not cool off while it is being poured down into the mould. The glue must not be too hot, because then it will stick onto or will even burn its way into the figure and the capsule. Nor must it not be too cold, because then it fails to find its way and flow into all the spots it needs to reach. This is why you have got to stay there beside the bucket and wait for it to cool down. Lubricate your finger with Vaseline and stick it down into the glue; if you can, quite precisely, keep your finger down inside the glue for approximately 10 seconds, then the temperature is just right. The water content, at this particular moment, must be such that the glue is thick but still can flow. If there is too much water in the glue, what you will get is a glue-mould with poor tensile strength.

When you pour the glue down into a closed capsule mould, you've got to use an approximately 15 cm high tin funnel with an access hole of approximately 3 cm in diameter.

You can have several glue-pouring holes.

Release agent —— What applies to both the inside of the plaster capsule and the figure is that moist plaster is to be prepared with shellac and is to be lubricated with a mixture of Vaseline and rapeseed oil. On the other hand, dry plaster does not need this kind of preparation. As a release agent, you can use a mixture of stearin and odourless petroleum, so thin that it's almost as clear as water. Just before pouring, brush the figure with a well-wrung soapy water/oil-brush, so that a smidgen of moisture will be applied to the figure – this will serve to facilitate cutting away the glue-mould.

When you are making a glue mould over a wax- or plasteline-model, it is important that the room is cold or chilly . The figure has to be prepared with thin shellac until it is glossy and smeared with rapeseed oil.

If the mould is going to be made as a capsule mould, there have got to be several glue-pouring holes; these holes need to be placed out on the sides, so that the glue will make contact with the dividing surface and so that filling can take place quickly, from several holes simultaneously. Upon completion of the pouring, a rapid standstill in the movements of the glue must be brought about by after-filling the glue funnels, so that the glue reaches the same height in the various holes.

On the following day, after the glue mould has cooled off completely, you can open it and cleanse its interior of grease, using benzine. After doing this, the mould needs to be impregnated, by brushing it with alum that has been dissolved in water; this admixture has to be saturated, that is to say, that no more alum crystals can be dissolved. If the glue should happen to curl up on the surface, this is a sign that the alum water has been too strong and needs to be diluted slightly. If the mould melts on its surface after the removal of a plaster casting, this is a sign that the alum water has been too weak.

For making plaster castings, the glue-mould is to be lubricated meticulously with a mixture of stearin and rapeseed oil. Casting plaster inside of glue moulds calls for a great deal of experience and skill: the heat emitted from the hardening process of the plaster can melt the glue. So either the plaster casting has to be carefully removed just before the plaster starts to heat up, before the plaster turns completely hard, or the whole thing needs to be left to 'rest' overnight. If you take out the plaster casting at the wrong moment, what you get is molten glue, which will discolour the surface. The mould must actually be used within the following days, before the glue dries, becomes stiff and inflexible, and loses its shape.

As I have mentioned before, glue moulds have been used for casting wax figures in connection with the *cire perdue* (French: lost wax) casting process. These wax figures were cast hollow. After being impregnated (tawed) with alum, the glue-mould was lubricated with rapeseed oil.

Casting with hot wax inside a glue mould that has such a low melting point may sound like a difficult thing to do. But in point of fact, you obtain the very best result if, with a steady and nimble hand, you brush the glue mould with melted wax that has been allowed to cool down slightly but is still fluid. On high edges, you build up with soft wax. After doing this, assemble the mould and fill it up with a suitably cool wax and let it stand for a moment before you go about emptying the mould. Then, preferably, what ought to have crystallised is a wax shell, around 3 mm thin, which is the ideal thickness for a bronze casting. Fill cold water into the wax figure so that it will cool off quickly. After the water has been poured out, fill up the wax casting with an admixture of crushed brick and plaster, which will then come to form the interior core of the *cire perdue* mould. After you have opened the mould, the wax figure is to be retouched and pieced together with inlet funnels and ducts in wax. The entire assembly then needs to be packed into a mould made of plaster and crushed bricks, which is subsequently fired inside a kiln for about a week, as the wax evaporated and leaves behind a now hollowed-out cavity, into which you can pour bronze or, as the case might be, brass, or even aluminium.

Concrete can also be cast inside glue moulds. After the glue mould has been cleansed, initially with benzine, and then with methylated spirits, the glue mould is to be lacquered with linseed oil varnish with siccative, (quick-drying linseed oil). When it is dry, you can lubricate the mould with mineral oil or, as the situation might call for, stearin with rapeseed oil.

Glue moulds can also be cast as open block-moulds.

Papermoulds

Gunnar Biilmann Petersen's assistant, Connie Linck (1930-), who designed the logo for the Danmarks Radio [DR] national broadcasting system in 1964, continued to teach in the use of fonts and script at The Sculpture School until 1980. It was from Connie's office that I took over a drawing archive-cabinet that contained many of Biilmand Petersen's paper mould.

Use filter paper, either in the form of coffee filters or as sheets, torn into strips and made wet. It would be best to leave the strips in a basin of water overnight. The paper is tapped, with a brush, onto the model in several layers, crisscross-wise. Filter paper consists exclusively of clean, long fibres, so that the mould coheres solely by virtue of the fact that the long fibres entangle their way into one another. After the paper has dried, it all hangs together and can be removed, ever so cautiously. This method is particularly suitable for use in connection with stone and other hard materials, and most especially bas-relief or inscriptions, and it is easiest to perform this in a warm climate, since the paper has got to be completely dry when it is removed; otherwise, it will not keep its shape. The paper mould then needs to be lacquered several times, so that it cannot absorb any more water. After doing this, it can be glued onto a wooden board. Paper moulds are best suited for making reliefs or inscriptions without deep undercuttings. The architect, Gunnar Biilmann-Petersen (1897-1968), offered instruction in Monumental Inscription at the Royal Danish Academy of Fine Arts and managed to create, together with the students, many paper castings of inscriptions on study trips to places like Rome and Istanbul. The students could subsequently bring home suitcases that were filled with lightweight paper moulds, which were eventually cast in plaster back home in Copenhagen.

Papermoulds and castings of leaf ornaments and script-forms from the city gate in the former Danish trading station of Tranquebar in South India – castings that I made as an emissary from DANIDA. I had been entrusted with the task exploring possibilities of restoring of the old city gate from 1792, which had been designed by Peter Anker (1744-1832), who served as the governor of Tranquebar at that time.

Plastercast and papermould of inscription from Ostia Antica.

Clay prints

Clay printing is one of the very simplest casting methods: a lump of clay that has been sufficiently moistened is pressed against a fixed figure in, for example, stone. The clay, however, must not be so moist that it sticks to the surface; it helps if the figure is sprinkled beforehand with talc powder. For larger objects, you can make a plaster casing that encircles the clay. Then, remove the plaster casing and carefully place the clay pieces back into the plaster casing (also called the 'plaster outer cap'). After this is done, you cast the plaster in the clay mould. At the Musée national des Monuments Français in Paris – which is presently a part of the Cité de l'Architecture et du Patrimoine, at Trocadero – located directly across the Seine River from where the Eiffel Tower stands, you can see how they have made plaster castings of entire Gothic church portals using this method. On several of these castings, you can see burrs, small elevations where the clay mould has been split up.

In ancient Greece, artisans made clay moulds that were fired and used for pressing clay into: these are the so-called "Tanagra figures".
At KAS, The Royal Cast Collection, there are castings made as clayprints, of heads from the original Trajan's Column, made in marble and dating from 113 AD. The column still stands in the middle of Rome.

These castings once belonged to the sculptor, Professor G.C. Freund (1821-1900), and are accordingly in a better state of preservation than is the original column.

Plaster casts from Trajan Column in Rome, marble, 113. A.D. KAS, The Royal Cast Collection, acquired 1902.

Musée des Monuments Français, Paris. Plaster cast collection of especially French gothic architecture displayed in this cast iron pavilion from Exposition Universelle 1889. The builing was expanded / built in 1937 into the modernist Palais de Chaillot at Place du Trocadéro.

Body casting

Once the alginate has solidified, you make a plaster casing of either pure plaster or plaster gauze.

The advantage of using plaster gauze is that it can stretch a bit when you remove it from the body.

You make the first half of the shell and build up a thick edge. This edge is lubricated before you build the next shell up against it.

Body casting with plaster gauze

Plaster gauze is available in rolls of different width; the gauze that is approximately 12 cm in width is especially good for body casting. The trick is to hold the entire roll under water until it is completely saturated and then to roll it around, for example, an arm, in much the way you would lay a bandage. There is a special kind of scissors that you can use for cutting the shell.

The shell can be used as a mould. But with this method, you usually obtain a lacklustre assembly.

Another way is to make the shell in two rounds. Initially, the one half is made, and a somewhat thicker edge is built up by folding the plaster gauze doubly or quadruply, right where you want to make the division. The edge needs to be lubricated before you go about building the next shell up against it.

The plaster gauze is clipped into smaller pieces and then placed gently in water. The gypsum powder, which is in the gauze tissue, must not be rinsed away. The pieces of gauze are laid so that they overlap one another. Around three layers give a strong shell.

The advantage of using plaster gauze, in comparison to what is the case when you make body castings with ordinary plaster, is that the plaster gauze can stretch and expand slightly when you remove it from the body. The impression in plaster gauze is not so fine: generally speaking, there will be a number of air holes where you can see right through the structure of the gauze tissue. It is as though there is not enough gypsum powder in the gauze.

If you want to obtain a really good impression, you can smear a millimetre-thin layer onto the skin of ordinary plaster before you lay down the plaster gauze. The skin initially has to be lubricated with Vaseline.

You have got to use lukewarm water for the first layer of plaster. If you put ice-cold plaster onto the skin, the model will get goose bumps, her/his hairs will rise, and even rather short hair gets cast into the plaster shell, and it really hurts the model when you take away the mould.

This is especially true when you use clean plaster directly on the body. All things considered, it's best to shave if you have got hairs on your body. You can lubricate the beard and the hair with a thick layer of Vaseline and then apply the plaster when it's almost as thick as whipped cream, but the result will still not look like real hair.

Body casting with alginate

Alginate is a product made from algae. It has been developed for dentists who use it when making castings of teeth, especially because it hardens so quickly. What is used when making a casting of teeth is a special steel dental plate, a kind of mould that can be pressed up against the teeth. Already after 2-3 minutes, you can remove it, and you've got a perfect impression of the teeth.

Once you have made a mould of alginate, the plaster must be cast inside the mould immediately afterward – and in any event, on the same day – because the alginate starts to dry out and becomes deformed. Alginate hardens very quickly, as soon as it has been combined with water. It is imperative that one adhere to the prescribed mixing proportions in order to obtain a good quality, and it is important that you stir it meticulously. It's best to use an electric mixing machine.

Alginate is relatively expensive. We've tried several different products: Chromatic (colour-changing) alginate; and Alginoplast. Ordinarily, one uses 1.5 litres of water for every 0.5 kg of alginate.

You can mix it up a little thinner so that it takes on the consistency of béchamel sauce. Then it's not quite so firm, but it's nonetheless firm enough to give a fine impression.

One drawback with alginate is that once it has solidified, you cannot get the next layer of alginate to be fastened onto the previous one. This is why you need to make the entire layer with one and the same mixture.

Alginate mould of a head, built up directly —— If you want to make a casting of a face, you can start out by mixing up a rather large portion of alginate, a portion of 2-3 litres. After doing this, let the model lean back his/her head and pour the mixture over the model's face. Having several people on hand is a decided advantage, so that one person can devote his/her attention to gathering up the excess fluid that runs off the model's face and pouring it back onto the middle of the face.

Once the alginate has solidified, you make a plaster casing of either pure plaster or plaster gauze. You can, as is shown here, make a separate alginate casting of the back of the head, which eventually, after it has been cast into plaster, can be assembled with the face to make a whole head.

As a matter of fact, you can even cast hair with alginate, provided that the hair is treated first with hair spray, so that it becomes a bit stiff. I've also tried casting stuffed animals in this way. There is actually no need to apply release agent onto the skin; if needed, a little bit of Vaseline will suffice.











Alginate mould of the back of a head, built up directly —— A rather large portion of alginate, a portion of 2-3 litres, is poured over the head, Having several people on hand is an advantage, so that one person can devote his/her attention to gathering up the excess fluid that runs off, and pour it back on the top of the head.

Alginate mould of a hand, cast inside a wooden box —— If you want to cast a hand, or an arm, you can make a box, or a tube, that you fill up with alginate and stick your hand down into. As soon as the alginate is solidified, you can tighten the muscles in your hand until you feel the alginate loosening. It can also be helpful to pour water down between the alginate mould and the hand. The material is so flexible that you can pull your hand up without cutting up the mould. After doing this, you empty the mould of water and fill it up with plaster, and what you get is a perfect casting without having to make any kind of assembly.

Photos taken at a course in body casting offered at The Sculpture School, in February 2008, realised with financial support from KUNO, in collaboration with Assistant Professor Heinrich Müllner from the Konsthögskolan in Stockholm.

Alginate mould of a whole body, cast in capsule —— This method corresponds, more or less, to a rubber mould cast in a capsule. It is a rather labour-intensive method but the advantage here is that you obtain a casting of the whole body all at once. It is rather material-intensive. I believe that we used, at any rate, at least 20 half-kilogramme packages of Alginoplast.
First off, you make a body casting, with plaster gauze, of the model standing in the position that you want the finished figure to be standing in. You cut the plaster gauze up so that you can get it off of the body, and thereafter, you collect it and tape 10-20 mm strips of foam rubber all over the figure.

Outside this foam rubber figure, make a capsule in two half-sections. In this particular case, we made it in fiberglass, but it could just as well have been made in Jesmonite. The capsule is assembled around the model, the person who is going to be cast, and alginate is poured into the capsule. You've got to have a whole lot of buckets ready, and it is necessary that three or four people be involved. Two people mix up a bucket with alginate: approximately 1.5 kg of alginate and 4.5 litres of water are blended with an electric whisk. The whole process has to proceed rapidly, because there are only 2 minutes to perform this part of the work! One person stands on a ladder and pours in the mixture, while the mixing team gets started mixing up the next bucket, which has to be poured in before the previous portion has solidified, so as to avoid the emergence of cracks in the alginate.

When the capsule is completely filled up, it is necessary to wait until the alginate has solidified completely, approximately 1 minute, and then it is time to open the capsules. With a spatula, the alginate has to be sliced through, along the seam between the two capsule halves. On the same day, you cast plaster shells in the two mould parts. Then, the plaster shells are assembled to make a casting of the whole body.

Concrete

Giovanni Paolo Pannini (1691-1765) Interior of the Pantheon, oil on canvas.

Wilhelm Lehmbruck, Woman's torso, 98 cm, 1913, polished light-coloured concrete.

Reverend Laier at work on the sculpture of Judas 1937.

Detail of one of the coffers in the Pantheon's ceiling

The Pantheon —— dating from 150 AD, has a cupola-shaped ceiling that was cast with the first type of cement, pozzolana, volcanic sand that was found outside of Rome. This is a so-called 'hydraulic binding agent' that actually hardens under water. It was during the nineteenth century that cement, as we know it today, was developed. When this substance is mixed together, in the proper proportions, with sand and stone, the resulting substance is what we know as 'concrete'. Concrete is a material with an enormous resistance to pressure but very little resistance to being fractured. When people subsequently started to reinforce concrete with iron, they could build bridges and other constructions using this material.

Wilhelm Lehmbruck (1881-1919) —— had the greater part of his figures cast in concrete, which he burnished and tinted with oil colours. Some of these figures were cast in grey cement; these have taken on a more moist character, like bronze, without actually aspiring to imitate bronze. Some of the figures in lighter-coloured cement take on the character of light-coloured marble.

Reverend Anton M. Laier (1883-1969) —— modelled Jesus in concrete on the cross in the parish garden, a deed that resulted in his dismissal as a priest. The other figure he made was Judas. His view was that it was wrong to model the human figure in bronze or marble. "Concrete is the material that most resembles skin," he said.

Wotruba modelling sketches for Kirche Zur Heiligsten Dreifaltigkeit, in clay, 'watched over' by his crow.

Einar Utzon-Frank (1888-1955) —— professor of sculpture at The Royal Danish Academy of Fine Arts, 1918-55, created "The Bull" in 1933, which was made in concrete and installed on the roof of Øksnehallen in Kødbyen [the former Meat-packing District], located on Halmtorvet in Copenhagen. "The Bull" was modelled inside the yellow-coloured 'ropewalk wing' at The Royal Danish Academy of Fine Arts' School of Sculpture, with the professor working in ensemble with his sculpture students, in the finest spirit of traditional Renaissance-style education.

Fritz Wotruba (1907-75) —— Kirche Kirche Zur Heiligsten Dreifaltigkeit, Wien Mauer, on the outskirts of Vienna. A scale model was modelled in clay. After this was ready, Wotruba – working together with construction engineers – built a larger working model, in wood, of each of the cubic blocks from which the church is constructed. After making this larger model, the moulds for casting the concrete were prepared.

Hindu Temple, in concrete —— In 1994, I visited South India for the purpose of helping with the restoration of the city gate in Tranquebar. In this connection, we visited a temple building site in Madras, led by a *sthapathi* (the term for a temple architect, who is also a sculptor and a building craftsman). The temple has been erected in bricks and concrete, with pre-cast elements and figures of Hindu gods, which have been modelled up with brick slabs and concrete on an iron armature and modelled up in concrete. Finally, the whole construction was painted with strong, intense colours.

"The Bull", by Utzon-Frank, standing in the middle, together with the stucco craftsman, Ferdinandsen, standing second from the right.

Fritz Wotruba, Kirche Kirche Zur Heiligsten Dreifaltigkeit (Wotrubakirche), Wien Mauer 1907-75.

Hindu god, being modelled up in concrete.

Concrete casting in plaster mould

The moistened plaster mould is to be lubricated with mineral oil or stearin with rapeseed oil. The mould must, preferably, be very moist: if necessary, you can give it plenty of water from the outside. The plaster's pores render it so that if you continue spraying water on the outside of the mould, the water will migrate its way through the plaster's pores all the way to the inner side of the mould. And together with the stearin (with rapeseed oil) on the mould's inner side, this will result in creating a most serviceable slip.

You can also lacquer the plaster mould with linoleum varnish (quick-drying linseed oil), which closes the surface and renders it less absorbent. Thereafter, you can lubricate the mould with machine oil or stearin/rapeseed oil.

Previously, we applied three rounds of shellac to the moistened plaster mould. And after doing so, we coated the mould with varnish (cellulose lacquer), so that the underlying shellac would not discolour the concrete figure. As a release agent, we used mineral oil (machine oil), diluted sometimes with petroleum. However, I've stopped doing things in this way because it has come to light that the vapours from cellulose lacquer can be very harmful to one's health.

Important: water-based acrylic lacquer must absolutely not be used as a lacquer because even when a release agent is applied, using acrylic lacquer will elicit the opposite effect – and almost give rise to a 'glue' between the plaster mould and the concrete.

Concrete is a mixture of cement and aggregates. The proportions recommended are ordinarily 1 part cement to 3 parts gravel (1: 3). Aggregate materials can be sand and gravel, in different grain sizes: for making sculptures, we often use masonry gravel, which is 0-4 mm. It is a mixture of different grain sizes, from 0-4 mm, which are distributed in such a way that there will be as little gap between the grains as possible. The more dense the aggregate material you have, the stronger the concrete you will get. Other aggregate materials can be sand-marble or sand-lime: for example, stone dust from Faxe. White or coloured cement and stone dust are called 'artificial stone'.

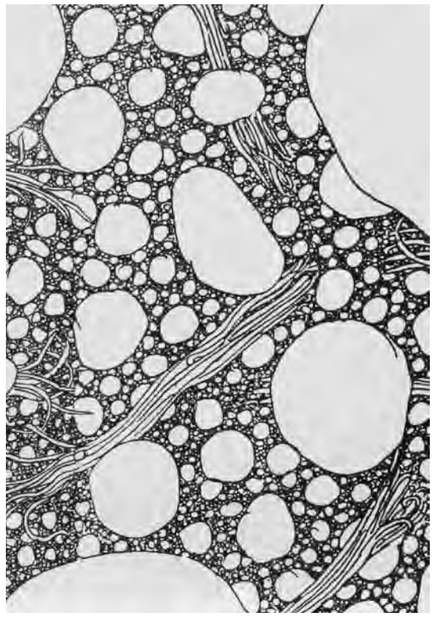
There are different methods of casting. The variation among them is contingent on how much water is being added to the mixture.

There must never be so much water content that water will float on top of the concrete mix. This will result in a weak concrete.

Wet casting can be done according to the procedure suggested for hollow casting, with dry sand as the interior support material, which can simultaneously absorb the moisture being emitted from the wet casting.

Or you can dry-pound, with such a low water content that you fail to obtain a smooth surface but can see the grains. In this way, it calls sand or limestone to mind.

At certain spots, reinforcing with rounded pieces of iron or the like might prove to be necessary. But please, don't overdo this, because the possibility of erosion occurring through rust can entail that the concrete can actually burst.



The strength of concrete is dependent on, the density of the material, that the mixture is of different grain sizes, which are distributed in such a way that there will be as little gap between the grains as possible. The more dense the aggregate material you have, the stronger the concrete you will get. Silica is a powder much finer than cement. The drawing by the sculptor Claes Lorenzen, shows how different grain sizes and fibres create a dense and strong material.

Kai Nielsen. Plaster mould of the statue relief, " The Genesis of the Earth", which now stands in "Studentergården" on Tagensvej in Copenhagen. To the left in the photo stands the stucco craftsman, Ferdinandsen, who was the only person to be entrusted and officially authorized to cast Kai Nielsen's figures in artificial stone.

Terazzo —— is well known from bathroom floors of earlier times. It resembles to some extent, artificial stone. Terrazzo is made of a mixture of 1 part cement and 2-3 parts coloured limestone or marble chips: half fine-chips and half coarse-chips. The cement can either be grey or white, or it can also be dyed. It is cast as wet-casting. When the mixture has hardened, after a few days, the material is sanded down approximately 5 mm: initially, coarsely, with an angle grinder; and then, finely, with diamond tools or water abrasive paper, so that you see the chips that are half cut through.

Dry pounding —— is ideal for waste-plaster moulds and for other hard moulds. The amount of water added here is so small that it is supposed to look like wet (moist) sand. When it is pressed together by hand, it should not separate. At the same time, your hands are not even supposed to get wet! Dry pounding results in a granular surface that calls sandstone to mind; that is why this technique is called "artificial stone". It is best to use your hands or knuckles for pounding in order to make a uniform surface. A hammer or similar implement will press the material together more forcibly in some places so using such a tool could result in a diversified, motley surface. Crushed yellow and white Danish Faxe-limestones have traditionally been used, but the yellow lodes have now been used up. A sculpture group that is titled "Jordens tilblivelse" [The Genesis of the Earth], created by Kai Nielsen, which now stands in the Studentergården [Student Commons], on Tagensvej, in Copenhagen, is made of yellow Faxe limestone. Three different sizes of grain were used for creating this sculpture group: one being as fine as flour; one being an intermediate size of grain; and one being a coarse grain (with a dimension that comes all the way up to approximately 3 mm. in grain size). It has been the medium grain-size that has been used most widely. The proportions between cement and stone dust can vary from 1:2.5 to 1:3. White cement is always used in this mixture.

■ Fibre Concrete

Cement	12 kg
Microsilica	0,8 kg
Bentonit	0,25 kg
Krenit fibre or Crackstop	0,3 kg
Gravel (0-4 mm)	16 kg
Sand (0-2mm)	16 kg
Water	ca. 5-6 liter
Total:	50 kg
	=25 litres

Fibre-concrete —— is yet another method. The material can be applied with a spatula in thin layers – circa 2 cm. – and applied vertically into the plaster mould. Large figures can be cast hollow, as shells.

The addition of calcified plastic-fibre mesh, so-called "Crackstop", yields a strong resistance to pressure and results in fewer shrinkage cracks during the first days of the hardening, something that is crucial to the durability of the concrete in the event of frost.

A significant advantage of using Crackstop-fibres is that they are thin and short and easy to mix: they can be used in virtually any form of concrete mixer.

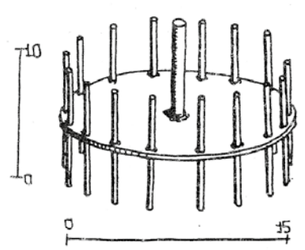
Earlier on, instead of using Crackstop fibre, we used Krenit fibres, which are longer and give a greater tensile strength. However, it was considerably more difficult to get them mixed.

Fibre is added, in amounts ranging from 200-300 g per 50 kg of finished concrete. In order to get the fibres adequately distributed, they need to be mixed separately with half of the aggregate material and some water.
Use 1/4 part of cement, that is to say 12 kg, and 32 kg aggregate (sand, gravel, marble sand, lime ...) plus approximately 1 kg bentonite and microsilica, and 3-5 litres of water to make approximately 50 kg of mixture.

Adding some bentonite (clay powder) makes the concrete more cohesive and is easier to model with. You can add as much as 250 grams of bentonite for every 50 kilograms of finished concrete.

Adding microsilica will make the concrete mix more dense, which entails both that it will be more flexible to work with and that the pre-hardened concrete will be less porous, more dense and possess a greater strength. Up to 0.8 kg of microsilica can be added to a mixture of 50 kg of concrete.

When mixing by hand, blend the cement, the bentonite, the silica and the aggregate materials dry, by rolling the substance back and forth on a thick sheet of plastic. The aggregate material is often a little moist in the plastic bags, and this is a good way of preventing too much dust from getting in).
Put some water in the bottom of a bucket, and mix up most of the dry blend until it is quite thin. Then, sprinkle the fibres down over the solution and stir it around so that the fibres will be distributed evenly. Put in the rest of the material and, if necessary, add some water until you attain the desired consistency. In force blenders, put the fine powder and the water in first, and mix it up until it has a creamy consistency, and then put in the fibre and the remaining aggregate admixture. And, if necessary, add more water.



The 12 mm long Krenit fibres have to be mixed with some of the sand, using a custom-made activator: a round steel plate with a piece of round steel welded onto it, which is mounted onto a drill machine. This is not necessary when using Crackstop fibres, which are much easier to distribute evenly.

Direct modelling in concrete

Moped-riding helmet, by Delphine Bechard (1974-)

Moped-riding helmet, enlarged 10 times, created by Delphine Bechard in 2008, at the time she was studying at The Sculpture School. Modelled on an iron skeleton welded from pieces, measuring 12, 10 and 8 mm, of Tentor steel.

Concrete was applied with a concrete spraying device onto the fibre net, in order to hold the first layer of concrete in place.

The helmet was then built up further in concrete having a thickness of approximately 3-4 cm and was coated, lastly, with black marmorini. The work was carried out in close collaboration between The Sculpture School and specialist teacher Hans Henrik Juul-Jacobsen, who worked at the time at Erhvervsskolen Nordsjælland [Trade School of North Sjælland], and Hans Henrik's students.

Equestrian statue in concrete by Ole Barslund (1968-) —— The equestrian statue was cast in fibre-concrete in a waste-plaster mould by Ole Barslund in 1994, at the time that he was a student at The Sculpture School. It was cast in fibre-concrete in a waste-plaster mould. The body of the horse was cast as a shell in fibre-concrete, and weighed about 500 kg. The three bearing legs, each of which measures about 10-15 cm at the thinnest points of the legs, were reinforced with ten carefully placed 10 mm ribbed round stainless steel bars. The socle was almost solid and weighed approximately 500 kg.

"Prosperous Pal" sculpture, by Lilibeth Cuenca Rasmussen (1970-) —— The small fertility amulet, which Lilibeth had purchased from a street vendor in a famous Catholic church, Quiapo Church, in Manila, the Philippines, was modelled in 2014 in clay by three students, Fredrik Tydén, Rikard Thambert and Amitai Romm who were studying at The Sculpture School at The Royal Danish Academy of Fine Arts, as a part of the educational program. The figure came to take on a height of approximately 3 metres.

Tine Hecht-Pedersen (1958-)

—— *Bust*, 1989, was modelled in clay and cast as a fibre concrete shell with marble sand as the aggregate material. The eyes were made in Egyptian blue faience, which was modelled right into the clay, with the result that they became fixed in the plaster mould and were cast firmly inside the fibre concrete shell.

The sculpture students Nils Viga Hausken and Bo Bisgaard helped with casting the fibreconcrete and my daughter Tussi helped with mixing krenitfibres and sand using the activator as seen on page 67.

Billedvogteren [Image Guardian], 1993 —— Public-space work, conceived and created in connection with storage spaces for low-radioactive waste at Risø, a part of Technical University of Denmark. The budget that was set aside for this sculpture was very modest. For this very reason, I chose to cast the *Billedvogteren's* head in bronze while the rest of the sculpture was cast in concrete at the site. Risø's building-technical services helped me to get the concrete pedestal cast in concrete, and we let some of the reinforcing bars stick out where the figure's body was going to be placed. I brought the plaster mould for the body to the site on the roof rack of my car. And then it was mounted onto the graduated-pedestal. The mould was filled up with the kind of concrete that is normally used for embedding low-radioactive waste, but with umbra-coloured pigment added, and after the concrete had hardened very firmly, the bronze head was glued onto the body.

Richford Ekholm (1962-) —— Ceremonial figure, 385 cm high, created for the park-based exhibition, "Skulptur89", in Lodsparken, Hvidovre, in 1989. Richford managed to weld an armature in solid I-profile iron beams, and he welded onto these beams a net of thinner rounded iron pieces, which were then covered with a finer net. Onto this net, he modelled up the figure in fibre concrete. The method can call to mind the way in which people built iron-reinforced concrete vessels.

Ceramic figures built around concrete cores

Gunnar Westman: Høne, keramik på kerne af beton, Grantofteskolen, Ballerup, 1980.

Gunnar Westman (1915-85) —— In outer Nørrebro, Gunnar Westman's Snow-owl stands as majestically as any Egyptian Horus-falcon. It is made of stoneware tiles, which have been glued onto a concrete figure with cement mortar or tile adhesive. Concrete is well suited to the creation of large powerful figures, and when it is covered with stoneware, one obtains a figure that always preserves its fresh newness. At the Grantofte School in Ballerup, there is a ceramic hen, which I had the opportunity to watch being cast, back in 1980 when I visited the stucco-workshop Ove H.Svensson & Søn. Gunnar had modelled the hen in clay. Then he removed a layer from the entire surface that was about 3 cm thick, a thickness that corresponded with the thickness of the stoneware tiles. After doing this, he had the hen cast in concrete. On the concrete figure, he could model the figure up in stoneware clay and carve it up into tiles, which were then dried, fired and glazed. The tiles will shrink during the drying and firing processes; this results in the emergence of spaces between the tiles. Thereafter, the tiles could be glued, using cement mortar or tile adhesive as the adherent, and attached firmly onto the concrete core.

In Rio de Janeiro, Brazil, there is a figure of Jesus – made by the French sculptor, *Paul Landowski*, that can be seen from virtually everywhere in the city. This figure is made of ceramic tiles fastened onto a concrete core. The roof elements on Jørn Utzon's opera house in Sydney, Australia, have been plated with hard-fired white stoneware tiles from Höganäs in Sweden. These have been laid onto a most sophisticated lightweight concrete construction.

Gunnar Westman: Fountain with dragon and bull, ceramic on a core of concrete, Krogerup Højskole, Humlebæk, beginning of the 1960s.

Gunnar Westman: Snow-owl, ceramic on a core of concrete, Nørrebro, 1968.

Peter Brandes (1944-) —— At the Tuborg Nord facility, there is a sculpture made by Peter Brandes that measures approximately five meters in height. It was built at Royal Copenhagen in collaboration with Bjarne Kielstrup, among others. The sculpture was modelled up in clay. Onto the clay, Peter Brandes drew all the pieces from which the figure was to be made, in such a way that the spaces between the pieces formed a pattern with which he felt satisfied. Afterward, the stucco craftsman, Peter Funder, created a plaster mould of each part. Then, all nine hundred of these parts were distributed along the lines that Peter Brandes had sketched out. For each and every part, stoneware clay was pressed down into the material, which was subsequently dried and fired. Before the clay figure itself was torn down it was thoroughly photographed and measured. The parts were then placed into position and glazed. Since the foot was going to be successively built up in plaster on site, this was – in contrast to Gunnar Westman's "Snow-owl" – accomplished without having to use a concrete core. The core was built up as the parts were being assembled by the bricklayers, Keld and Palle Nielsen, who worked from nothing else but the photographs. The process was not an easy one, but they certainly managed to come up with a fine piece of work. There are many who believe that leca concrete is better suited to serve as the core in ceramic sculptures than ordinary concrete is. If you are to fill up a ceramic sculpture, you can prepare a mixture with leca-balls and pure cement. Use approximately 8-9 parts of leca balls to 1 part of cement.

Peter Brandes: Isac. Memorial commemorating the Jew's flight across the Sound from Denmark to Sweden during WW2, designed as a monumental foot. Ceramic on a core of leca blocks, placed in a basin of black Swedish diabase, Tuborg Nord.

Ursula Reuter Christiansen (1943-) —— In 1985, I helped Ursula make a portal in front of Aabenraa Museum with two concrete figures that she modelled in clay. She pressed old porcelain and conch shells into the clay, which was then cast along with the coloured fibre concrete, with the result that half teapots and soup tureens are protruding from the mother of the adventurous boy, who is looking towards the samurai with a large conch in his helmet.

Egon Møller-Nielsen (1915-59) —— Born in Denmark. Moved to Sweden during the war and became the professor at Konstfack in Stockholm. Egon Møller Nielsen had his studio inside a glass house and made many 'useful' sculptures in concrete and artificial stone: benches in Stockholm's metro; a large egg inside which children can play, placed in a central location in Gothenburg; and a play sculpture in a small park close to the terrace house area, Søgården – located on Krogshøjvej in Herlev, Denmark.

Mortar- or Concrete-intarsia

A mortar-plastered fields above the entrance doors to Finsensgård, at Finsensvej 58-68 in Frederiksberg, executed in the early 1950s by the three visual artists, Helge Bertram, Sigrid Lütken and Bent Sørensen. The motifs were drawn up by Sigrid. The fields were mortared up by Helge, who was a trained bricklayer. And Bent, who, by his own account, was a workman, took responsibility for mixing up the materials. The fields have been created in a special technique, which could be called "concrete intarsia", inasmuch as it consists of whole colour fields that are adjacent to each other. This all takes place in such a way that one initially builds up a colour in a thickness of approximately 10 mm. Then, with the aid of the drawing, the outline of this colour field is transferred by piercing holes through the drawing and cropping the edges. You can also cut out templates from 10 mm Styropor (polystyrol), which can then be removed on the following day.

After doing this, you build up the next colour layer against the backdrop of the previous one. Hence the name, because what you obtain resembles the fine intarsia works made with small pieces of wood – sometimes ivory or mother-of-pearl – that fit together in the same plane.

Jørgen Sonne's frieze at Thorvaldsens Museum has been made as concrete intarsia. The frieze was carried out in 1850 after drawings by Jørgen Sonne (1771-1851), and was executed with cement and gravel dyed with earth colours: umbra, Indian red, burnt sienna and ochre, in whole fields. The contours in the drawing were cut or etched out in the moistened plastering mixture (cement mortar), and these were filled out with a black concrete plastering mixture. At the beginning of the twentieth century this frieze was in a very bad shape, and in the 1940s, Elof Risebye and his assistant managed to get the frieze pulled off the wall with the aid of a special technique that is ordinarily used to remove a fresco painting from a wall.

On one field of the frieze, the canvas is glued with water-soluble glue, and when the glue is dry, the outermost layer of plastering mixture is pulled away from the wall. Then the back side is glued up onto a new canvas with waterproof casein glue, and lastly, with pieces of cloth that have been dipped in warm water, the canvas and glue are removed from the front of the frieze field. In this way, one could rescue and save the original friezes. It was only the very outermost part of the coloured layer of plastering mixture that was being pulled off. Since the coloured layer of plastering mixture was 2 lines (i.e. 4-5 mm) thick, several impressions of one and the same motif could be made. The Royal Danish Academy of Art still has two of these impressions in its possession. When you examine these impressions, you can see how the badly weathered frieze looked after the passage of a century. In the 1950s, a group of artists working under the leadership of Axel Salto recreated Sonne's frieze, as we can still see it today.

■ **Sgraffito**
Sgrafitto is yet another technique where you build up several 5 mm-thick layers of variously dyed concrete or lime mortar, and while it is still moist, you etch down into the material, with the result that you can see the differently coloured layers. What is shown here is a sgrafitto I have created in coloured lime mortar, built up onto a slab of wood-wool, which is actually an acoustic plate of the kind that is often used in parking basements and the like. It is made of wood shavings dipped in concrete and doesn't weigh very much. It has an open surface and is therefore suitable for making small frescos. The mortar has been dyed in, respectively, black, green chromium oxide, ochre and light blue (ultramarine + marble sand).

Mosaics

If you really want to see mosaics, you will have to travel all the way down to Ravenna, or to Istanbul to see the ancient Byzantine mosaics. These are glass mosaics, where the tesserae, (the small 1x1 cm glass squares) have been pressed directly into lime mortar. This has been a most imposing task, sometimes involving very difficult working postures, but the result is nothing short of fabulous. That the colour pigments are melted into the glass gives them a very powerful luminosity, which can call to mind the slightly moistened effect in oil painting. In the Hagia Sophia museum (formerly a basilica and mosque) and in the Kariye Museum (the Chora Church in Istanbul), fantastic mosaics can be seen, where, at some spots, the tesserae have been placed, ever so deliberately, in such a way that they tilt in different directions and consequently capture the light in an altogether fabulous way.

Other fine mosaics are the Roman ones, made in natural stone, like The Alexander Mosaic, which can be seen at the National Archaeological Museum in Naples. This is a floor from Pompeii and is a replica of a vanished Greek mural. The Roman stone mosaics were laid out with very small stones. Sometimes you've got to move up very close to the piece in order to see that it is actually a mosaic and not a painting.

There are also a number of fine mosaics in Copenhagen. One striking example is the fine mosaic on the underside of the arch that can be found on the street that runs from Kongens Nytorv on the left side The Royal Theatre, in front of the entrance to the fantastic building that is called "Stærekassen", the only thoroughly conceived and elaborated Art Deco building in Copenhagen. The mosaic was executed in 1930 and was financed by Sigurd Schultz's Legat [Stipend]. It was designed by the painter and professor Ejnar Nielsen, while the actual mounting of the mosaic was headed up by Elof Risebye, the painter and professor at The Decoration School. The two men worked closely together. Ejnar Nielsen provided guidelines for the choice of colours but left many of the decisions to Risebye, who in turn engaged many of his best students to tackle the task: among several others, Agnete Varming. They were given a large room to work, where they could go about laying the enormous drawings for the mosaic in full size, the drawings that are called "cartoons". These were laterally inverted, and the 1 x 1 cm large glass mosaic tesserae were laid directly onto them. When one of the artist-artisans was finished working with a certain area, 30 x 30 cm large paper sheets were pressed, using water-soluble glue, onto the finished mosaic fields. After the glue had dried, the fields were numbered. Then they could be assembled between wooden plates, ready for being transported to the construction site. For the process of mounting the mosaic, a special concrete mix (today, we would use tile adhesive for the purpose) was flung onto the existing arch, and the same mixture was lubricated onto the back of each of the mosaic fields. Then these were pressed up, with the paper at the bottom. Each of the fields was placed close to the next one. On the following day, after the concrete had hardened sufficiently, the craftsmen started dissolving the paper with water. Once the paper had been removed, the craftsmen could start to fill out the joints. Using a rubber spatula, cement was pressed down into the joints. After a bit of time had passed, the excess cement was wiped away, and a little later, it was brushed clean. All of the cement sludge had to be cleaned away from the top side of the mosaic tesserae, because it would certainly be very difficult to remove it later.

You can make small mosaics, as a tile, like the one I am showing here, by gluing the tesserae with a water-soluble glue – for example, wallpaper adhesive – either onto a paper or a transparent plastic plate, with the drawing positioned beneath the paper or the plate. When you are finished doing this, make a wooden frame around it and fill in concrete: initially, a thin mixture with fine sand, so that it will penetrate its way in between the tesserae; and thereafter, a coarser concrete and, should the situation call for doing this, iron reinforcement, also.

Juan O'Gorman (1905-1982) —— Mexican artist and architect. On a study trip with The Sculpture School to Mexico in 1990, we visited the sculptor, Helen Escobedo, who was living at the time in the house, Casa Pueblo, which O'Gorman had built for himself around a volcanic crater. In one of the ceilings, he had created a mosaic with variously coloured, round stones, as a test piece for the wall mosaic at The Central Library of the National Autonomous University of Mexico (UNAM) in 1952.

Ceiling mosaic at Casa Pueblo.

Fresco painting

■ **Fresco painting**
If you want to see frescoes in Denmark, you really should see Jais Nielsen's (1885-1961) fresco decoration at Sankt Elisabeths Hospital in Amager, 1928-35. Jais Nielsen managed to embellish the entrance and the three-storey stairwells with scenes from the life of Saint Elisabeth, where the story unfolds continuously around corners and around doors, and ends all the way at the top of the stairwell with an enormous beautiful wall. Here you can really see mural painting at its finest. It is also interesting after seeing this work to see Nielsen's large picture in Frederiksberg Town Hall, which was made 20 years later. It's nothing other than a large wall, but Nielsen has chosen to work with a much greater simplicity, which suits the large hall.

At Lyngby Town Hall, there are also frescoes, and they were created by architect and artist Georg Jacobsen (1887-1976). These frescoes tell about the municipality, its administration and its citizens. Georg Jacobsen was a professor in Oslo and he taught his own theories about composing pictures, theories he had developed while carrying out conversations with Diego Rivera, whom Jacobsen knew from Paris. Jacobsen's theories inspired many of the Norwegian artists who made frescoes in Oslo City Hall.

A truly momentous experience, however, awaits the interested seeker at Viborg Cathedral, where Joakim Skovgård created, in the period 1901-06, a frescoed decoration of the whole church, with many assistants. It could be said, perhaps, that the most skilled of these assistants was Niels Larsen Stevns (1864-1941), a painter that you ought to study more closely if you are interested in painting. Stevns also made some very fine frescoes about H.C. Andersen's life in Odense. Also in Hjørring, Stevns made frescoes in the former library about the history of the Vendsyssel region.

Airbrush og sgrafitto

In the fresco- and stucco lustro-techniques, a fresh plastering mixture of lime and fine sand is painted on, so that it forms an appropriately solid surface. In this way, the layer of plastering mixture must have "set" in such a way that it will not dissolve when one paints on top of it. Should it go into dissolution, it will blend in with the colour, which will become greyish and muddy to look at. What is best is when the painting can be executed on a brick wall, because such a wall is able to stay moist for a long time, so that the layer of plastering mixture will dry slowly and so that one can work for a longer period of time. When the layer of plastering mixture becomes dry, the lime from the plastering mixture will bind the colour to the surface.

In fresco technique, a colour is painted on which consists primarily of coloured pigment and water. If needed, you can add 5-10% dissolved lime to the water in order to enhance the capacity of adherence to the ground. Too much lime in the colour will make it chalky to look at. When the colour and the layer of plastering mixture are dry, the lime will bind the coloured pigment to the plastering mixture layer.

In the classic tradition, you use the clear water (which contains dissolved lime) that lies at the topmost section of the mortar tub. In the Mexican tradition, however, the colours are mixed up with clean water.
The lime, which is used for the binding agent, undergoes changes that can chemically be described as follows: $CaCO_3$: limestone (unfired lime), i.e. calcium carbonate, is fired in kilns and transformed into CaO: calcium oxide (fired lime). By adding a sufficient amount of water to the burnt lime, what is obtained is slaked lime, Ca(OH)2: calcium hydroxide. Slaked lime and sand are mixed up to make mortar. As the mortar dries, the content of calcium hydroxide is converted back into the stone-like material, $CaCO_3$ (unfired lime), also known as calcium carbonate.

Airbrushing is actually very well suited to making frescoes. Mix colour pigment and clean water or clear limewater and pour this into the spraying device.

Another technique is sgrafitto, where you put several layers of coloured plastering mixture and scrape down to the different layers. Or you can scrape in the painting layer.

The colour pigments need to be lime-proof and lightproof. All earth colours are good. Ultramarine, chromium oxide and cadmium colours are also good.

Together with the Royal Danish Academy of Fine Arts' Laboratory for Serigraphy, under the leadership of Lars Grenaae, I have been making experiments in printing frescoes with silkscreen-technique. As soon as the paint layer is lustrous and has dried sufficiently so that it can absorb more moisture, you print with pure pigments and water + Icelandic moss or the like, which gives the colour the thick consistency that is necessary.

Stucco lustro —— is a form of fresco painting where the colour pigments are blended with "smalto" (a special mixture of soap, lime and water) instead of limewater or pure water. As soon as this colour, after being painted on, has settled, that is to say, when the water is no longer visible in the surface of the colour it is glazed over with a hot iron, so that it becomes glossy and deep in the colour. Start by holding the hot iron approximately 1 mm from the surface, so that the colour will not be smudged or smeared. After doing this, you can press a bit more firmly. It's important that you don't wait too long to do the polishing, because if the lime in the smalto should start to harden, then the surface will become uneven, and the lustre in the colours will not emerge in the proper way. It is the even, smooth and lustrous surface that is precisely what is so characteristic of stucco lustro.

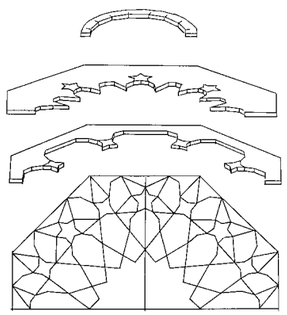
■ **Ground materials for fresco and stucco lustro**
1. Screed coat, Three parts, by volume, of coarse sand, with grains that are sized between 0 and 4 mm + one part, by volume, of slaked lime is applied, in a layer that is 0.5-1 cm thick, and smoothed over with boards or pieces of splitwood. If you want to apply this to a non-absorbing wall, you can build this layer up to as much as 3 cm in thickness.
2. Layer of plastering mixture, Two parts fine sand, 0.3-1 mm + a measure of slaked lime is applied, in a 2-5 mm thick layer, and levelled with a wooden float-trowel, so that it becomes flat.
3. Painting layer, A measure of fine marble dust + a measure of slaked lime is applied, in as thin a layer as possible, approx. 1 mm thick, and polished with a steel board.

■ **Recipe for smalto**
1.1 kg of Marseilles soap, made of olive oil, and in the form of chips; 4-5 litres of water; and 5 litres of slaked lime. Soap and water are mixed and then brought to boil for a short time, after which the mixture is stirred around until all of the soap is dissolved. Then mix up the soap with lime until it takes on the consistency of crème fraiche. Smalto has to be made a few days before it is to be used. In Roman times – for example, in Pompeii - they did not use soap in the smalto. Instead, they used birch tree ash, which has the same properties as soap. Remains of kaolin have also been found in the frescoes from Pompeii.

Stucco

Stucco relief from Persia,
circa 1000 BC. Section of wall,
Pergamon Museum, in Berlin.

Early islamic stucco cornice
with animal motif.



Ashgar Sharbaf at work on
creating a mihrab at The
Sculpture School.

The word "*Stucco*" can be used either in connection with building decorations or as a designation of a particular material. Stucco can be pure plaster or it can be constituted by different kinds of lime/chalk, sometimes modelled up around a core of clay.

Iran and Iraq —— ¨are both rich in plaster sculptures. The vast Babylonian and Assyrian palaces, with their large sphinxes and reliefs (for example, Ashurbanipal's royal Lion Hunt) that can now be seen inside the British Museum, have been carved in alabaster, a natural gypsum stone. In Iran, there is an unbroken tradition for stucco that leads all the way back to before the advent of Islam. Ashgar Sharbaf, a stucco worker from Iran, visited the Royal Danish Academy of Fine Arts' Sculpture School for a period of fourteen days in May 1994 and built up a *mihrab*, a niche for praying. The process of creating the work has been documented on video and also in a book entitled "Islamisk stuk" [Islamic Stucco].

Pompeii —— and Herculaneum were buried underneath a volcanic eruption in the year 79 AD. These towns were re-discovered in 1748. Archaeologists found there the most beautiful houses, covered with layers of plastering stucco, often laid out in the form of reliefs or as murals *al fresco,* or as walls of *stucco lustro,* luminous stucco, which were glossy fresco paintings possessing an incredible durability. The working procedures employed have been described in detail by the renowned Roman author, Vitruvius, who writes about how and in what sequence the various layers of stucco were prepared and applied. In contrast to their temple constructions in marble, the Romans built their houses with bricks that were then plastered with lime mortar, fired and slaked lime with gravel, sand or marble sand. At the intersections between the ceilings and the walls and at many spots on the walls, stucco ornaments were executed in the form of cornices or reliefs, whether these were modelled or marked up with stamps or scrolls. The stucco was painted, both in the form of pictures and as an imitation of marble. This was carried out according to the method of *al fresco,* which means to say that the painting was made on the still-moistened plaster.

Stucco cornice from Pompeii,
with white figures modelled up
against a blue background.

White stucco relief on wall in
Pompeii., The surface with
lime and fine marble sand,
polished so it resembles
stucco-lustro.

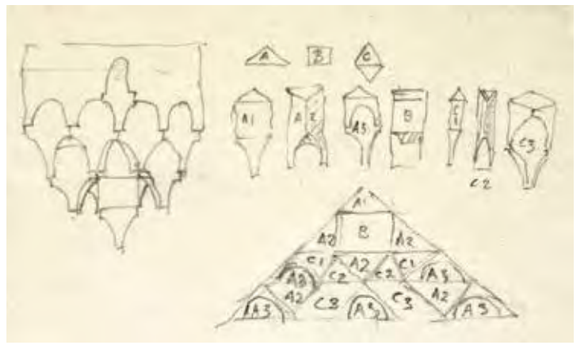
Cornice surrounding a
pilaster inside a villa, in the
vicinity of Pompeii.

Islamic stucco in Spain

In the period between 711 and 1492 AD, Spain was governed by the Moors, who were Muslim people from North Africa. They have left behind a most exquisite legacy of Muslim art and architecture, particularly in the southern regions of Spain. The very finest example is the celebrated palace and fortress, The Alhambra, located in the city of Granada. Here, one can clearly spot – in the ceilings, the capitals and the walls – the Muslim people's preoccupation with mathematics and geometry. Generally speaking, the ornaments are situated on the same level of depth with respect to the wall. They have been carved down into the plaster. At some spots, however, the patterns are only barely intimated. In other places, they are carved 10 millimetres down into the surface. This brings forth an entirely graphic effect of shadow impressions. In the ceilings, the capitals, and the arched vaults, we can see muqarnas, stalactite patterns and beehive-like patterns.

These are similar to what Ashgar Sharbaf showed us at the stucco seminar, held in 1994. If one views these muqarna patterns in their vertical orientation, and inspects them from the bottom up, it is possible to perceive them as starry patterns of hexagonal or other geometric figures.

The Lion Garden in The Alhambra, built during the reign of Mohammed V.



Muqqarnat pattern drawing after Titus Burchardt.

The Alcazar in Seville. Detail of the arched gateway leading to the Patio del Yeso.

Mudéjar style —— In 1364, the Christian king, Pedro of Seville, expanded his Alcazar with the help of Muslim craftsmen, among these being Nazirian craftsmen whose help he was borrowing from his ally, the Muslim ruler, Mohammed V of Granada. This was the beginning of the Mudéjar style, which lived on in Spain even after the Christians' "Reconquista" of Spain. What is particularly delightful is the small yard space of the castle, the Patio del Yeso, with its gateway arches, replete with volute-like ornaments. Here, you can see how the ornaments start to rise from the surface and become more spacious, just like those that emerge with the baroque style, as can be seen in the Carthusian Cloister in Granada.

Cathedral in Seville. Detail from the arch of the doorway.

Italian baroque

Sant'Andrea al Quirinale (1658-61).

The sculptor and stucco worker, Giacomo Serpotta (1656-1732) —— lived for some time in Rome, and presumably had a chance to actually meet Bernini. He decorated many churches on the island of Sicily. The finest of these might be the rather small L'Oratorio di S. Lorenzo.

Gian Lorenzo Bernini (1598-1680) —— Sant'Andrea al Quirinale (1658-61) is an oval space, set in a markedly scenographic way, with the apostle, Saint Andrew, on the cornice above the altar, looking up toward the lanterns with a dove, the symbol of the Holy Spirit. Andreas and the rest of the stucco were modelled by Antonio Raggi (1624-1686), following Bernini's instructions.

Comacini masters —— Several generations of stucco workers came from the Intelvi Valley, near Como, located between Switzerland and Italy. These skilled craftsmen were entrusted with creating stucco decorations all over Europe; they were specialists in stucco marble, which was a way of imitating marble, using plaster. In a book entitled "The Stucco Worker's Life and Craft" (published in Swedish as "Stuckatörens liv och hantværk" by Forum in 1987), the Italian-born stucco worker, Domenico Inganni, offers a description of his home region.

St. Cecilie, Como. Stucco by Giovanni Battista Barberini (1625- 91), one of the Comacini masters from the region around Lake Como. Barberini had been working for one of Bernini's assistants, Ercole Ferrata (1610-86), who originally hailed from the Intelvi Valley, also.

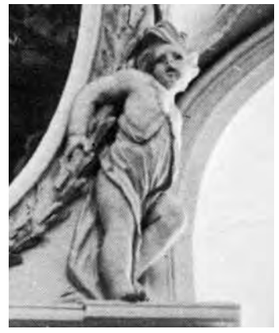
Serpotta: L'Oratorio di S. Lorenzo, Palermo. Ceiling and walls are covered with smooth white stucco, life-size figures and putti who appear to be playing with the curtains.

Baroque in the rest of Europe

Vienna —— is full of fantastic Baroque churches. Here, the stucco workers from the Intelvi Valley also worked in the seventeenth century.

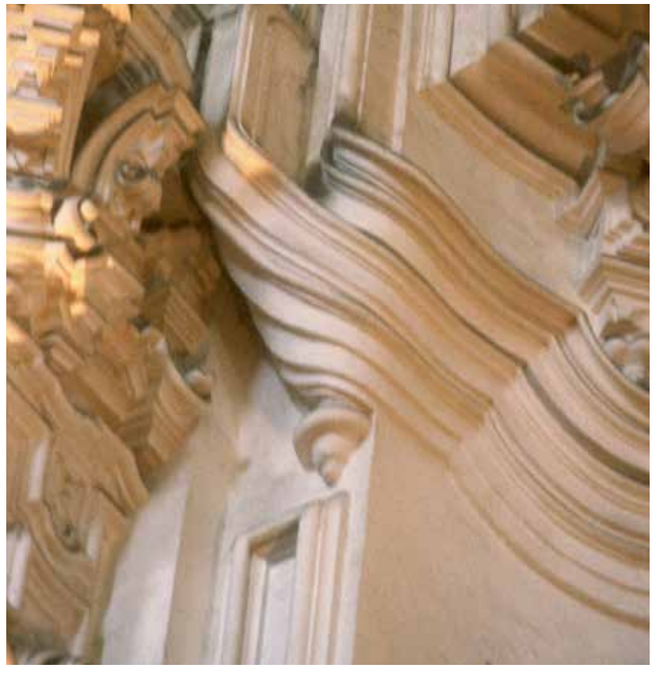
Bavarian Rococo —— Egid Quirin Asam (1692-1751) studied in Rome and was quite taken with the work of Bernini. He created "Maria's Ascension" in 1723 inside the Augustiner Chorherren Klosterkirche. Together with his brother, who made fresco paintings, Egid Quirin Asam worked on - and even financed - the St. Johann Nepomuk Church on Sendlinger Strasse in Munich.

Spanish Baroque —— also had a strong tradition of stucco decorations, particularly borne forth by the work of Francisco Hurtado Izquierdo (1669-1725), who worked on the Carthusian Cloister in Granada in 1713. Moreover, he headed up a school for decorators and craftsmen working with the applied arts. Distinct traces of his signature style can be found as far away from Spain as Mexico, where Izquierdo's approach has been integrated into Native American motifs.



Putti, modelled by Barberini inside the Servitenkirche in Vienna, 1669.

Egid Quirin Asam, "Maria's Ascension", Augustiner Chorherren Klosterkirche, Rohr, 1723.



Francisco Hurtado Izquierdo (1669-1725). Carthusian Cloister in Granada.

Baroque and Neo-classicism in Denmark

The putti are pulling the curtain aside at the end of the passage to the audience chambers at Frederiksberg Castle. This calls to mind a drapery, borne by angels, appearing in a piece that was modelled by Raggi (1656-57) and which can be seen inside the Vatican. It's quite likely that the architect of the passage, Lambert van Haven, had seen Raggi's work during his sojourn in Rome in 1668-70.

Detail of the stucco ceiling in the Cupola Hall at Charlottenborg.

Detail of the stucco ceiling in the Ceremonial Hall at Charlottenborg.

Fredriksborg Castle —— stucco ceiling in the passage from the castle to the audience chambers, which is situated all by itself on the other side of the moat, inside an old Renaissance building, the interior of which was converted into a decidedly baroque style in 1681-90 by the architect, Lambert van Haven.

Cupola Hall at Charlottenborg, in Copenhagen —— has an incredibly exquisite stucco ceiling. The stucco was executed in a plastering mixture of lime at the time the palace was constructed in the 1680s. However, exactly who created the lovely decoration is unknown, although it was presumably created by one or more foreign-born stucco craftsmen (and quite possibly by the renowned French stucco workers, the brothers Claude and Etienne le Coffre). The stucco ceiling of the Cupola Hall calls to mind the stucco in Foquet's Château, Vaux-le-Vicomte, outside of Paris. We are quite certain that Charlottenborg's architect, Lambert van Haven, actually saw the stucco decorations in Foquet's Château.

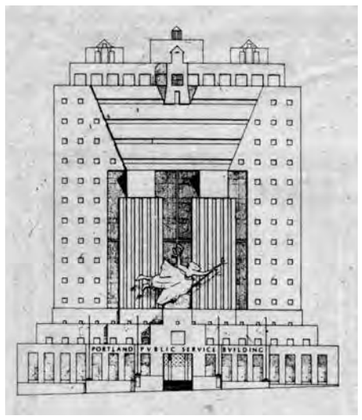
Neo-classicism —— The Ceremonial Hall at Charlottenborg represents the neo-classicism typical of the 1820s. It was with the dawning of neo-classicism, in around 1750, which appeared hand-in-hand with the Age of Enlightenment and the advent of Industrialism, that stucco started to be perceived as something more special than commonplace handicraft. The neo-classical style builds on the recapitulation of the very same ornaments, which could therefore be cast at the workshop and mounted on site. For this reason, using plaster for the stucco was an obvious choice. The stucco ceiling inside the Ceremonial Hall at Charlottenborg, the interior of which was designed by the architect, C.F. Hansen, stands as a typical example of this tendency.

Historicism —— which has also come to be known as 'style confusion', actually deserves a better reputation. Its forbearer was the architect, Karl Friedrich Schinkel (1781-1841), who held the opinion that the building should stand on its own terms, as a self-contained (hi)story. Historicism is an unabashed cornucopia of narrative ornaments, and it occasioned an enormous boom of activity for stucco workers and decorative sculptors, a group of skilled professionals who modelled pieces, working on commissions and following sketches made by others, who frequently happened to be the architects themselves.

Cubism —— *La Maison Cubiste* was a fascinating plaster model, unfortunately no longer extant, for a villa with cubist ornaments, which was created by the French artist Raymond Duchamp Villon (1876-1918). The model was shown at the decorative-art section of the 1912 Salon d'Automne in Paris. There were also a number of Czech architects who, inspired by this very piece, had baroque buildings remodelled with cubist stucco. These are reminiscences of Art Deco ornaments, like the ones you can see inside Stærekassen [the Royal Theatre's "New Stage"], located just off Kongens Nytorv in Copenhagen, which were executed in the late 1920s, following drawings made by the architect Holger Jacobsen.

Postmodernism —— in the beginning of the eighties was very specific and concrete in the realm of architecture, employing certain fundamental features from modernism while setting these into some kind of narrative. One typical example is Michael Graves' Portland Building, which was constructed with large festoons in fibreglass cast at the side of the buildings. At the same time, there was an awakening interest in stucco.

From a catalogue of stucco decorations, which was published at the end of the nineteenth century.

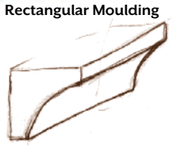


Michael Graves, Portland Building, 1980.

Partially decomposing plaster consoles on the façade of a building in St. Petersburg. Photo from my visit there in 1997. It is clear to see that the figures have been well protected from rain and erosion at certain spots while they have been badly damaged in the spots that were not so well protected.

Ornaments

Rectangular Moulding

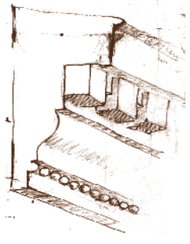


Cove Moulding

Rounded, or Half-Moon Moulding

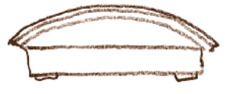
Cornice Moulding (Ogee Moulding)

Rounded Moulding



Denticulated (Notched-) Cornice

Triangular-Gable

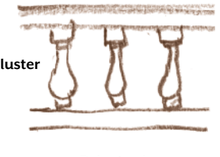


Segment-Gable

Console-Cornice

Rosette, Stylised Rose

Console



Baluster

Balustrade

Ionic Capital, on top of a column, from C.F. Hansen's Christiansborg Palace, in the Sculpture Garden.

Volute

Flute

Ionic Capital

Corinthian Capital from C.F. Hansen's Christiansborg, presently located in the Sculpture Garden. C.F. Hansen designed the capital, using as a prototype a capital from ancient Rome.

Acanthus Leaf

Corinthian Capital

Acanthus Leaf

Diamond Cross-Section

Bead Moulding, "Pearls and Sausages"

Bead Moulding, "Pearls and Plates"

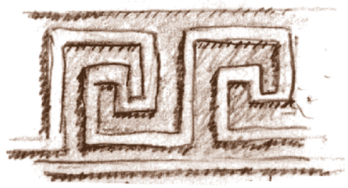
Bead Moulding

Fasces-Staff

Dentils

Eggs and Darts, "Kymation"

Palmette frieze, Palmette and Lotus Leaves



A La Greque

Lambrequin

Running Dogs

Festoon

Arching Crania Frieze

The Royal Danish Academy of Fine Arts' Collection of Plaster Castings

Ditlev Martens, Cermonial hall at Charlottenborg, 1824, oil on canvas.

The oldest parts of The Collection of Plaster Castings stem from the time that pre-dates the founding of The Royal Danish Academy of Fine Arts in 1754. The resources of this collection were used as part and parcel of the teaching at the academy.

Back at the end of the 1700s and in the beginning of the 1800s, the sculpture students of the Academy were not allowed to work from live models during their first years of study, because we humans are not perfect. On the other hand, the ancient Greek and Roman figures were! They were created from divine proportions. Not before an extended period of time had been devoted to making sketches, while looking at ancient plaster castings, was the student permitted to depict living persons, so that the representations they would be making would, of course, also come to take on the divine expressions and proportions. The Danish National Art Library, located in the courtyard behind the Royal Danish Academy of Fine Arts, has a large selection of these student drawings, which are signed – and not by the students but rather by their professors – so that the students could substantiate that they had actually carried out and completed this phase of their studies. Should he (or she) prove to be sufficiently qualified, the student could then make an application to take part in The Royal Danish Academy of Fine Arts' annual competition, wherein one would create a work of art, typically over a theme taken from the Bible. The reliefs in the entrance portal of Charlottenborg's at Kongens Nytorv are actually works of art that stem from these competitions.

In the early 1800s, C.W. Eckersberg encouraged his students to paint motifs from the Antique Hall, which is now the Ceremonial Hall. From looking closely at these paintings, we can see how the figures were set up at that time, and we can see how the students were making their drawings.

The Collection of Plaster Castings was continuously supplemented through purchases and gifts, but at the end of the 1800s, many castings were handed over to what was the newly created Statens Museum for Kunst, KAS, Kongelige Afstøbningssamling [Royal Cast Collection], which is exquisitely set up inside the West Indian Storehouse. Many of the old castings, however, remained at The Royal Danish Academy of Fine Arts and were supplemented again with a considerably large number of new purchases in the early 1900s.

"Untwins", a sculpture in plaster and zinc by Lone Høyer Hansen (1950-), created for the "Spejlinger i gips" [Reflections in Plaster] exhibition, in 2004. In the period spanning 2003-09, Lone Høyer Hansen was professor at The Royal Danish Academy of Fine Arts' Sculpture School. "Untwins" has been created in a way that strictly follows Lone's preliminary sketches and drawings, and includes zinc profiles that were prepared by Troels Sandegaard in 2004, at the time he was studying at The Sculpture School.

On the right side of the photo, the head of the horse, appearing beside "Untwins", is a casting of a section of the original equestrian bronze statue of Marcus Aurelius), for the Capitoline Hill in Rome. Today this statue has been replaced by a bronze copy. The original bronze statue from 175 AD can be seen inside the the Capitoline Museum.

Photo from the Royal Danish Academy of Fine Arts' Ceremonial hall, from the exhibition "Spejlinger i gips" [Reflections in Plaster]2004 that I curated in collaboration with Bjørn Nørgaard and classical archaeologist dr. phil. Jan Zahle, who examined all the paintings from the Cermonial hall, made in the beginning of the 19th century. Helped by this, we could recreate the collection as closely as possible as it was installed two hundred years ago. 10 sculptors created new works that went into dialogue with the old castings. See the book: exhibition "Spejlinger i gips", published by the Royal Danish Academy of Fine Arts Schools.

Today, The Royal Danish Academy of Fine Arts' Collection of Plaster Castings consists of approximately 1000 pieces. In the course of the 1970s, the collection was being treated in a way that was sorely lacking in care and attention. Through the years, Poul Holm Olsen had been taking good care of the collection, and this is a matter that we continually discussed, and at great length. Since that time, for more than 30 years, I have been active, in the care of – and the registration of – this collection, with assistance from student helpers, including Rune Frederiksen, Rebecca Hast Sørensen, who were students of archaeology at the time, as well as several other helpers.

Today, the pieces have been set up altogether properly as a study collection in the basement beneath Hirschsprung's former tobacco factory, which is a part of The Royal Danish Academy of Fine Arts' building complex on Peder Skrams Gade. At the end of the 1960s, around 100 castings were placed on deposit at The Museum of Ancient Art in Aarhus, including the utterly unique Laocoön group, which dates back to the time before the establishment of the Academy.

There are many other exciting collections of antique castings: among these are those in London – inside the Victoria and Albert Museum and in Sir John Soanes Museum; and the collection inside the Musée national des Monuments Français in Paris, in the Trocadero Palace. This was founded at the end of the 19th century and is concentrated on French sculpture, featuring whole Gothic church portals that are truly worth seeing – sheerly by virtue of the sizes, it is most impressive to see these! Many of the large castings were made as clay prints; this can be clearly seen from the colour and in the small clay folds visible on the surfaces of the castings.

One of the oldest plaster castings that we know about, a portrait bust of the Egyptian pharaoh Akhenaten, which was cast in plaster, after a clay model.

Plaster cast found in Baiae, made after a original antique bronze statue "The Athenian Tyrant-Killers", the original bronze is lost, but with this plaster cast we study the surface of the original.

Sculpture – original – model copy - casting Original – copy

Sculpture is born in clay, dies in plaster and is resurrected in bronze or marble.

Many sculptors have been quoted as saying this. Many sculptures are subjected to several processes before the artist can enjoy the finished work. For this reason, it can sometimes be difficult to say what is the copy and what is the original. In any event, you cannot compare this with a reproduction.

Plaster is a perishable material. However, when stored under the right conditions, it can have almost unlimited durability. Plaster cannot withstand rain: already after only a few days of rainy weather, you can start to see small holes appearing in the surface. If you go about moistening a plaster object, using a garden hose, you can also quickly see how the water in motion erodes the plaster, with the result that furrows emerge.

Completely dry plaster can actually withstand frost but as soon as water gets into the pores of the plaster, the water is going to expand and will slowly burst the plaster from within.

Many of the facades of old houses in Copenhagen that date from the 18th and 19th centuries have plaster ornaments: However, these ornaments, when they were dry, have been placed in linseed oil until they couldn't absorb any more. And after this, they were painted.

Outside the old butchers' shops in Copenhagen, hung gilded cows' or steers' heads that were made in plaster. I have been told that, once a year,the shop owners were supposed to put a dollop of paint on the topmost spots, where the rain was falling hardest on the gilding, and then the plaster steers' heads could last for a good many years.

One of the oldest plaster castings that we know about is a portrait bust of the Egyptian pharaoh Akhenaten, which was cast in plaster, after a clay model, sometime around 1360 BC. Akhenaten founded a new capital, Amarna, which was suddenly abandoned right after this pharaoh's death. In Amarna, in the early 1900s, German archaeologists found a sculptor's workshop, housing several plaster models, which had been preserved in pristine condition in the dry climate of the Egyptian desert. These were original models for stonecutters, who first modelled the heads in clay. After this modelling was done, a plaster mould of the head was made in one piece around the clay. The mould, which was open at the top, was sawed half through, vertically, in two places and then chipped into two halves, in order to facilitate the process of digging out the clay. The mould was subsequently assembled once again and filled up with plaster. mould burrs can be seen quite distinctly on the neck and above the ear.

In Baie, near Naples, a most interesting find was made of plaster models from the Roman era. These plaster castings were found under a stonecutter's workshop that was turning out marble copies of Greek statues. This means to say, these plaster castings were being made from original bronze Greek statues, which we know about today only from ancient texts. Among these is a very renowned statue group, *The Athenian Tyrant-Killers*, which depicts the two men who paved the way for democracy in Athens. This statue group had previously been known solely through what was a rather imprecise marble copy, and now one could experience a high-quality casting of the surface of the bronze statue.

Back in the 1980s, at Dokumenta's bookshop in Kassel, Germany, I spotted a set of bookends made of plaster that represented a king reading and shackled between two columns. The bookends were created by an American artist named Tom Otterness. In the beginning of the 1980's, Otterness made small stucco friezes, which he sold individually and which were used in buildings around doorways and similar architectonic features. It was Tom's aspiration to be able, in this way, to disseminate sculptures in a more popular way, outside of museums and collections.

I have created a figure that is being sold through the aegis of the Danish daily newspaper, Politiken. As of this writing (2018), more than 6,000 copies of this sculpture have been sold.

I have also made an edition of plaster figures. One of these figures was used, for example, as a gift to every one of the members of the Sadolin Art Association. These figures were glued onto different corner socles, with the result that none of the figures were entirely identical to any of the others.

Photo:Torben Glarbo

August Rodin (1840-1917)

Few sculptors have influenced our perception of sculpture to the degree that Rodin has. On the one hand, Rodin represents tradition. On the other hand, it was he who initiated a new departure in sculpture. For me, Rodin has also been a source of excitement because he possesses such a thorough knowledge of and respect for the craft. Presumably many of his contemporaries also had this knowledge, but he has displayed it in such an original and such an innovative way.

Rodin spent his years of apprenticeship as an artist in the studio of a decoration sculptor. In "Art: Conversations with Paul Gsell"(University of California Press 1984, p.25), the artist tells us, in his own words, about how he was taught the *science of modelling*. While Rodin, one day, was working on a capital ornamented with foliage, a professional modeller going by the name of Constant said to him: "... 'Rodin', you are not doing the right thing. You make all your leaves flat. This is why they do not look real. Make some of them project toward you so that they seem to have depth.'

"I followed his advice and marveled at the results I obtained. 'Do remember what I am about to tell you,' Constant continued. 'From now on, when you sculpt, never think of forms as planes, but always as volumes. Consider a surface only as a protruding volume – as a tip, however wide, pointing at you. This is how you will acquire the *science of modelling.* '" Rodin continues from here, and recounts: "this principle was amazingly fruitful to me. I applied it to the execution of figures. Instead of imagining the various parts of a body as more or less flat surfaces, I represented them as projections of interior volumes. I endeavored to express in each swelling of the torso or the limbs the presence of a muscle or of a bone that continued deep beneath the skin. And so the trueness of my figures, instead of being superficial, appeared to grow from the inside outward, as in life itself."

Later on, Rodin made use of his early experiences with casting techniques as an implement in his sketches and models. He had the same figures cast in plaster in several examples, sawed them into pieces and assembled them in somewhat different ways – and sometimes these pieces stemmed from several different figures. And he managed to create certain figures in positions that would not be directly observable from nature. These pieced-together figures were used as models for marble or bronze sculptures. However, there are times when one gets a sense that Rodin regarded these plaster assemblages as independent works of art in themselves.

In the background, a morning dressing gown that Rodin, bought from Balzacs own tailor and dipped in plaster as a preliminary sketch for the Balzac statue which stands in the foreground.

Plaster assemblage by Rodin.

Etching from "Les Cathedrales de France", where Rodin writes:

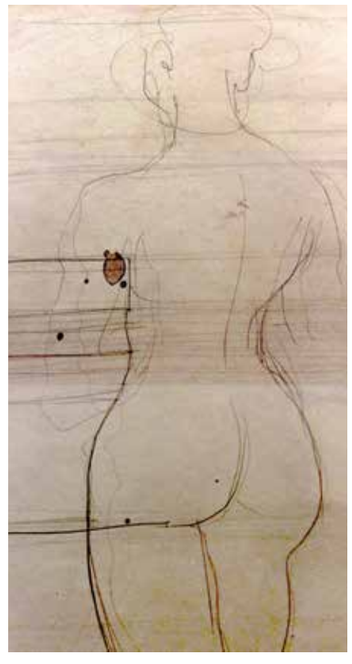
"...the Renaissance has transposed the worshipped flesh of the woman, and its softness, into the cornice, into the ornament, into all the architecture, into the music of the body. Cornices are symphonies of immense sweetness."

From the French original of "Les Cathédrales de France", you can find it at the Danish National Art Library:

"La Renaissance a fait passer la chair adorée de la femme et sa tendresse dans la moulure, dans l'ornement, dans toute l'architecture, cette musique de chair... Les moulures sont des symphonies douces."

The French word "chair", means both flesh and also the soft parts of the body, but translated to other languages it might sound odd to say "music of the flesh".

On a large casting made from Rodin's "Victor Hugo", on view at the Ny Carlsberg Glyptotek in Copenhagen, you can see just how thin the plaster shells were that the Parisian stucco workers could cast, with tow (linen or flax fibres) as the armament material.



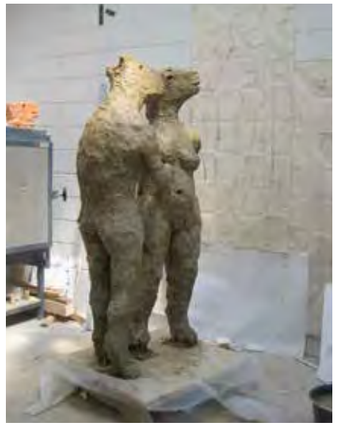
Model drawing by Rodin, where he – with horizontal lines – shows the resemblance between the shapes of the female body and the profiles of the cornices from the Gothic cathedrals.

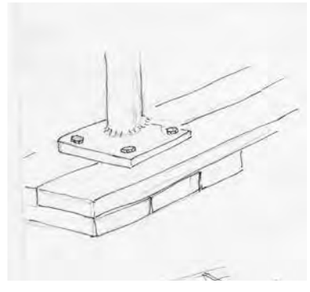
About armatures

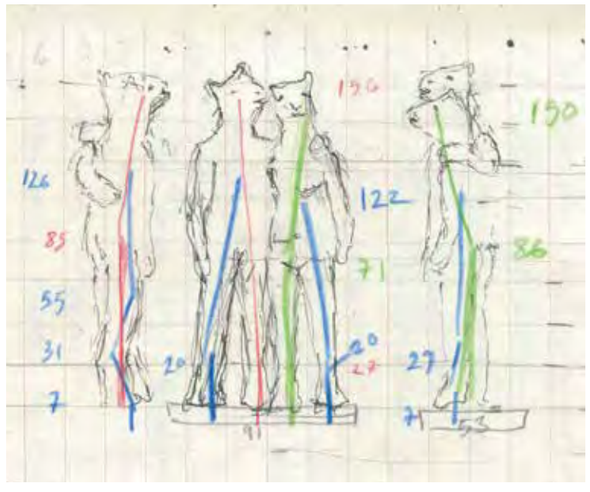
When you model a sculpture in the dimensions of a human body, doing so requires a proper armature. You can use one-inch iron pipes (25 mm in the inside measurements), which have to be welded firmly onto a 2-5 mm thick iron plate, with the approximate dimensions 10 x 10 cm and with holes drilled in the four corners, so that the armature can be screwed securely into a wooden board, made of two or three layers of boards that have been screwed together in crisscross fashion. The pipes have to be bent according to the dictates of an armature drawing, that is to say, a technical drawing embodying a representation of the figure as seen from the front and from the side. If there are two figures together, they can be drawn from three sides. It is important to understand that this is not a perspective drawing. When you are working by looking at a living model, you have got to draw all points with a horizontal view. You can take measurements of the model and set these into the drawing. Mark out a clear horizontal line and draw perpendicularly to this: a vertical line. If the model's head is placed squarely above the foot of the supporting leg, then they both have to be placed in vertical alignment. The drawings from the front and from the side have to be viewed perpendicular to each other. It is a good idea to mark out a main vertical line in the middle of the armature drawing, a line that corresponds to the middle of the plate on which you are modelling. Now you can draw the pipes for the armature right into the drawing, so that they will remain inside the figure.

The advantage of making an armature drawing is that you can take the drawing with you to a blacksmith, who can bend the pipes in the way that has been prescribed. At The Sculpture School, we have been doing this ourselves, with a pipe-bending contraption for bending strong steel pipes, which can then be fastened into a screw-vice. Or we have cut the pipe in half, so that it can be bent and subsequently welded together once again.

After doing this, thinner pieces of round steel are fastened to, for example, arms.







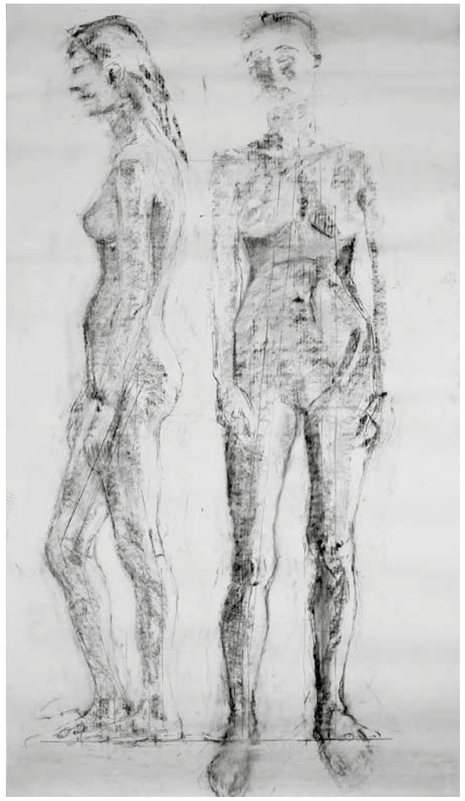
These pieces can either be welded firmly – you can drill a hole through the pipe and stick a piece of round steel through – or the pieces of round steel can be fastened with a special kind of fitting: a U-shaped ring with a small plate that can be tightened around the pipe with nuts. The pieces of round steel can also be assembled with wire locks, which can be obtained in different sizes.

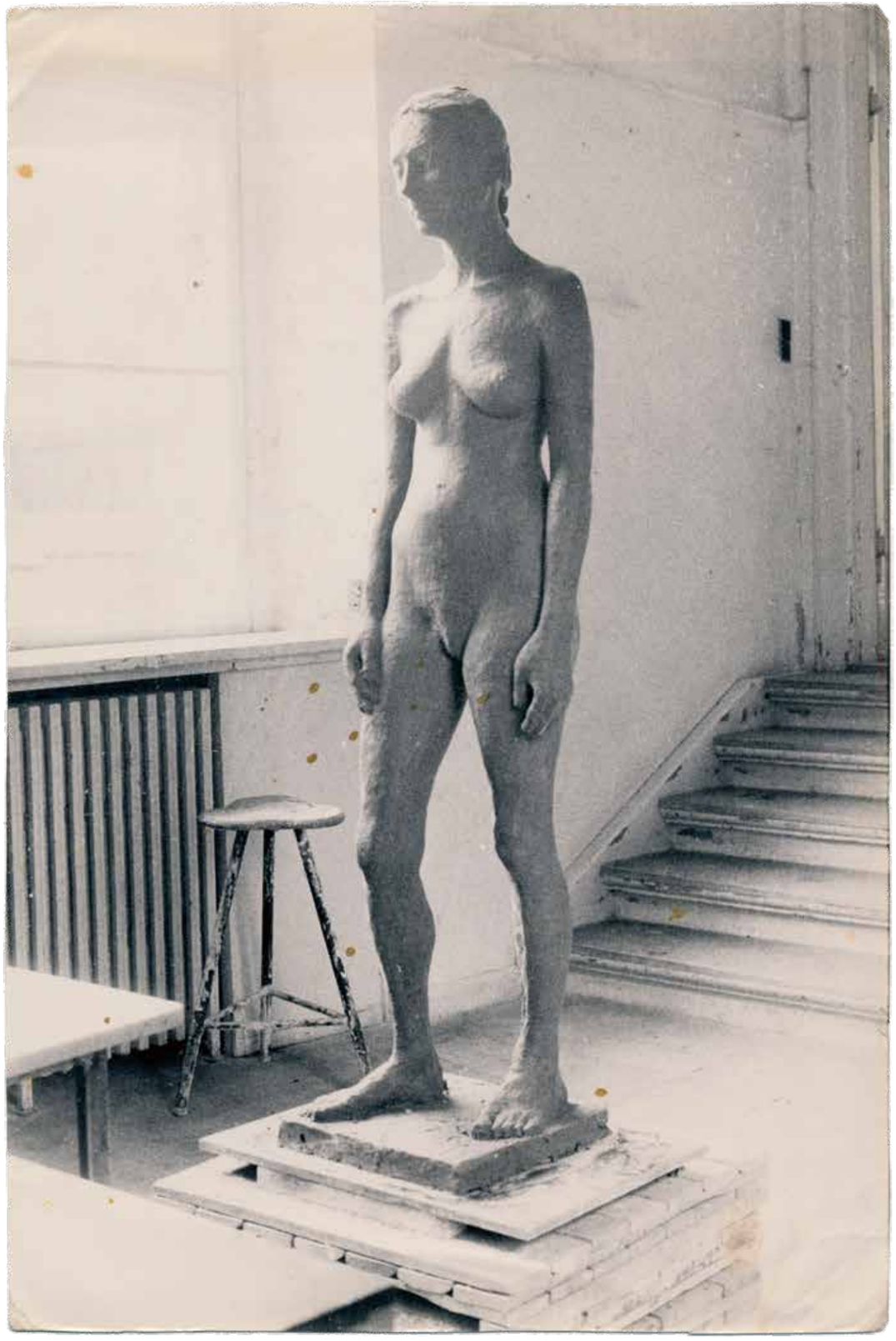
One challenge that has to be faced when modelling is that clay, because of its weight, has a tendency to sink and slide downward. I usually fasten a piece of chicken wire that can be tied securely to the pieces of round steel, which constitute the armature for the arms. What can also be done with steel thread is to tie small wooden crosses together, which can be fastened into the armature and serve to stop the clay from gliding downward. Alternatively, you can strike two holes in beer bottle tops and thread steel wire through the holes, so that these contraptions can be used in much the same way.

Often, pieces of Styropor (polystyrol) are tied securely with the chicken wire, so as not to use so much clay. These are also carefully fastened to the armature and will ensure that the figure will not collapse. Be sure to keep the figure moist by wrapping it well with plastic. The figure needs to be wrapped in moist fabrics: old washed-out sheets, for example, since they absorb the moisture best. The sheets are to be made wet, squeezed out and shaken before being laid close to the figure. If you place plastic around the clay figure immediately after doing this, the moisture will be absorbed right into the clay figure.

Drawing by the sculptor, Svend Jespersen (1895-1985), which discloses how the armatures were made at the time when Aarsleff was the professor.

Poul Holm Olsen, my teacher at The Sculpture School, also helped me in such a way that I was able to execute a study after a living model in life size. He showed me how to make a full-size armature drawing, in the way that he had learned from the sculptor William P. Larsen(1884-1961), who had been a teacher at The Sculpture School. William had told Poul that way back when he had been a student of Aarsleff (from 1912), the armatures for working with figure-modelling at the Model School were connected to an L-shaped steel rod that they called a 'gallow'. This steel rod bore the weight of the figure and was itself supported by the plate on which the figure was only partially resting. The steel rod/gallow stuck out from the figure when it was finished being modelled. Consequently, one was not bound by the strict limitations of the armature, but could make variations on, for example, the size of the plinth. The figures were ordinarily being made in half-size. This way of proceeding was traditional at the Royal Danish Academy of Arts when Aarsleff was the professor. What Utzon-Frank wanted, however, was an armature that would be situated inside the figure, like a skeleton. It was crucial to know beforehand which dimensions and what extension the figure was going to have. Sketches and models were necessary. The figure would be standing on its own and would not be borne by any kind of gallow.





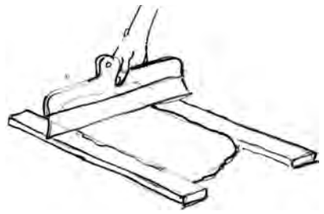
Making of models

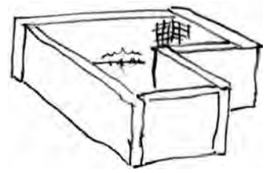
Whenever we make castings, we call the original figure on which you make the mould “the model” or “the original model”. The model that you are fabricating might be a model in clay. Alternatively, you can model directly in plaster.

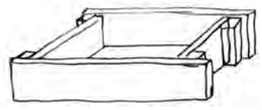
Large plaster models with Styroform —— In 1996, I started to live next door to Bent Sørensen and Sigrid Lüttgen and for a period of about 10 years, I was privileged to follow what they were doing as sculptors. At that time, they were in their eighties, and they were still busy making large sculptures in stone and bronze. The sketches were made in ceramics, but the large sculptures were worked up in Styropor (polystyrol) – in everyday jargon, ”flamingo”. Bent had developed his own special way of enlarging the small sketches. The flamenco pieces were built together with whipped-cream-thick plaster, and on top of this surface, it was possible for them to work further with plastering. Onto this finished plaster model a mould was then made for casting the piece in bronze with the *cire perdue* technique, or it was used just as it was, as a point of departure – also called a ”huggemodel” [=stonecutting model] – for making a sculpture in granite.

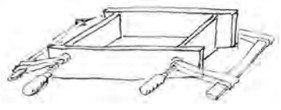
The Greenlandic sculptor Simon Kristoffersen was a guest student at Billedhuggerskolen in 1969 and was taught by Poul Holm Olsen. Here Simon performed, among other things. his tupilak figure over the Greenlandic legend about the boy Kaassassuk. The sculpture was cut out of a 1 x 2 x 1 meter styropor block and then finished in plaster. It stands in bronze outside Greenland’s self-government building in Nuuk. For a Greenlandic sculptor, it is more natural to cut a sculpture out of a block than to model it up, at least then, when they all still cut their sculptures into wood or bone.

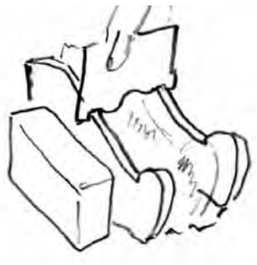
Casting of plaster boards and plaster boxes











When you are making geometric figures or profiled figures, drawing or turning them with a zinc template or assembling them from plaster plates can be advantageous. When you are going to cast plaster boards, you will first have to find two wooden strips that have the thickness you want the plaster boards to have. Smear the wooden strips and the table with stearin/rapeseed oil or the equivalent; place bricks on the strips so that they'll remain lying down.

If you want to have a particular width for the boards, you will need to measure the distance between the wooden strips.

Mix a good, strong plaster, and pour this out, on top of the table, between the wooden strips. Pour successively, while the plaster starts to thicken in its consistency, until the plaster has filled the vessel so that the plaster mixture has risen to a level just above the strips.

As soon as the plaster has attained the consistency so that one can remove the bricks without having the wooden strips move, scrape off the surplus plaster with a broad spatula. Move the spatula sideways, back and forth, in order to avoid making stripes as a result of the hard plaster grains. After the first smoothing, take a short break from the work, as the plaster gets even harder. Then adjust it once more. In this way, you can attain a completely smooth surface, in the end.

You can, of course, also make a frame with four wooden strips. However, if you pour the plaster in, successively, as it is hardening, two strips will suffice.

After the plaster has hardened, you can remove the wooden strips and saw the plaster plates you need with a handsaw, preferably an old and tired one. Then you can assemble the plaster plates with cellulose glue or with burlap, dipped in plaster. You can assemble the four sides and then go about casting the fifth directly on the table in between the four boards.

You can cast a plaster cube or a hollow plaster box by sawing out the sides in wood, two of them having the desired dimensions and the other two being somewhat longer, so that they can be fastened together with clamps or can be screwed together from the outside. Smear the inner side of the box and the table with stearin/rapeseed oil, and either fill it up or cast it hollow with burlap and possibly steel reinforcement. When large boxes are going to be filled up, it is a good idea to seal the casting box on the outside with plaster, which is then allowed to harden before the box is filled.

A console can be made by sawing two plates out according to the profile of the concole, as seen from the side. Then, set these upright, with the desired gap in between them, which should then be filled up with newspaper and plaster, at the top. Then, cut out the profiling that you desire in a zinc plate, which is then to be dragged along the two plaster plates.

Drawing a profile with zinc template

■ **Release Agent**
Both the template and the supporting table should be lubricated with stearin/rapeseed oil

The zinc template is clipped out from a 1 mm thick sheet of zinc, with a small plate shears (goldsmith's scissors). You can also cut even lines by making an impression with an awl; the etching has to be done sufficiently deep for you to be able to make out the line on the other side of the sheet metal plate. After this is done, the zinc is snapped off along the etched line by bending the plate back and forth. With a sharp pair of metal compasses, you can etch a precise radius that can be snapped along the etched line by bending the plate back and forth.

The zinc template is placed on top of a piece of wood (15-20 mm thick). The profile is copied and cut out, with a compass saw, about 2 mm larger in extension, and bevelled at the back. The zinc is nailed firmly to the wooden piece with small blue large-headed nails; before you do this, you will need to use an awl and make small holes. Nail wooden pieces, about 30-40 cm in length, to both ends of the template's wooden piece. Then stabilise them with wooden strips functioning as struts. Fasten a straight board to the length of the table, along which the template can be dragged.

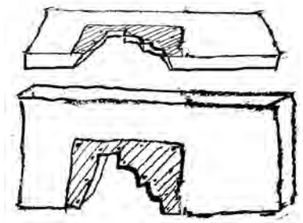
You can also choose to proceed by nailing an extra board to the one end, which will extend a little bit lower down. This is known as "the sledge". What this facilitates is that the template can be dragged along the edge of the table. It is a good idea to nail a vertical wooden batten onto the inner side of the sledge. The wooden template should be nailed firmly to the wooden batten. This provides greater stability to the whole profile.

Spoon the plaster up from the bucket (from the one side of the bucket). This plaster will be considerably softer than the plaster on the table. Now, build up the edge with a heaping handful of this spooned-up plaster and push towards the profile and the template, while dragging the template all the way through.

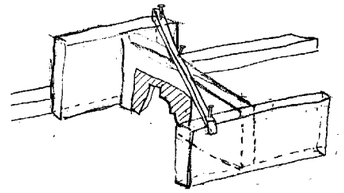
The plaster is to be placed on the table inside the area of the profile. After the plaster is reasonably firm, drag the template along the length of the table, as you build the plaster profile up with your left hand. Drag the template all the way through, once or twice, so that the plaster profile emerges in its main characteristics. The template has to be cleansed, especially below and behind the zinc template. The profile is drawn quickly through the plaster profile. Doing this will also serve to remove the surplus plaster. The template then has to be rinsed once again.

Now, we can spoon the plaster up from the bucket (from the one side of the bucket. This plaster will be considerably softer than the plaster on the table. Now you have got to build up the edges, with a generous handful of this spooned-up plaster, which is pressed toward the profile and the template, while at the same time, you are pulling the template all the way through. This process has to be repeated until the result is satisfactory. In between every round of the process, rinse the template very thoroughly. Every second time, you must drag the template across the object very rapidly in order to remove the build up of surplus plaster.

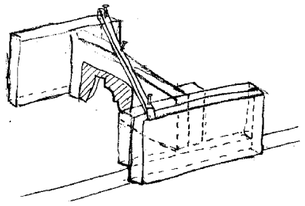
The best result of all is achieved by finishing the profile with one and the same mixture of plaster. If necessary, one can stir up a new batch of plaster, but then you have to move the template constantly. Otherwise, the plaster profile will suddenly be so large that you will not be able to move the template, since plaster expands at the rate of 5 mm. for every meter during the final phase of the hardening.



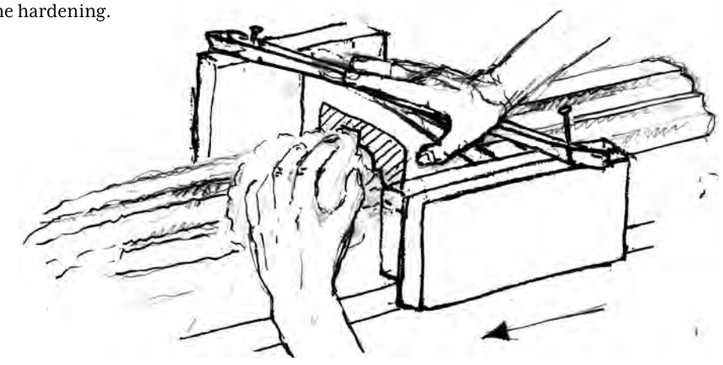
The zinc should be nailed firmly to the wooden piece, with small blue large-headed nails. Before doing this, you will have to make a small hole with an awl.



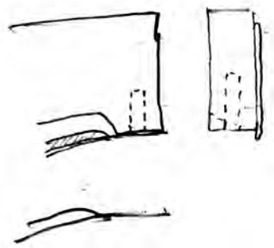
Fasten a straight board to the table, along which the template can be dragged.



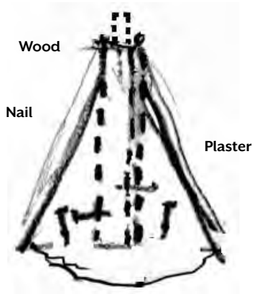
An extra board, which extends a bit lower down, makes it possible to drag the template along the edge of the table.

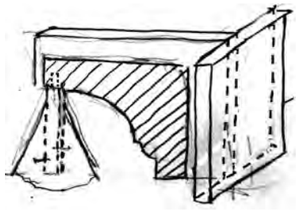


Rounded profile with the zinc template



Wood screw with its head sawn off





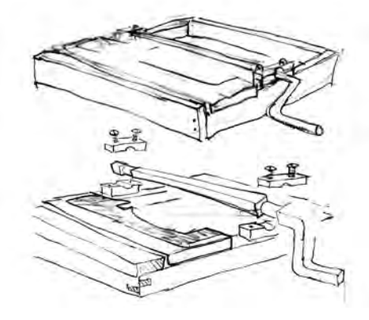
A hole is drilled in the template, with the same diameter as the wood screw with its head sawn off.

Build up the profile in synch with the hardening of the plaster, while the template is drawn around the centre of rotation, as described on the previous page.

As a centre of rotation, use a piece of wood that is as tall as the gap between the hole in the template and the table. At the top of this contraption, insert a wood screw (for screwing into wood), with its screwhead sawn off by a hacksaw, so that a peg remains. This peg ought to have the same thickness as the hole in the template. The wooden piece is then plastered firmly to the table, with the plaster being shaped conically, so that the resulting shape will facilitate removal of the material. First apply shellac to the wood. Then insert small nails into the wood and down into the table, before applying plaster, so that the centre of rotation will be stationary during the process. Should you happen to be working on a stone table, you can drill a hole, down into which a wooden peg can be inserted. Then you will always have a spot on the table down into which you can hammer a nail.

After this, you can build up the profile in synch with the hardening of the plaster, while the template is moved around the centre of rotation, in the same manner as described above in the discussion about "*Drawing (pulling/dragging) a profile with zinc template*"

Turning of thin objects



One can also turn a model in plaster situated around a ribbed piece of reinforced steel rod that has been bent to form a winding handle, fastened to a wooden frame. On the same wooden frame, fasten the zinc template. It is best to have two people carry out this operation. One of the two can turn while the other one builds up a core, possibly with long strips of canvas dipped in plaster. When there is only 1-2 cm missing from covering the whole edge of the template, mix up a new portion of plaster, so that you can finish turning the model with this portion.

At The Royal Danish Academy of Fine Arts' School of Sculpture, we have a wooden frame with a skilfully-welded winding handle, where the axle is square-shaped and narrower at the one end, so that the model can easily be dismounted from the pin when the work is finished.

This contraption has been used for turning balusters and the like.

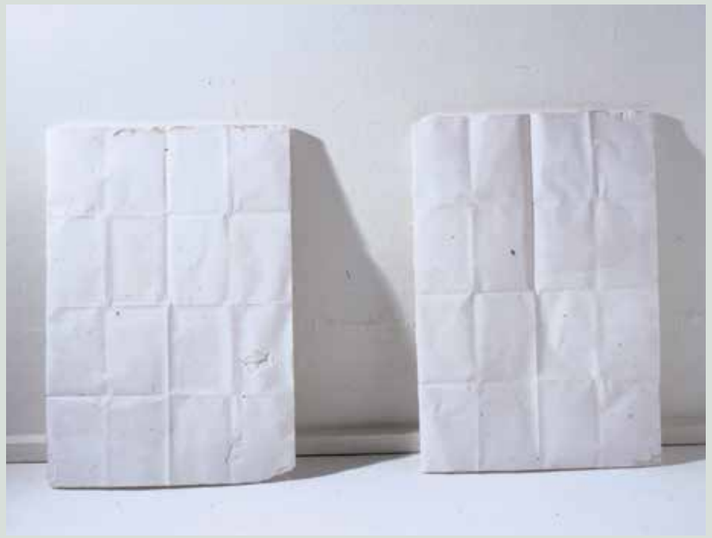
Kirsten Ortwed,
"The Middle of the Hour"
in progress 1999.

The HVID [WHITE] Exhibition —— Kunsthal Charlottenborg's advisory board had a plan about setting up an exhibition that would be comprised entirely of artworks made on site in paper, plaster and wood. I was excited by this idea and I certainly wanted to participate. And I actually agreed to curate the exhibition. My inclination, however, was to focus on plaster. I wanted to borrow Professor Poul Gernes's buttocks-imprint made in the cardboard box, as well as one of Professor Bjørn Nørgaard's plaster pourings on top of cardboard boxes, which would be shown together with a film made by Peter Louis-Jensen, a film that was shot while Bjørn was casting a classic column in a plastic bag and a wooden stand, and a video that showed two Iranian stucco workers at work while visiting the Royal Danish Academy of Fine Arts' School of Sculpture – and also the pieces they had made. All in all, twenty-one artists were invited to participate in the exhibition.

Each of these artists was given a package with a piece of plasterboard, a piece of Masonite, 100 grams of plaster, and a piece of paper measuring about 100 x 50 cm, which I had folded together rather carefully. Mogens Otto Nielsen (1945-) folded out his piece of paper, smeared it in oil, placed it down onto sand and cast a plaster mould of it. In this, he could cast fantastic reliefs. When these were exhibited, leaning up against the wall, with lighting coming in from the side, they faithfully reproduced the lightness of the paper. In a number of flat forms, Kirsten Ortwed (1948-) cast round plates in plaster, and just when the plaster began to harden, she let drops of water drip down onto them; they lay on the floor like gigantic water lilies. Quite a few wonderful pieces came into being. Among others was Bjorn's house made totally of plaster, which was cast on site, with steel threads in the windows and doors, which paid a nod to his plaster pieces from the 1960's.

Bjørn Nørgaard, "Maison
Imaginaire" in progress
1999.

Mogens Otto Nielsen,
plaster relief, 1999.

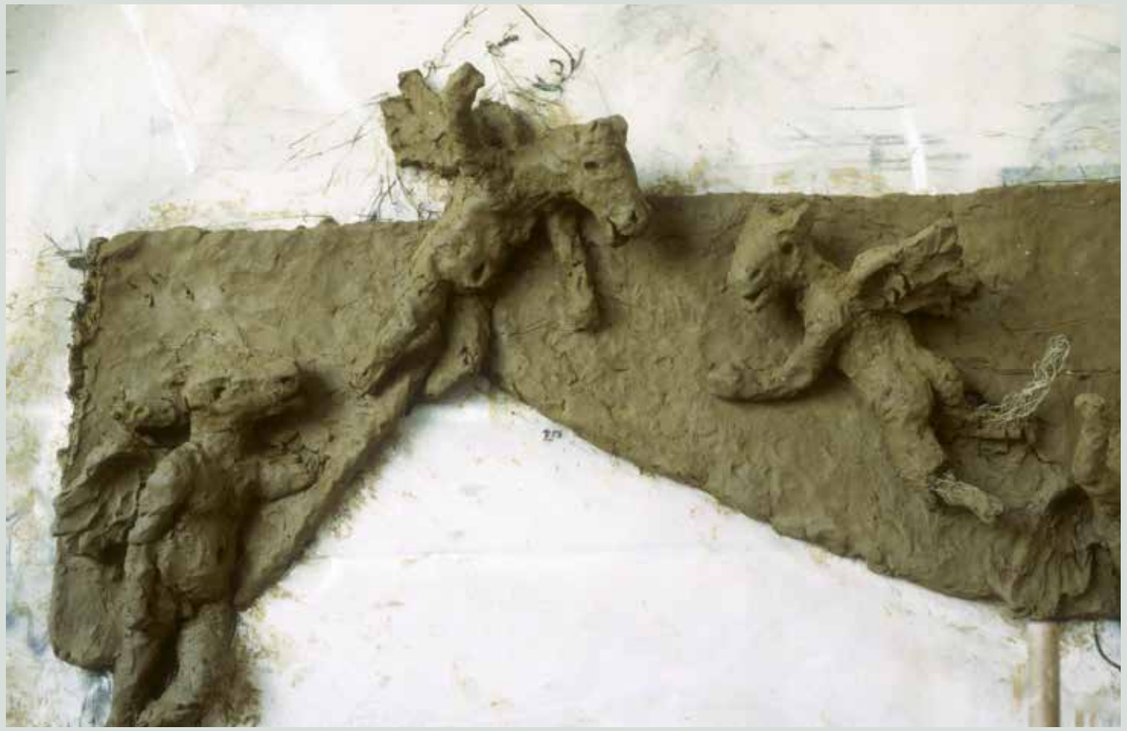


For this exhibition, I created "Horses' Gate", with a huge console built up from plaster slat boards, which were enlarged after a model in the scale of 1:5. On site, the slats were screwed into place on wooden battens. Then they were filled out with paper. Lastly, they were filled up with plaster. The figures were then built up in the form of boxes of plaster boards (sheetrock).

The angel above the gate was modelled directly on the wall, onto a armature in the right height. The armature made it possible to lift down the pieces of the angel before I started making the waste plaster mould on the clay.

"Fortællingernes by" [City of Narratives] exhibition —— Presented at the Museum of Contemporary Art in Roskilde, in 1997. The craftsmen followed my drawings in constructing the coulisse house and the doorways. After they were finished doing their work, I applied the plaster. Inside the House of the Satyr, represented on the left side of the picture, there was a plaster cornice with angels' and devils' heads. I modelled the angel over the doorway directly in clay onto the wall, at the desired height, with an armature, so that I could dismount it in parts before I went on to make the waste-mould on top of the clay.

Inside the "House of the Satyr" was a cornice with heads of angels and devils.



Dental clinic at the Mun-H-Centre —— I took my inspiration from *putti*, small angel children who draw curtains aside at the end of the secret passage leading to the Audience Hall at Frederiksborg Castle, which in turn very much resembles a drapery supported by angels modelled by Raggi in 1656-57, on view inside the Vatican. I screwed chicken wire onto the wall of my studio so that I could model the stucco curtains and then make a waste-plaster mould in three parts, which, when they were cast, could be transported up to Ågrenska. Here, I screwed them securely to the wall and retouched the joints between the three respective parts and the wall, so that the stucco curtains would make their appearance as part of the wall.

Landshövdingehus in Olskroken, 1975, Gothenburg.

Landshövdingehuse —— The very first time that I became aware of stucco was when I was 20 years old. I was living in a former working class area known as Olskroken that had been constructed in the 1890's. The houses were built according to the prevalent procedure of the time in Gothenburg, with the ground floor in stone and the rest of the building in wood. At this time, in the middle of 1970s, it was deemed that these houses were to be torn down. Although they were badly maintained, they were still good, solid and excellent houses.

Watching these old wooden buildings, that date from the latter part of the nineteenth century, by and by being torn in half by bulldozers, can elicit a very brutal reaction. However, right here, suddenly, one could clearly see something interesting about the construction of the buildings. Both in the ceiling and on the walls, the plastering hung down in large flakes, with the result that one could see the planks behind the plastering. That the plastering had not fallen down entirely is due to the fact that it had been plastered up around reeds that were bound together – with delicate steel threads – in the form of mats. Where the ceiling and the wall met, there was a stucco moulding, a cornice cast in plaster, with profiling and stylised flowers, that had been attached so firmly that the layer of plastering came undone from the cornice in those spots where it had been ripped free from the wall. What was surprising to me, and this is something that had never occurred to me before, was that there was a hollow space behind the thin plaster cornice. Suddenly, I could intimate a sense of refined talent for craftsmanship that was hidden here, and I started to wonder whether there was anyone left who could perform the craft with mastery.

House of Dreams, installation at Art Copenhagen 2014.

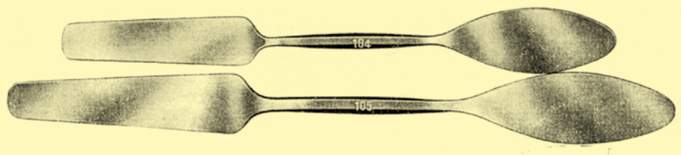
Tools and materials

Tools

Caselli or Milani no 2 and 5, 18 and 18,6 cm.

Caselli or Milani no 164, 23,5 cm.

Caselli or Milani no 71, 34,5 cm.



Caselli or Milani no 104 and 105, are 31,5 and 38,5 cm.

In the mountains east of Carrara and Pietra Santa, to the north of Pisa, two workshops existed that made special tools for stucco craftsmen: Milani and Caselli. Here is a photograph taken at the Caselli workshop, in the town of Bagni di Lucca. The picture was taken in 1986 when I visited the place.

This company has been shut down by now, but the other firm called Milani (website: http://www.milaniutensili.it/), makes the same types of stucco worker's tools that Caselli used to make. Moreover, they are using the very same catalogue numbers as the tools that have been depicted here.

It is the way that these items are forged and hardened that renders the thin blades of the stucco spatulas simultaneously hard and elastic: they can bend slightly without becoming "bent".

They are heated up to a very specific temperature, which can be seen by the colour, and then they are cooled off in a bath of water, which must also have a certain temperature. This is why the stucco worker's spatula must not be warmed up over a flame, as some people do when they are working with wax. The heat can destroy the tempering, and the steel can lose its elasticity. For working with spatulas that you want to heat up over a flame, you ought to find other kinds of tools!

In London, there is a special shop for sculpture-making tools: Tiranti, located at 27 Warren Street. Here they also sell Italian-made plaster spatulas. See. http://tiranti.co.uk.

Here are the tools that I feel are the most necessary ones for you to have at your disposal:

A "ziehklinge" (pulling blade) is just perfect for scraping plaster smooth.

You scrape in different directions in order to obtain a surface that is completely flat. A *ziehklinge* can sand in a way that is finer than what ordinary sandpaper can accomplish. Carpenters and violin builders also use *ziehklinges*. There are both completely rectangular *ziehklinges*, with straight edges, and rounded *ziehklinges*: for example, those that are called "goosenecks".

The one that you will want to use most often in connection with working in plaster is rectangular in shape, and it should be 0.6 mm. thick, so that it can be bent just a little bit.

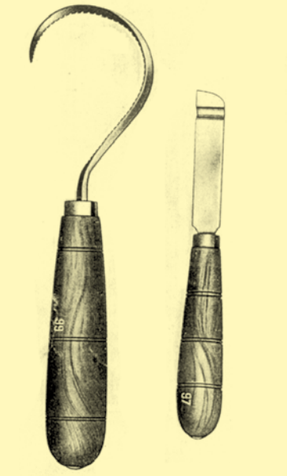
To sharpen the *ziehklinge*, you need to fasten it tightly into the vice and file the edge so that it becomes sharp.

There are also thinner *ziehklinges*, with rounded corners, which are actually made for being used in ceramic work.

You can also use sandpaper on plaster, but I'm not so fond of doing this because I think it gives rise to flaccid and imprecise shapes inasmuch as it amplifies the unevennesses that are there beforehand, while with a *ziehklinge* or a rasp, you can tighten up the shape.

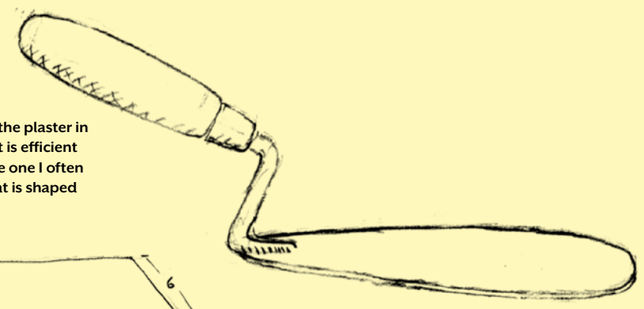
Ordinary wooded rasps can be used, especially on dry plaster. There are special rounded rasps for marble, which are also excellent for working with plaster. As long as the plaster is slightly damp, plaster will settle into the teeth of the rasp, and then the plaster can be cleansed away with a steel brush. On many of the sculptor Kai Nielsen's (1882-1924) plaster models we can see circling trails and marks from rasps, which he used on his figures, which were in possession of those very taut rounded shapes that were so typical of the Jugend-style era.

If you want to obtain a completely smooth surface, you can finish off by using special sandpaper for wet-polishing, which can be kept clean by constantly immersing it in water.

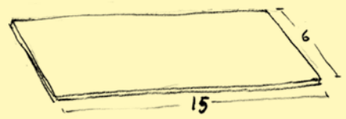


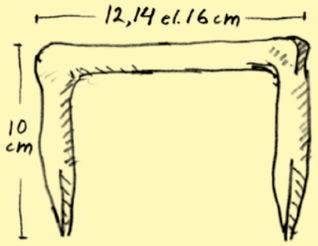
Sling no. 99, which is 23 cm long, is good for scraping plaster, especially hardened plaster that is still moist. But it is also good for working in clay, and it is just fine for digging clay out from the large moulds.

The small knife was originally designed for glue-moulds. But if you sharpen this tool with a file, it can cut rubber moulds up so that they obtain a kind of tongue-and-groove contour and can hold each of the two rubber-mould halves in place, in this fashion.

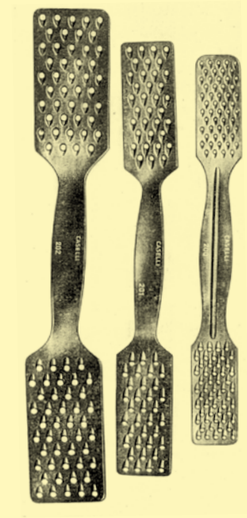


When building up the plaster in successive layers, it is efficient to use a trowel. The one I often use has a blade that is shaped like a fish scale.



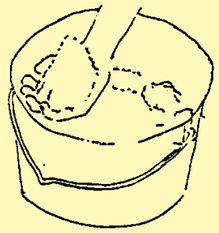


Iron cramp for assembling the plaster mould, with forged edges and corners that have been forged flat, so that they will not get bent.

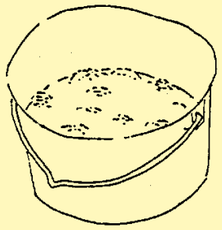


Plaster rasps: the one in the middle, no. 201, is 27 cm. long. They look like vegetable graters. Actually, these are the same contraptions that are found on those kitchen utensils! Hard-form rasps, made by Stanley, have the same function; they give a smoother surface.

Materials



Plaster powder is finely sprinkled into the water, mostly along the edge of the bucket.



When the plaster powder lies like islands on the surface it will become a strong plaster.

Use the plaster from the one side of the bucket to the other.

Plaster of Paris (Gypsum) —— The English-language verb, "to plaster" signifies "to work in mortar", and should not be confounded with the noun that is the shortened form of Plaster of Paris: 'plaster', which is also called 'gypsum'.

Calcium sulphate, $CaSO_4$, with chemically bound crystallisation water, is found in nature, especially in the form of alabaster. When alabaster is fired, some of the substance evaporates as water of hydration, and what remains is the plaster that we use for casting. Plaster is available in sacks containing either 25 kg or 40 kg, from paint stores or shops that specialise in dealing building materials. The plaster is sprinkled into water. It is important to distribute it as you knead it into fine grains with your fingers. Sprinkle the greater part of the plaster out near the edges, since plaster has a tendency to float in toward the middle of the solution, anyhow. Eventually, there will be about twice the volume of ready-to-use plaster as there was water at the outset of the process. The strength of the plaster is contingent upon how much plaster is sprinkled into the water: the more plaster that is sprinkled into the water, the stronger it will be. If the plaster is stirred up when the plaster powder lies like 'island' accumulations on the surface of the water, it will also be a very powerful plaster, good for casting figures or making piece-moulds. On the other hand, if the plaster is stirred up when there is still approximately one centimetre of water above the level of the powdered material, the result will be a weaker plaster.

To mix up 1 litre of plaster solution that is ready for use, combine 1000 g of plaster of Paris with 600 g of water. Accordingly, a plaster object occupying a volume of 1 litre is going to weigh 1600 g right after it is cast. Already during the hardening of the plaster, it will start to emit water. This is something you can sense as it becomes warmer and warmer during the final phase of the hardening process and when water vapour starts to rise from the plaster. After this, it will still feel moist and will dry according to how warm, how airy and how humid it is, and depending on where the piece happens to be standing – drying out can take anywhere from one day to several weeks.

When the plaster feels completely dry, it's going to weigh approximately 1100 g. This means to say that 100 g of water is chemically bound inside the plaster, and this is the chemically bound water that serves to turn the plaster into a solid form.

The 500 g of water that have evaporated off from the plaster has formed an entire system of ducts. It is these small, fine hollow spaces in the gypsum that endow the plaster with its porosity, with its considerable absorbency.

If you want to make a strong plaster, sprinkle gypsum powder into the water until the powder lies there like islands on the surface. If, however, you want to mix up a weaker plaster, then stop sprinkling the gypsum powder into the water at the moment when there's still approximately 5-10 mm of water on top of the plaster after the mixture is stirred up. Then there will be a greater quantity of excess water, and – as has been mentioned – this will give rise to more of the fine, small hollow spaces, and the plaster will be more absorbent and more porous. On the other hand, the proportional relation between the chemically bound water and the plaster will be the same.

The time that it takes for plaster to harden can be anywhere from 20 to 60 minutes. This all depends on how vigorously one stirs the plaster and on how warm the water with which the plaster is being mixed happens to be. Cold water and not too much stirring will result in a long period of time for hardening; warmer water and a lot of stirring will result in quicker hardening.

If you use cold water and if you refrain from stirring too much, it ought to take around 10-15 minutes before the plaster will start to become as thick as whipped cream. After this stage, it will take another 10-15 minutes before the plaster becomes firm.

During the limited interval of time when the plaster is as thick as whipped cream and when you can work with plastering the mixture on, it's crucial that you use the plaster sequentially, moving quite deliberately from one side of the bucket to the other. This means to say, you need to avoid taking the plaster up from 'here and there'. If you go about doing things in this way, then all of the plaster will harden at the same time. After 15 minutes, the plaster starts to get warm: now, it is going through its final stages of hardening, in full swing. When it cools down once again, the hardening phase has come to its end. During the hardening process, the substance can attain a temperature of circa 30-40 degrees Celsius. Dental plaster, on the other hand, can get much warmer than this; this is one of the reasons why one should never use dental plaster for making body castings. During the hardening phase, a great many microscopically small hollow spaces are being formed inside the plaster and these are, at this point in the process, full of water.

Plaster object, which occupies a volume of exactly 1 litre, cast in a rubber bowl with 1000 g of plaster and 600 g of water, as part of an experiment to determine the correct proportions of water and plaster to be used in the process.

After the plaster has hardened but is still moist, it is darker in its colour, it is pliable, and it is soft to cut into. If you place a completely straight cast plasterboard diagonally up against a wall, it will become curved. As a stucco worker, I was casting plaster cornices that were approximately 1 cm thick and 60-70 cm in length. These were supposed to be placed up against the wall, almost vertically, immediately after they were cast. If they were left standing diagonally up against the wall, they would all be crooked on the following day.

The different sections of moist plaster moulds need to be stored together, since they can otherwise lose their shape, with the upshot that they might not fit together. After the plaster is dry and when the water has disappeared from the cavities, the plaster entity is almost completely white – just how white it is can vary, according to what the various factories are turning out. It is actually hard to cut into the dry plaster: it's not pliable anymore and it cracks easily. At the same time, it weighs close to half of what it weighed when it was moist. Even though the plaster is dry, it still contains the chemically bound water, so-called 'crystal water'. When the plaster is heated up and brought to a temperature exceeding 120° C, the crystal water starts to be liberated, so the plaster loses its binding power and returns to the state it had when it was still in the sack. And, in principle, it can most certainly be used again. This is what people did during the Second World War. My old teacher, Palle Damsholt, told me that after the occupying German authorities issued a ban on the import of plaster, which was decreed as punishment for the sabotages carried out by the Resistance Movement, stucco workers started to send moulds and plaster models to The Royal Porcelain Factory Here they were burnt in a kiln at app. 180 degrees, but because of the shellac, the canvas and other impurities, what supervened was a rather weak plaster, which hardened quite quickly. Nevertheless, it could be used, if absolutely necessary.

It has been said that the hardening of plaster is reversible, in contradistinction to cement which, once it has hardened, has definitively taken on a different chemical structure.

The fact that plaster absorbs crystal water as it hardens also results in the plaster expanding during the hardening phase: approximately 0.5%. In other words, if you cast a plaster rod of 1 meter in length, it will become 5 mm longer after the plaster has hardened.

After the plaster has hardened completely, that is to say, after approximately 50 minutes of time have passed, it is as though a glass membrane has been formed, with the result that the plaster does not absorb so much more. If you are modelling directly in plaster and want to apply more plaster, you will need to scrape scratches into the surface, moisten the plaster and wait until the next portion of plaster is as thick as whipped cream before you go about putting it onto the figure. If you do this correctly, then the different layers will cohere quite well, and you will succeed in attaining a somewhat uniform hardness; this same principle applies when you make minor repairs. Here, you can otherwise run into a situation where the spot that has been repaired appears to be darker than the rest of figure. And this is not – as many people believe – a colour variation in the plaster but rather because the plaster figure is dry and draws water from the plaster of the repair which, on account of its low water content, becomes harder and darker in colour. If you happen to cut into the plaster with a knife, you might run into problems with the repair being harder than the surrounding plaster.

For this very reason, it's actually beneficial to mix up a weak plaster, as has been described above, stirring in it for about 1 minute and waiting until the plaster has become as thick as whipped cream, so that it's as if it can better retain its own water. Then, moisten the plaster figure before making the repair, scraping away any excess plaster, and moistening again. With a little bit of practice, you can finally make repairs that have the very same hardness as that of the surrounding plaster.

If, during the working process, you happen to have inadvertently made a crack in a piece of the plaster figure, the piece in question can be glued on again with transparent cellulose glue, which will absorb its way into the plaster, even if the plaster is slightly moist.

A plaster cast of the Partenon frieze fell to the floor. I made sure all parts were picked up. As it originally had been reinforced with wooden sticks, I could glue the parts together, with cellulose glue up around the wooden strips and work my way towards the middle. At the end I could reinforce the relief from behind with burlap, dipped in plaster.

I have also repaired many broken portrait heads in a similar way. When repairing a portrait head I, after gluing all the pieces together, filled it up to one-fourth with liquid plaster andt urned the head around so that the plaster would spread evenly inside the head. If there were any pieces missing so that the head could "leak", when I turned it around, then I would seal it from the inside with plaster or from the outside with some clay. If I could get my hand into the head, I could reinforce it from the inside with burlap, dipped in plaster.

In this way, the glue will not leave behind the trace of any joint.

'Stucco plaster' and 'model plaster' are names of different qualities that are difficult to define precisely. Generally speaking, however, it can be said that stucco plaster is coarser and will not become quite as hard, while model plaster is finer, cleaner and becomes harder than stucco plaster. Chemically, all plaster is the same but the cleaner and more fine-grained the plaster is, the less excess water remains inside, and consequently, the harder and denser and less porous the hardened plaster will be.

The hardest plaster of all is dental plaster: it is considerably harder than ordinary plaster. It is denser in its structure, it is less porous, and it has a 'ring' to it when it resounds in response to a percussive impact, like that which porcelain makes. It remains in the liquid state for a longer period of time than ordinary plaster, but once it begins to harden, the process transpires more rapidly. What works best is to pour the dental plaster right down into the mould. If you mix it up with a thick consistency and cast it on a vibrating table, you will obtain incredibly hard castings. It becomes very warm during the hardening phase: in the centre of the plaster, it can attain temperatures of up to 70 degree Celsius and must therefore not be used for moulding directly on the body. It is, moreover, unnecessarily hard and expensive for such a purpose, anyway.

There is also a material called 'gypsum plaster' (plaster mixed with lime), which is not altogether suitable for working with sculptures, because it does not become as hard as plaster of Paris. It is a substance that has been fabricated specifically for working with walls. It's easy to work with, and when it dries completely, it obtains a reasonably hard surface.

Jesmonite —— is a composite product, as hard as dental plaster. There are similar products being sold under other names. What is common to them is that they consist of a plaster-like powder and an acrylic liquid that need to be mixed in a particular ratio. One can add a retarding agent, which gives a longer hardening time, and a liquid that makes the Jesmonite more thixotropic (i.e. giving a greater tendency to become liquid when stirred or shaken), so that it is easier to cast thinly on vertical surfaces.

Fibre mats are well suited for shell casting in Jesmonite.

Stucco marble (gypsum marble or scagliola) —— Gypsum marble is a technique which, when carried out correctly, can result in something that is astonishingly like polished marble. Gypsum marble is made of gypsum that has been mixed as thick as porridge or mortar. Bone glue is added to the water that has been used for the mixture; this prolongs the hardening-time of the gypsum, depending on the concentration of the glue water, for as much as 12 hours. You cannot measure how much bone glue needs to be put into the water; this has to be tested out. You make up a glue mixture that is liquid but rather concentrated. Then you pour a coffee-cup volume of this into 1 litre of water. Stir this up well and mix up gypsum from this water. If the gypsum hardens too quickly, then try with two coffee-cups for every litre of water. And so on. Remember that gypsum has to be stirred very thickly: this means to say, with a very small amount of water. This is what gives the strength, while the bone glue water only prolongs the hardening process, so that it becomes possible to work with this thick plaster. The large content of gypsum also entails that you can mix in considerably more coloured powder without the gypsum becoming weakened. To make a marble with various nuances of yellow, mix a little bit of ochre into the whole mixture. Remove 2/3 of this, and then colour what remains with a little more ochre. And, lastly, use half of this and go about mixing in a whole lot of ochre. Then, start tossing splashes of the three colour mixtures, in small clumps, up against each other, in the form of a plate; do this either on a table that can be lubricated with stearin/rapeseed oil, so that it can be loosened, or do this directly onto a wall. After some time, when the plaster begins to harden, start to plane down – with, for example, a Surform rasp – a few centimetres down into this plate, until you can see a marble-like pattern emerging. Now, several small holes will start to appear between the clumps; these can be filled up with clean white bonegluewater gypsum. On the following day, polish the plate with a sharp ziehklinge, or possibly with fine sanding stones or water abrasive paper. Several days later, you can treat the marble plate with wax so that it takes on a shiny gleam.

One of the finest examples of gypsum marble in Denmark is the large walls inside of Christiansborg's Castle Church. It can be difficult to distinguish gypsum marble from real marble, but the distinction can often be made by noticing that there are very large fields, or columns, without any joints, and the material does not feel as 'cold' as real marble.

In Italy, gypsum marble is called *scagliola*. In the Intelvi Valley, there are many beautiful examples of *scagliola*. And also in Vienna, the enormous pillars inside the Karlskirche were executed by the Northern Italian stucco artisans.

Lime —— Limestone, $CaCO_3$, is fired in kilns at around 1000° Celsius and is converted to fired lime, i.e. calcium oxide, CaO, which is corrosive. When the fired lime is mixed with water, slaked lime Ca(OH)2 is formed under the high generation of heat. Slaked lime needs be stored under water. Today, you can buy this substance in plastic buckets. In olden days, however, it had to be stored inside a lime pit, which was a hole dug into the ground inside the workshop.

When slaked lime comes into contact with the air, it slowly starts to become converted into limestone. When slaked lime is combined with gravel or sand, you get mortar, which was used for doing all masonry work up until sometime in the 19th century, when people started to use cement, instead. In the Roman Empire – for example, in Pompeii – the houses were built up with lime mortar and bricks, the walls were plastered in lime mortar, and artisans built up stucco and walls in fine lime mortar, which was then painted upon, using fresco techniques. These methods have been described in detail by the Roman architect, Vitruvius.

In Rome during the Middle Ages, many marble statues were burned for the purpose of producing lime; this was a process that generated high-quality lime for use in construction. Pondering over how many excellent works of art were sacrificed in this way is nothing short of horrifying!

Cement —— Cement that is mixed up with an aggregate admixture, such as gravel, sand, limestone, marble and/or other lapidary elements, is known as "concrete". Cement is both an inexpensive and a weather-resistant material. Cement is fabricated of clay, sand and limestone, which are fired and pulverised. In ancient times, slaked lime was combined with pozzolana and siliceous volcanic earth (calcium silicate hydrate, $CaO+SiO_2+H_2O$), and the result was a kind of cement that could harden under water. The cupola that crowns The Pantheon (built some time around 50 AD) in Rome was cast with the use of pozzolana and broken tiles. In the 15th century, Vitruvius's writings were found again, and it was then that people started to rediscover cement, but it was not until people in the 1800s discovered how to reinforce concrete with steel that it really came into widespread use.

People could build daring bridge structures in iron-reinforced concrete – iron and concrete have the same coefficient of expansion – but if the iron reinforcement was placed in the incorrect way, unfortunate consequences could result. Water can migrate approximately 5-10 cm into concrete, and if the iron reinforcement should rust, it will, because of the expansion, start to burst the material. That The Pantheon's cupola is still standing after two thousand years while a whole lot of concrete construction that was not even built 50 years ago is already starting to crumble is truly thought-provoking. It ought to be mentioned here that The Pantheon is not iron-reinforced: the cupola is being held aloft by its own shape, just as the Roman arches are supporting themselves. The Pantheon's cupola is actually very thick at the bottom and relatively thin at its very top.

Clay —— When we use clay for making sculptures that are going to be cast, we make use of red clay or blue clay: the same kinds of clay that were used for making low-fired ceramics or in the production of bricks. This kind of clay is "short in it", as the Danish craftsmen are accustomed to saying: this is their way of expressing that it is stable. Fine stoneware clay is more "long in it", the Danish craftsmen way of saying that the clay can have a tendency to collapse. During the modelling phase, the figure can be packed into moistened cloths: preferably old washed-out sheets, since the fibres in newer sheets are not nearly as absorbent.

We recycle clay. This means that you can have several tons of clay that can be used again and again. And in fact, the clay just gets better and better with time and with use. During the first year that I was attending The Sculpture School, Palle Damsholt, with a tone of feigned drama, said to me: "Take good care of the clay, it stems all the way back to Thorvaldsen's day!" And, in fact, there's

Clay pit in the monumental workshop of Beijing Art Academy CAFA.

probably some of the recycled clay at the academy that dates back to that time. Remember to take care of keeping the recycled clay clean of plaster pieces and remember to take care, especially, of removing all metal netting, nails and screws, so that when you happen to be re-using the clay, you won't hurt yourself.

Normally, people hurry to put the clay into a closed container so that it will remain moist, preferably with some kind of moistened fabric placed on top of it.

If you have got large amounts of clay, you can have a clay pit, which can be designed in a variety of ways. Some clay pits have one meter high walls and a sloping bottom made in concrete, with a drain at the lowest point. Others can be more like a whole box in concrete, down into which you have got to climb, wearing rubber boots, when you want to get the clay dug up.

You can also collect the clay into a large pile and cover it thoroughly with tarpaulins or pieces of plastic and then, every now and then, lift up the covering and spray the clay with water. Ordinarily, the outermost layer of clay can be a little dry, but if you dig down a little ways with a shovel, there will be some fine and thoroughly moistened clay. You can knead the clay in a clay-kneading machine of the same type as a rye bread kneading machine, where the clay is spewed out from the machine in the form of a long sausage, and then you can run it through, again and again.

You can also knead the clay by throwing it down onto the floor. In China, I've seen how they use large vegetable knives with broad blades and cut through the clay in criss-cross fashion so that it eventually becomes even, coherent and easy to model with, especially when it comes to the last layer.

Plasteline, or modelling wax —— is basically clay, which has been combined with a non-drying oil instead of water. The advantage of this is especially apparent when working with smaller figures: they do not dry out, and they continue being malleable. There are a great number of recipes prescribing how to make plasteline at home, but all of them are rather complicated. In the sculptor Anna Maria Carl Nielsen's sketchbooks, there are recipes for plasteline that contain ingredients like butter, fat, oil, flour and other foodstuffs, together with clay powder. Even though plasteline is rather expensive, it's best to buy it as a ready-to-use product.

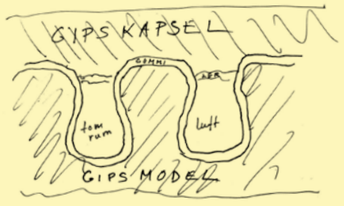
Two-component silicone rubber

—— There are many different types of silicone rubber, with diverse properties, made by several different manufacturers. Silicone for use in construction hardens by giving off acetic acid. For making moulds, we use two-component silicone rubber, to which you've got to add a hardener. Ordinarily, you've got approximately 1 hour of time to do what needs to be done with the rubber. After 24 hours, it is completely hardened. One type of silicone rubber is the liquid kind, which can be poured onto an object, either as a block- or a capsule-mould.

You can also brush the liquid silicone rubber directly onto the object. This is fraught with certain difficulties, because the rubber will constantly be running downward and will need to be brushed upwards again. It will be of help if one can alternately apply: first, fibreglass fabric and, then, silicone rubber. By proceeding in this way, it will be possible to make a thin and relatively strong rubber mould.

When we apply rubber with a spatula directly onto the figure, we use a special filler rubber, wherein the manufacturer has added a substance that renders the rubber sufficiently pastose so that it will not run down but will remain on the figure, and even on vertical surfaces. It is often so thick that it is heavy and cumbersome when you have to stir the liquid hardener into the rubber base.

In recent years, I have started working with a thixotropic silicone rubber, which is blended from two components in equal parts, by volume: one grey and one white. The one component contains hardener, so you do not have to handle pure, concentrated hardener; this makes the whole process somewhat less harmful to your health. It is easy to stir. It is not at all as pastose as ordinary filler rubber, and yet it doesn't run, even when working with vertical surfaces.



Here one can place an app. 2-3 mm thick layer of rubber inside the hole. The thickness must be sufficient so that this part of the rubber mould can support itself, and so that it becomes like a balloon which can easily be pulled from the hole.

The stuccocraftsman Anker Nielsen(1913-2008), who was a close friend of my teacher Palle Damsholt once told me how he made a rather difficult glue mould over a leaf ornament in the ceiling of a villa north of Copenhagen. These were elegantly modelled leaves and flowers that they wanted repeated in another room.

He then laid a layer of clay all over the ornament and on the clay he cast a plaster capsule. In order for the plaster capsule not to fall down, he had a suitably long wooden stick ready, which he could put in between the floor and plaster capsule when the plaster began to get hard. He took the plaster capsule down and emptied it for clay.

The next day, he melted a half-full 15 liter bucket of glue and brought it in a taxi. He could then fill the mould almost completely with glue and press it up against the ceiling and put the wooden stick between the floor and the plastercapsule. The day after when the glue was cold he could bring the plaster capsule and glue mould down. He prepared and greased the glue mould and filled it up with plaster and pressed the mould up to the ceiling and in this way could cast the leaf ornament directly onto the ceiling.

Normally, the glue was melted in a 15 liter galvanized tin bucket, which stood on a brick in a 30 liter tin bucket of water, which stood on a gas stove to keep the water boiling.

Into both the filler rubber and the thixotropic rubber, you can mix vermiculite, partly to save costs associated with using too much rubber, and partly to make it a little more rigid when working with large rubber surfaces.

Sometimes, undermining can be like deep and narrow holes (almost like a small well inside the sculpture), from where it is difficult to get the rubber out again. What you need here is for the rubber to be as flexible as possible. So, in this kind of situation, you will need to use pure rubber. At some difficult spots, where a hollow space becomes larger as it moves inwards, wresting a solid rubber block out from the cavity can prove to be virtually impossible. If the hole is too thin, you cannot make plaster wedges in several parts, either. Here, you can put an approximately 2-3 mm-thick layer of rubber into the hole; the thickness has to be such that this part of the rubber mould can support itself and has to be such that it becomes like a balloon, which can easily be pulled out of the hole. Before making the plaster casing, try stuffing a few loose sheets of paper into the hollow space. Or place a thin clay plate in front of the hole, so that the plaster won't get in there.

In rubber moulds, it is possible to cast with plaster, cement and wax without any previous preparation or oiling, and it is possible to cast many times in the mould without it becoming worn down or deformed. If you can leave the mould to lie with an actual plaster casting inside, silicone rubber moulds can be stored for a very long time.

According to the manufacturers, working with the rubber base is not hazardous to one's health. It will last for a long time, but it is often the case that there's silicone oil in the rubber base, which will evaporate in time. After about a year, especially pastose filler rubber will be very tough and difficult to work with; if this should happen, you can add a little bit of water, around half a teaspoon for every 200 g of rubber, and stir it around very well before adding hardener. The hardener, however, can provoke allergies and has been classified as toxic, as being irritating to the skin, and as being flammable. You need to follow, and to follow very carefully, safety precautions related to suggestions like wearing rubber gloves and having proper ventilation in the working area.

Glue —— As mentioned earlier, working with glue moulds is a technique that is rarely used anymore. Working with rubber moulds is, today, much more practical and much more precise. However, with today's demands for 'sustainable development', working with glue might be an exciting alternative. For this reason, I thought that it would be a good idea to gather all the information there is to find about the use of glue moulds.

The glue that is used is animal glue (carpenter's glue), manufactured from skin, bones and other animal tissues. It is also called 'gelatine', and can be purchased in the form of beads or granules.

The dry glue is placed in water. As soon as the glue has started to become gelatine-like on the surface, but is otherwise hard, take it up and place it on a wire grid. Then, after approximately 12-18 hours have passed, and it is pliable, the glue can be melted down in a water bath. It doesn't matter if it boils. When the glue is brought to a boil, this will reduce the glue's adhesive capacity, which is not desirable when using the glue as moulding material. Some warm water can be added to the glue, if – after being cooled down – it is too thick to pour. Mix in approximately ¼ litre of glycerine to 12-15 litres of glue, or even more glycerine, should the situation call for doing so. The effect of this is that the finished glue-mould will not dry out as quickly.

To impregnate glue moulds, inside of which you are going to cast in plaster, use alum water. Alum is purchased as crystalline powder at the pharmacy or at the special-supplies store. The powder is poured into boiling water, in which it will dissolve. The alum water is to be used after it is cooled down and when any excess alum has crystallized on the bottom of the jar.

Before applying the alum water, you have got to thoroughly clean away oil and other foreign substances from the glue mould with pure benzine. After doing this, rinse the mould with alcohol and brush it down with talc powder.

When, after smearing the mould with rapeseed oil, you cast plaster inside the mould, the cast has to be removed from the mould before the plaster starts to heat up. If the mould starts to curl on its surface, this is a sign that the alum water has been too concentrated. If the mould starts to melt on its surface, after being removed from a plaster casting, this is a sign that the alum water has been too weak.

In order to impregnate (tan) the glue so that it cannot melt, the glue can be treated with formalin spirits. Formalin, a clear, colourless, aqueous solution of 30 or 40 per cent formaldehyde) can be purchased at the pharmacy. Dilute with an equal portion of alcohol. Use this for impregnating glue-mould edges, against which hot melted glue must be poured (the second half of the mould).

Half models of children's buste made by J.F.Saly (1717-1776).

When you previously made glue moulds on a popular figure, you often made half models, ie. that when you opened the glue mould and had prepared and greased it, then cast plaster in the two halves separately, so that you got a cast of each half with the lock edge in both the glue mold and gypsum capsule. Then each of the two plaster capsules would fit the corresponding half model and the next time when one again needed a glue mould of this sculpture, you could close the plaster capsules and half models together and be able to fill both up at the same time simultaneously. In this way, you could save a lot of work next time.

The edge of the glue-mould must be cleaned thoroughly of oil and the like with purified benzine, and thereafter with alcohol. A single application of formalin spirits will suffice. Important: formalin is toxic and must not come into contact with foodstuffs!

Stucco worker Jørgen Bau, who was an apprentice from 1953 until 1957 at Victor Moth's workshop, has told me that when they were busy making particularly delicate portraits, they melted the pre-soaked and softened glue into what was virtually pure glycerine.

The glycerine rendered it so that the mould would not dry out so quickly, and this made it possible to use the mould for several weeks.

And in those cases, when they were supposed to cast many castings from one and the same mould, they would "cheat" and prepare the mould with so much formalin that the *innermost surface of the* glue mould simply could not melt again. When melting the glue, thin membranes of formalin-treated glue be would then floating around, which had to be fished up from the glue.

Vermiculite —— A lightweight and porous silicate mineral, mica stone, which has been expanded as a result of being heated. This is a very inexpensive material that can be used as filler material in fillable rubber. After you have mixed the hardener into the rubber and it has been stirred well, the vermiculite is mixed in. Put in just enough vermiculite so that you can still see rubber between the vermiculite grains. If you mix too much vermiculite into the rubber mass, it can lose its strength. Vermiculite makes the rubber mould less flexible. But this can be an advantage when it comes to working with figures with large flat surfaces. It was the stuccocraftsman and sculptor Aage Leif Nielsen (1944-2012) who discovered that you can use vermiquilite in two-component rubber.Aage worked together with Leif Jensen right from the time he started his bronze foundry.

Sheet metal —— Brass foil and aluminium foil with thicknesses of 0.25-0.5 mm are both available in rolls, 15 cm wide, at large hardware stores. You can also use aluminium offset plates, which can generally be obtained from a printing press. Sheet metal can be used for parting up a waste-plaster mould. What is easiest is to oil the sheet of metal before cutting it up into strips. The strips should be 2-3 cm in width.

Zinc sheeting, with a thickness of approximately 1 mm, can be used for making templates for pulling and turning in plaster.

Reinforcement

Burlap, fibre, and tow as reinforcements for shell castings —— It is important that you get hold of the type of burlap (also called 'hessian', when it is made of jute-fibre) that has the largest holes. The best variety is the type that furniture upholsterers use for furniture, because the large holes (approximately 5 mm) make it easy to fashion the fabric around the rounded parts of the furniture. It is important that the plaster is able to penetrate its way through the fabric. If you use a tightly woven fabric, it won't work effectively as an armament but will, on the contrary, separate the layers of plaster. With two layers of burlap, you can make a thin and strong plaster shell of 5-10 mm.

The Parisian stucco workers also made some fine, thin plaster shells with tow as the armament. Tow is made from flax fibres; plumbers use tow when making pipe assemblies. On a large casting made from Rodin's "Victor Hugo", on view at the Ny Carlsberg Glyptotek in Copenhagen, you can see just how thin the plaster shells were that the Parisian stucco workers could cast, with tow (linen or flax-fibres) as the armament material.

In a film made by Torben Glarbo, where he visits Sonja Ferlov Mancoba in her studio in Paris, you can see how she draws with chalk on the floor and places tow/linen fibres dipped in plaster, following the drawing. And later, she raises it up as one of her mask figures. The tow fibres are so thin that when they are immersed in plaster, you can cut right through them with a knife: you cannot do this with burlap. If you try to cut down into burlap, it becomes completely frayed; in case you do want to cut into burlap, you will need to use a very sharp passé-partout knife/Japanese knife.

Using tow in connection with working with plaster is something that Sonja Ferlov Mancoba learned from Alberto Giacometti, whom she came to know in Paris in the 1930s. Many of his thin figures are made with plaster and tow in just this way. It was certainly difficult to keep the thin clay figures moist.

Fibre and fibre mats are well suited for shell casting in Jesmonite and fibre concrete.

Reinforcement of plaster moulds —— Large plaster moulds can be reinforced with wood. Ordinarily, we use partition laths of the dimensions 38 x 57 mm, which are placed on the high segment in order to provide optimum stability. These are nailed or screwed together in the form of a ladder that can be fastened together with strips of canvas dipped in plaster. When you need to lay the mould on the floor, it can rest on the wooden armature.

Small shapes can be reinforced with rounded steel.

Reinforcement of plaster and concrete figures —— If, in a casted plaster figure, ordinary steel is lying too close to the surface, what can arise, during the short period of time when the plaster is still moist, are rust stains. And these are very difficult to remove. Here, you've just got to make sure that the steel reinforcement is lying at least 5 mm inside the plaster. In thinner parts of the plaster figure, it is important to make sure that the steel reinforcement is, as far as it is possible, lying in the centre, where it can provide the optimum reinforcement. Avoid using rectangular-shaped steel because, with its edges, it is prone to being fractured; this means to say that a fracture that starts in one corner can arise.

When working with reinforcement, using ordinary steel in concrete figures that stand outdoors, it is important to remember that water can migrate approximately 3-5 cm into the concrete, and if the steel starts to rust on the inside, the rust can expand and cause cracks in the concrete. For this reason, you are either to use stainless steel or to paint the steel with rust-preventive paint.

Using stainless steel is expensive, but it is also considerably stronger and stiffer than ordinary steel. However, take care to avoid using the completely smooth stainless steel. Choose, instead, a version that is ribbed, like Tentor steel, to which the plaster will successfully attach itself in a firm way.

Shellac —— Shellac is a naturally occurring, albeit, fabricated lacquer from South-east Asia. It is a resin secreted by female lac bugs, and it can be purchased either as ready-mixed or in the form of flakes that can be dissolved in methylated spirits. It dries quickly and can also be used on moistened plaster for the purpose of rendering it less absorbent. You can apply shellac one or more times. Especially after the first application, the shellac will need to dry for a long period of time. When the lacquer no longer smells of methylated spirits, it is dry, and you can lacquer one or two more times.

Release agents

Stearin —— is the most effective release agent and is especially well suited to non-absorbent surfaces like shellacked surfaces. Stearin is used in the buckets and on the tools to facilitate cleaning after use. Stearin can be purchased at the drug store or from companies that deal in wax. Or you can simply use candles. Melt a bit of the stearin in a pot over low heat. After the stearin has melted, remove the pot from the stove and pour rapeseed oil into the melted stearin, using a proportion of 2-3 times as much rapeseed oil as stearin.

As soon as the admixture has cooled, the stearin is ready for use.

It can be torn or scraped away like cold butter and diluted, more or less, with rapeseed oil.

You can shellac the plaster mould first, so that it will be absorbent to the desired degree. If the mould is lubricated repeatedly, and if the mould is too absorbent, it is possible that a thick layer of rapeseed oil will be formed. In the past, stearin was thinned out with ordinary or odourless petroleum.

Stearin/ odourless petroleum was originally used as a release agent for plaster or glue-moulds on dry plaster, where the petroleum was quickly absorbed into the material or where the petroleum evaporated and left behind a thin membrane of stearin.

Soapy water —— Soapy water is the release agent that gives the best imprint, especially on absorbent surfaces like plaster. Remember that the plaster mould has got to be wet. Soapy water, in this case, ought to be made of genuine brown soap, with 500 grams of solid brown soap dissolved in 1 litre of warm water. After the solution has cooled down, add 1/2 – 1 litre of rapeseed oil. The mixture can simultaneously function as a preparation lubricant and a release agent. It is applied in a generous quantity and the surplus liquid is to be dabbed off with a twisted brush.

Soapy water can tolerate a minor dilution with water, but it's best if you stick with the previously prescribed proportion of soapy water and oil.

Soapy water must not be thin as water; it ought to feel 'fatty' between the fingers.

Soap flakes —— also known as "Marseilles soap", is whipped up in warm water. After this, a bit of rapeseed oil is added. It must be prepared so that it is a thin solution. After some time, however, it's going to thicken up. It can then be used in either the thick consistency or the liquid consistency. It dries quickly. And on the following day, you can pour a little bit of boiling water onto the soap and whip it up.

When you make plaster moulds for porcelain or clay casting, you should use only soap flakes on the original model! Other release agents like brown soap or stearin will come to fashion a thin membrane on the mould, with the result that the mould will not absorb a sufficient amount of water. A good idea is to apply shellac to the plaster model, so that it will not absorb too much liquid; the soap flakes might otherwise have a tendency to lie there like clumps on an underlying surface that is all too absorbent.

Lubricating oil —— which is minerally based, can be purchased at gas stations. It is used in either an undiluted or a diluted form – together with petroleum, when casting cement in wet or linoleum varnish-lacquered plaster moulds. Be careful when using rapeseed oil for cement casting, because doing so can result in making spots on specifically white and light-coloured types of artificial stone.

Wax —— A bit of bee's wax is melted in a pot over low heat. After the wax has melted, remove the pot from the flame and pour turpentine into the melted wax, using about twice as much turpentine as melted wax. After the admixture has cooled, it's ready for use. Alternatively, you can purchase ready-to-use wax for furniture. Wax/turpentine can be used as a release agent when making a two-component rubber mould on figures or reliefs made in different materials as: shellacked plaster, clay, plasteline, wood or the like, with the use of two-component rubber material. The wax is applied to the figure, and when it is dry, it is polished up with a brush. (a marten-hair brush). Absorbent surfaces can be lacquered with shellac before being coated with wax/turpentine.

Waterglass
Sodium silicate, also called waterglass, can be used as a binding agent for mural paintings. It was developed by the German company, Keim, as an alternative to fresco painting in the somewhat harsher climate north of the Alps. You can also use waterglass in the finishing of concrete.

List of some of the material that have either been of importance to or, are part of the results of my teaching and research within my field of study

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Audio recordings, movies

Archive material about sculptor Einar Utzon Frank at the Danish Art Library, including cassette tapes with sound recordings of teachers at the sculpture school, Claes Baumbach, Svend Jespersen, Aksel Theilmann, Aage Petersen, Mogens Bøggild and others, recorded in preparation for exhibition about Einar Utzon Frank, 1984 at the Skovgaard Museum in Viborg.

Hesten på Kongens Nytorv, movie by Bjarne Henning Jensen, 40 min, 1952

Iransk stuk, stukseminar på Billedhuggerskolen, movie 20 min, 1994

Pontus Kjerrman på Rudolph Tegners museum- english sub, Anna Martensen, movie 10 min., 2017

Vandkunst i Køge - Skulpturens proces, movie 40 min, KØS, 1993

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—— to all the rectors I've worked with. Visual artist Helge Bertram, who was rector the first year I taught as teacher, the art historian, Else Marie Bukdahl, who was my rector for 20 years, Mikkel Bogh, Sanne Kofod Olsen and Kirsten Langkilde, who followed. All have backed up my teaching and in various ways contributed with support and encouragement to this book, which has been in progress for 35 years.

—— to my many teachers, mentioned in this book, and thanks to good colleagues - present as well as former - at the Academy of Fine Arts.

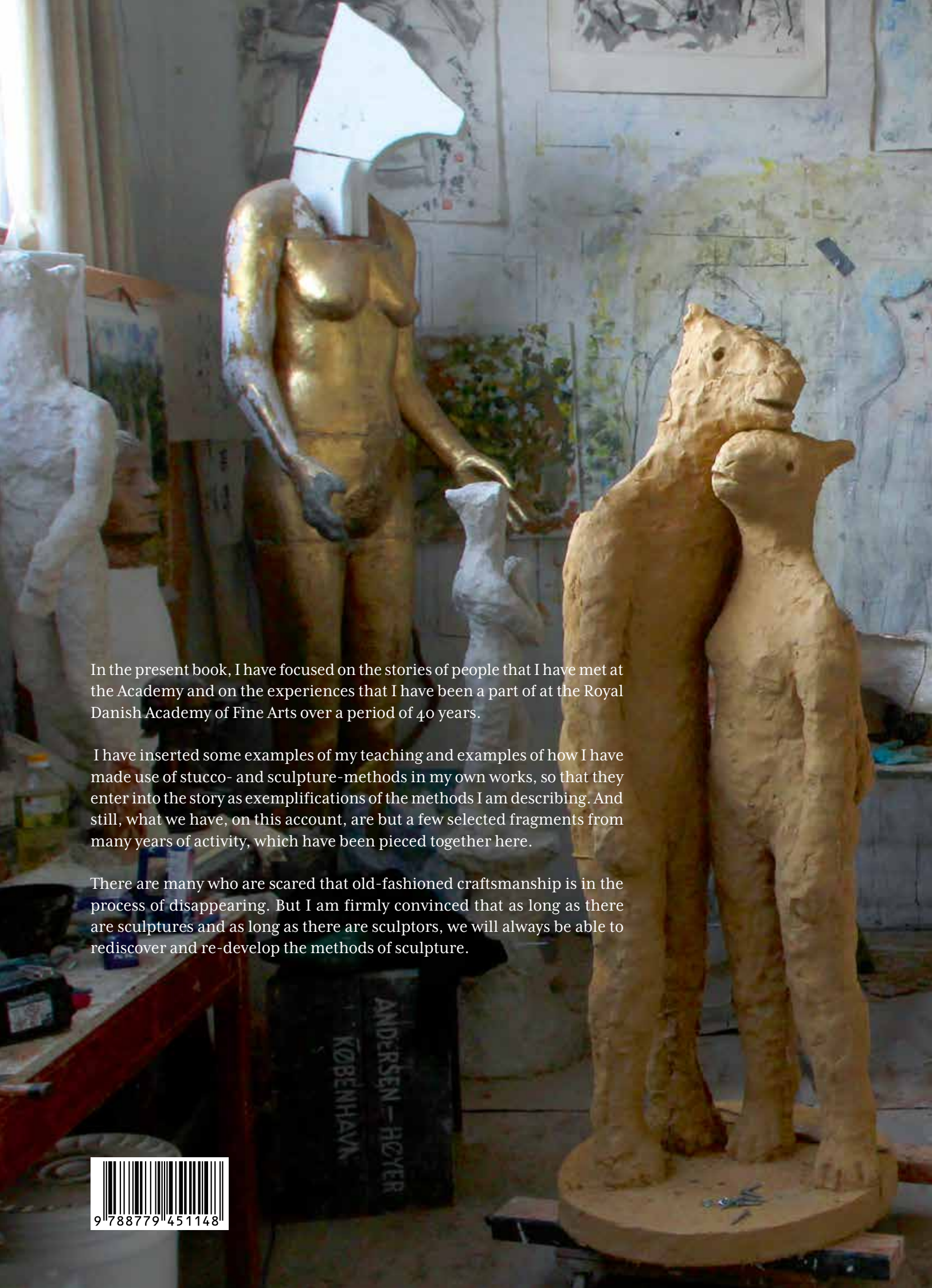
—— to the many students who have taught me as much as I have taught them, and all the other employees who have helped making the Academy of Fine Arts the wonderful place it is.

—— to my wife and my children for their commitment to my artistic work, and for their never-failing helpfulness in that regard.

—— to my friends and their never failing support and interest.

It is my sincere hope that the reader will come to feel that this book can contribute to the continuation of enthusiasm for the craft of modelling and casting sculptures!

Pontus Kjerrman, March 2019



In the present book, I have focused on the stories of people that I have met at the Academy and on the experiences that I have been a part of at the Royal Danish Academy of Fine Arts over a period of 40 years.

I have inserted some examples of my teaching and examples of how I have made use of stucco- and sculpture-methods in my own works, so that they enter into the story as exemplifications of the methods I am describing. And still, what we have, on this account, are but a few selected fragments from many years of activity, which have been pieced together here.

There are many who are scared that old-fashioned craftsmanship is in the process of disappearing. But I am firmly convinced that as long as there are sculptures and as long as there are sculptors, we will always be able to rediscover and re-develop the methods of sculpture.

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