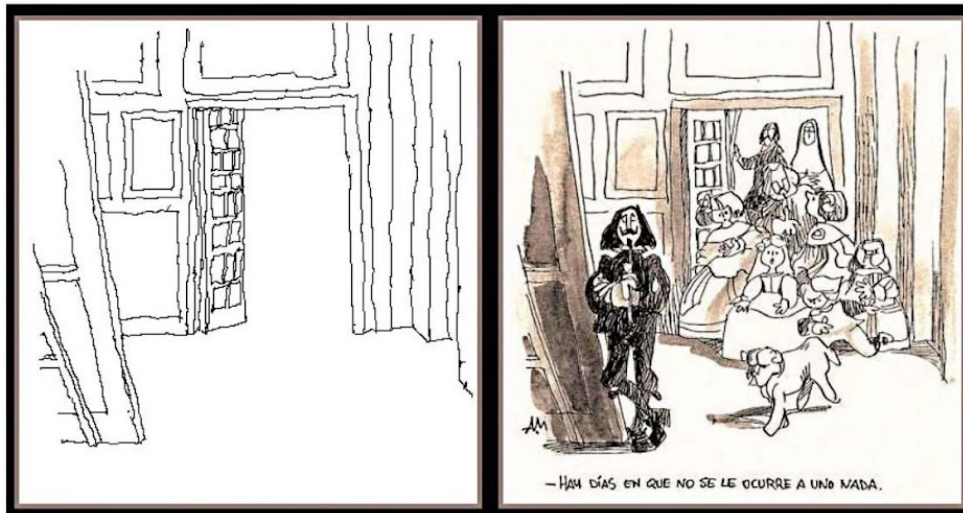


03 CADoP Papers

Computer Aided
Deconstruction of Perspectives

By the way, speaking of Las Meninas



Lluís Clotet, Oscar Tusquets
y Miguel Usandizaga (ed.)

Credits

As in the other issues, +

Cover illustration: Antonio Mingote, M.U.

Originally, the article on Las Meninas that we published in issue two of Papeles DPACO was to be entitled "Eureka! Velázquez, Las Meninas and the camera

obscura". It seemed to us that the importance of our discoveries deserved a shout of satisfaction. But our voice of conscience warned us sharply:

"...the worst thing about your text is the title. Shouting "Eureka" ("I have discovered") means that you have removed the veil from something hidden or forgotten, in any case pre-existing, and made "the truth" appear. This produces two bad tastes:

First, that no work, be it work of art or work of saddlery, is a charade, a riddle to be cleared away and left "solved" and exhausted upon discovery. There is nothing to discover. Each new serious analysis will find the work as enigmatic as at the beginning. Wrong: more enigmatic than at the beginning, more and more so, because over it is the accumulation of glances and our own change of glance (Freud, "Die endliche und die unendliche Analyse"; Borges, "Pierre Menard..."). To see Las Meninas in 2020 is not only to see it through the computer screen, it is to see it through Goya, Picasso, Ortega, Gaya, Brown and everyone you know... We know more and we do not know more of the work."

Everyone - we suppose - has the voice of conscience that he or she deserves, but the truth is that ours is not the voice of a nice Jiminy Cricket, what more would we want! It is totally autonomous. If it has something to say, it says it. And if it's unpleasant, you're screwed. We decided to change the title. We have been living together for so many years that we have come to the conclusion that it is better not to argue.

The same voice continued:

"Of course, you do something fundamental: you don't go looking for the "content", the "what it means", but the "how it is made", the "how it couldn't have been made in any other way, with what the author had at his disposal", which is what we saddlers are interested in."

Man, thank you! Very kind of you. And it went on:

"Second, and consequently, because the task of the analyst is not to "tell the truth" (one that would be hidden in the work) but to teach how to look. Your analysis makes us see things we had not been able to perceive: you teach us to look. Your writing does not have the work as a pre-text, as an excuse to launch a nice speech, but as a

excuse to launch a nice speech, but it ends up making your reader return to the work seeing more things. Their eyes have changed, and they are now able to identify new misunderstandings in the work, which they did not suspect before.

Here is what Baxandall considered proper to rigorously scientific analysis, demanding of analysis the same conditions that Galileo set for all scientific knowledge: that the "experiment" from which the scientist had arrived at his conclusions could be repeated and verified by anyone. If what you write to have seen is not also seen and verified by your readers, your analysis is falsified. Baxandall liked that, because he equated "scientific" with "democratic".

"At the end", or during the analysis, not only grow new eyes to your readers, but a new dictionary. "Author", for example. The two paintings (the duplicated, mirrored work, great attraction of mannerism) does not impose to put them in chronological subordination, but to change an anachronistic, heroic-romantic way of understanding their "author". Surely from the eyes of the nineteenth century it can be explained: one who wants to repeat a painting on commission or to sell it, or one who wants to make a "model" of a larger work... But it is a matter of seeing it from other eyes. From Giotto and Piero to Le Corbusier (to make a leap or a jolt), the workshop is the one who makes the work (not exactly: if in Piero's time you ask someone "who is the author of The Flagellation of Christ", he will tell you the client who commissioned it, specifying quantities of colors and iconography). Once the painting was fixed, the assistants made the backgrounds and the bulges of the characters, and the master made faces and hands. The same thing happened in rue Sèvres: Le Corbusier "personalized" the perspectives that had been previously made, with their vanishing points and their rules of t, by the draughtsmen, some of whom even knew how to imitate the characters and objects of the master's hand.

Is it possible to doubt, positively, through your analysis, that we know what the word "author" means, imagining the two works advancing at the same time, or perhaps, as you see, separating the operation into two moments: first the stage and then the arrival, in successive stages, of the characters? As in a theatrical performance. And several hands on the canvas, without detriment to Velázquez (And perhaps it would be time to start calling someone named Diego de Silva Velásques a "Portuguese painter")."

The truth is that he doesn't talk nonsense, that voice. It does, however, have some rather extemporaneous anti-Spanish outbursts, and it must have its reasons for that... And if it doesn't, it doesn't matter much either: nobody is perfect.

Or maybe it is not our voice of conscience, but simply that, sometimes, we hear voices. It doesn't matter; we can't say where they come from.

In any case, it was true, we had not exhausted - far from it - the mystery of Las Meninas. We could see that right away. We already knew that investigating Velázquez was dangerous. This had been made clear to us in a novel by Eduardo Mendoza, stupendous as all his novels: *Riña de gatos*. But our situation was even more dangerous: we were not looking for a missing Velázquez, but we were affirming that Las Meninas is a work of art from the time of its technical reproducibility, to put it mildly, with the title of Walter Benjamin. Let's say that Velázquez had painted that painting by machine...

We had no trouble imagining ourselves lying dead, stabbed with stabs of erudition in a seedy alley. We decided to ask for help. We did so to two great architects who in the early seventies made us discover with an astonishment that we have not forgotten, with a jewel, a little house called Belvedere Georgina, that there was architecture outside the International Style and its late derivations: Lluís Clotet and Oscar Tusquets.

What follows is the transcription of the exchange of emails we have had with them. We have deleted some passages that had nothing to do with Las Meninas. And all the greetings and farewells. Our conscience does not allow us so many expressions of affection. What would you think of us!

We have left, however, a sonorous (and ordinary) first greeting from Oscar Tusquets that made us so excited that you can't even imagine. Because we had already made some attempts to explain our research to a renowned expert on Las Meninas to whom, when we told him on our last phone call who we were talking to, we heard him muttering in sorrow: "Oh God..."

After that, naturally, the "Joder Usandizaga" sounded like glory and we thought: we will understand each other. Since then, we've had a lot of fun writing these messages... We hope you have fun reading them too, and that you learn to see space better.

Crossed e-mail messages

1. With Oscar Tusquets

1.1 From Miguel Usandizaga on 19.7.2019
11:51 Dear colleague:

We are writing to you because we need help. We have gotten ourselves into a tremendous mess: we have discovered how Velázquez used the camera obscura to paint Las Meninas. And, naturally, when you tell someone that, the only thing that comes to mind is that you are completely crazy.

Attached is an article we are going to publish about perspective in Vermeer's The Music Lesson. We use the same technique in this study as in the analysis of Las Meninas. If you want, we will explain it more calmly when you can. You don't need to read the whole article, the summary and the conclusion are enough to understand it.

1.2 From Oscar Tusquets on 2019.7.19 13:14

Fuck Usandizaga

On the verge of publishing my next book (coming out in October), in which I dedicate the second chapter to Las Meninas and the fourth to Perspectivas, I receive your article. I have no choice but to send you both texts with the request that you do not disclose them before the appearance of the book. I will send you the images by Wettransfer.

If you find any obvious error (not a difference of criteria) perhaps there is still time to correct it. Your text on Vermeer's painting is absolutely convincing. I have more doubts about Las Meninas (you can tell from my text) but for that we should meet.

1.3 From M.U. on 2020.3.17 13:03

We have finally managed to finish the study on Las Meninas. We enclose it herewith, it will help you at least to kill some time during this confinement... We are looking forward to your comments.

1.4 From O.T. on 2020.3.17 18:30

I had a blast and found you totally convincing, totally. I don't understand how you had to publish it in a university edition and not in Thames & Hudson.

The embarrassment of so many artists in acknowledging the use of the camera obscura is quite curious and brings us back to the current one on the use of photography. David Hockney has shown that its use was widespread in the painting of the old masters.

Your research, typical of Sherlock Holmes, is exciting and I think that the absurd and disproportionate sheet of panels in the background has no other explanation. It seems incredible that no one has noticed the incongruity of the leaf and the gap it should close, nor the absence of the thickness of the lintel and the right jamb. It is obvious that they are not architects.

(Editor's note: We hear the same voice again... "Regarding Sherlock Holmes. I suppose you have in mind Carlo Ginzburg, his inevitable article "Indicios. Raíces de un paradigma indiciario", which in Spanish is in *Mitos, emblemas e indicios* (but the article can be found in pdf by internet).

But if you compare the parallel chapters on the baptism of Christ by Piero della Francesca in Ginzburg (in *Pesquisas sobre Piero*) and in Michael Baxandall (in *Patterns of intention*), you will see that the proper instrument for "architecture students" to analyze any work is Baxandall, not Ginzburg. (After having compulsorily read Ginzburg).

For your sympathy, Wiki says of a book by Ginzburg: "In the recent *Il filo e le tracce*, historians, novelists, inquisitors, scholars, shamans, or poets appear. He speaks of Montaigne, Voltaire, Stendhal, Auerbach,

Kracauer, moreover, to reflect once again on the craft of historians and their difficulties with the truth").

I appreciate the mentions you make of my text in yours. We differ only in one thing: in what you see at the bottom of the painting. I say that it is the reflection of the kings who are "outside" the painting. You say it is a last minute addition motivated by the desire of the monarchs to appear in this great work. Okay, let's accept that this is so: the Queen asks the painter to introduce them into the painting and Velázquez comes up with the only elegant way to do so is to have them appear reflected in a mirror. It is an absolute genius motivated by an unforeseen event. As architects we have seen how many brilliant discoveries have been produced by unforeseen problems. The thing in the background is a mirror, not a painting for three reasons:

It is much more brightly lit than the surroundings of the wall cloth itself. In the small painting this supposed painting is not very convincing either.

The kings receive the light from the right side of the painting, something unusual in all right-handed painters and, therefore, in Velázquez.

Velázquez paints with his usual skill a mirror and I see the perimeter bevel of the mirrored glass.

Therefore, I do not see that we contradict each other; I continue in my thirteen.

One day we could stage a colloquium for a mass audience. Perhaps at the B.B.C.

1.5 From M.U. on 2020.3.18 11:55

Regarding the mirror in the background, we propose a pact: you say that

Velázquez comes up with the only elegant way to do it is to have them reflected in a mirror.

and we would add: and he paints them as if they were reflected in a mirror. The "as if" is fundamental. But they were not: the queen posed to the right of the king for this portrait. And the light comes to them, as it does to all the figures in the painting, from the south façade. Because Velázquez painted them with the painting already

hung on the east wall of the Gallery. If it's all right with you, we'll include it and make peace... Velázquez was really great. You are right that

As architects we have seen how many brilliant finds have come about because of unforeseen problems.

It is true, good architecture is full of these things, which come from unforeseeable accidents...

The reaction of José Antonio Martínez Lapeña and Elías Torres in the swimming pool of the San Sebastián Baths in Barceloneta is exemplary in this respect. The entire roof is an inclined plane that drains into a gutter that, by means of a gargoyle, would launch the water towards the beach. With the building finished, the technicians of the Ministry of Public Works were kind enough to tell them that there was no way. That nothing was to be dumped on land under their control, not even rainwater. The architects did not bat an eyelid. Another gutter under the first one, with a slope to the other side, another gargoyle, and that was it.

Such findings are not so common in painting, don't you think, where there are no uncontrolled problems? Especially in oil painting, watercolor can be more treacherous, can't it?

1.6 From O.T. on 2020.3.18 13:07

Let's see, Miguel:

Let's suppose you are right and the kings ask to appear in the painting. Velázquez has 4 solutions, namely:

Paint them in the background, behind the main figures who would commit the indelicacy of turning their backs to them.

To paint them as ghosts floating around, a solution that would be centuries ahead of surrealism, but strange to Velázquez.

To represent them in a painting already made. Apart from the fact that they would be strangely shining with respect to the surroundings, it makes no sense that they appear illuminated from the right. If they do, it is because they are not painted; they are "there" present receiving the light from the south façade. They are ahead of the picture plane "but they are there".

Paint them "as if" they were reflected in a mirror. Great, truly great, solution to the problem posed. The main characters, including the painter, do not turn their backs to them, they look at them and look at us, with respect and interest. In front of the painting we become the Kings, isn't it obvious and transcendental? Faced with an unsuspected problem Velázquez paints what has never been painted, what is in front of the picture plane. By painting them "as if" they were reflected, the geometric analyses make no sense, in a certain sense they are reflected "ghosts".

It seems to me that my reasoning is typical of Holmes and, therefore, as irrefutable as yours. I recognize that beneficial accidents occur more in architecture, and even in sculpture, than in painting. I will look for a case in mural painting, more subject to accidents than easel painting. It is true that in watercolor (not in mine, unfortunately) there are very gratifying accidents.

If you get on well with Don Diego you will have detected his Andalusian indolence. Pasotism that explains that, having already painted the door of cuarterones, and being evident that it does not fit in the hole, he is lazy to repeat it; indolence typical of a Curro Romero. As a Catalan pawn, I envy her.

You have amused me and with this epistolary exchange I am having fun.

1.7 From M.U. on 2020.3.20 9:02
And answer O.T. on 2020.3.20 13:17

I understand that we agree on the kings, right? If you agree, let's add a note about it.

The only thing that does not fit in my hypothesis of the reflection (since imagining the kings in a fishbowl does not convince me) is the position of both monarchs. I can think of two explanations:

The kings are not formally and frontally posing; they are conversing, three-quarters, about the painting.

Velázquez says to them; "ok, pose for a moment and in a moment I will put you in the painting". He does it alla prima (as always and with devilish skill) without realizing that the scene should be symmetrical.

that the scene should be symmetrical, that he should use a mirror. When she is aware of her mistake, she is too lazy to rectify it (as in the door of the quartered door) and thinks that no one will detect it, how wrong she was!

About Velázquez's Andalusian indolence - not to call it directly laziness - we say it in the article in passing, comparing him with Adolf Loos in that so important thing for him of not liking excessive work. But, in addition to the fact that he did not like to work himself to death, if he wanted to be noble - and he did -, he had to prove that he had never worked in his life... I do not know if I envy him: this is what I envy him for: the mud is the result of that.

Although I do not believe in stereotypes, there is something of indolence in the Andalusian character, which does not prevent an absolute Catalan, Carles Rexach, to have been a historical indolent.

2. With Lluís Clotet

2.1 From M.U. on 2019.7.20

How are you? We hope you are well! We are writing to you because we need help. (And don't start laughing, as you always do when we start explaining serious things...) we have a serious problem: we have discovered how Velázquez used the camera obscura to paint Las Meninas. And so, we need help: credible people who say we are sane.

2.2 From M.U. on 2020.3.17

We don't remember if we had explained to you that we were working on the perspective in Las Meninas. We have finally finished the article. We attach it for you. At least, it will help you to kill for a while the boredom of being locked up...

2.3 From L.C. to M.U. on 2020.3.21

I read your article carefully and I liked it very much. I saw you as a shrewd detective uncovering the killer's ploys and telling them with a fine sense of humor. The G-spot and the bald lady prove it.

The text runs like a mathematical demonstration, moving from one line to the next in an inevitable and clear way. And yet, the most suggestive point comes when you state your unprovable intuition that the painting was exhibited on the East wall of the Prince's Lower Room Gallery. When you say that you imagine the work to have been conceived to be inside the reality it so faithfully represents. Your false modesty when you allude to the almost exclusive merit of the computers, makes no sense here.

It must be true that the characteristic of any great work is that it is talked about for centuries and its complexity is not exhausted. And I wanted to ask you two questions.

Velázquez decides to open the door on the right to solve a dark corner that otherwise would have been difficult to solve. It seems to me a pretty obvious choice. What surprises me is that to face such a simple problem (a first year student of descriptive geometry would be able to do it quickly), he organizes with the displacement of the camera obscura, the mess that you tell. And the result is so obviously wrong and so easy to change that it is also difficult to understand how it turned out that way.

I'm a bit lost with your hypothesis of how he painted the figures. I'm probably missing data, but if Velázquez had placed a huge mirror on the West wall of the Gallery, couldn't he have done it without the need for so many movements?

And the drawings, beautiful and precise. I had never noticed that it is almost the same word.

2.4 From M.U. to L.C. on 2020.3.23

If I may, I would like to add a comment to your writing, which is clear and concise:

The computer thing is not false modesty. Without CAD it is not possible to do what we do. The problem is that with CAD people do nothing but nonsense and "horrenders". Have you seen the foam rubber Guernica that you can walk around

in "3D" and I guess in "real time" (another idiocy, is there a different time?) It's disgusting. It is in <https://www.youtube.com/watch?v=CZPTf41gbew>

Richard Sennet, in *The Craftsman*, explains it very well:

"The abuses of CAD illustrate how, when the head and the hand are separated, it is the head that suffers. Computer-aided design

could serve as emblematic of a great challenge that modern society must face: that of thinking like craftsmen who make good use of technology."

We need to recover the use value of things, and stop quantifying so much: quality matters.

And in answer to your questions:

Question 1: is that Velázquez did not even know the first descriptive, and instead, he knew how to handle the camera obscura. In addition, he could not locate the vanishing point J at the distance at which it is located. Consequently, he could not trace the horizontal vanishing lines from the door to that point and construct geometrically the perspective. It is exactly the same reason why Vermeer could not have geometrically constructed the perspective of the *Music Lesson*: a vanishing point was too far away. Much farther than that of the perspective of a highway that Oscar remembered that you had found it four tables away when drawing it....

Why did you leave it like that, and not fix it? According to Oscar - and it seems plausible to us - because of laziness...

Question 2: We put Elías [Torres] in copy, you will have to discuss it with him. May it be mild... He strictly forbade us to write that Velázquez had painted the figures with a mirror (which didn't even have to be very big, it was enough to move it around). We completely agree with you. Several of the figures look at Velázquez reflected in the mirror, starting with the Infanta.

It is true, precious and precise is almost the same thing... and precision is an obsession of architects. Not of those other I-don't-know-what who say that a certain Patinson is the most beautiful because it resembles the golden section by 92.15%! Can you imagine an error of 7.85% in the construction of the dome of the Pantheon in Rome? More than three meters difference in diameter?

2.5 From L.C. on 2020.3.28
and answer M.U. 2020.3.30

It is true that there are great houses (the Ugalde house, for example) and with many botched constructions.

I am afraid to get into such specialized fields and ask you questions that show my ignorance, but your last letter has left me with a couple of doubts that I would like to insist on.

1. I take it for granted that Velázquez constructed the drawing of the painting using a camera obscura, but didn't Velázquez know descriptive geometry?

No. The inventor of descriptive geometry was Gaspard Monge, who lived between 1746 and 1818. Monge, building on knowledge going back at least as far as Albrecht Dürer, systematized a system of representing three-dimensional space on flat surfaces by orthogonal projections, the so-called dihedral system. Descriptive geometry began to be taught at the Ecole Polytechnique in Paris, founded in 1794.

Monge was one of the four founders of that teaching institution in which we must also highlight another professor, Jean Nicolas Louis Durand, whose influence was enormous in the development of modern architecture.

Once the fundamental lines of the room had been drawn on the final canvas, deducing the position of the vanishing point of the perpendiculars to the picture plane and the horizon line was elementary. And from here, drawing geometrically the thickness of the wall, the half-open door and the coffers was much simpler than moving the camera obscura in a bad way.

Believe it not: given the dimensions of the large painting of Las Meninas (276 * 318 cm.), the vanishing point of the horizontal lines of the door in the background is 159 cm beyond the right edge of the painting. Besides, if Velázquez had geometrically constructed the perspective of that door, the leaf would close the gap, don't you think?

In a bad way because necessarily the new position of the camera had to be centered on the real door on the left... but it didn't fit in the room. All very complicated.

No, the camera (and therefore the point of view) could be located in front of the door that connected the Gallery with the Golden Tower. The drawing of the doors in Gómez de Mora's plan is merely indicative, they all seem too narrow (Fig. 20, Papers DPACO 02). Anyway, you are right that it is an obscure point in our reasoning, but we have not found anything more convincing.

I find it strange that Velázquez, lazy and elegant, decided to place the point of view in the adjoining room, with all the complication that it entailed and that you explain so well.

Would the painting have been so different if the camera lens had been changed a little and it could have been placed in the room itself?

It's just that the point of view is in the Golden Tower. We thank you for these comments because they have forced us to discover a simpler way to explain the situation of the point of view, which we have incorporated into the text of the study on Las Meninas.

The door between the Gallery and the Golden Tower -perhaps punctured in front of the camera lens- would have facilitated the alternative darkening of these two rooms. Even today, the projection machine of the cinemas is not in the hall, but in a small adjoining room.

2.If Velázquez had placed a large fixed mirror or several movable ones on the west wall to paint the figures, the painting would not be the present one, but its symmetrical one, but all the complicated movements you suggest would have been avoided. Then and according to your imaginative hypothesis, it would have been exposed on the West wall, but if it was so important to place it where you say, the whole process could have been done so that it would have been.

To sum up: the murderer being as skilled, cunning and fine as we know, I am surprised to think that the materialization of the crime was not simpler, with fewer touches, away from the mess and as brilliant as everything he did. Did he have assistants? Maybe that could explain the door and more.

Yes, she did, and the main one was her son-in-law, Martínez del Mazo. And that reminds us of a matter that intrigues us: in 1666, after the death of Velázquez and Philip IV, Mazo painted a portrait of the widowed Queen Mariana, which represents her on the main floor of the Alcázar on a checkerboard pavement similar to those of other contemporary Dutch painters (Hooch 1660, Vosmaer, 1663). They are not frontal perspectives, they are not drawn using a camera obscura and the diagonals do not escape to any single point?

Didn't they let Mallet use the camera obscura to draw that perspective? Did Mazo not see the camera working while Velázquez was painting Las Meninas? We don't know. But the location of the camera in the Torre Dorada would have allowed control over who saw it working, and who did not.

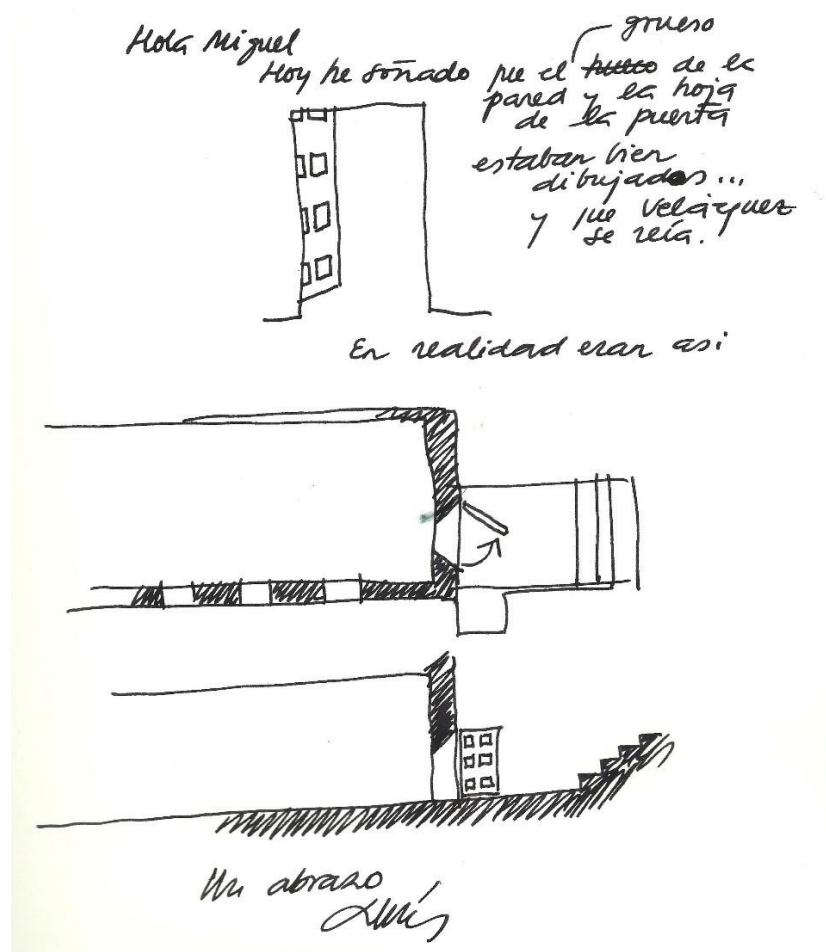
I remembered a final exam in Hydraulics, a make-up exam for those of us who had missed a day of class. The professor posed a problem and asked if anyone had any doubts. Unconsciously, I dared to ask him for clarification and he replied

that what he had said showed that he had no idea of the subject matter that had been explained during the course... That was it.

If it is any consolation: two hours after starting an exam on structures, when there were two more left, we discovered with dread that the axial forces of the beam of the portico we had to calculate, instead of cancelling each other out, were adding up... the portico was moving? We called one of the professors, the one who looked more human - our dear colleague Josep Gómez Serrano, the one with the key to go up to the roof of the Sagrada Familia -, explained the problem and asked him what he thought. "Well, it seems to me that you know very little about structures," he replied. And, unfortunately, he was absolutely right.

3. Between L.C., O.T. and M.O.

3.1 From L.C. on 2020.4.22 17:01



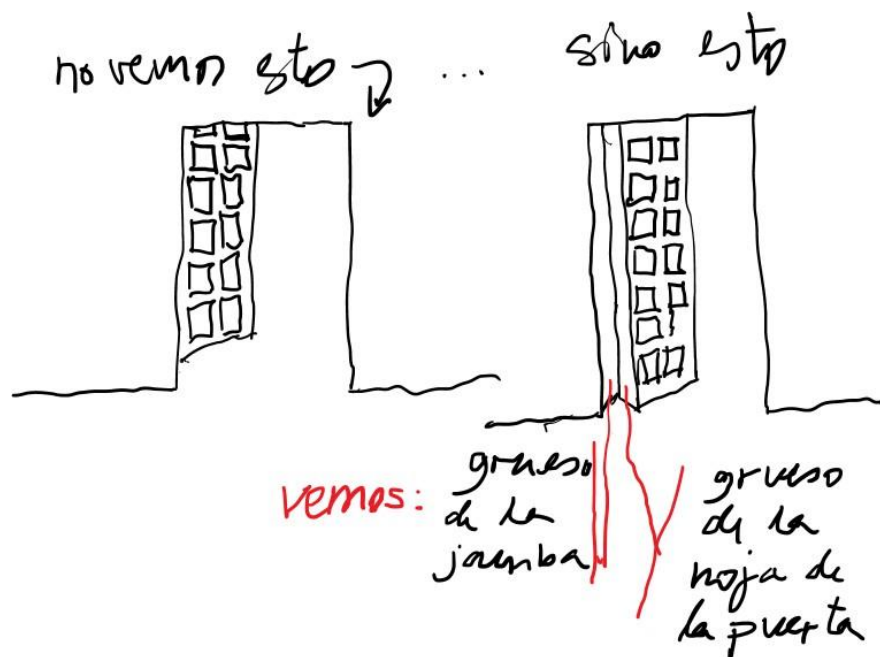
3.2 From O.T. on 2020.4.22 20:48

It would be the only case in the history of construction in which the leaf is placed on the widest face of the opening. The thick flaring was only used to gain luminosity. It is reminiscent of the Marseilles capial.

3.3 From M.U. on 2020.5.14 10:29

Sorry it has taken us so long to give signs of life. We have been, and continue to be, very busy. This distance learning thing is incredibly hard work. Because if you make a mistake in class, it's okay. Chances are that nobody notices anything. And if someone notices it, you say sorry, correct it and that's it. On the other hand, if you write it down, you're lost: it stays there forever. The only thing we remember from Professor Montero's Construction Materials notes is that "yellow marble is the most beautiful", and we read it almost fifty years ago...

Attached is the printable version of Las Meninas. It is not necessary to read it all, the changes we have been talking about (and that, to you, Lluís, give you nightmares, we are very sorry...) are in the matter of the door in the background and in how he painted the figures. We have left in both cases the two possibilities we have found, and let the reader decide.



(By the way, Oscar, what is the capialzado de Marseille that Lluís should remember?).

3.4 From O.T. on 2020.5.14 12:30

How young you are! The capialzado de Marsella was a compulsory subject in the School. I think in Construction class, although it should have been given in Descriptive Geometry (the most "architectural" subject of the career and the one that presaged the best architects). I was going to tell you what I remember about it, but first I decided to do some research on Wikipedia and found several interesting entries. As lately I have decided not to lecture or write anything that can be found on Wikipedia, I refer you to it.

I will look again at your definitive text but my positive comment I already made clear in Passing Clean. I find it nice to publish our correspondence, but without touching at all its colloquial freshness. We should delete some non-pertinent comment.

The Vermeer thing I had already read and it is uncontroversial. The lack of orthogonality in the ceiling beams in the Lady to the virginal with a gentleman [The music lesson] can only be explained by the submission to the camera obscura (in this case not totally parallel to the back wall) over the geometrical construction. The historical prurience of not showing the camera obscura is very similar to the current dissimulation of the use of photographs.

Brunelleschi's perspective was a brilliant contribution to represent "unbuilt" spaces and buildings, an infallible method to convince clients of the desirability of making them real.

3.5 From M.U. on 2020.5.14 20:47

Descriptive geometry was, in fact, one of the most architectural subjects taught at school when we began our studies in 1971... a few months before, we told our father that we might want to study architecture, and he (who was a doctor, and could not guide us) asked his friend José Antonio Coderch, who said: "You have to know how to see space" and sent us to study descriptive geometry.

study descriptive geometry. Much later we understood what "knowing how to see space" means. We continue to learn it. The demise of descriptive geometry and its replacement by CAD has been truly catastrophic....

About the ceiling beams in The Music Lesson: It is very curious that the beams go down from left to right and the transverse lines of the pavement as well. It seems as if the ceiling and the floor leak in opposite directions. The explanation that comes to mind is that it is a deformation produced by the camera lens.

3.6 From M.U. to L.C. and O.T. on 2020.6.8 11:56

Attached are two versions of our cross-postings on perspective and geometry issues: a complete ("whole") version and one in which we have deleted expendable items ("deleted"). Let us know what changes need to be made.

3.7 From O.T. on 2020.6.8 13:47

As you can guess, I have not studied more than the "erased" version which I found very entertaining. I only dare to suggest you to include my text printed in red. It seems important to me because it confronts the only weak point of my argument (the position of the monarchs).
Hug and go ahead, we are creating doctrine.

3.8 From M.U. on 2020.6.8 18:34

We have added it. Sorry, we had inadvertently deleted it. Besides, it seems to us that it happened as you say, we don't understand why we were discussing it...

I totally agree with what you say in today's interview in La Vanguardia. The idea of everyone going on vacation to Punta Cana was absurd. What for?

And what about the fear of dying? Michel de Montaigne was absolutely right: it is as stupid to complain that in a hundred years we will not be here, as it would be to complain that we were not here a hundred years ago either...

And what you say about creating doctrine? is there a charge for doing so? We are afraid not...

3.9 From O.T. on 2020.6.8 19:16

We don't get paid, but we make history. I didn't know about Montaigne, but it's great as always and I'll include it in my book.

3.10 From L.C. on 2020.6.9

I'm fine with the "deleted" version.
Above all, don't "erase" that my participation in this exchange of opinions between two experts has curiously reminded me of the Hydraulics playoff exam. In both cases like a fish out of water.

3.11 From M.U. on 2020.6.10 12:21

Don't be modest: the practical discoverer (which is the important thing in these cases) of the problem of the distance to the vanishing point in a perspective was you...

By the way, three reminders about perspective:

One: in the 70's it became fashionable to draw perspectives of cities with a blimp flying over them. Rafael Moneo, correcting a student who had done it: "But man, you didn't have to go to so much trouble... you just had to put the date...". It was enough to put the date."

Two: Our common and dear friend Elías Torres began to draw an aerial perspective for one of his projects as a student. Some time later, I don't think it was long, he realized that it was too heavy to do it. Undeterred, he drew the wing of the airplane, covering all that was left to do of the perspective. All of this, very typical of Elías: to start doing something without having foreseen anything and upon realizing what it costs to do it, to react immediately with decision and ingenuity. On to something else. This ability is enviable.

And three: A couple of years ago, a student tells us that their professors have ordered them to draw a "bow-wow". What is that, we ask, and he shows us a drawing by some Japanese architects whom we didn't know (and who we thought were doing interesting things). They are called Atelier Bow-Wow, and what they now call bow-wow is... a runaway section. Something that also became fashionable, that also cost a lot of work, and that disappeared so completely that not even the name survived.

A runaway section is nonsense, a dispensable drawing that makes the worst mistake: it shows us neither "how things are", nor "how things look", but an incoherent mixture of both possibilities, a sort of 13, rue del Percebe done in all seriousness, without noticing anything unusual. It will pass, that's the good thing about fashions....

3.12 From O.T. on 2020.6.10 12:45

I don't know if I agree with the fugitive section. There are beautiful and very explanatory ones by Fernando Higueras. The mixture of "how it is" and "how it looks" does not seem bad to me. All the axonometric and cavalier perspectives and many sketches are like that. I say this to disagree.

3.13 From M.U. on 2020.6.20 22:12

You are right, Higueras' escaped sections were very beautiful. And they were so because Higueras drew them knowing perfectly well how they were, how they could be built. And he did them to demonstrate the perfect coherence of form, use and construction. They had the same kind of beauty of musical instruments:

there is nothing in them that does not have to be precisely in that place. And the problem with bow-wows is that the students who draw them don't know what it looks like or how what they draw is constructed. They put things as they remember to put them. They are making... what in German is called a *Machwerk*, a "work of making". In Spanish, a botch job. Something done by someone who did not know how to do it.

When Antonio López drew, in 1969-70, his fantastic Restoration Center, he drew the building of Fernando Higuera and Antonio Miró's artistic restoration center, then under construction. López draws without worrying about the construction. He draws what he sees. That is the difference that

we wanted to highlight. And from here two very important questions arise:

1. When Piero della Francesca paints his flagellation or Jerg Ratgeb his, they paint things, bodies, places as they are, as they should be. With absolute clarity, as Wölfflin would say. And they do so because what they intend with their paintings is to explain something, to tell a narrative. To put it black on white, to write it on a sheet of paper. In this case, the passion of Jesus Christ (and Piero, in addition, some other different story). For this reason Ratgeb makes Christ appear at different times in the same painting, in what Rafael Sánchez Ferlosio (or a friend, by order of him) called *palinschematic representation*.

On the other hand, a flagellation by Caravaggio does not pretend to tell anything, it is not a narrative that develops over a longer period of time. It only wants to show an instant. Like a photographic snapshot. A flash of light is shot and something is seen until the light goes out and it returns to the darkness, to the black background. Nothing more. We do not know how things are, but only how we have seen them. Wölfflin would speak in this case of *Unklarheit*, Sánchez Ferlosio of *haploschematic representation*.

We say all this without claiming scientific rigor, just to understand each other. Surely others have said it before and better than us. As well as the appearance of the movable type printing press probably marks the boundary between before - when paintings explained stories, narrated - and after, when books explain what there is to know, and paintings show impressions, instant images. Impress us, scare us, excite us. Because we are in the counter-reformation, in the baroque, and the priests want to continue being indispensable and transform the church into their theater, from which they leave (again Sánchez Ferlosio):

"...at the door of the street to hawk his merchandise. They are emphatic, dramatic, overbearing gestures, of a sacred orator, signaling the loss of faith and its graying into propaganda: the horns of a split pediment are the arms of a preacher shouting "Come in and pass on, gentlemen, to the

great barrack, to the bazaar of redemption!" Which, by the way, does not exclude, by a long shot, the threat either."

2. Drawings are different depending on their purpose, their destination and who they are intended for. If they are construction drawings, in order for the builders to be able to

do their job well, they have to be clear, unambiguous and precise. And they have to show the true magnitude of the parts of the work. That's what orthogonal projections and descriptive geometry are for. They must show things as they are or as they should be.

On the other hand, if they are aimed at convincing the property, the owners or those who represent them - or the eventual buyers - that they are going to invest the money the work costs, they have to be persuasive, charming. And they need neither clarity nor precision. Hence my protest against bow-wows, which are useless for building, because they do not allow us to see what is hidden behind the perspective projection, nor to measure in the direction of depth; and they are also useless for convincing the client, who does not quite understand them and wonders anxiously: "Shouldn't there be a wall here? What if it's cold?"

To build, you need plans, floor plans and sections. To foreshadow what a building is going to look like, perspectives. Or, better yet, models, which is what normal people understand and like best. Because they can touch the material and notice that to make them you have to know something they don't know. And if you give the mason the perspective and the client the construction detail plans, you are a fool. That's what we meant.

When perspectives cost a lot of work, we drew very few of them. Instead, now, with computers, students waste an enormous amount of time giving unnecessarily precise data to the computer, without having the slightest idea of what is going to come out of it, and then they try to convince you of I don't know what with some dreadful perspectives full of vanishing points in all directions and light sources everywhere, and "textures". And that they have religiously paid some colleagues of theirs who make a living out of it....

When I was a first year student at school I remember a drawing teacher who used to tell us: "to... make textures... for example... you take..." - he took the Dupont lighter out of his pocket, put it under the paper and said, rubbing the paper with the pencil: "...you see... eh?"

Now they give you materials. They are like wallpapers. Worse: like marble Aironfix. And to top it off, they add some half-transparent photographs of people

stuck on top of them, playing ball or dancing. Sometimes they are like tall trees, and when they are not, the trees are two meters high.

meters high. And always, absolutely always, the trees are all identical, fresh out of the photocopying machine.

The other day we saw - we promise - a lady in a bathing suit jumping into the pool from the top floor of the section... of an inner courtyard. And we'll never forget a gentleman leaning on a bridge railing, and the poor guy was on this side of the river and had his hand on the railing on the other side.

And if you make them see any of that nonsense, they look at you over their shoulder raising an eyebrow, as if to say "aysh what a horror, what an old guy... pleaseoooo." And if they are more modest and discreet, at the very least they ask "you mean?". They do it by speeding up their voice, so it sounds like: "¿quiees dcir? Dani Freixes explains it with great grace. Well, yes, I mean. That's why I say it, otherwise I wouldn't say it, I don't like to waste time on nonsense... it happens to us like the saddler in Adolf Loos' story. And like Velázquez.

3.14 From L.C. on 2020.6.20 22:12

I read your last text and it fell on me like an avalanche. Beautiful about Piero della Francesca and Caravaggio.

It is true that drawings are different according to their purpose. Perhaps we should also talk about those drawings that are made at the same time as thinking, that do not explain a previous idea a posteriori, and that are like the often winding, hesitant, contradictory trace... that thinking leaves behind. Of those drawings in which thought and action cannot be dissociated because everything is mixed, it is simultaneous, impossible to know what is the responsibility of the head and what is the responsibility of the hand because they mutually excite each other when they coincide in time.

I really liked the voice of conscience. I found it fine, sharp, incisive, readable, suggestive?

3.15 From O.T. on 2020.6.23 17:43

THE THINKING HAND

3.16 From M.U. on 2020.6.24 21:30

Oscar, you are referring to Juhani Pallasmaa's book, right? The issue you raise is very interesting, but the truth is that we do not remember ever having had that experience. The head and the hand work separately. And as Richard Sennet says, it is our head that suffers....

In that discussion we cannot help you. We are sorry. We have much more experience in the development of projects than in their ideation. The truth is that working with Elías Torres and José Antonio Martínez Lapeña, having ideas was not necessary. There were plenty of them. What was necessary was to know how to reconcile contradictory conceptions.

Anyway, thank you very much for your attention and your reflections. It has been a real pleasure. We will ask for your help again when we find ourselves surrounded by a pack of scorned scholars blind with rage, armed with their styluses, stilettos, letter openers and - the taurophiles - cheeks and laces ... How awful! And these things, even if it seems that they are not, you end up knowing...

Velázquez using a camera obscura to paint Las Meninas?
Shameless!