Robert Capa

and the mystery of the lost photos

Experimental research by
Tristan da Cunha

in collaboration with
Allan D. Coleman

and the **Photo Museum**
of St-Bonnet-de-Mure

Tristan da Cunha in a few dates:

- Born in **1973** in Paris.

- 1990 : discovers photography and throws himself with passion into what is primarily a hobby.

- 1992-1995 : School of applied arts ATEP, Paris, 4 years of studies in drawing and creation of volume objects for communication.

- 1995-2000 : Uploads images of insects to BIOS agency.

- 1998-2000 : Paid employment in the digital laboratory ARRET SUR IMAGE, Paris, where he mainly learned all the secrets of Photoshop.

- 2000-2015 : Assistant, then food photographer and associate retoucher in the LE FOTOGRAPHE studio, alongside Etienne Heimermann. Photo studio specializing in food photography for advertising, and one of the first Lyon studios to go digital in 2000.

- 2015-2017 : Independent retoucher.

- 2017 to present : Food photographer and retoucher at the Julien Bouvier studio.

At the same time, has always been practicing black and white and color film photography, without interruption until today. This in all formats, from miniature 110 to 8X10.

In 2015, he embarked on the daguerreotype and practiced this process with passion for three years.

In 2019, learns about wet collodion thanks to the expertise of Michelangelo Bertani.

In 2020, discover 3D with Blender.

WARNING

This study is not intended to discredit the work of Robert Capa or to mar his memory. I really admire this photographer and consider him to have rightfully earned his place in the Hall of Historical Image Makers.

This is a technical work whose objectives are above all scientific curiosity, the search for the truth, but above all a pretext to have a good time and make interesting discoveries.

The start

It was in August 2020 that Robert Capa entered my life, during a stay in Normandy, on the landing beaches.

Indeed, this emblematic place did not fail to remind me of the photos of this famous photographer, who was the first to bring back images of the first hours of Operation Overlord.

Everyone knows the story: Robert Capa, then at the height of his fame, and already considered the greatest war photographer in the world, was given the mission to leave with the soldiers of the first wave to cover the beginning of the fighting.

This act of voluntary courage already commands respect, but it is even more impressive to learn that he managed to take about a hundred images spread over four rolls, and to get them to the London office of Life, just in time for the closing.

Unfortunately, these efforts were ruined by a clumsy lab assistant who accidentally destroyed the films. He accidentally closed the doors of the drying room, despite instructions, which caused the emulsions to melt in the confined space.
Only 10 images would have survived this disaster, which will become what will be called «The Magnificent Eleven».

Why 11 and not 10? Because the nickname «The Magnificent Eleven» originated to rhyme with the title of the hit Hollywood film «The Magnificent Seven». More euphonious than «The Magnificent Ten»!

Funeral monument located approximately in front of where Capa disembarked.

Since this story had been told without much change since the beginning, I naturally considered it authentic, especially since it had never been questioned.

But while searching on the Internet, I discovered that it was contested by the American historian Allan D. Coleman, who has done a research work that commands respect.

He manages to demonstrate with numerous arguments and historical proofs that this story of melted films was only a fable intended to hide a less romantic truth: Capa would have finally made only the 10 images we know, not one more.

In front of the quality of the arguments Coleman presented, I was quickly convinced, and I could have left it at that.

But I thought it would be interesting to provide additional evidence, by carrying out experiments and photographic tests that had never been attempted before.

So I played the game of the investigator, based on my knowledge as a professional photographer for 20 years.

The contact sheet

Allan Coleman publishes on his website the contact sheet of the surviving negatives. We can see there nine negatives of 135 format, coming from a Kodak Super XX film. It is a panchromatic film with a speed of ISO 100, the maximum available at the time. Eventually it can be pushed to ISO 200.

To make an analogy with today's film, let's say that it is the ancestor of the Kodak T-max 3200, the film that one thinks of as soon as one really lacks light. So Capa made a good choice in taking Super XX cartridges with him. These films were loaded into a Contax II (see below), equipped with a 50 mm lens, probably a Zeiss open at f/ 1.5.

Considering these elements, the visible motion blur on the images, the depth of field, and the available light at that time, the images were probably made around 1/50th at f-2.8. But not at full aperture, as there is no vignetting in the images. I was able to verify that from 2.8, the Zeiss lens does not vignette.

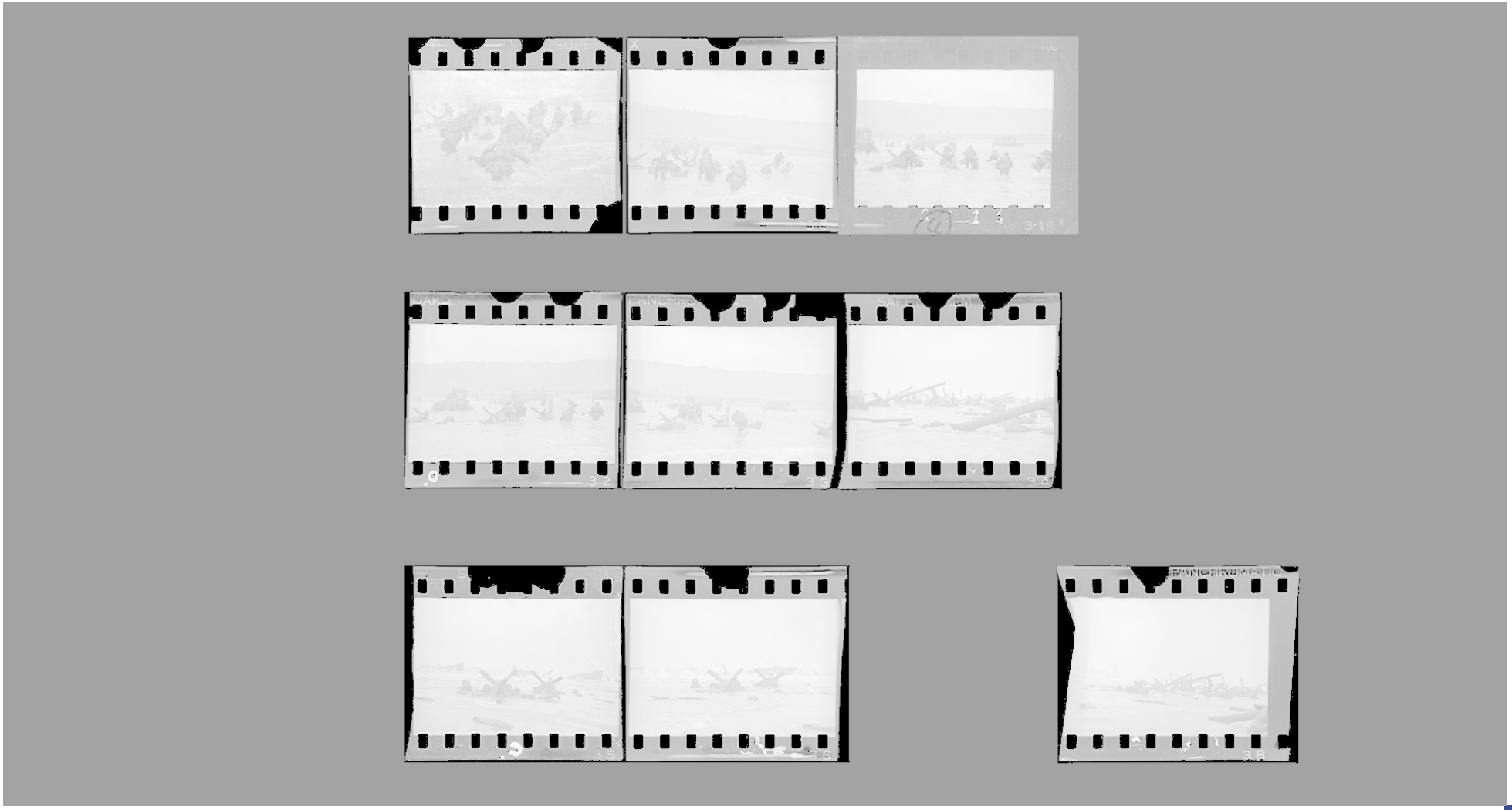
The originals are not classically presented in strips, as is the general practice, but are cut individually. Allan gives us the answer: at the time, the negatives were cut out frame by frame, to be selected by the censor, in order to make prints.

According to Allan, the damaged or missing parts (in the shape of an arc of a circle) are reminders of punching made for the selection of images by the censors or editorial directors. But apart from these elements, the perforations are intact and not distorted in any way.

I quickly realized that this contact sheet is not really a contact sheet, because it was obtained digitally, simply by placing the individual scans of the negatives on a black background. This can be seen by strongly lightening the image, revealing that the negatives are on a background of different density.

The original of image 31 has disappeared, only a countertype remains. One negative is also missing, that of the famous blurred image of the soldier floating in the water, entitled The Face in the Surf.

Dark bands can be seen on the right and left sides of each negative. These are artifacts probably created by the way the originals were held in the scanner. Period or current prints do not have these defects. They can be ignored.



Allan Coleman publishes the sheet with his own annotations:

He assumes that the 11th frame is before the featured sequence (before realizing, according to him, that it never disappeared, but is part of the censored images), and that The Face in the Surf is placed between frame 36 and frame 38.

Because the negatives are not in a single strip, some supporters of the legend have used this feature to argue that the negatives are from four different films brought back from Omaha Beach.

It has also been suggested that Capa might not have used standard cartridges, but could have loaded the film into reusable cartridges himself, which would have led to the conclusion that the frame numbers would no longer correspond to the usual logic: frame 1 could have been located anywhere on the roll thus loaded.

In order to see clearly, we have to reconstitute the negative strip by carrying out a digital editing work. We have previously voluntarily lightened all the images in order to show all the information present in the margins of the photograms.

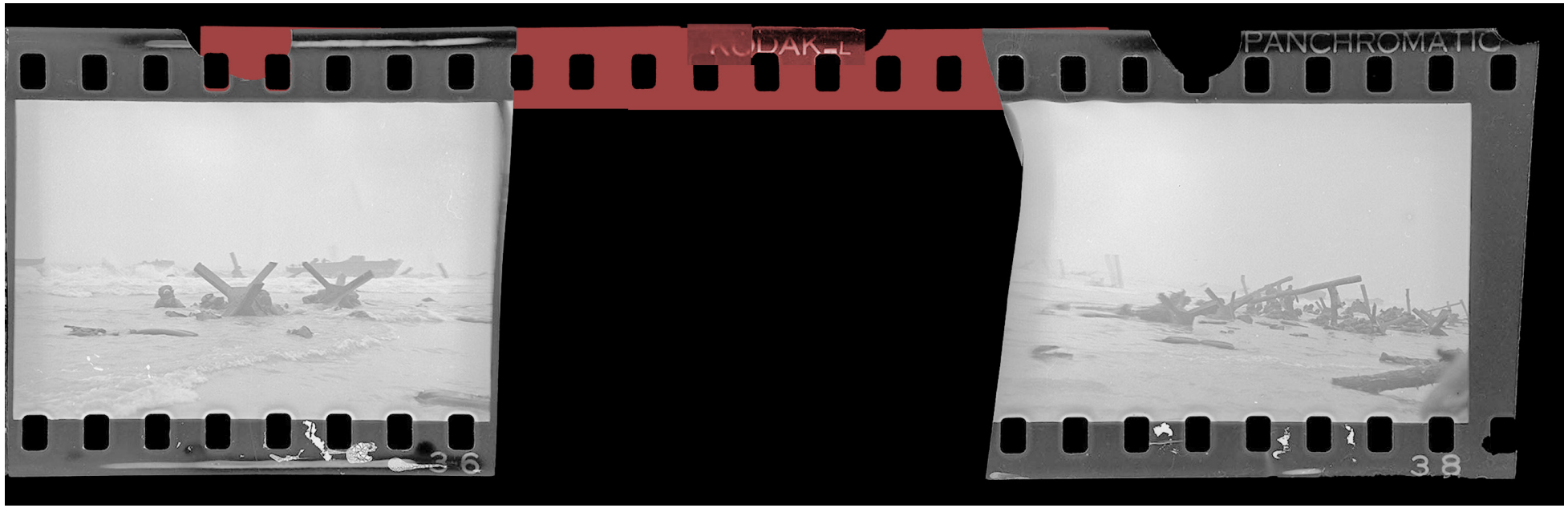
If we analyze the images thus assembled, we can clearly see that each image fits perfectly with the next. The hand cuttings (with a chisel) made at the time, are all different, which makes it possible to formally identify two negatives that have the same cut profile. This is the case from one view to the next.

Even view 31, which now exists only as a facsimile, behaves as expected. The technical data written around the perforations also show a perfect consistency. The Kodak Panchromatic Safety Film and Super XX phrases are fully legible, reconstructing the missing parts. And finally, the frame numbers are also consistent.

In fact, the sequence of images thus presented follows a logical temporal order: Capa is still on the landing barge and photographs the soldiers on the beach in the first 6 images, gradually moving away from the photographer. Then he disembarked in his turn, went to stand under the protection of a broken down tank, and photographed the scene on his right and in front of him.

View 38 has the particularity of presenting a blank space of film at the very end. If Capa had used film by the meter, it could not (except by chance) have been the last image in the film. Logically, another image should have followed, with an interframe space of the same width as the previous frames. But this is not the case.

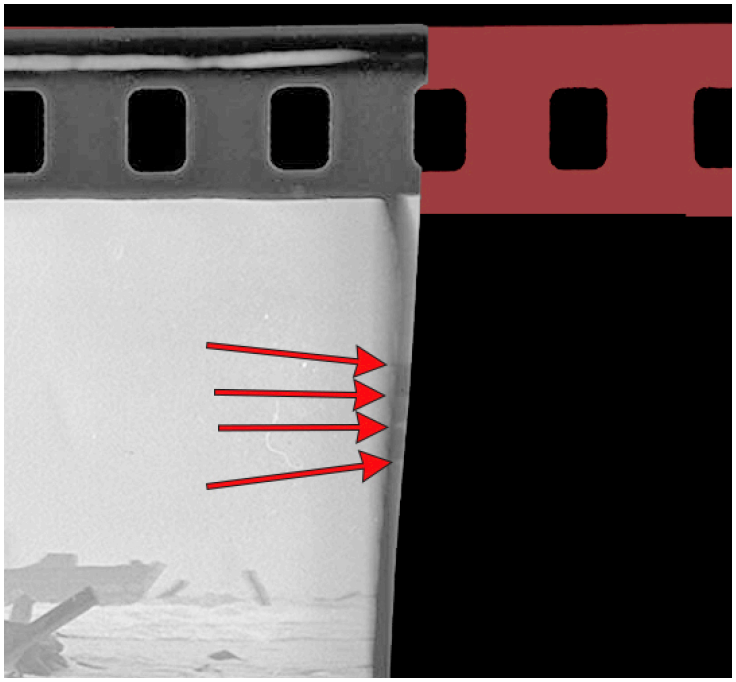
The length of blank film that follows #38 is too long for the film-by-the-meter thesis to be likely. We can therefore conclude with certainty that Capa simply used a standard 36 exposure film.

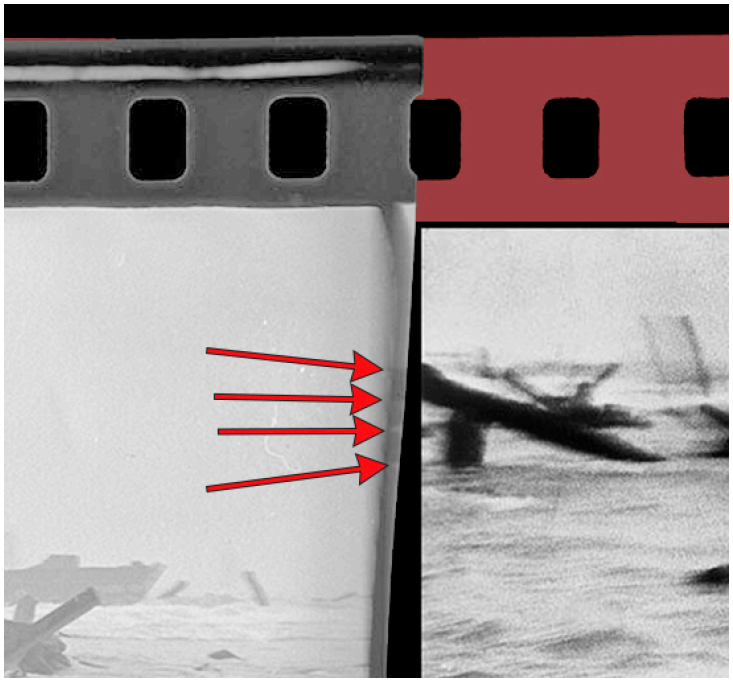


We can also determine the width of the missing area between view 36 and view 38 by reconstructing the number of perforations that would normally appear in this area, and by placing the word KODAK-L where it should be, if we follow the logic of the film inscriptions. We fall exactly on our feet. This allows us to conclude that only one image is missing. Is this the location of the famous Face in the Surf (see below), as Coleman assumes?

A careful observation of the preceding negative gives the key.
In the area indicated by arrows, we can guess some details that belong to the missing image.

If we place the photo of the Face next to these details, we see that they coincide perfectly.

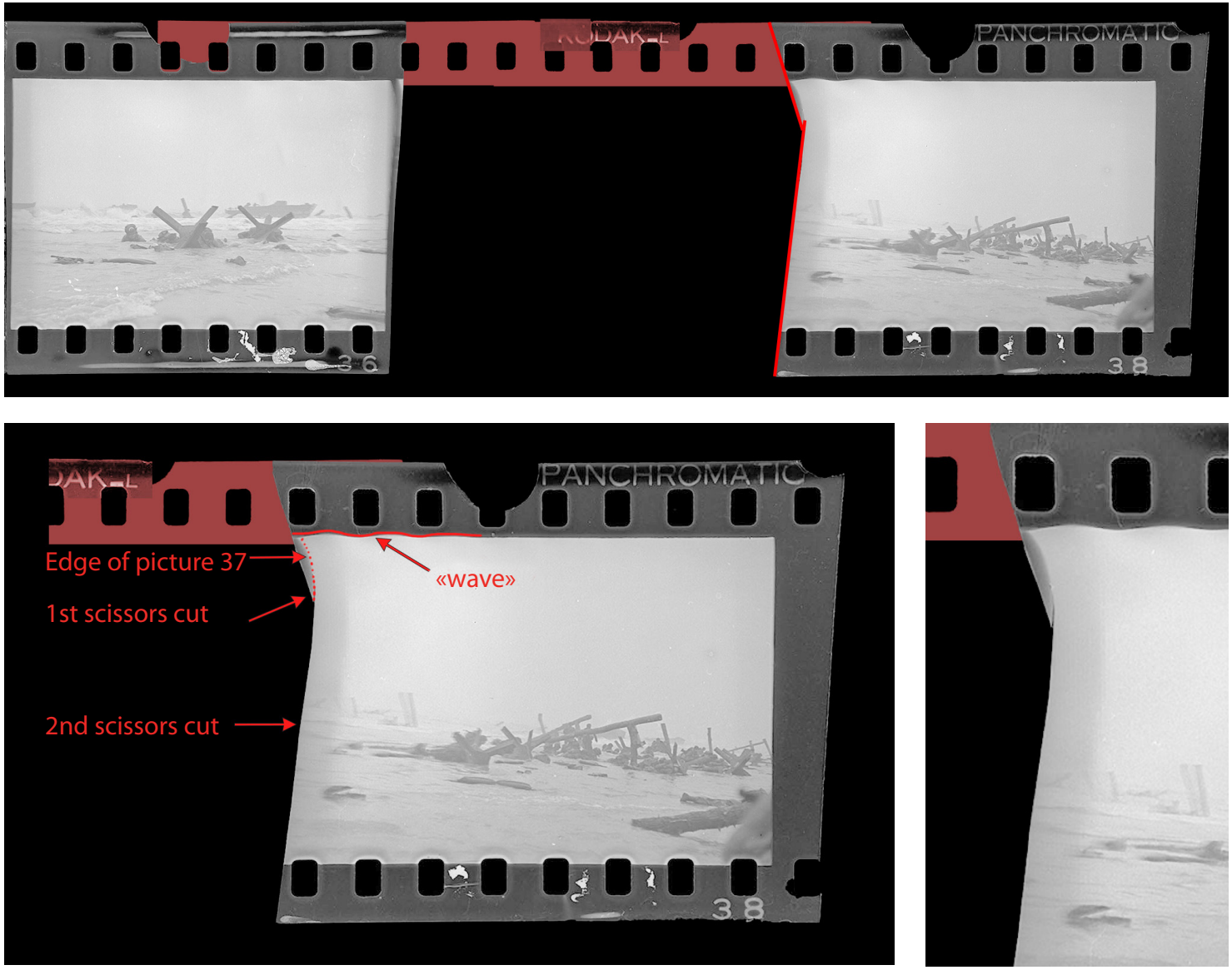




The Face in the Surf is therefore the missing image, and it is located at frame 37. We can see that it was slightly cropped during the printing process (from the original negative before it disappeared). The reason for the cropping is simple: the entire right side is badly damaged. What happened to it?

Let's analyze view 38, it gives the answer.
This image has often been used to justify the damage suffered by the film, damage due to the famous heat and which would have deformed it.

However, we can see that the perforations of the film have not been damaged at all. Moreover, the singular cut in circumflex accent is not due to a negligence of the laboratory assistant. On the contrary, he carefully followed the particular shape of the inter-image space, proceeding in two successive scissor strokes.



These deformations are characteristic of a defect of flatness of the film. In this area, the film no longer conforms to the exposure window, and the parts that move away from it are blurred, while those that are still in contact with it remain sharp. The result is a wave form, with blurred areas in the image, which can look like motion blur.

We can now attempt a reconstruction by extrapolating this data a bit:

We now understand more clearly that view 37 has suffered from a flatness problem in the camera, combined with a lateral motion blur. What gives this singular effect, difficult to identify at first sight.
If this phenomenon occurred on frame 37, it is not a coincidence, it is undoubtedly due to the proximity of the end of the roll (and this reinforces the idea that frame 38 corresponds to the last image of the film). The cartridges of the time, as we will see later, were made entirely of metal, and had an easy tendency to jam, especially towards the end. I experienced this myself, having increasing difficulty advancing a 1943 Super XX film.

Did Capa experience a blockage in the film, forcing him to force the arming, which would have caused the flatness defect? It is possible, even if there is still a question about what could have caused this «loss of adhesion» of the film. A defective film press could be an explanation, especially since a careful observation shows that the defect is also present (but hardly visible) on all the previous views.

In any case, there is still something to think about here.

Here is an example of a flatness defect that I was able to reproduce (accidentally) in 120 format, in a 1934 Ikonta camera.

For a reason not worth describing here, and before loading it into the camera, I had voluntarily unrolled the 120 film to make it start at the end, which caused a slight flatness defect, but enough to completely transform the images. We find the deformations of the frame, as well as geometric deformations in the image itself. However, with much less blur, simply because I had closed the aperture to F-16 (Capa was around F-2.8) which increased the depth of focus.

We notice that the perforations have a heavy tendency to come and invite themselves at the bottom of each image. This characteristic, at first sight abnormal, was used as an argument by some to demonstrate that it was a reminder of the beginning of the emulsion's melting. The images would have «sunk», «slipped», until they came to bite the perforations below. This thesis is in itself completely far-fetched and demonstrates a serious lack of knowledge of the way in which a film is manipulated during its development.

Even if one accepts the improbable idea that the images can slide off the support, the movement cannot be in the direction of the perforations, since a film, when drying, is placed vertically in the drying booth. At best, the movement should be in a left-right direction.

Photographer Rob McElroy found the cause of this «slip». He was able to demonstrate that its origin lies in the Contax II that Capa was using. This German-made camera was designed to work with the brand's proprietary rechargeable cassettes. There was a cassette that fed the film, and another that received it, the film passing from one to the other during use, thus avoiding the rewinding at the end of the film.

One could nevertheless use standard cartridges, like the Kodak, but it turns out that these cartridges did not have exactly the same measurements. Being slightly shorter than the proprietary cassettes, there was some play in the camera housing.

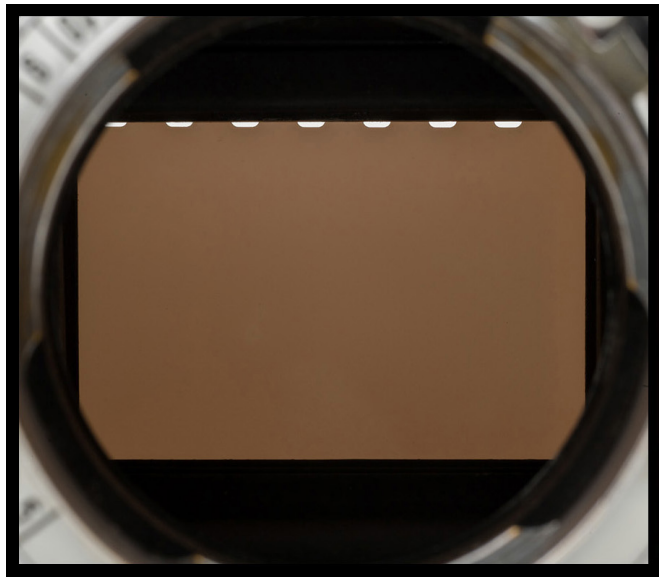
With gravity, the cartridge tended to fall down a bit, which meant that the film was no longer centered in relation to the exposure frame, and the perforations came to invite themselves in the image.

Photos : Rob McElroy

1: The proprietary cartridge comes right up against the removable back, it is held without play.

2: The Kodak cartridge is too small, there is play between it and the removable back.

3: With gravity, the cartridge moves downwards, the film is no longer positioned correctly.



Photos : Rob McElroy

What was from frame 1 to frame 27?

The entire negative, now reconstructed, allows us to situate the action:


Matériel de démineurs- Musée Overlord

The first image shows the soldiers exiting the barge. Capa is still on the ship and photographs the same scene up to view 33.
Then he finally gets off the boat, walks through the water until he is behind the protection of a broken down tank, photographs Rommel's «asparagus» to his right (view 34), the mine-clearing soldiers in front of him (busy mining the obstacles) in view 35.

Then moves away to his left a few steps, photographs the same mine-clearing soldiers again (view 36), records in front of him the Face in the Wave (view 37), and turns his head to his right to take the same Rommel asparagus (view 38) as in view 34. One assumes that from here on, his film finished, he does not dare to change it, and therefore stops photographing.

But what happened before view 29? There is the case of the 11th lost view, which, if it really existed (it seems not), is necessarily located in view 28, but before? What did Capa photograph on the first two thirds of his roll? There are only three solutions:

Barge de débarquement restaurée au Musée du Mur de l'Atlantique.

- Capa did consume the beginning of his film, but the images represent sensitive data that the censors preferred to put aside (a vision of the invasion device that should not have been disclosed). I refer to the work of Allan Coleman, who went very far in this research.

- Capa had a technical problem that prevented him from producing a usable image.

- The lab had a technical problem. Here, the pretext of the melted films comes up again. I can immediately state that this explanation is incoherent, as I will explain later.

As has been proven, it is impossible for Capa to have started his roll at frame 28 (or 29), since he used standard commercial cartridges, not strip film which could have actually started at number 28.

Here remains an unsolved mystery, but we can make some compelling assumptions:

I can't imagine that Capa would have gone to such an important event with a film that was three quarters of the way through.

The least serious photographer would have had the reflex to start his day with the maximum of autonomy before having to recharge his camera, knowing how difficult it is to change film in the middle of the action, under the expected circumstances.

My personal conviction is the following, and only commits me: Capa did load a new film that day. He began photographing the soldiers in the barge on the way to the beach, until he reached view 28.

Allan Coleman confirmed this hunch for me.

From Charles Herrick's work, it seems that Capa's images on the first two thirds of his roll showed the extent of the invading armada, and these elements were not to be disseminated in the press (the German services were of course gathering information by exploiting the Allied newspapers).
These images, as soon as they were developed, would have been removed by the censors, even before John Morris (the head of Life's photo service in London) was informed.

I refer you to the article published on Coleman's website :

https://www.nearbycafe.com/artandphoto/photocritic/2019/07/10/alternate-history-robert-capa-on-d-day-44a/

This explanation seems to me more credible than a technical shooting problem, such as forgetting to remove the lens cap, or an exposure error rendering the film unusable.

With the lens cap in place

Could the films have melted?

To answer this simple question, it is not enough to analyze the surviving negatives, even if, as we have seen, they already give many indications. For we can very well imagine that the images that remain to us had been spared by being placed in another booth, or developed before, or what have you...

To demonstrate that they could have been melted, it is necessary to have period films. Indeed, to heat a modern roll would not be relevant, because since the 1950s, they are on polyester support, very resistant to heat, whereas the emulsions of the years we are interested in are on acetate support.

And to go to the end of the process, the ideal is to find the same film as Capa (Kodak Super XX), from the same period, and moreover still virgin and... to take pictures with it! Then to develop it, and finally, to submit it to the heat of a cabin built for the occasion.

A beautiful challenge, as one can imagine!

And indeed, I was far from imagining the complexity of such an undertaking.

Finding a period film, even one that was the same as Capa's, seemed insurmountable at first. I was willing to settle for any type, as long as it was before 1950, the approximate date of the change of medium among manufacturers. This was without counting the energetic enthusiasm of Rob McElroy and Allan Coleman.
Rob quickly found me a blank 1947 cartridge on Ebay, which I promptly purchased.

Then, it was Allan Coleman's turn to offer me two other Super XX cartridges, one from 1943, and the other from 1944, the same year as D-Day!

With this treasure, I couldn't back out!

Film Kodak Super XX from 1947, 20 exp.

This film was bought on Ebay US. The cartridge is made of metal (including the shaft) and is wrapped in a metallic paper. The whole is slipped into a cardboard cylinder. The expiration date is May 1947.
A notice on separate paper is provided (see next page).
The film seems to be in good condition, the support has a normal aspect, of excellent mechanical resistance. No visible alteration. A few micro-scratches on the surface of the primer, due to rubbing in the wrapper.

KODAK PANATOMIC-X FILM (FX 135)
KODAK PLUS-X PANCHROMATIC FILM (PX 135)
KODAK SUPER-XX PANCHROMATIC FILM (XX 135)

Load and unload your camera in subdued light, never in direct sunlight nor in exceptionally strong artificial light. Light leaking through the film slot in the magazine will fog the film. After the last picture has been made, rewind the film into the magazine and remove it from the camera; then place the magazine in the metal container in which it was originally packed.

Warning: Do not wind the film beyond the last exposure or it may break loose from the spool in the magazine and necessitate unloading the camera in the darkroom.

DAYLIGHT EXPOSURE TABLE

These exposures apply when the film is processed as recommended

Kind of Film	Brilliant[1] Subjects	Bright[2] Subjects	Average[3] Subjects	Shaded[4] Subjects	Light Condition
Panatomic-X	*f*/11 & 1/100	*f*/8 & 1/100	*f*/5.6 & 1/100	*f*/4 & 1/100	Bright* Sun
Plus-X	*f*/16 " "	*f*/11 " "	*f*/8 " "	*f*/5.6 " "	
Super-XX	*f*/22 " "	*f*/16 " "	*f*/11 " "	*f*/8 " "	

*For Hazy Sun, use next stop larger. For Cloudy-Bright days, use 2 stops larger, and for Cloudy-Dull days, use 3 stops larger.

[1]**Brilliant Subjects:** Beach, marine, and snow scenes, distant landscapes and mountains without prominent dark objects in the foreground.

[2]**Bright Subjects:** Near-by people in marine, beach, or snow scenes; scenics with foreground objects.

[3]**Average Subjects:** Near-by people, gardens, houses, and scenes, *not in the shade*. Use this classification if in doubt.

[4]**Shaded Subjects:** People, gardens, and other subjects in the *open shade* (lighted by open sky—not under trees, porch roof, etc.).

SPEED AND RECOMMENDED METER SETTINGS

Film	Light	Kodak Speed	Weston Meter	G.E. Meter
Panatomic-X	Daylight	125	24	40
	Photoflood	80	16	24
Plus-X	Daylight	200	40	64
	Photoflood	125	24	40
Super-XX	Daylight	400	80	125
	Photoflood	250	50	80

DEVELOPMENT: These films are sensitive to light of all colors and it is recommended that they be handled and developed only in *total darkness*.

TO OPEN THE MAGAZINE: Press the sides of the magazine and pull off either cap; then remove the spool from the shell.

Kodak Developer D-76 is recommended for developing these films, if contact prints or slight enlargements are to be made. For minimum graininess, Kodak Fine Grain Developer DK-20 is recommended. These developers are obtainable in prepared powder form at your dealers'.

The Kodak Day-Load Tank is recommended for obtaining the best results in developing these films.

Approximate Times of Development at 68° F. (20° C.) in a tank

Film	D-76	DK-20
Panatomic-X	14 min.	14 min.
Plus-X	16 min.	16 min.
Super-XX	20 min.	23 min.

RINSING AND FIXING: After developing, rinse the film thoroughly in water; then immerse it in an acid hardening fixing bath. This may be prepared conveniently, using the Kodak Acid Fixing Powders or a bath prepared according to the formula for Kodak F-5 Fixing Bath. Fix for twice the time required to clear the film of all milkiness—about 15 minutes at 68° F. (20° C.) with frequent agitation.

WASHING AND DRYING: Wash the film for at least 30 minutes in running water. Wipe the film carefully with a Kodak Photo Chamois, and hang the film in a clean, dry place until it is thoroughly dried.

FILTER FACTORS: The filter factors may be defined as the number of times the normal exposure (without a filter) must be multiplied to give the correct exposure when using a particular filter.

Filter	K1	K2	G	X1	A	Filter	K1	K2	G	X1	A
Sunlight	1.5	*2	3	4	7	Photoflood	1.5	1.5	2	*3	4

*Correct color rendering.

PHOTOFLOOD EXPOSURE TABLE FOR SUPER-XX FILM

With Lamps in Kodak Handy Reflectors

Shutter Speed 1/25 Sec.	*f*/11	*f*/8	*f*/5.6	*f*/4	*f*/2.8	*f*/2
	Distance of Subject to Lamp in Feet					
2 No. 1 Lamps	3	5	7	10	14	20
1 No. 1 Lamp and 1 No. 2 Lamp	3½	5½	8	11	16	23
2 No. 2 Lamps	4	6	9	12	18	26

For **Plus-X Film,** increase the exposure 1 lens opening.
For **Panatomic-X Film,** increase the exposure 2 lens openings.

More detailed information about these films and developing procedures may be obtained by consulting "Kodak Films" Data Book on Negative Materials or the "Kodak Reference Handbook," on sale at your Kodak dealer.

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The manual provides information on the speed of the film, which is not indicated in ISO. But we can extrapolate thanks to the F16 rule. This rule indicates that in full sunlight, if you go to F16, the speed is equal to the sensitivity of the film. We see in table 1 (Daylight exposure table) that the speed for Bright subjects is 1/100th at F16.

This corresponds to a speed of ISO 100.

Concerning the processing, Kodak indicates a time of 20 minutes in the pure D76 at 20°C. For the record, this developer still exists!

Instead of taking the risk of exposing the whole film, I played it safe, and decided to do a first test on a small piece of cut film (the length of two frames).

To do this, I loaded the camera normally (an Olympus OM-1), and advanced the film to the first frame. Then, I took two pictures and then, in the darkroom, I cut the film just after this frame.

To expose the film, based on previous experiences (notably the rule of thumb that one should overexpose by one f-stop every 10 years of expiration), I chose to overexpose by 5 f-stops on the first frame, and by 7 f-stops on the second frame. That is respectively 1/8th of a second at F-8 and 1/2 second at F-8 in full sun.

The goal here is to avoid exposing longer than 1 second to avoid the non-reciprocity effect that occurs in long exposure.

Then comes the time of development. A dilemma questioned me for a while. Which developer to choose?
Using a classic developer is often not optimal for outdated films. Indeed, with time, they lose their native sensitivity, and furthermore, they are subject to «chemical haze». This is a phenomenon that results in a darkening of the transparent parts of the film. This can make images difficult to read.

Some developers do better than others at limiting chemical fog.
But since these tests are part of a historical research, I have to be as close as possible to the conditions in use at the time, namely the use of D76 as a developer.

The D76 is therefore not ideal for developing a film that is 75 years out of date, but I decided to stick to it. Anyway, I have little chance to multiply the tests, otherwise the whole film would have gone through, and that's not the point. Moreover, I know that the three films will behave differently (the storage conditions having varied for each one), the extrapolation of the parameters from one to the other will be hazardous.

The vintage manual advises to use the pure D76, for 20 minutes at 20°C. Although this time seems excessive (I have never encountered such a long development time with developer used pure), I respected it. You have to start from a certain point, so it might as well be this one.

Note that Kodak D76 and Ilford ID-11 are exactly the same developer. So I used the latter, which I know well and had in stock. The purists will reproach me for this, but since they are the same developers, I will assume this heavy mistake...

So let's start the development process.

Before pouring the ID-11 in the Paterson tank, I pre-wet the film for 1 min with clear water (at 20°C). Then, I emptied the tank and poured the developer. The agitation will be done as follows, and this will be valid for all future developments: Agitation by turning over during the first 10 seconds, then 2 turnovers of the tank every 30 seconds, this all along.

Then, empty the tank, and use a stop bath (Ilford Ilfostop, diluted according to the manufacturer) during 1 mn.

Empty the tank and then fix. Kodak recommended a non-tanning fixer, this is the case of Ilford Rapid Fixer which will be used. The film will be fixed during 4 minutes in continuous agitation (using the rotary axis).

Then empty the tank and rinse with running water at about 20°C for 30 minutes (with the ad-hoc hose).

Last step, emptying of the tank and filling with demineralized water with a few drops of wetting agent (Ilford Ilfotol).

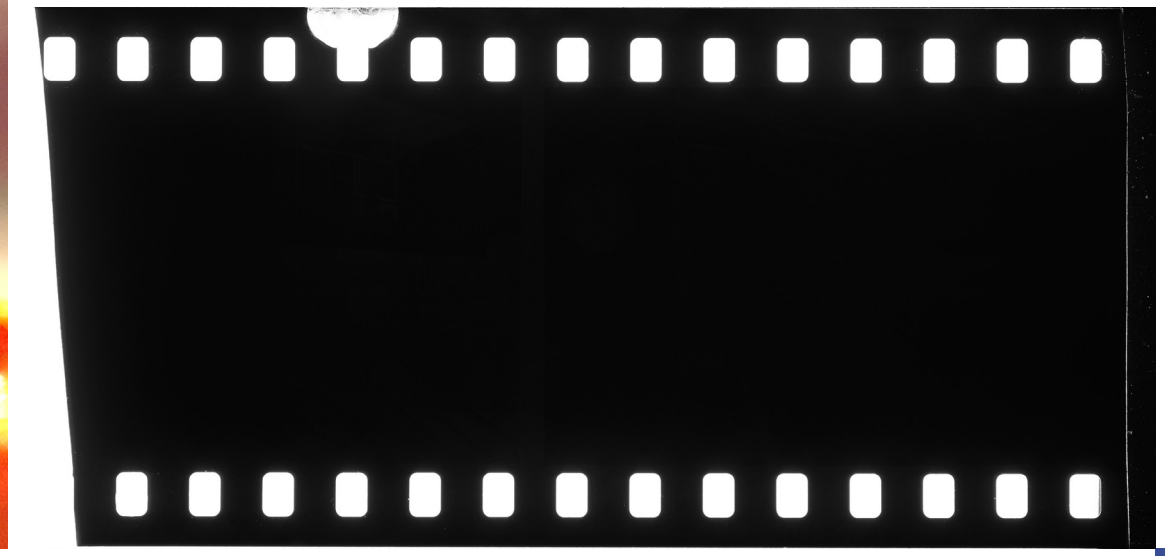
The film is then spun by centrifugal force (by tying the spiral to the end of a rope while making windmills), then air-dried (we'll avoid the drying cabin, won't we?).

The result is eloquent.

Basically, an entirely black film. This result is not due to overexposure, because the perforations are as black as the image part. It is rather an overdevelopment, aggravated by the chemical haze.

At that moment, I thought it would be impossible to obtain images with such an old film.

But I did not want to despair, and took the time to observe meticulously, under a strong light, this small piece of black film.



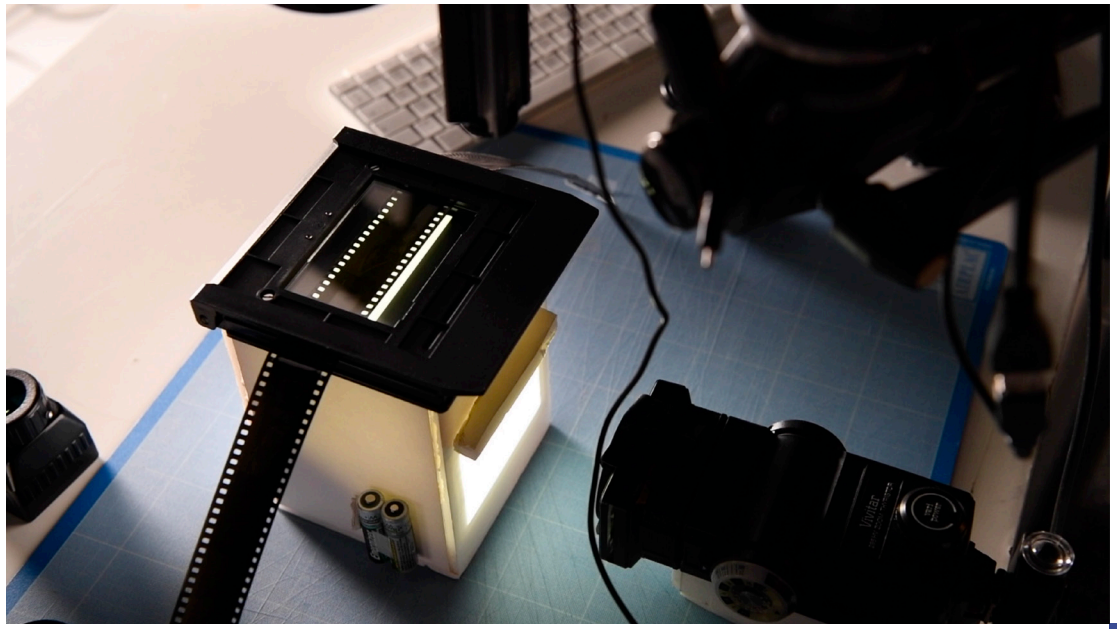
And I was surprised to find that a very faint image was visible.

I then tried to digitize it.
Of course, a scanner is in this case, of no use (the original is much too dense, scanners are unable to go so far in the blacks). So I chose the method of reproduction with a digital SLR camera and macro lens.

Note that for several years, I have completely abandoned my film scanner (Coolscan V) in favor of reproduction with a digital camera, much more efficient, flexible and fast. All the originals in this study are scanned in this way.

My method is the following: Nikon D750 camera (sometimes D850 if needed), Olympus OM Zuiko 80 mm F4 macro lens, used at F8, mounted on Olympus bellows (adapted to Nikon camera via a Leitax ring).

The originals are held in place in an enlarger negative holder, with lenses if necessary. The whole thing is placed on a home-made light box. The lighting comes from a reportage flash. This way, I can reproduce any original, from 6X7 to subminiature format, always taking advantage of the full resolution of the sensor.
The images are captured in RAW, and processed in Capture One software.



The use of this method takes all its sense with the present «case», completely out of the ordinary.
The reproduction allows to adjust the exposure at will. It is enough to increase the power of the flash. If that is not enough, you open the diaphragm.
And if you are really right, you just have to increase the ISO on the camera.

Even so, I pushed the system to its limits, as I had to overexpose by no less than 15 stops to reveal the image below!

This result, while miraculous, is of course not satisfactory.
We absolutely have to find a way to get a more readable negative without artifice.

But still having managed to «pull out» an image, hope returned.

After a quick reflection, I realized that if I was to achieve my goals, I had to modify both the development time and the exposure.
Since the margins of the film are black, the revealer was too powerful. To lighten this black, we must reduce the action time of the developer, and increase its dilution.

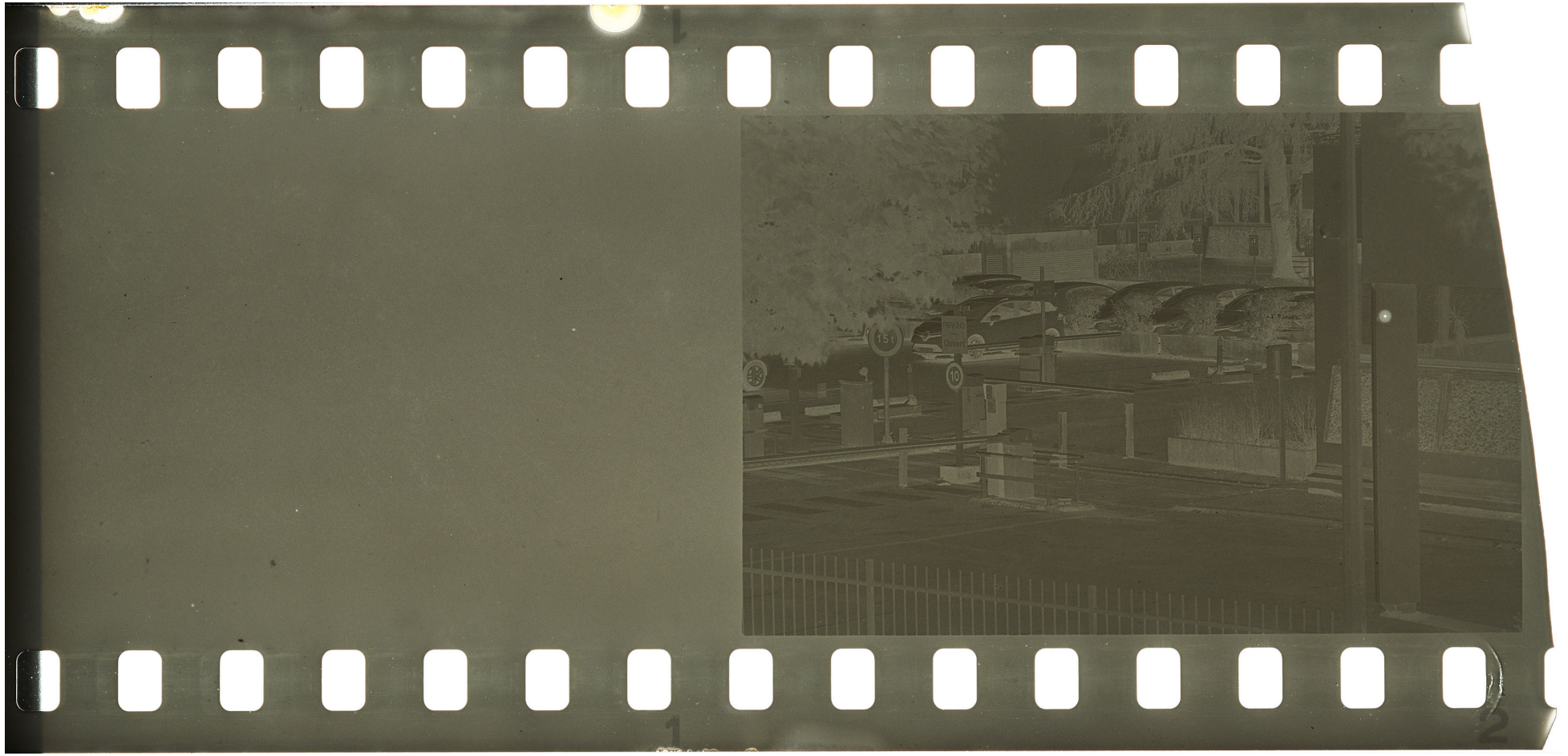
But a less powerful developer involves overexposing the images even more, to compensate.

An image truly out of nothing ...

With these considerations in mind, here I go for a second try, on a piece of film of similar length.

This time, I overexposed by 7 f-stops (not more, it's a reckless tactical choice, there is a very low image risk), and I drastically lowered the action of the developer by choosing a time of 10 mn (instead of 20) and by diluting to 1+1 (instead of pure). All other parameters remained unchanged.

And I was happy to obtain this:



The image is perfectly readable. And incredibly, the numbers in the margins are present! Consider that these numbers have survived as a latent image for 75 years!

The choice of just overexposing by only +7 stops seems to pay off.

Indeed, the film is unable to achieve denser blacks than here anyway, as evidenced by the presence of white cars which also show specular sun reflections in places. Normally, these areas should come out completely black on a fresh film, and this is not the case. So you can't expect to improve things by overexposing more.

One could lighten the blank areas by lowering the development time, but this would be at the expense of the image density.
On the other hand, the digital processing of the image gives a very convincing result (below).

So I decided to use the rest of the film as is, without further testing.

The goal is not to succeed in a competition development, which would require to consume the whole film in various and hazardous tests, but to obtain readable images.

This is already enough, because it authorizes the continuation of the project.

The goal being, I remind you, to melt a period film in a drying booth.

I was finally able to confidently load my Olympus OM-1 and finish the film. I overexposed each time by +7 stops, using a Sekonik L-408 handheld cell.

Four Zuiko OM lenses were used:
- 28 mm F-2.8
- 50 mm F-1.8
- 135 mm F-2.8.
Used between F4 and F8.

For the three indoor shots of the film cartridges, I used a Zuiko macro 135mm F-4.5 on a bellows. Long exposures of several minutes.

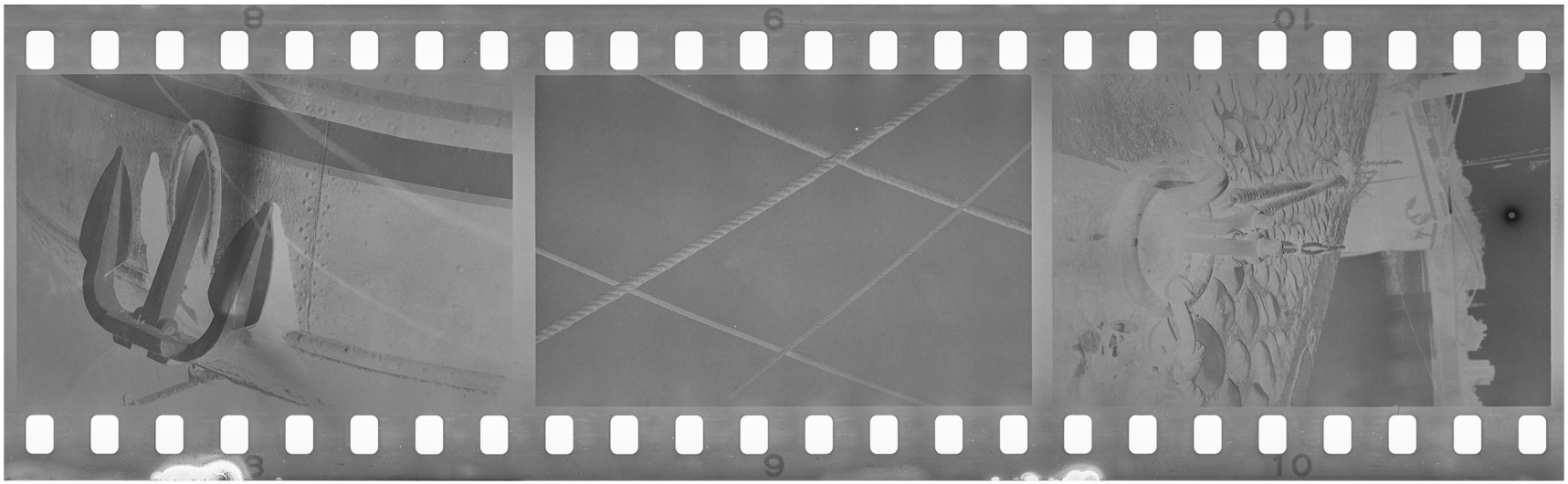
Development identical to the second test.

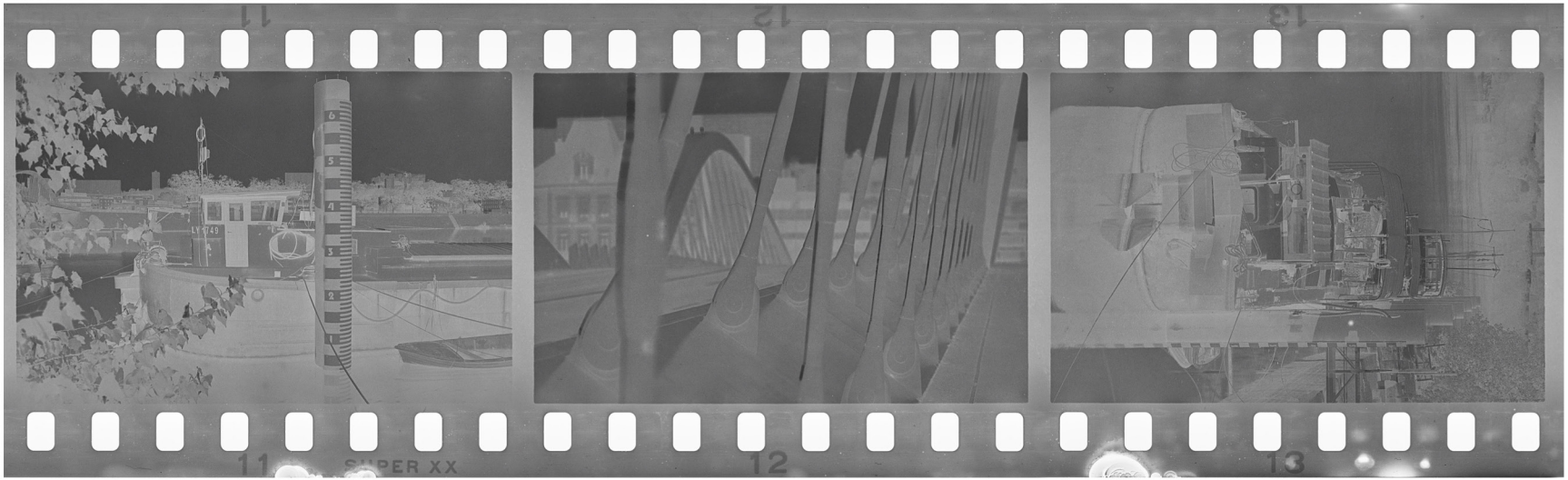
No image was missed.

And I had the pleasure to discover the SUPER XX mention well readable throughout the film, as well as the frame numbers.

The film presented whole, without cuts. Reproduction of the film in pieces, then assembly of the files in Photoshop.

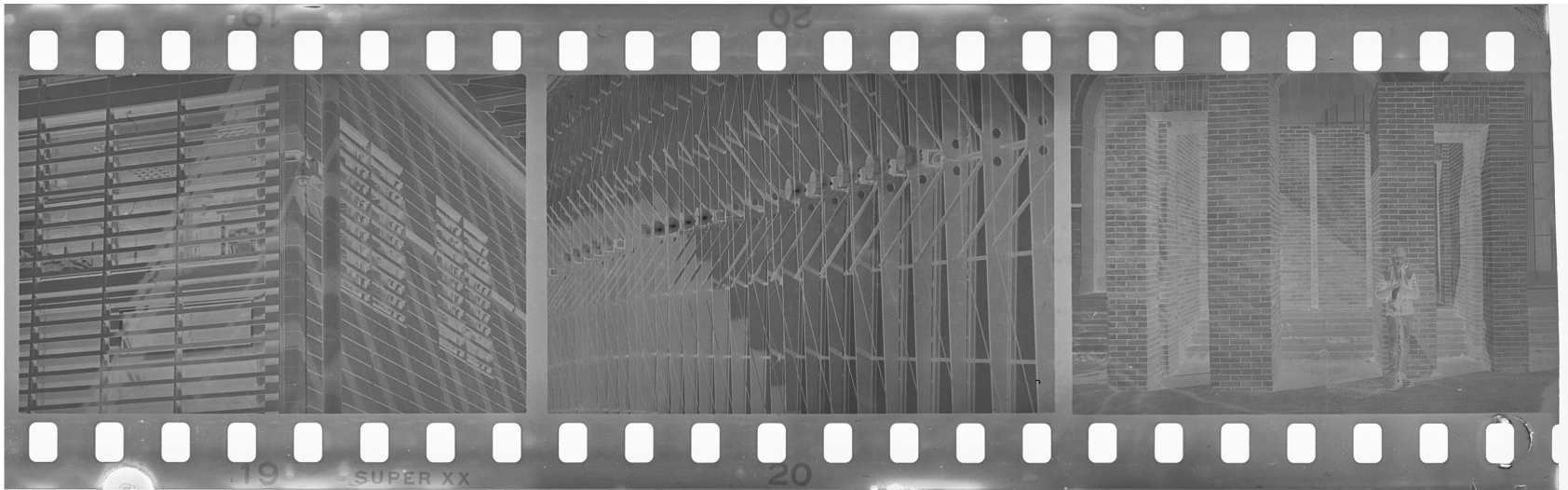

SUPER XX



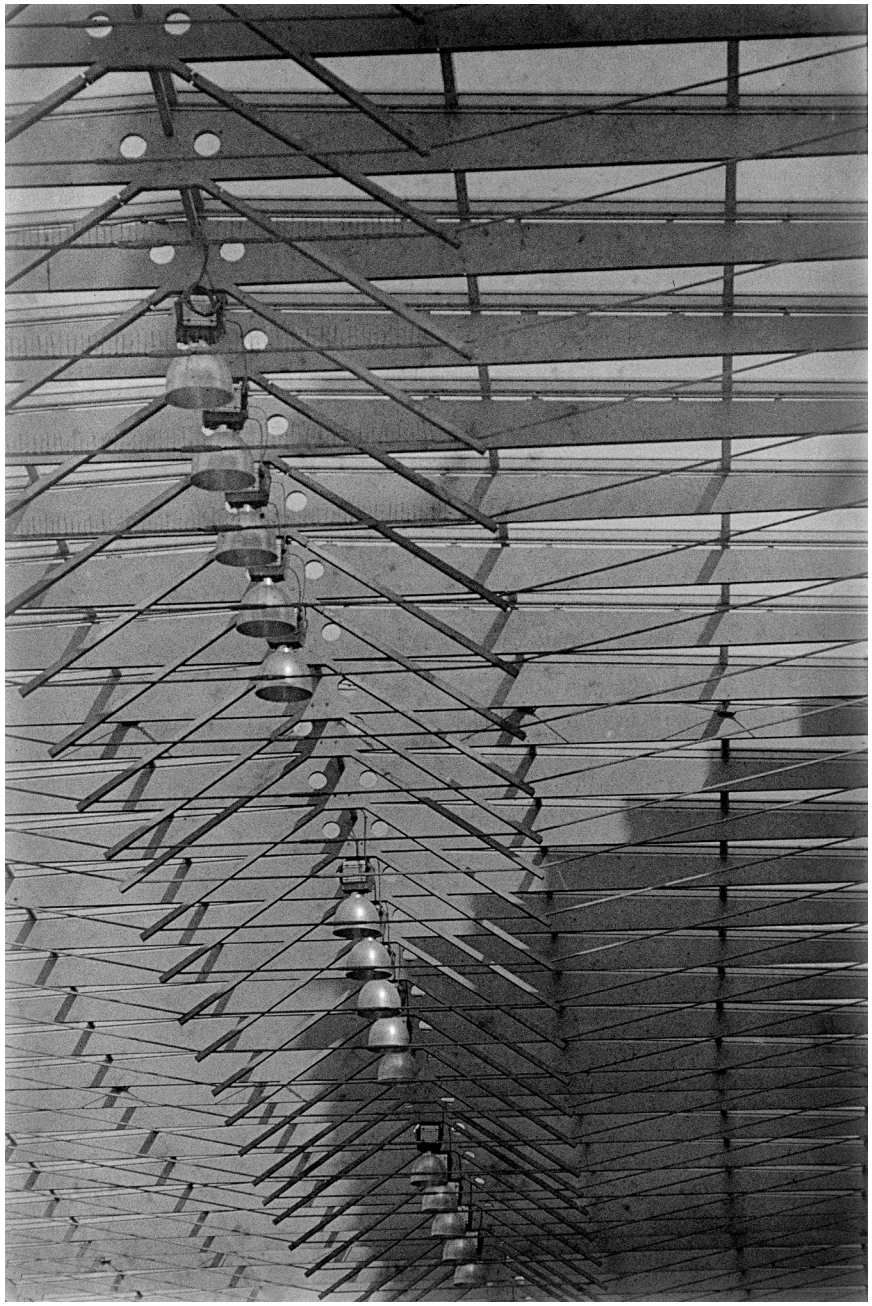

SUPER XX

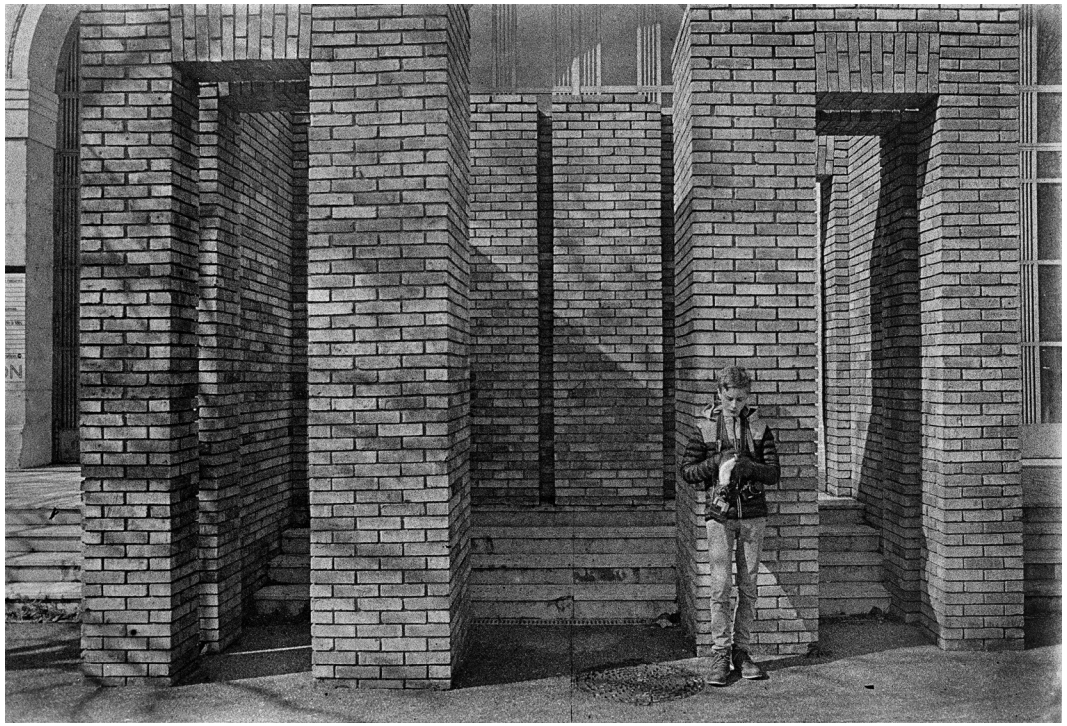

14
15
SUPER XX
16
KODAK
SUPER-XX
XX 135
IA BEACH, 6 JUIN 1944

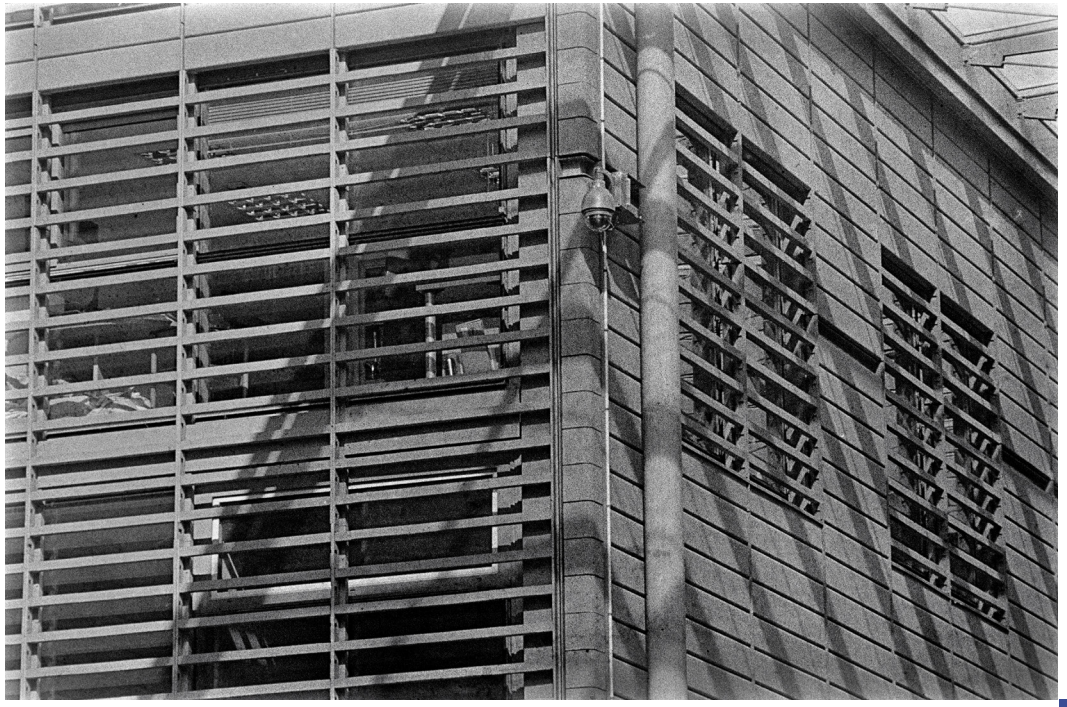

17
18
19
SUPER XX
KODAK
SUPER-XX
XX 135
IA BEACH, 6 JUIN 1944

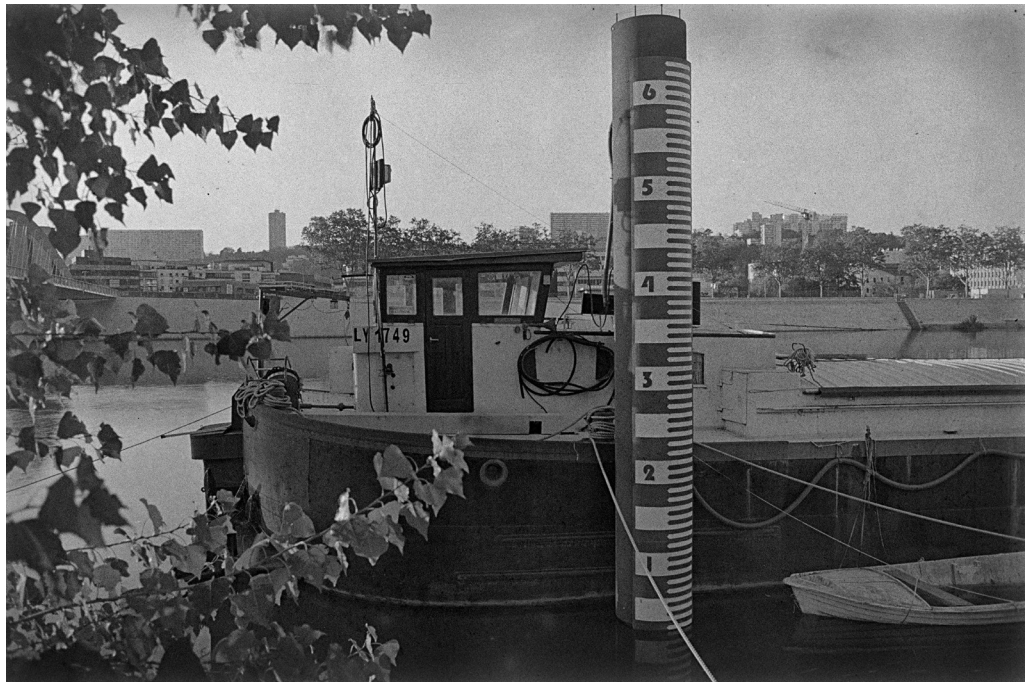

19
SUPER XX
20

For your viewing pleasure, here are some pictures after quick processing. Not unpleasant retro look and amazing picture quality considering the age of the film.








6
5
4
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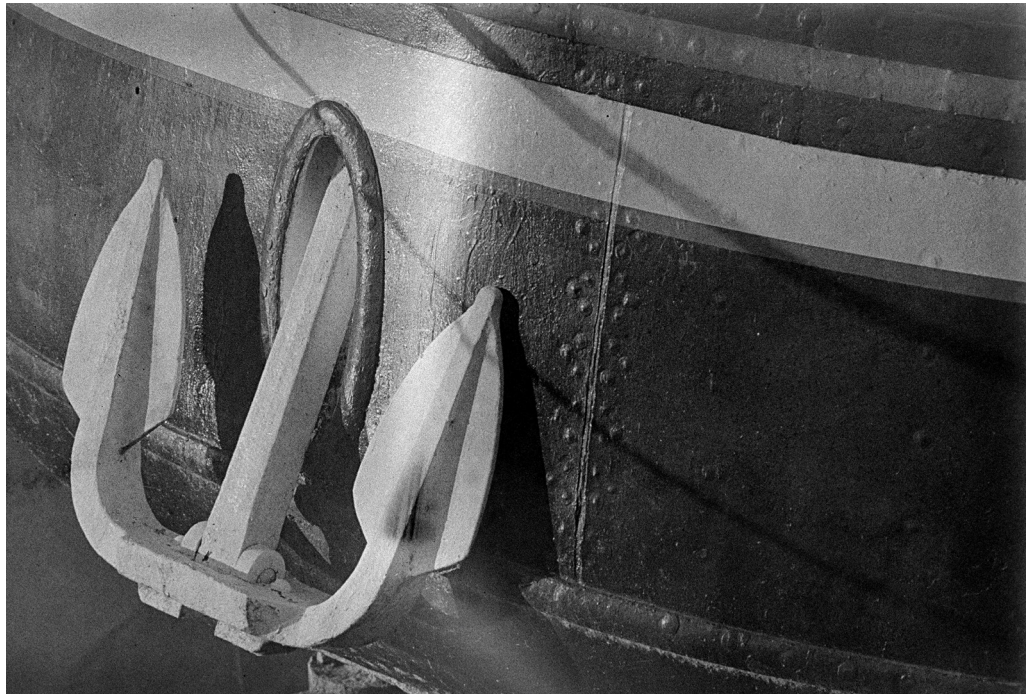
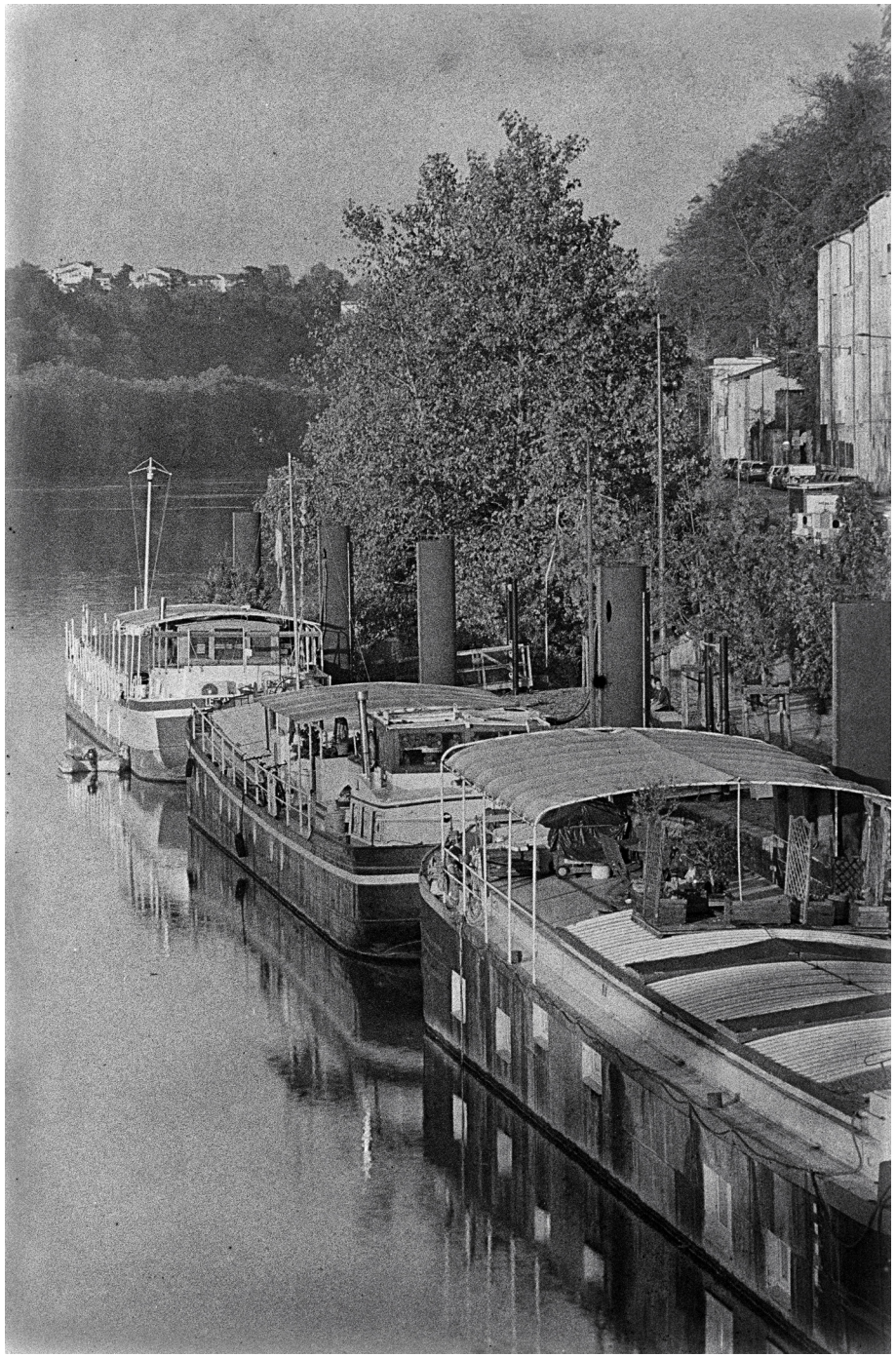
2
1






KODAK
SUPER-XX
24 x 36 mm
XX 135
36
EX.
SUPER-XX
HIGH SPEED
PANCHROMATIC FILM
IN MAGAZINE FOR 35 mm KODAKS
CONTAX, LEICA, and SIMILAR CAMERAS
SUPER-XX
20
24 x 36 mm.
XX 135
EX.
KODAK
SUPER-XX
24 x 36 mm.
XX 135
18
EX.
HIGH SPEED PANCHROMATIC FILM
IN MAGAZINE FOR 35 mm. KODAKS
CONTAX, LEICA, and SIMILAR CAMERAS
EASTMAN
PAT. IN
OTHER
IA BEACH, 6 JUIN 1944
MAGNUM PHOTOS

Film Kodak Super XX from 1944, 18 exp.

This film, purchased on Ebay US, is composed of a metal cartridge with a different design than the previous one. Apart from this detail, the packaging method remains the same.

The emulsion is without any apparent defect, its appearance seems intact, as well as its mechanical resistance, and no dimensional change is to be noticed.

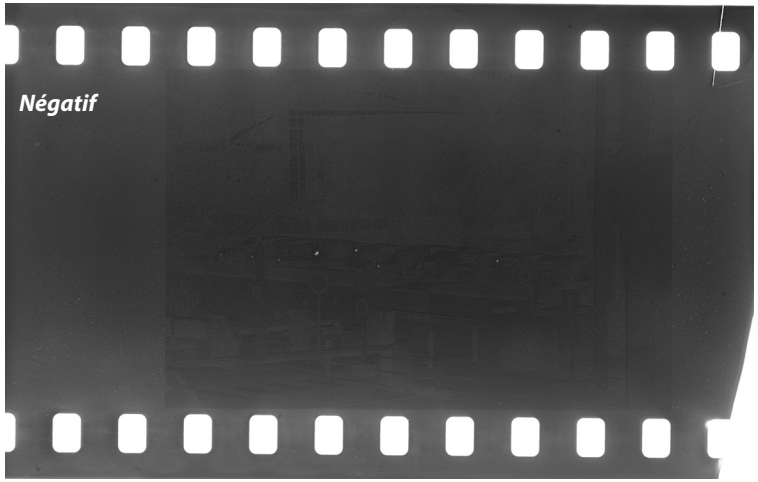
I was surprised to discover a small label in the metal foil packaging, which is a touching testimony of that time when everything was devoted to the war effort.

Since it is impossible to transpose the results of the 1947 film to the following ones, given that the conservation conditions are unknown, it is necessary to start again with tests on samples of the film.

But this time, with the experience acquired, we start with more chances of success, which does not prevent surprises.

A first test on the basis of an overexposure of +7 stops (and the same development as before) gives the following catastrophic result:

There is almost nothing on the negative. The latter has obviously been much worse preserved than the 1947 one. This despairing result forced me to push the exposure to +12 stops on a second try:



Result still unsatisfactory. We note a solarization effect on the specular reflections of the cars. Instead of coming out white, they are reversed.

I then tried again, by going straight to +18 stops. That is to say 2 mn of exposure at 2.8 in full sunlight (EV 14.5 for ISO 100). Finally a readable image!

But you will notice a surprising phenomenon: the image is directly positive! Indeed, the massive overexposure has led to a phenomenon of solarization. But this solarization did not cause any distortion of the values, which gives a natural result.

Of course, we are far from the limits of reasonableness, but here, the goal is above all to obtain readable images, no matter how they were obtained.

What matters is to be able to make images with this film, in order to use it for the rest of the experiment.

Note that on this test, the image is not centered and will be lost in the lower perforations of the film.

Although appearances suggest that I wanted to reproduce the result obtained by Capa in his Contax, it is not so. It is simply the fruit of chance, which made the small piece of film move fortuitously in the camera.

Concerning the development, on this last test, I reduced the time by 30 seconds, in order to try to lighten the black tint of the margins. Well, not very effective, and I didn't dare to under-develop any further. So I'll stick to this development parameter for the rest of the test.

I was about to use this 1944 film in my OM-1, when Allan Coleman sent me the following request: find a Contax II identical to Capa's, load the Super XX in it, and shoot with it!

That was an interesting challenge, but where to find the gem? Finding such a camera in the Ebay era is not so difficult: this site is so rich, that with a little patience, I would have eventually seen one. Nevertheless, the price where the beast is usually negotiated is still too high for me.

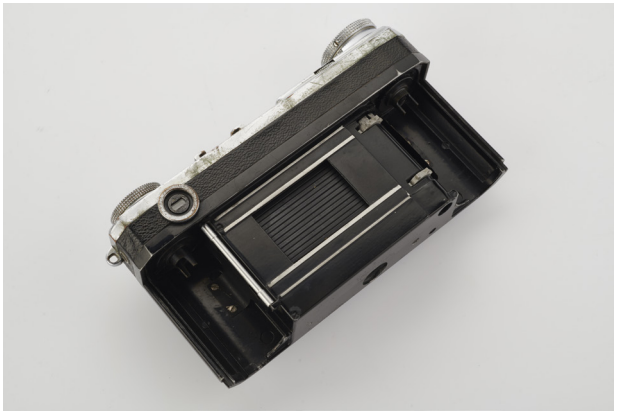
So I turned to my collector friends at the Saint-Bonnet-de-Mure photo museum to see if they could help me. After some explanations, they accepted with enthusiasm to lend me the camera exposed in the permanent collections of the museum.

The camera was given to me with the following accessories: Zeiss Opton Sonnar 1:1,5 - 50 mm lens, Zeiss metal lens cap, Berthiot 4,5 - 145 mm lens, universal external viewfinder.
The Sonnar is a beautiful piece, in excellent condition.

This optic was released in 1937, without lens coating, with just the name Carl Zeiss (without Opton). After 1945, the treatment of the lenses appears with the name Opton. From 1953, Opton disappears. That makes it possible to date our optics between 1945 and 1953.

But apart from the treatment of the lenses, nothing has changed, and Capa could have used the same one. In any case, the focal length is identical, which is important for us.

A test of this Sonnar was conducted by Ken Rockwell: https://www.ken-rockwell.com/zeiss/50mm-f15.htm#sampleimages



The camera itself is in a worn state, and shows the weight of years, so I realized that its shutter was not really operational anymore.

Only the B exposure seemed to work, but it acted as a kind of T exposure: when you trigger the shutter, it opens, and it closes when you advance the film. Unorthodox operation.

We will see later that I had misidentified the problem.

As a precaution, I chose to make a test with a modern film (Tmax 100), in order to check if the camera could still record pictures.

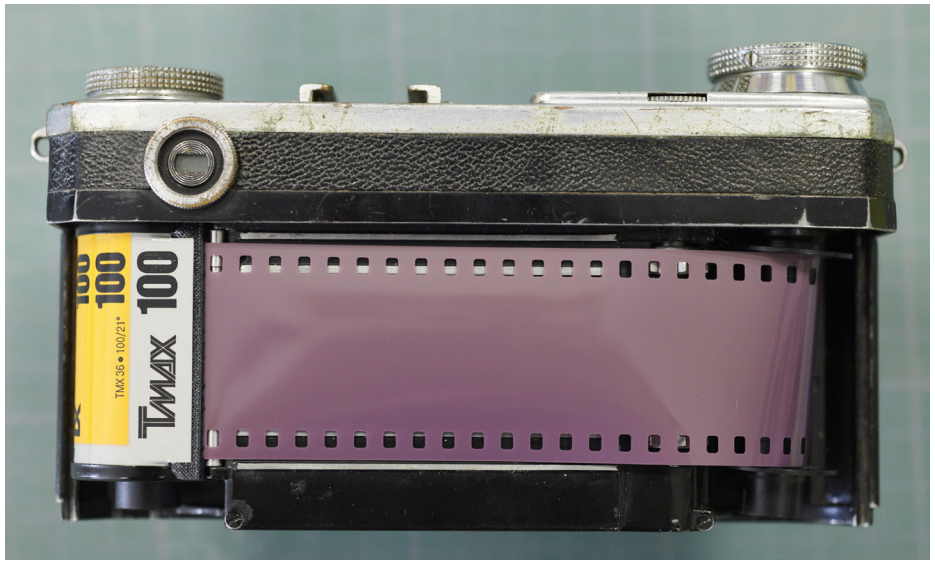
By closing at F8, and by fixing a neutral grey filter in front of the lens, removing 6 stops (ND 64), it was possible to do without the inoperative speeds of the shutter by using only the B exposure.

To expose, I placed a black screen in front of the lens, and opened the shutter (by pressing the shutter release with my finger). Then, I removed the black screen during the exposure, and replaced it in front of the lens. Then I reset the camera, which had the effect of closing the shutter.

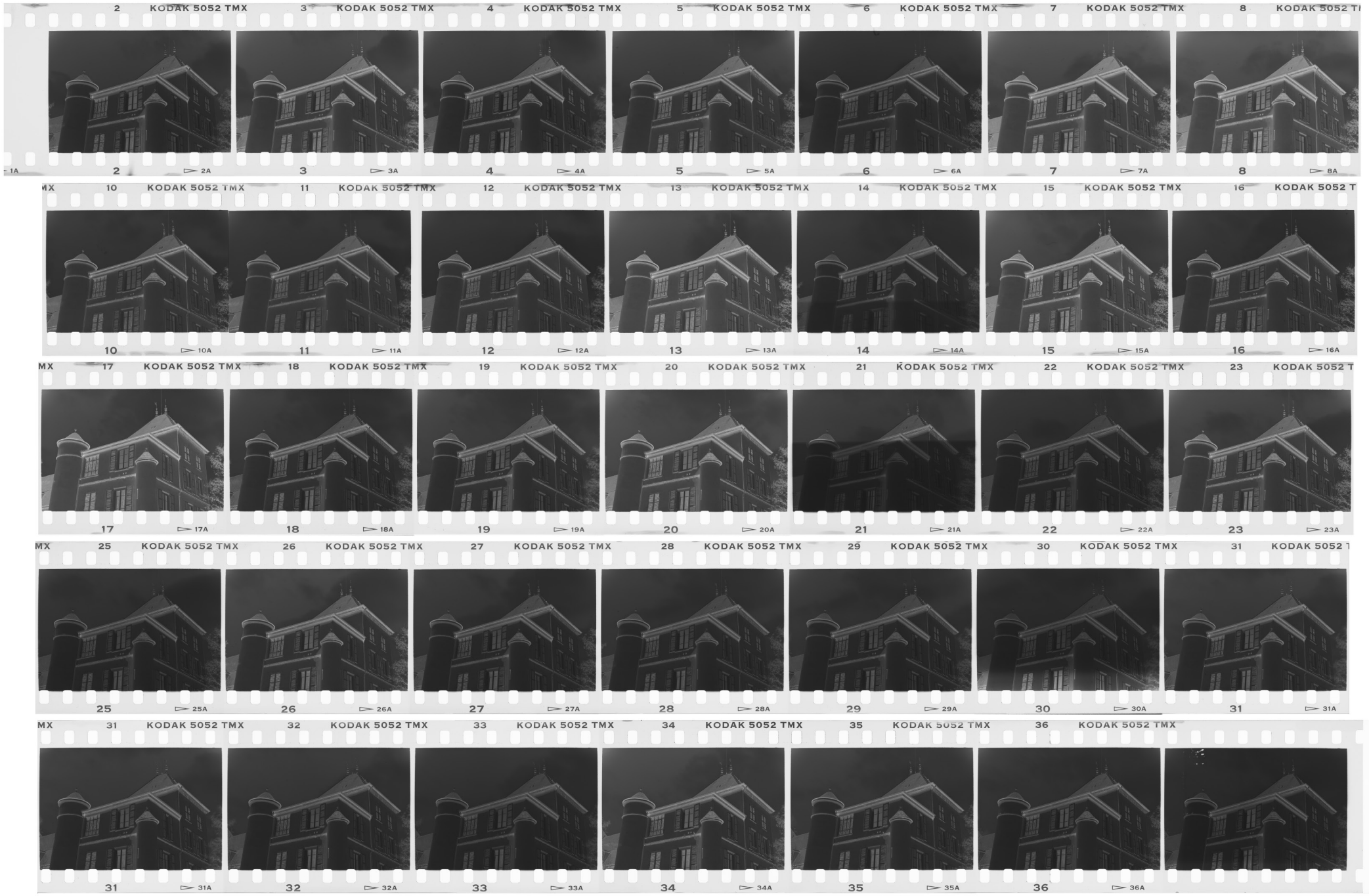
I thus exposed a whole film of 36 exposures, by varying the exposures (between 1/2 s and 4 s).

The shots were taken in front of the museum of photography in St-Bonnet de Mure, the subject being the town hall.

I then developed the film on the spot, and noted that there were indeed images.



Demonstration of shuttering by the «occultation with a book that falls right» method



Entire Tmax 100 film made with the Contax II and the Zeiss Opton lens at F8.

We can immediately notice that the images are shifted downwards, which definitely accredits Rob McElroy's thesis. This shift comes from a problem of compatibility of the standard cartridges VS the proprietary Contax cartridges.

There is a small gap between the bottom of the cartridge and its housing, which has the effect, under the effect of gravity, of making the cartridge fall, thus creating the shift.

The images are exposed differently depending on the exposure time (logically), some are overexposed, others are OK. I was not able to get any less exposed frames (shorter than 1/2 s) with my manual blanking method (I'm not fast enough!).

View 21 highlights a problem that I didn't notice right away. If I had, I would not have experienced the setbacks that followed. As I was not too confident in the rangefinder, which I suspected (rightly) to be out of focus, I made different adjustments. So the sharpness varies a bit from one view to another.

But when you find a view that is both well exposed and correctly focused, you get a very good quality, even by today's standards, as shown in the view below:

Contax II and Zeiss Opton at F8, film Tmax 100

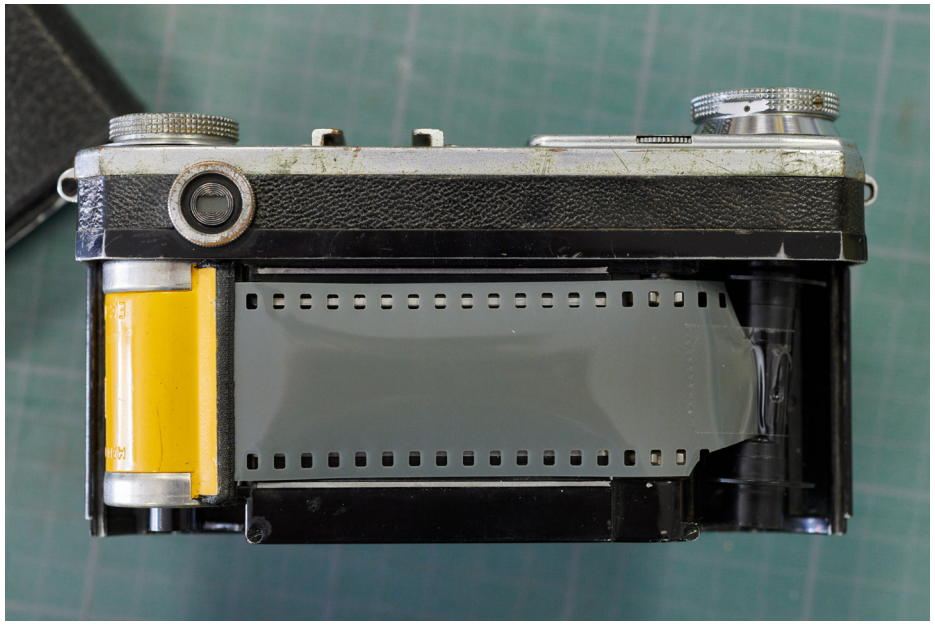
I then decided to load the Contax with the 1944 Super XX film.

The Contax in the test did not have a take-up reel (supplied as an option, as it is normally designed to work with a two cartridge take-up system), so I cobbled together a system with a salvaged cartridge shaft, and cut the film by hand. It works perfectly.

I then repeated the same shots of the Town Hall building, along the entire length of the film.

I opted for an exposure time between 1 and 5 minutes at F2.8 for each view, this on the whole length of the film.

Once this was done, I rewound the film, without swallowing the leader. Then, once the camera was unloaded, for safety, I tried the shutter again with its «pseudo T exposure», just to see. And there, I saw... with horror that once triggered, the shutter opened well, but that it ended up closing by itself after 3 to 5 seconds!



Normally, in B exposure, a shutter behaves in the following way: you release the shutter, the curtains open. As long as you keep your finger pressed on the shutter release, they stay open. And as soon as you release the pressure, the curtains close.

Here, the curtains were so seized that they remained open even after releasing the pressure on the shutter release. And only after a few seconds did they go back down by themselves, without any noise.

This behavior of the curtains staying open in B-position by the action of the Holy Spirit had intrigued me at first, but I had unfortunately ignored it. And I had not realized that the defect was already present on the Tmax film, because the exposure times (between 1/2 and 5 s) were too short to reveal the problem, except in view 21 (opposite). On this view, we can clearly see a horizontal band corresponding to the partial rise of the curtain.

I should have been suspicious...

I then realized that I had «screwed up» my 1944 film with exposure times that were now 5 seconds instead of several minutes!

Then, after the moment of panic, I realized that all was not lost. The film, after all, was still almost virgin, almost nothing had been recorded. Moreover, I had taken care to leave the beginning of the film out.

So I decided to start shooting again, but this time with a different subject. The town hall of St-Bonnet is gone, and a bridge in Lyon is in place.

My strategy was the following: I use the first two thirds of the film for these new photos (which will therefore overlay the previous ones), and I leave the end with the underexposed photos of the Town Hall. This is in the hope that there will still be a beginning of an image.

This time, I took care to use a soft shutter release with a lock, in order to force the curtains to remain open during the whole length of the exposures: I should have taken this precaution from the beginning, and it served me right.

I should have taken this precaution from the beginning, and it was a lesson to me. But being a bit superstitious, I decided, at the end of each exposure and before advancing the film, to replace the metal cap in front of the lens. This allowed me to make a second mistake: on one shot, I forgot to remove the cap...

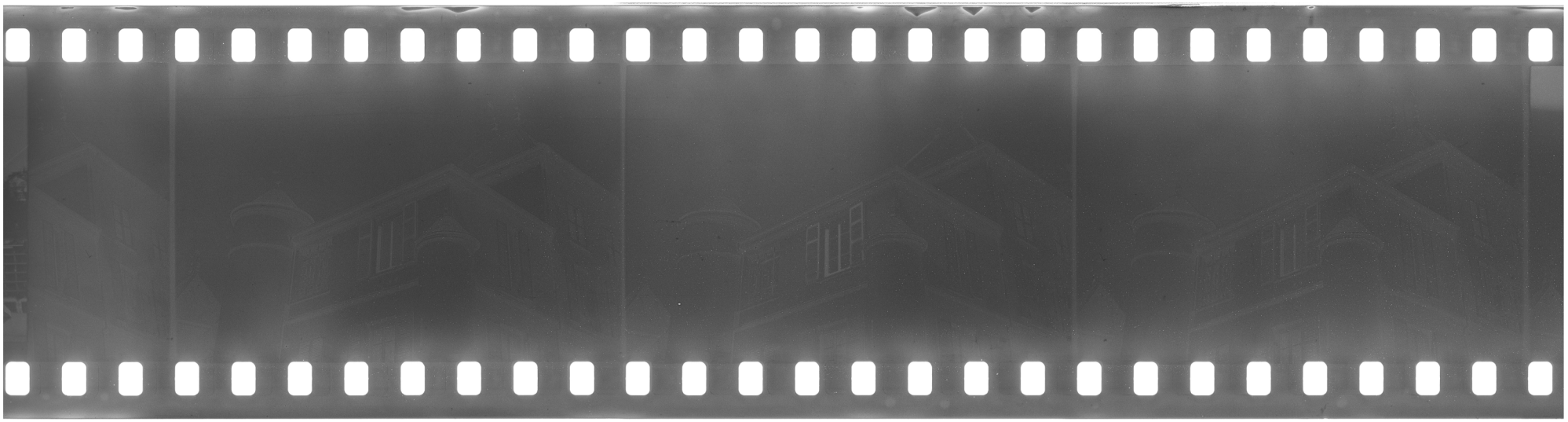
This mistake illustrates that even in calm and concentrated moments, taking pictures while leaving the cap on a rangefinder camera, it happens.

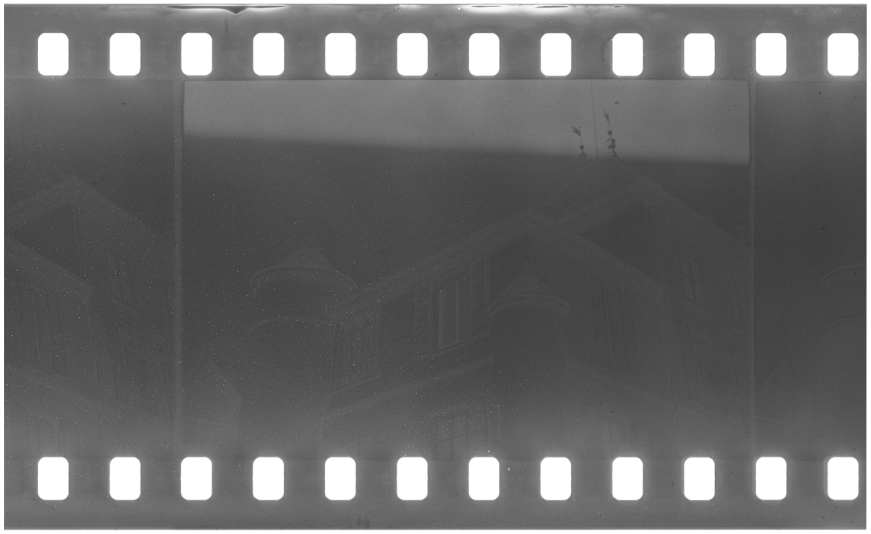
This oversight in removing the cap could have explained the absence of images on the beginning of Capa's film, but we have seen on page 16 that Charles Herrick gave a more convincing explanation.

The exposure times will range from 1 to 5 minutes at F2.8.

The development of the film will follow exactly the procedure described above, namely 9 mn 30 s at 1+1 in ID-11 at 20°C. 2 reversals of the tank every 30 seconds. Bath, stop, fix and wash as usual.

Here is the result:





We find again the downward shift of the images, which is confirmed for the second time with a vintage cartridge. Note that the frame numbers are totally invisible here, completely erased by time.

The images with long exposure times (the bridge) are presented directly in positive, because they are solarized. They are well readable, especially the 5th view of the bridge, which received the longest exposure (5 mn at F-2,8). The others, underexposed, remain in negative.
Although we can guess the city hall in overprint on the bridge images, it is not very visible and not disturbing.

The last view shows very well that the shutter was half closed.

Here is what the best image looks like after inversion, contrast work and cleaning. Note that at F2.8, the lens does not vignette, which is compatible with Capa images.

A first heating test

So I have at my disposal at this stage of the investigation, a whole developed period film, as well as some samples of the 1947 and 1944 films that I used for the first tests.

Before starting to build a heating cabin, I wanted to know how an old film behaves when exposed to heat, and in particular what temperature it could reach before it was completely destroyed. This can already give interesting information. To do this, I decided to sacrifice the 1947 film sample, with the parking lot image, by placing it in my kitchen oven.

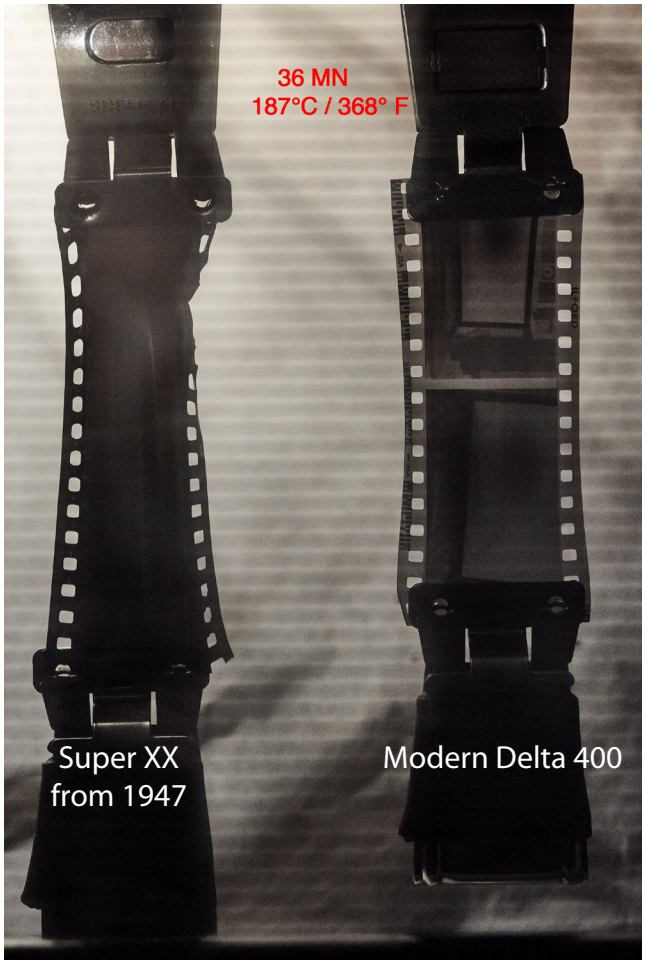
I hung it vertically, between two metal clamps identical to those usually used for this purpose.

I also took the precaution of adding a control sample on a modern support, an Ilford Delta 400 film (on the right on the picture).

I installed a temperature probe inside the oven, connected to an electronic thermometer on the outside. This will give a reliable indication of the temperature, a precaution that will prove useful, as the indications given by the oven will prove to be very optimistic.

Both films were placed still wet (soaked in deionized water), as if they had just been developed.

I started the experiment with the oven cold, and then set it to 200°C, without air circulation. The heat source came from above.



It took 36 minutes to reach a temperature of 187°C, with the oven set to 200°C from the start. During the first few minutes, the films curled up while they were still wet, then returned to their original shape.

Not much changed after that, when suddenly, at around 180°C, the Super XX film started to stretch, then tear.

The modern film suffered little.

Film Super XX after the test

As can be seen, the decision to use a vintage film proved to be a very good one, as its support (acetate) behaved quite differently from the control film, which is on a polyester support.

Yes, an acetate film can melt, but not before the impressive temperature of 180°C.

This is quite a feat, considering that it took more than 30 minutes in a real, well-insulated oven to reach this heat!

On the other hand, the modern film suffered little from this extreme treatment, confirming that heating tests only on this type of support would have led to erroneous conclusions.

Film Delta 400 after the test

It should be noted that the Super XX, once melted, did not behave like a liquid mush. It simply fell to the floor after it had detached, and then I took it out of the oven (while the temperature was at 190°C) in this state.

One can see that the image is still visible, it did not move on the support, confirming in a clear way the farcical character of the thesis of the films which would have slipped by the heat! This thesis is even more implausible if we note that a film is always placed vertically to dry. If the images had slipped, they would have moved in the direction of the film held vertically, and not the other way around.
Last point: even if it is a bit limited, it is still possible to exploit the melted image, if one is really motivated by its exceptionally important content, as should have been the case with Capa's photos.

I would have been the guilty laboratory assistant, I would have tried everything to exploit the damaged films anyway!

This is the look of the image on the melted film, after reproduction and simple digital processing (inversion, adding contrast, that's all). The film was reproduced with a digital camera using an enlarger holder with glasses, which allowed it to be flattened.
Obviously, with the enlarger, we wouldn't have the same correction latitude, but we could still output a readable image. Of course, there are distortions, but nothing totally unacceptable, if we really want to save an image that is unique in the world.

Construction of the heating cabin

Now comes the crucial step of the full-scale heating test with an entire film. Here, we enter a very uncertain field, because we don't know completely the configuration of the booth used by Life in London on the famous day. Was it made of wood or metal?

John Morris (Life's head of photography) mentioned a salvaged storage locker, equipped with an electric heater on the floor, large enough to hold several 36-posts films suspended, and of course equipped with the famous door!

After long discussions with Rob McElroy and Allan Coleman, and after searching in vain for a hypothetical ideal rack, I finally decided to build a custom system.

Since I could not find any historical information about this famous cabin, I opted for the simplest solutions.

I used reclaimed wood, and chose dimensions compatible with the drying of a dozen films of 36 exposures at the same time.

The heating system will be a simple raclette machine that I have lying around in my kitchen. It is equipped with an electric resistance (red-hot iron rod) that is quite powerful, not adjustable. In all honesty, I would never have dared to entrust my films to be dried in a cabin equipped with such a powerful device.

But if the films resist to this treatment, it will be the demonstration that even a too hot system cannot overcome them.

The heat source will be placed at the bottom, and on the right side. The goal is to avoid that the films are just above the resistance, which would have been improbable (the films would be systematically destroyed, even with the door open).
To be able to observe and film the experiment, it will be necessary to provide the cabin with an opening that does not allow the heat to escape. A glass plate recovered from an oven door will do. A lighting system (tungsten bulb with filament) will complete the whole.

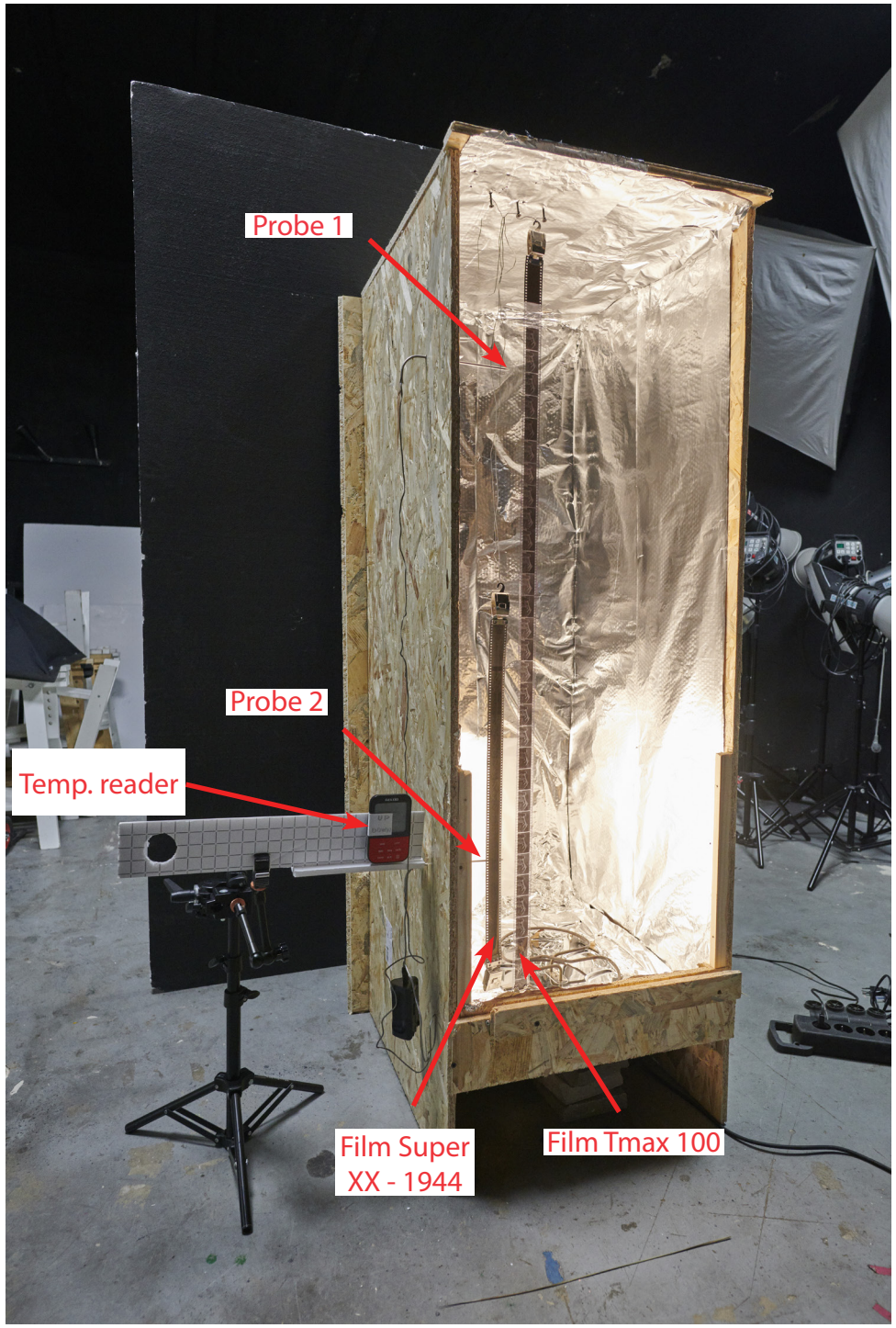
I have planned to place temperature probes in strategic places.

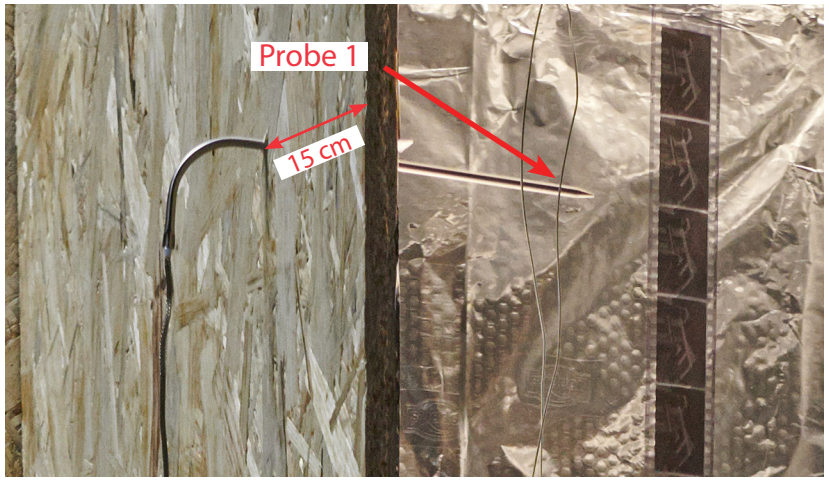
Finally, for safety reasons, the inside of the cabinet will be lined with aluminum foil, because a test heating (in my oven) of a piece of wood of the same nature as the cabin, revealed that it was browning strongly while giving off a clear smell of burning. I do not wish to put myself in danger during the experiment, so I assume this deviation from the supposed historical reconstruction.

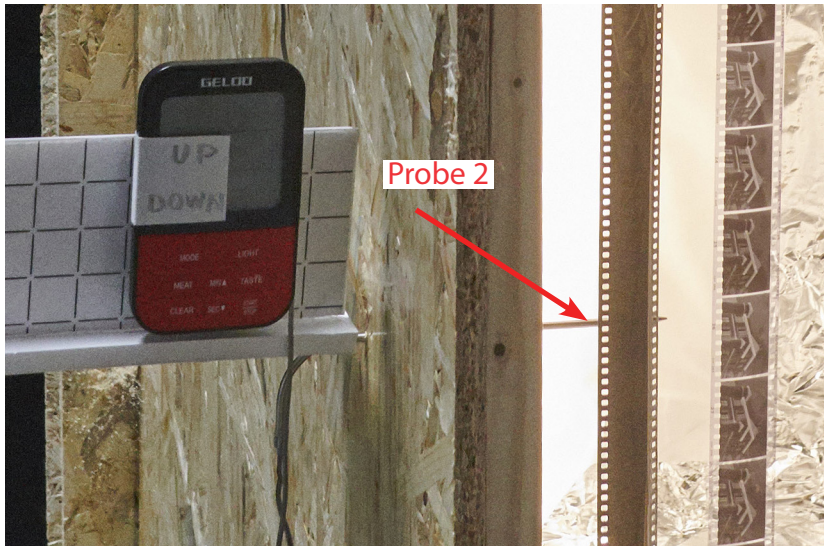
I planned that the test would not exceed 35 minutes. This time already seems to me much longer than necessary, since it was the desire to shorten the drying time as much as possible that pushed the LIFE lab technician to make his mistake. Knowing that a film is normally dry in a standard drying cabin in only about 15 minutes, the 35 minutes delay is already extreme.

Electrical resistance in place

A 60W tungsten bulb provides lighting. In front of it, a sheet of baking paper (heat resistant) serves as a diffuser.





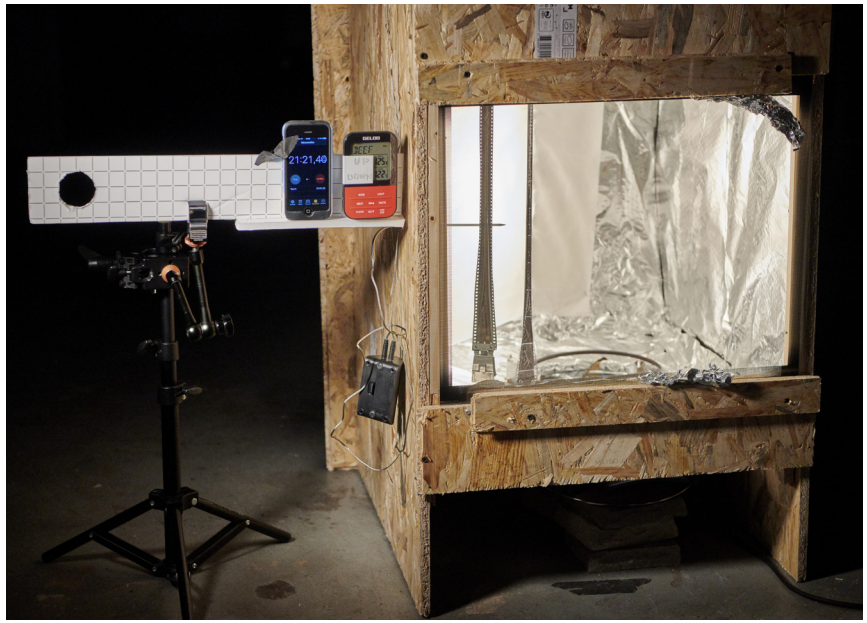


On the left is the Super XX film from 1944, on the right, the Tmax 100 film used for the Contax II test.
The Super XX being shorter, I made sure that the bottom of the film arrives at the same height as the bottom of the Tmax. This in order to place the films as close as possible to the heat source.

Note that both films are installed wet (they have been soaked in demineralized water with Ilford wetting agent).

Our guinea pigs are placed close to the door (14 cm from it), and not above the resistance. The 1944 film is on the left.

During the test, a wooden panel (lined with aluminum foil) is screwed on and acts as a door.
An oven glass closes the window.



The heating test

Once the door is closed and the glass is in place, the test starts immediately by turning on both the lamp and the resistance.

A smartphone serves as a stopwatch. The red box is the temperature indicator. When the test starts, the temperature is 25°C in the top of the cabin, and 23°C in the bottom.

The experiment is recorded with a Nikon D850 camera and a Nikon 70-200 F-2.8 FL zoom lens, at 135mm focal length and F-5.6. Exposure 1/60th at ISO 400, continuous halogen light.

Shooting in interval mode (one picture taken every two seconds). Full resolution raw format (46 mpx).

About 1050 images will be recorded during the 35 minutes test.

These images will form an accelerated video sequence showing the evolution of the films in the cabin. The result can be seen in the documentary made in parallel to this study.


00 : 00 mn
UP : 25 °C
DOWN : 23°C


01 : 00 mn
UP : 27 °C
DOWN : 25°C


02 : 02 mn
UP : 41 °C
DOWN : 37°C


03 : 16 mn
UP : 64 °C
DOWN : 62°C


04 : 18 mn
UP : 80 °C
DOWN : 80°C


05 : 20 mn
UP : 91 °C
DOWN : 92°C


06 : 22 mn
UP : 98 °C
DOWN : 98°C


07 : 23 mn
UP : 102 °C
DOWN : 102°C


08 : 26 mn
UP : 105 °C
DOWN : 105°C


09 : 27 mn
UP : 108 °C
DOWN : 108°C

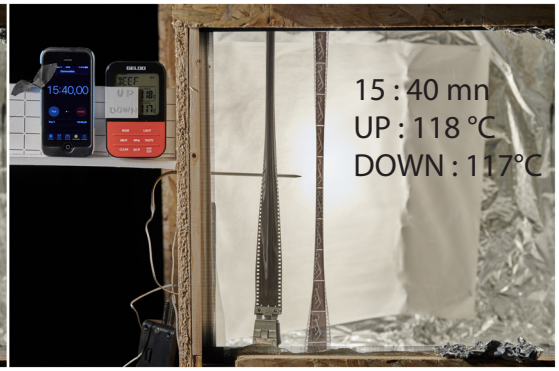

10 : 30 mn
UP : 111 °C
DOWN : 110°C


11 : 31 mn
UP : 113 °C
DOWN : 111°C

12 : 34 mn
UP : 115 °C
DOWN : 113°C

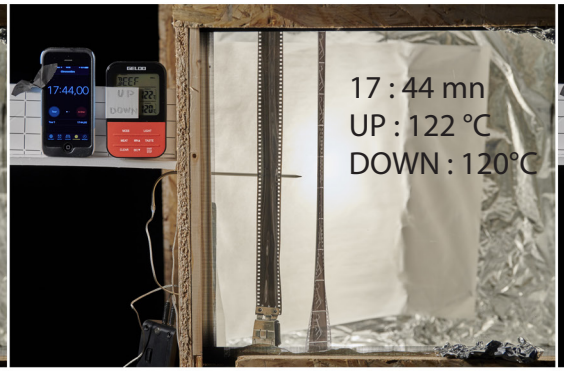
13 : 36 mn
UP : 116 °C
DOWN : 115°C

14 : 38 mn
UP : 117 °C
DOWN : 116°C



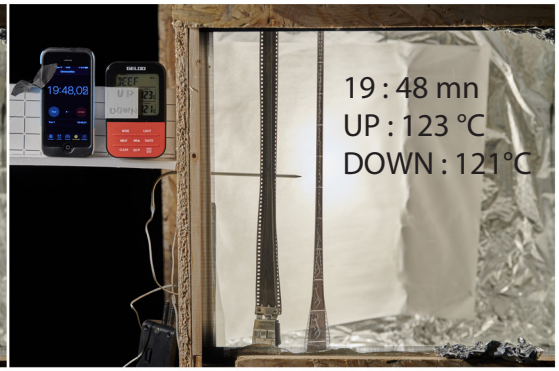
15 : 40 mn
UP : 118 °C
DOWN : 117°C

16 : 42 mn
UP : 120 °C
DOWN : 118°C



17 : 44 mn
UP : 122 °C
DOWN : 120°C

18 : 46 mn
UP : 122 °C
DOWN : 120°C

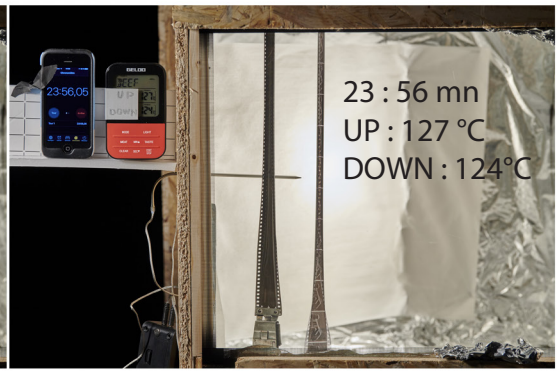


19 : 48 mn
UP : 123 °C
DOWN : 121°C

20 : 50 mn
UP : 125 °C
DOWN : 122°C

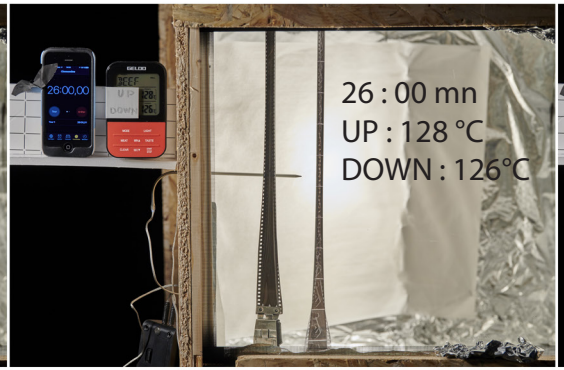
21 : 52 mn
UP : 126 °C
DOWN : 123°C

22 : 54 mn
UP : 126 °C
DOWN : 123°C



23 : 56 mn
UP : 127 °C
DOWN : 124°C

24 : 58 mn
UP : 128 °C
DOWN : 125°C



26 : 00 mn
UP : 128 °C
DOWN : 126°C

27 : 02 mn
UP : 128 °C
DOWN : 126°C

28 : 04 mn
UP : 128 °C
DOWN : 127°C

29 : 06 mn
UP : 130 °C
DOWN : 127°C

30 : 08 mn
UP : 131 °C
DOWN : 127°C

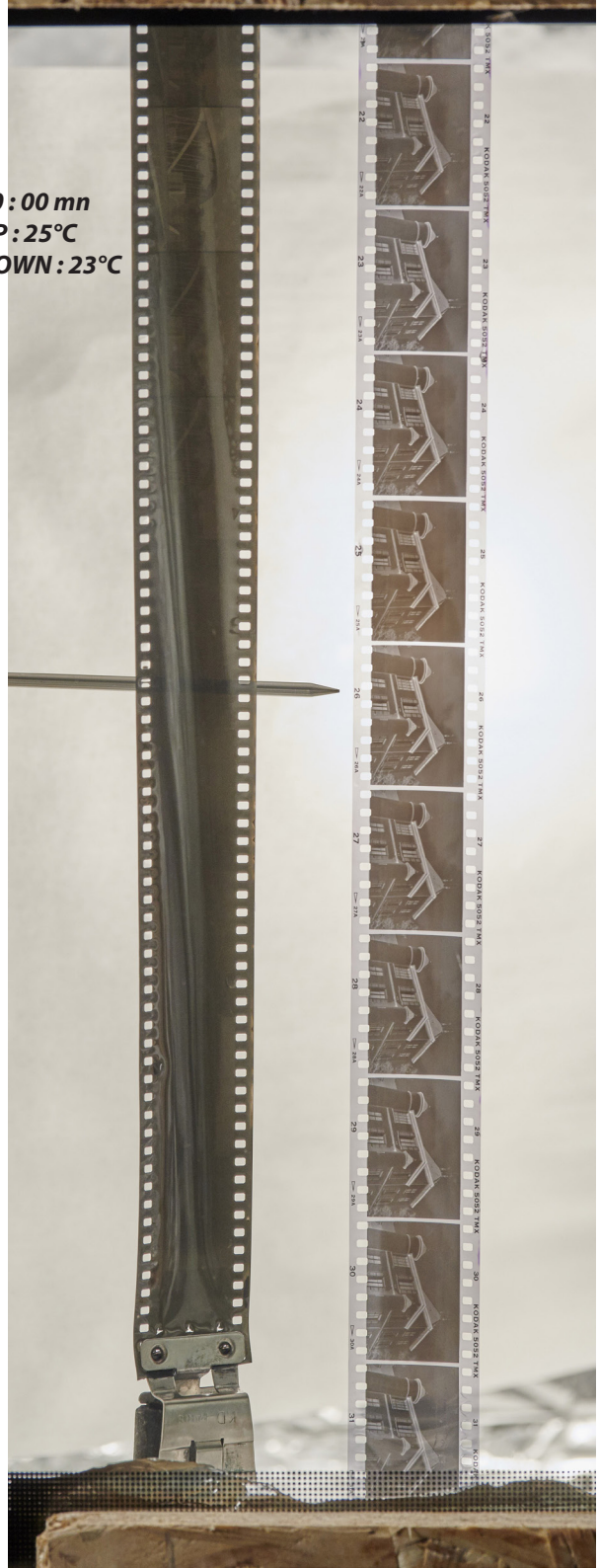
31 : 10 mn
UP : 131 °C
DOWN : 128°C

32 : 12 mn
UP : 132 °C
DOWN : 128°C

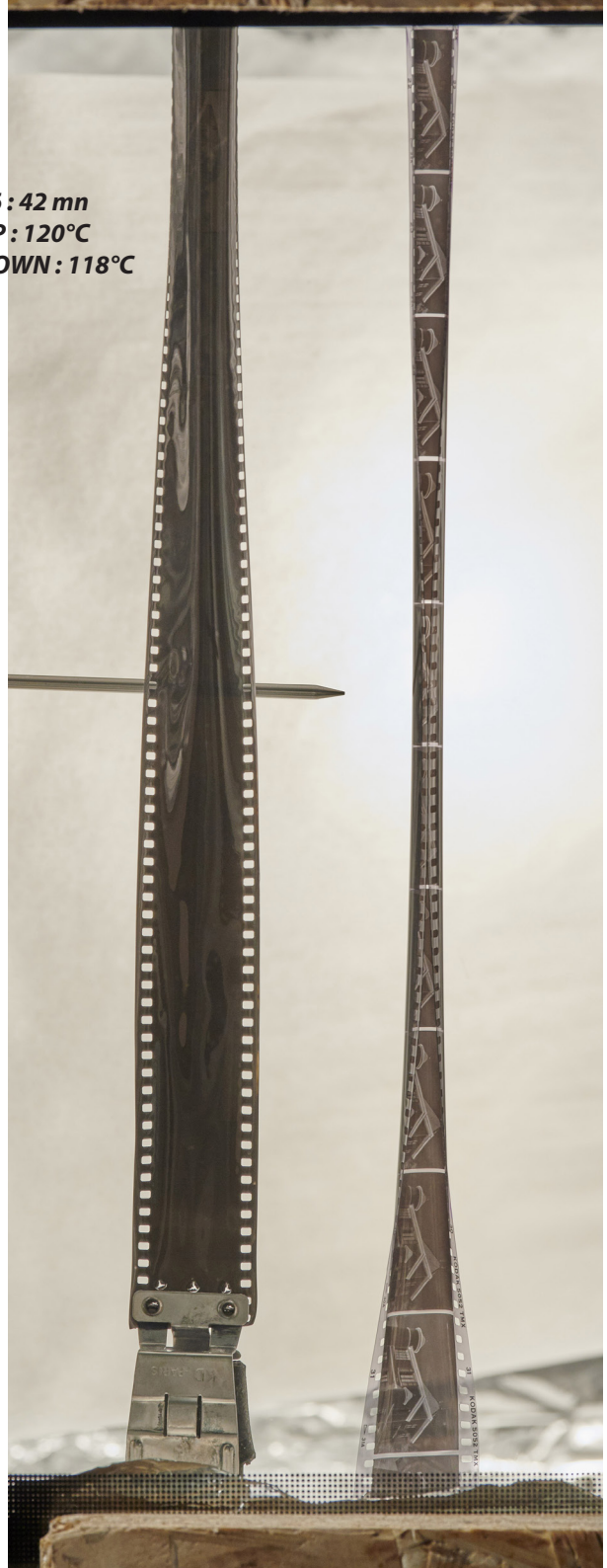
33 : 14 mn
UP : 132 °C
DOWN : 129°C

34 : 16 mn
UP : 132 °C
DOWN : 129°C

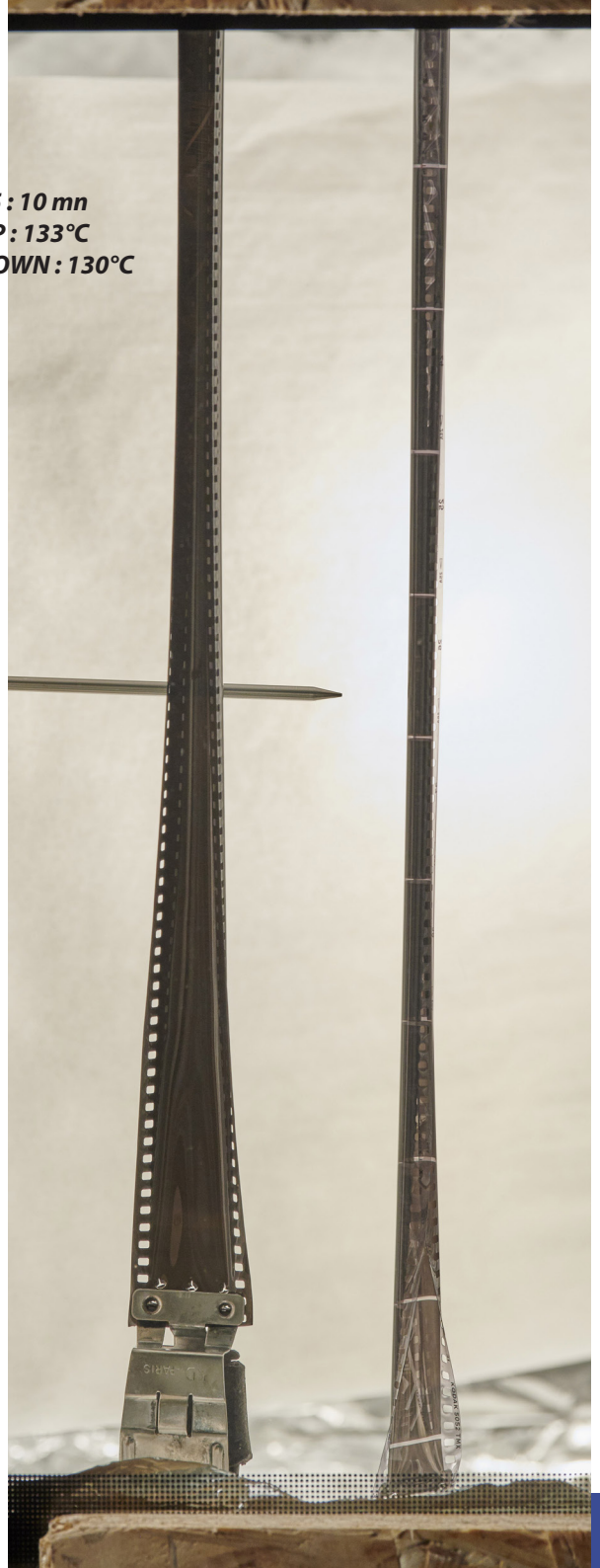
35 : 10 mn
UP : 133 °C
DOWN : 130°C



00 : 00 mn
UP : 25°C
DOWN : 23°C



16 : 42 mn
UP : 120°C
DOWN : 118°C



35 : 10 mn
UP : 133°C
DOWN : 130°C

Results

After this test, the conclusion is obvious: Despite a temperature of over 130°C, the films did not melt.

And against all expectations, they shrank along their length, the Tmax by about 2.5 cm, the Super XX by about 1 cm. The two films are not the same length, which explains the difference.

They curled up on themselves, the Tmax stronger than the Super XX. On both films, the images remained intact. They did not slip off their support.

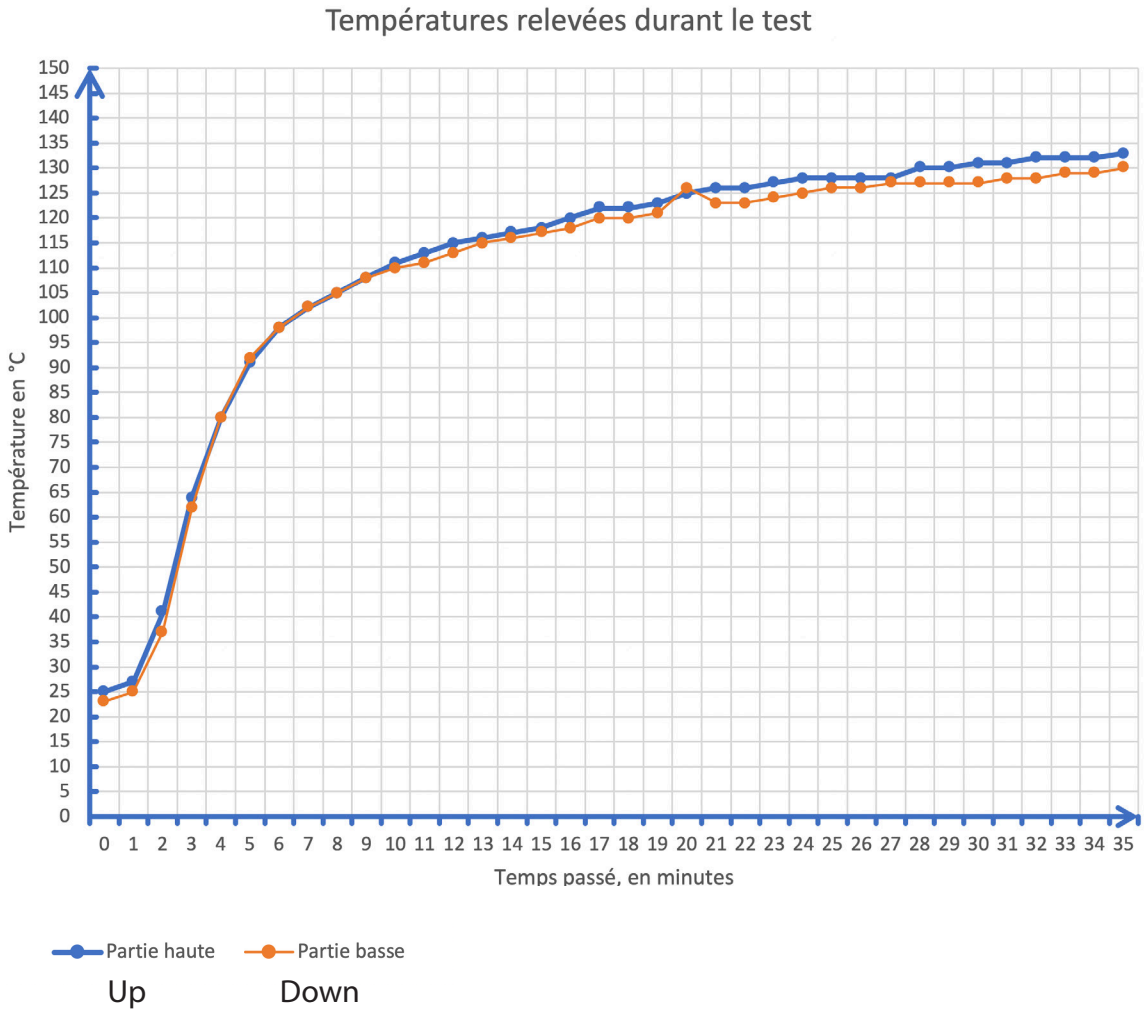
Here below, a graph showing the evolution of the temperatures for the upper and lower part of the cabin.

The temperature climbed very quickly the first minutes, then ended up leveling off around 130°C.

We can see that there is a difference, admittedly small, but effective, between the top and the bottom of the cabin.
After 10 minutes, the top was on average a little hotter than the bottom, by about 3 degrees.

This result, quite logical (heat tends to accumulate on the upper parts of an enclosed space), contradicts the legend that some of Capa's films survived the heat, and the rest melted.

Explanation on the next page!



When loading 135 film in commercial cartridges (such as Super XX), the operations are always the same:

- Once finished in the camera, it is rewound. It is then entirely returned to its cartridge and is thus protected from the light.
To develop it, we take it out of its envelope (in the dark), by uncapping one of the sides with an adapted clip. (***figure 1***) Although this was probably not practiced in 1944, one can also use a primer extractor to avoid destroying the cartridge (what I did here, that explains the presence of the latter on ***figure 2***).

- Then, the film is inserted in the developing spiral, ALWAYS starting from the beginning (on the side of view 1). Here, for demonstration purposes, a nylon spool is shown, which did not exist in Capa's time, as metal spools were used (loaded through the central axis). But the result is the same. (***figure 2***)

- As the roll is retracted, the first views advance into the spiral, so that once the film is fully loaded, view 1 is as close as possible to the central axis of the spiral, and the last views (36 to 38) are towards the outside of the spiral, regardless of its model, steel or nylon. (**figure 3**)

- Once the film is developed, it is taken out of the coil while still wet in order to dry it (in a cabin or in the open air).
To do this, a clip is attached to the end of the film, the only accessible one... that is, on the side of view 36. (***figure 4***)

- Then we hang this clip connected to the film on the drying support.
- Then we finish unrolling the film, and at the other end, we place a second weighted clamp, in order to force it to dry straight. (***figure 5 and 6***)

The effect of these operations is that view 36 is ALWAYS at the top when the film is drying in the booth. And therefore, view 1 is at the bottom.

As the temperature was found to be higher at the top of the booth, if the film had melted, its upper part would have been damaged first. However, it turns out that the images which remain to us of Capa correspond to an END of film, which normally, had to dry at the top of the cabin. Logically, this part should have melted first, and left the bottom in better condition.

We are therefore entitled to strongly doubt that the end of Capa's film could have survived the more intense heat from the top of the cabin, while its beginning was destroyed in a colder area!


figure 1

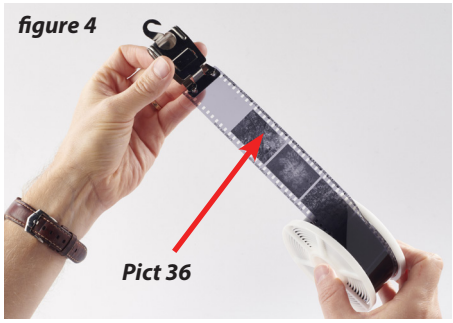


figure 4

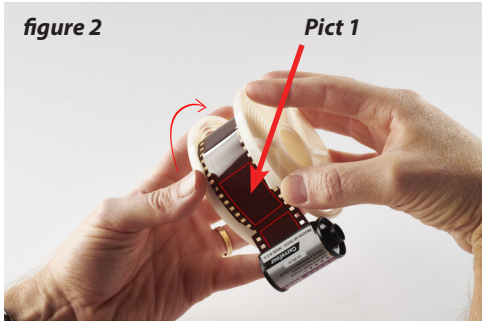


figure 2

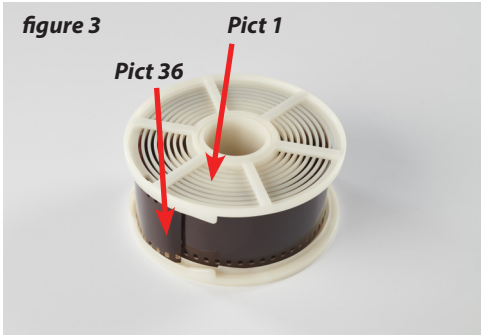


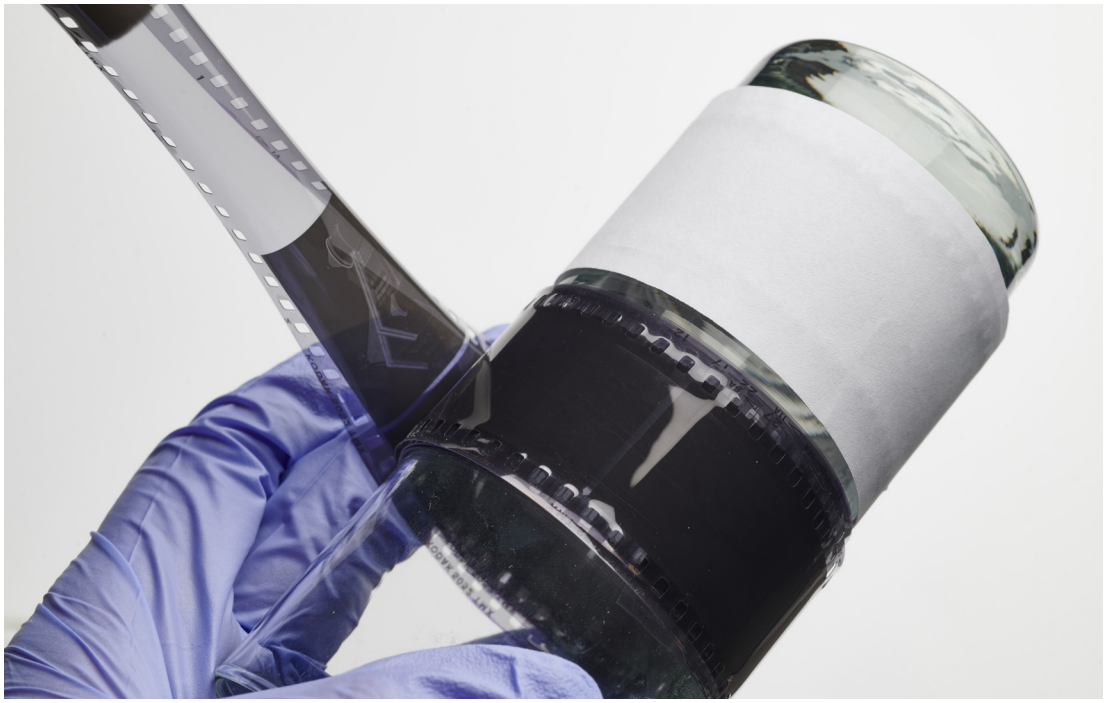
figure 3

fig 5

fig 6

The fact that the last view of the movie Tmax was found here below is not contradictory with the theory mentioned on the previous page.

I had just taken this film off and put back in the spire many times, and it mistakenly ended up upside down in the cabin.



I just had to roll the films on a cylinder to get them back to their original shape. The Super XX was very easy: it was flat again 48 hours later. The Tmax took longer to get back in shape.

FILM BEFORE TEST :

FILM AFTER TEST :

The small differences in density come from slight variations in the method of scanning the film. In fact, other than a slight shrinkage, the film didn't flinch.

The result after finalization.

To conclude, although it seems that I have demonstrated that a film like Capa's cannot melt in a drying room, it is necessary to qualify the statement:

- It is not known to what extent mechanical-chemical processes could have worked to modify the properties of a photographic emulsion that is more than 75 years old. And it will always remain impossible to influence this fact, unless one has a De Lorean well up to date with its plutonium and travels back to 1944 to buy a fresh cartridge of Super XX.

- The configuration of the historic cabin is unknown. The simple fact of changing the base material (wood for metal, for example), can undoubtedly strongly influence the temperature. Moreover, what about the power of the heat source? Not to mention its internal volume, the number of films present at the time of the accident, the temperature of the room, its humidity level, etc.

- It has been demonstrated that a film on an acetate support was capable of melting, making the legend not totally impossible in absolute terms.

But it remains reasonable to think that it is highly unlikely that Capa's films were melted, as the facts provided by this study demonstrate, and also if we consider the following common sense elements:

- Life's laboratory was a professional entity, where usually everything is optimized to ensure optimal results. Even if the booth was homemade, with salvaged materials, it should have been designed not to destroy the films in any way. If the simple act of closing the door puts the images in mortal danger, it renders the object unusable. A door is designed to be closed! Sooner or later, an unsuspecting or dizzy staff member will make the mistake. This is fatal and unthinkable.

- Moreover, a heating booth with the door open is useless: the heat cannot be distributed evenly enough to guarantee optimum drying, and all the dust can freely come and stick to the wet films, a convection current creating an air movement favorable to the arrival of particles.

- Under these conditions, it would be preferable to let the films dry in the open air, possibly in the same drying cabin with the doors open, but with the heating switched off. At least, the drying would be done uniformly, without too much risk of dust sticking to the film (no heating, therefore no convection movements). But with the big drawback that the films will take too long to dry! Because it takes at least two to

three hours for a 36 exposure film to be completely dry without heat. This is difficult to bear in the context of the permanent stress of a news magazine.

One hypothesis remains...

Could the films have been destroyed by seawater?

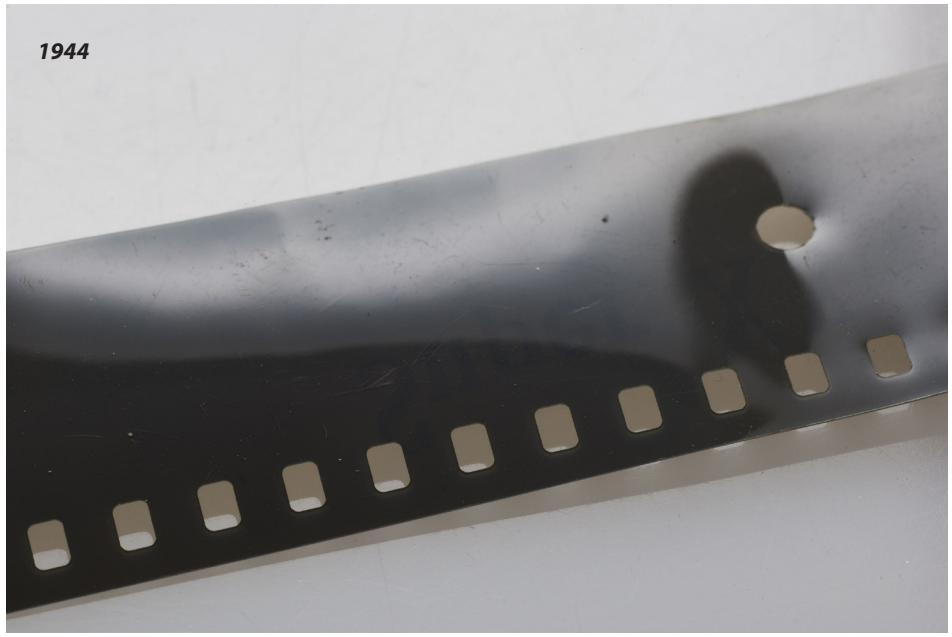
Capa, in an early letter to his mother, claimed that his films had not melted, but had been destroyed by sea water. In any case, sufficiently damaged that they were rendered unusable.

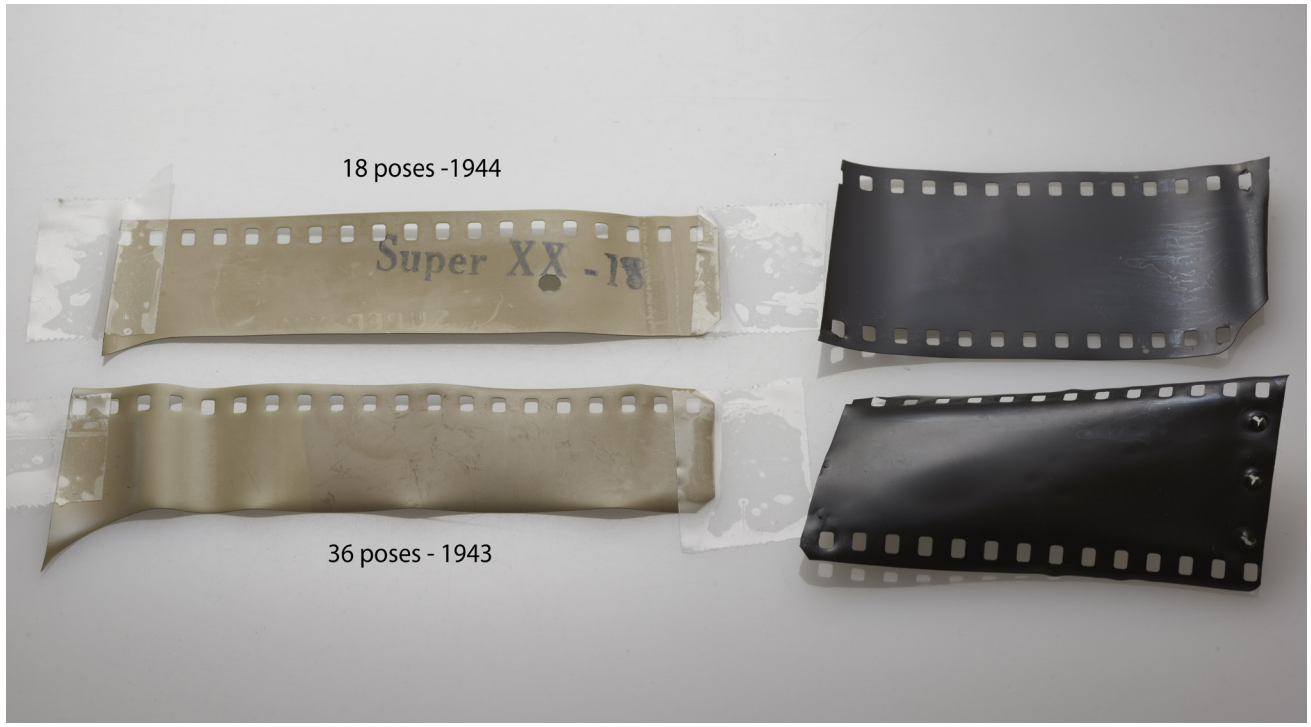
This point deserves to be clarified, in order to confront all historical hypotheses with experimentation.

This is a good thing, because I still have a third blank Super XX film to use as a guinea pig!

Film Kodak Super XX from 1943, 36 exp.

Film purchased on Ebay US at the same time as the 1944 one, but from a different buyer, and with a different background.
The film comes in a green cartridge like the 1947 one, but with black flanges. No cardboard tube, replaced by a metal container. Same instructions as before, no label about saving metal in wartime.
The appearance of the film left me doubtful. It looks warped, as if it had been dampened, yet there is no evidence of water damage.
That's why I decided not to use it for the heating test, despite the 36 exposures available that would have done the trick.

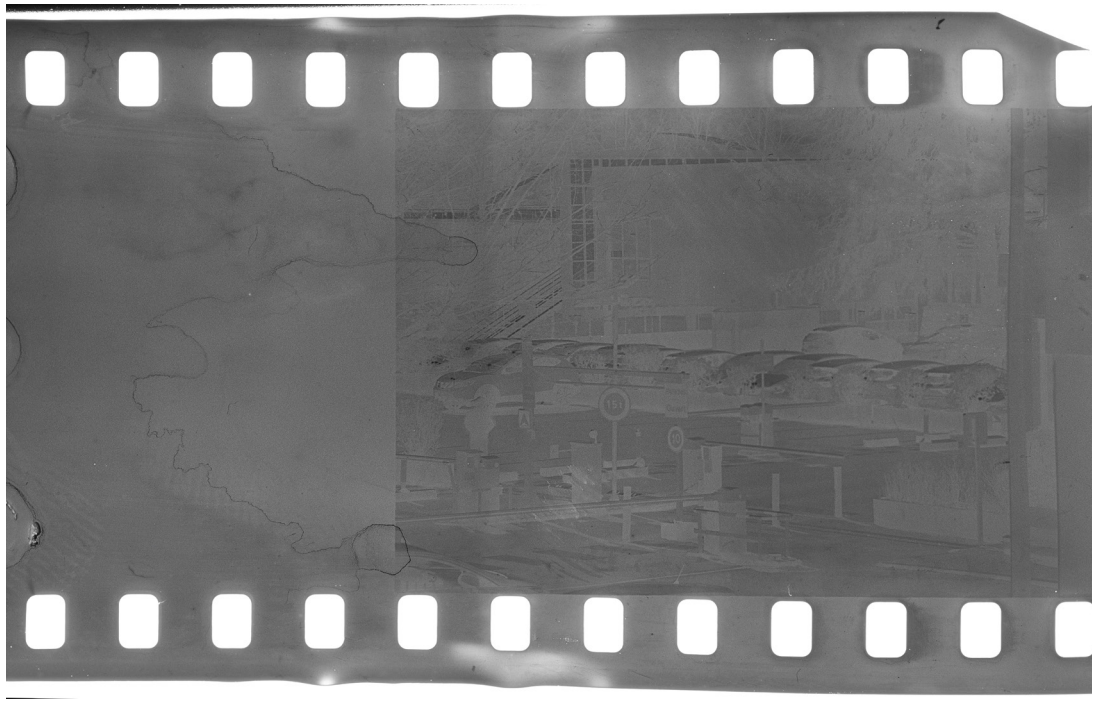




Here is a comparison of the 1943 and 1944 film primers. We can see that the 1943 film has been altered.

Mechanically, its resistance remains good, but it is slightly narrower than normal, the perforations do not fall very exactly in front of the camera gears.
So it seems to have contracted, perhaps as a result of humidity at some point in its history?

We will see that this will pose various difficulties that will complicate the task.



As usual, my first reflex is to test this film on a sample. I started directly on the same parameters as the 1947 film, i.e., overexposure of +7 stops, and development of 10 minutes at 1+1.

The result gave me something between the two films previously used. Not as good as the 1947 one, but a little better than the 1944 one.
The density of the support, unfortunately, makes the images still difficult to read.

The film, when drying, has strongly curled up on itself. Proof that the support has deteriorated and no longer has all its mechanical characteristics. To reproduce it, I was forced to wedge it between two glass plates.

On this sample, no inscription in the margins is visible.

The visible drips come from the support, which secretes unknown residues as long as it is wet...

Given the previous experiences, I realized that there was no hope of improving the situation on the development side. I could only play on the exposure side.

So I decided to expose the film without further testing, taking the precaution of bracketing strongly in the direction of overexposure.

Test protocol

In order to verify if the story of the films damaged by sea water could be true, I have to reconstruct the circumstances of the accident, according to the data we know, namely :

- Films supposedly fallen into the water on June 6, 1944 by Robert Capa, or handled with very wet hands (which, by the way, should have also damaged the camera). Or else they fell into the water because of the fault of a third party after Capa had entrusted them with his rolls, but how could the latter have known this, since he had remained on the spot?

- There was a 36-hour delay between the immersion and the development of the film, which corresponded to the time it took to get the film from Normandy to the Life office in London.

Here's how the test is planned:

- I had a sample of seawater taken from Brittany, only a 2-hour drive from Omaha Beach. The water was stored frozen, in order to preserve it until the moment of the test.

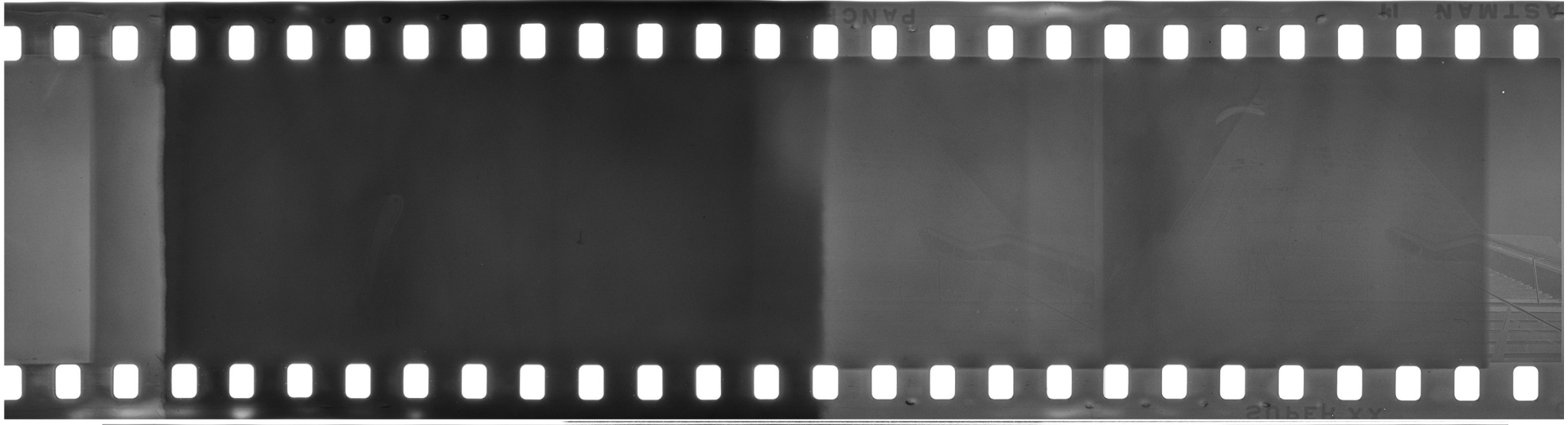
- Exhibition of the whole film, on various subjects. Then, extraction of the first half, which will be developed and put aside, in order to be used as a control.
- The other half remains in its cartridge. Then, preparation of a container filled with thawed sea water. Immerse the cartridge at mid-height for 5 minutes.
-Wait 36 hours to develop the film.

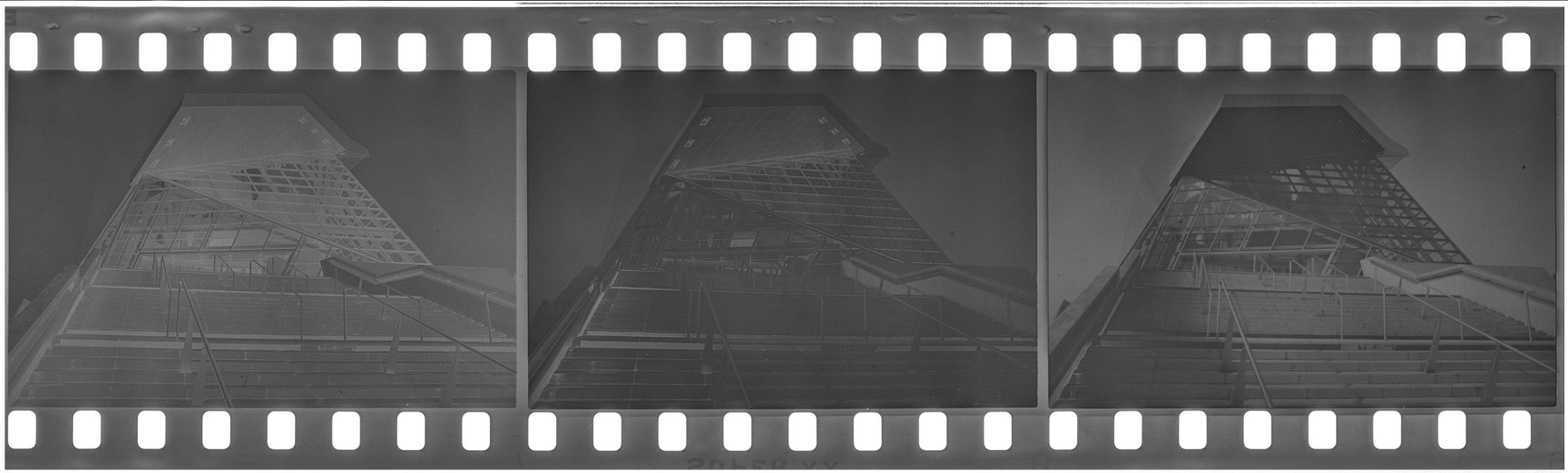
Immersing the film halfway up deserves an explanation: the aim is to check the behavior of the support when it is sometimes wet, sometimes more or less preserved.

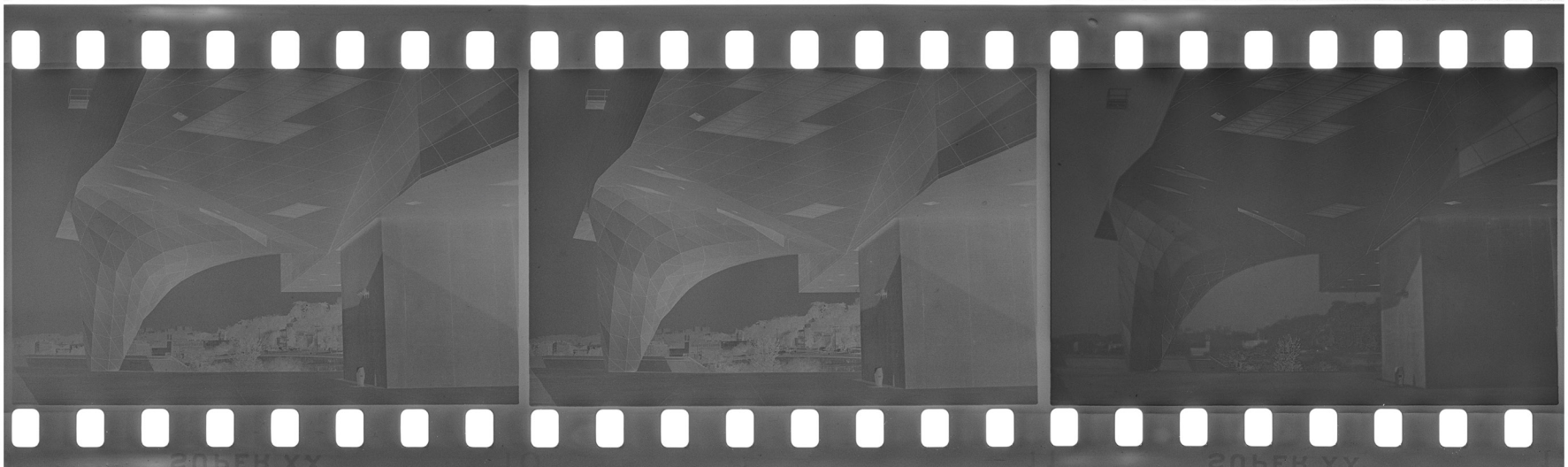
3D illustration showing a film cartridge half submerged in seawater.

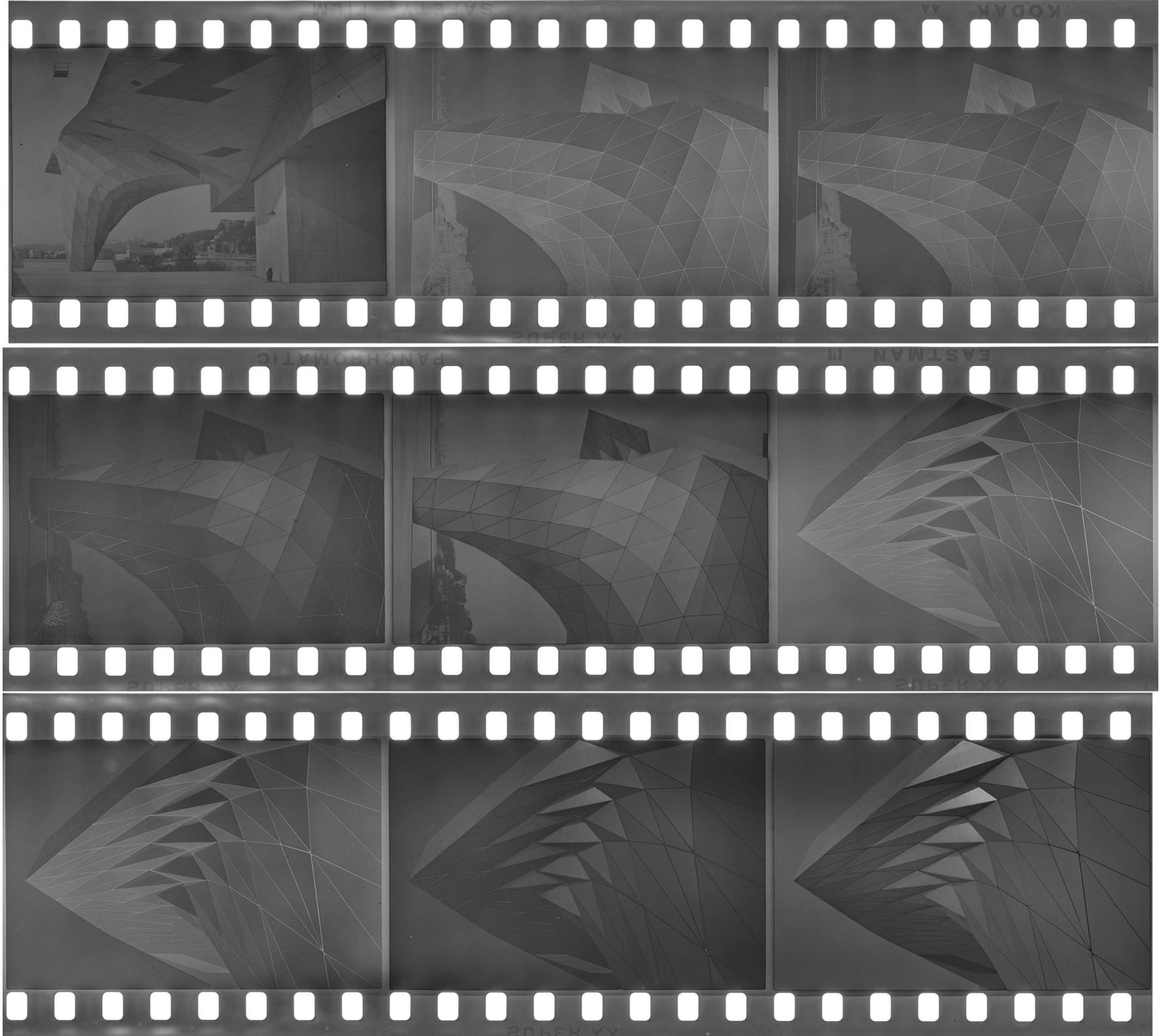
In accordance with the chosen protocol, I first exposed the whole film, bracketting for each subject, in order to guarantee that many images would come out correctly. This time, I did not use the Contax II, whose use was risky considering its condition.

So I took out my OM-1, always reliable, for a little shoot in the sunshine at the Confluences museum, in Lyon.

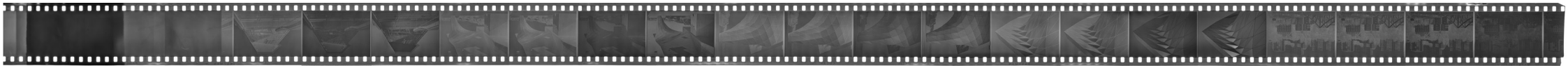








The film, presented in one piece:



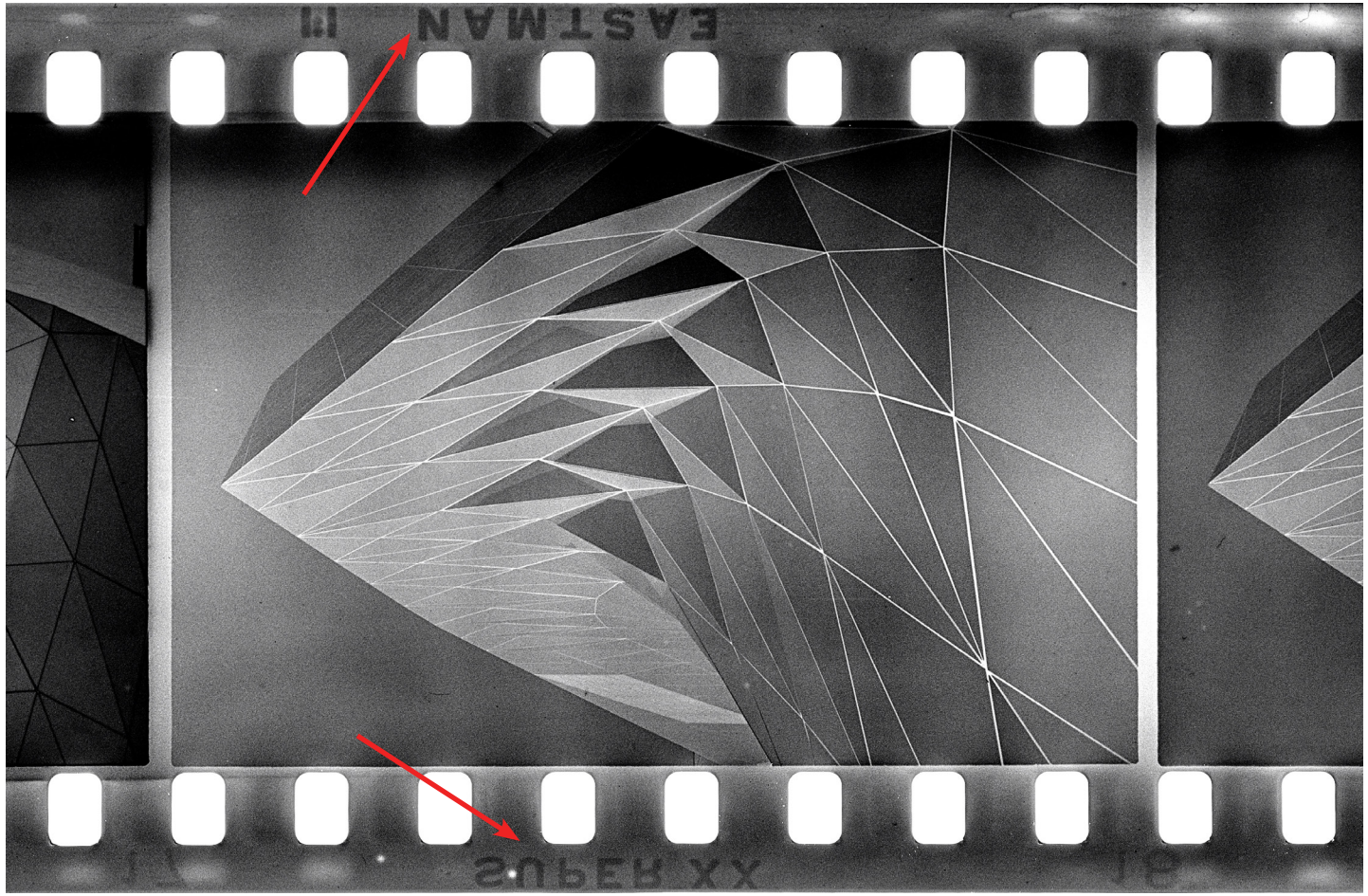
Several remarks: As the previous times, the more we overexpose, the more the images tend to be solarized. We go then abruptly from a negative image to a positive image, but without damaging the general rendering.

The images also tend to bite on the perforations. But this time, the cause is different. The film having shrunk, it is a little smaller than usual in height. As a result, the space between the perforations is missing, and the positioning becomes imprecise.

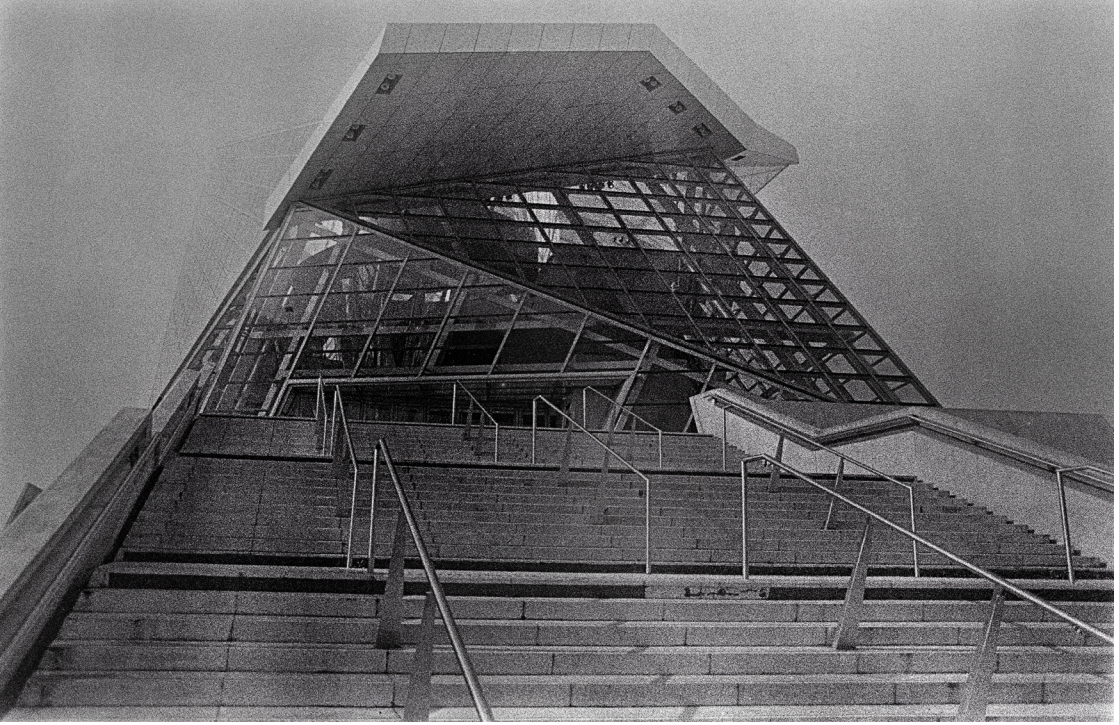
Note that the annotations in the margins are present, but incredibly and never seen before, if the words EASTMAN II PANCHROMATIC KODAK SAFETY FILM present at the top of the negative, are readable in the right direction although head to toe, the words SUPER XX with the frame numbers are mirrored! Rob McElroy gives me his point of view:

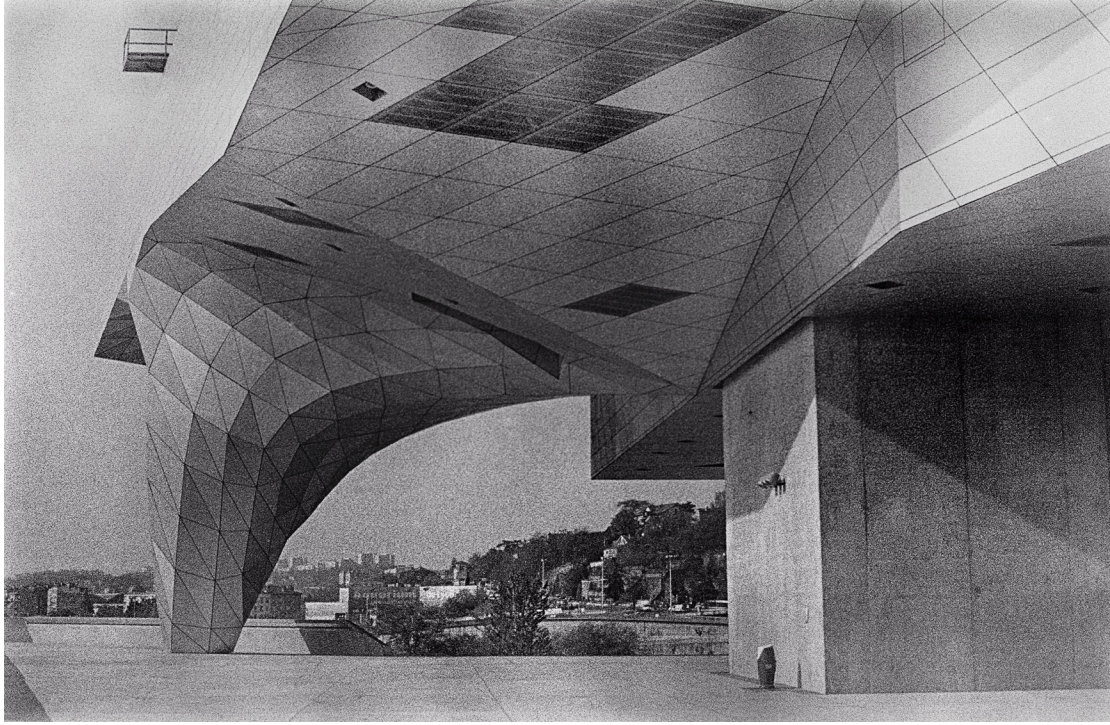
«In my opinion, this was not a manufacturing error, as I have several rolls of Super-XX film from this same period that have the same condition, as well as others that do not have this problem. I believe that Kodak experimented with different printing orientations for the inscriptions during this period, before implementing a standardized procedure.

When you look through the film from the emulsion side facing you, the standardized way is to have all the lettering readable from left to right. In the old days, this was not the case, and sometimes you had to look across the base to get an edge of the film read correctly. This makes it possible to identify the different Kodak manufacturing plants that exposed the lettering in one direction or the other. Capa's film was actually manufactured in the United Kingdom, which can be determined from some of the Kodak code markings visible in the margins of the film.»

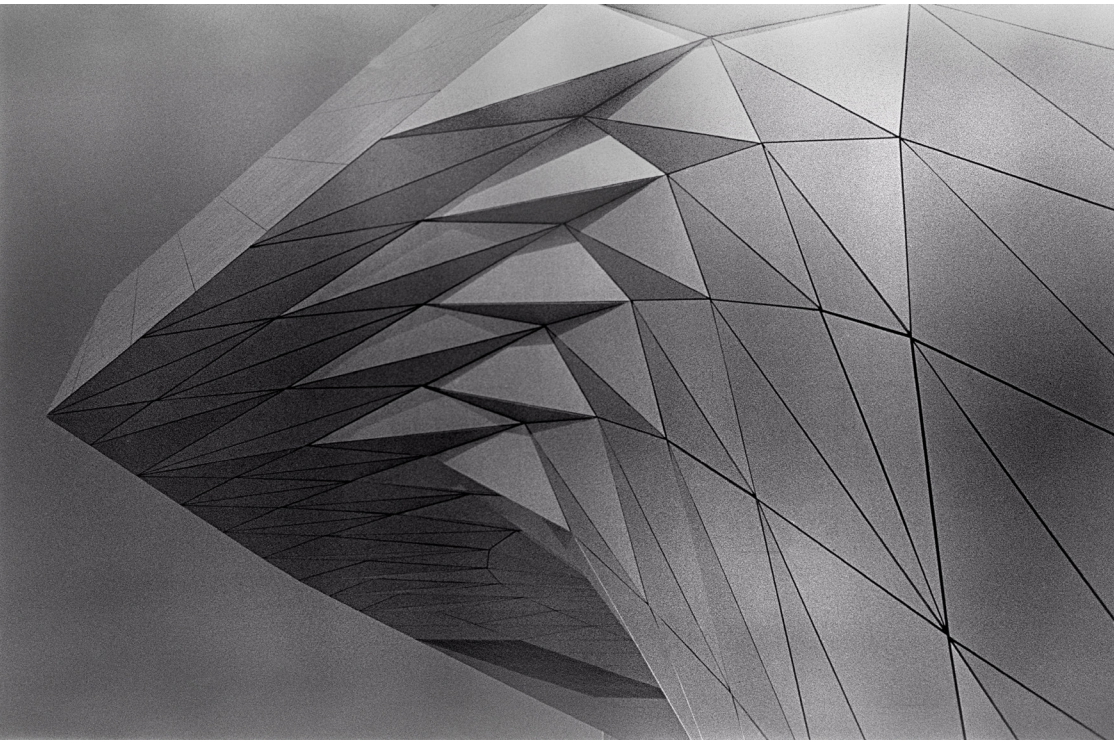


Sample of the film with exaggerated contrast, in order to bring out the inscriptions in the margins.
We see that the lower indications are written in mirror, unlike those above.





Some images taken from the negative, after processing. 28, 50 and 135 mm focal lengths.

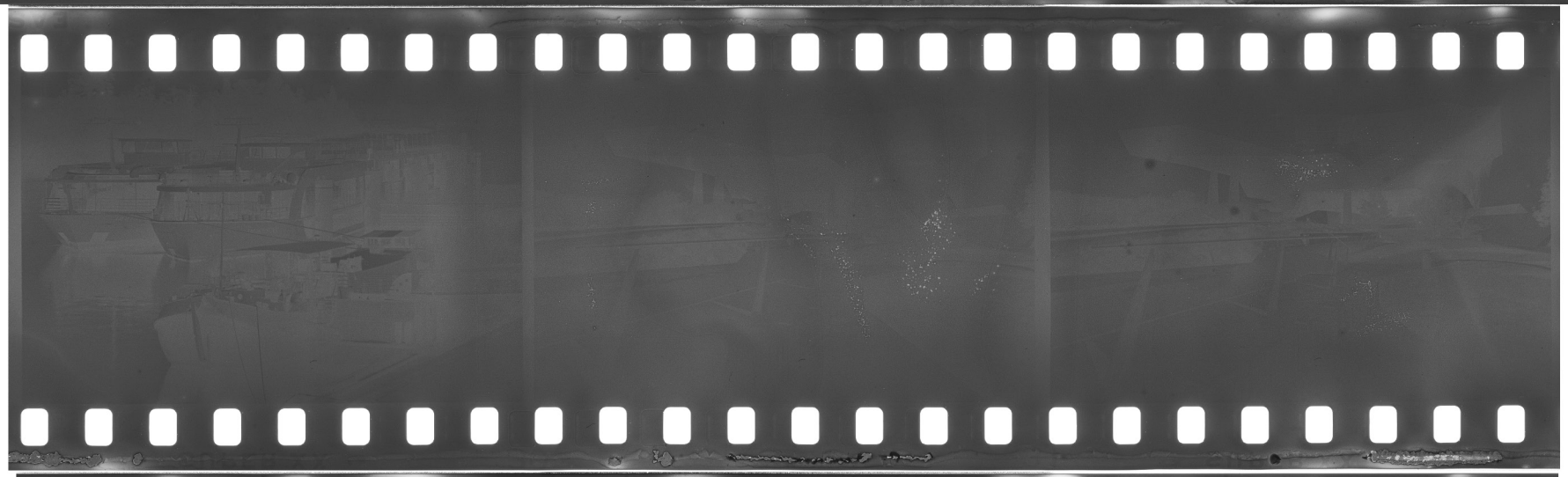


With the rest of the film still in its cartridge, the cartridge is immersed in a container filled with sea water, so that the water level reaches half the diameter of the cylinder, for 5 minutes.

But after this time, I changed my mind, fearing that this would not be enough. So I put the whole cartridge back into the water. Too bad for the initial intention, but I preferred to make sure!

Then, I waited 36 hours before the next step, the insertion of the film in the developing spiral. I was very worried that the film would get stuck during this step, as it was still wet and very soft. Fortunately, the sea water is not fresh water, and its slightly oily texture acted as a lubricant. The film slid into the nylon spiral (Paterson) without too much difficulty. So I was able to develop the film normally, just like the previous ones.

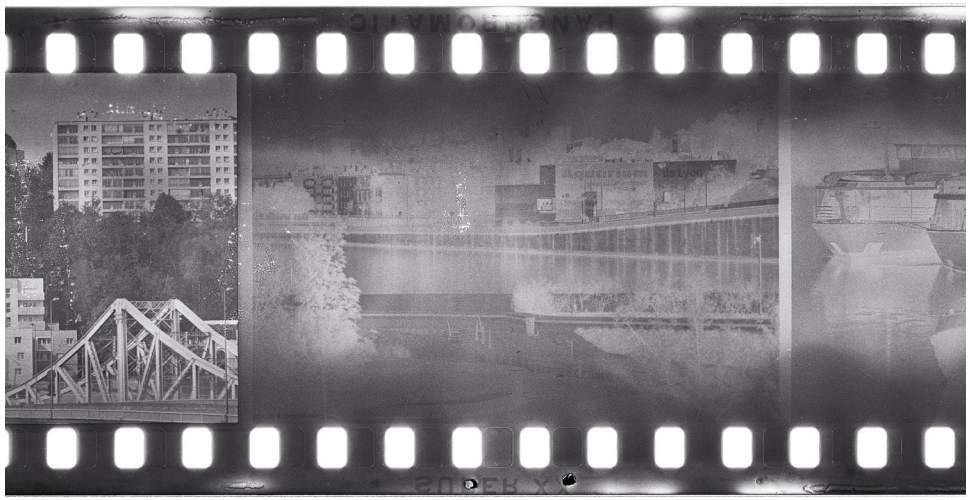
But after processing, I took care to let it dry still rolled up in the spiral, instead of laying it out vertically. This precaution allowed me to avoid that the film would be completely twisted, considering its condition.



As we can see, the film has indeed suffered from the immersion in sea water. But finally, not much. Some mottling and black/white spots are to be deplored, combined with a slight general fading.

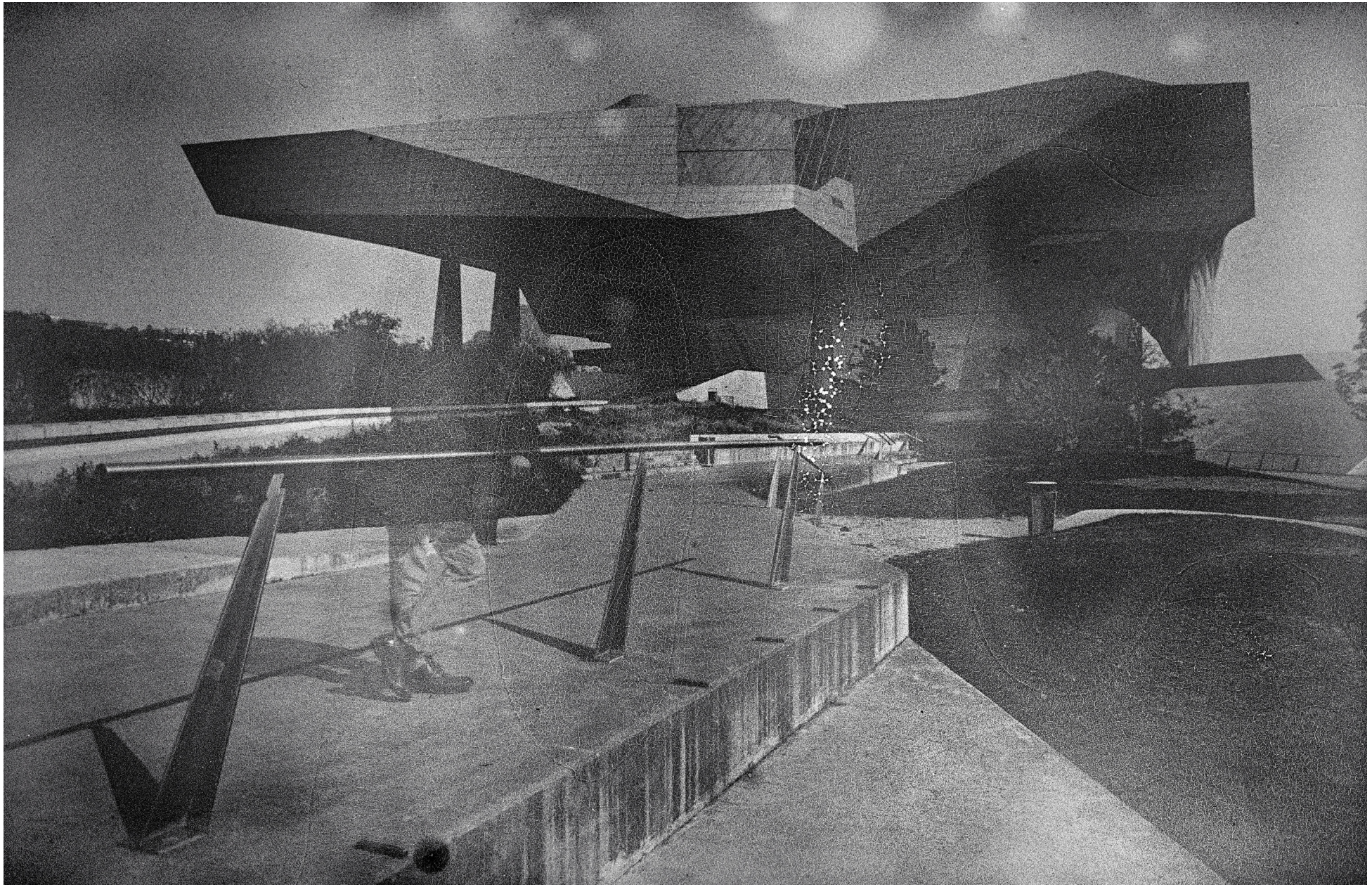
This doesn't prevent the ones that received enough light from being perfectly usable, especially the first image (which is to be compared with the same one, but from the control part), but also the last one, which is very readable.
The very last image of the film is not one, it is a blank part.

The inscriptions in the margins remain visible, as shown in the picture below:



The entire film.

This image should be compared with the same one, taken on the non-submerged part of the film.



An unsuccessful self-portrait attempt ...


LY 1768
LY23096

Repeat of the test with a modern film

For comparison, here is exactly the same sea water test, but this time with a modern film. What will be the reaction?

Reminder of the protocol : Use of a TMax 100 film, always taking the same image (car wreck), with a Nikon F-90x and its 50mm F-1,8 AF. Then, extraction of a first half of the film, development (control film) while leaving the rest in the cartridge.
This cartridge is put to soak completely in a container containing the same sea water as the previous time, during 5 minutes.

Then, wait 36 hours, then put in spiral and development in the stride.
The developer is always the usual ID-11 / D76 (at 1+1, 11 mn at 20°C), even if I know that it is not the one recommended for Tmax (they prefer the Tmax or Xtol developer), but in our case, it remains coherent to carry out all the developments with the same product.
Besides, this is not critical for the moment, the images are largely qualitative enough with the ID-11.

The fixation lasted 6 minutes in constant agitation, longer than normal, but this is usual with Tmax. Otherwise, with the standard time, they would have come out pink!

Note that the two successive developments (with and without passage in sea water) were carried out with a particular precision and care. I really tried to be as precise as possible, as much in the temperature, the dilution, the time, as in the agitation. I think I have succeeded in making two exactly identical developments. This is important to make the comparison relevant.

The film is left immersed for 5 minutes in sea water.

The pink dye from the film begins to leak!

Control strip:

Regular *+ 1 stop* *+ 2 stops*

Strip after immersion :

+1 stop *+ 2 stops* *Regular*

During the shooting, I took care to bracket on 3 images: 0, +1 stop, +2 stops. We find on the control strip these corresponding densities.

We notice a significant loss of density and contrast of the «sea water» band compared to the control band. This can be seen on the images, but also on the inscriptions in the margins. In fact, it is an underdevelopment.
The sea water has thus acted as an attenuator of the effectiveness of the developer.

This is what we noticed with the Super XX of 1943: the submerged views are blander and less legible.

We now have the confirmation that sea water has a harmful effect on the films, but not to the point of making the images unusable.

Indeed, it is enough to push the contrast at the print (here in digital post-processing) to completely make up for the differential (see next page).

So we cannot blame sea water for the destruction of Capa's films, whether the film is old or not.

Image 22a (control frame) after inversion and contrast management.

Comparison 22a and 26a: made identical.

Image 26a (frame submerged in seawater) after application of the same treatment as 22a. The lack of contrast is obvious.

Image 26a (frame submerged in seawater) after applying the same treatment as 22a, and after adding additional contrast. The loss has been fully recovered.

The final word

What can we conclude from all these experiences?

Alan D. Coleman and his team have done a monumental job of historical investigation and analysis that has led them to conclude that Capa did not bring back more images than the number we know.

Throughout my own journey, I have tried to put these conclusions aside, focusing solely on objective technical data, and letting myself be guided by them.

Nevertheless, it is clear that my conclusions are in line with Coleman's, and even reinforce them.

Is there now proof that Capa lied? The question is sensitive, and there are still many grey areas. But it is reasonable to think so.

Is that the main thing?

Finally, knowing how many photos Capa took that day is only a detail. For let us not forget that he had the courage to land on Omaha Beach on June 6, 1944, was able to take pictures, return alive and share his experience with the world.

Few could have boasted of this feat.

Tristan da Cunha, 2021.

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studio-umami.com

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Contact : lamaisonphoto.fr

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In spite of the distance, the language barrier, my doubts, and the time that passed, he always gave me, the obscure unknown Frenchman, his confidence, pushing me to go always further in the rigor. Without him, I would never have been able to succeed. Thanks to you, Allan!
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