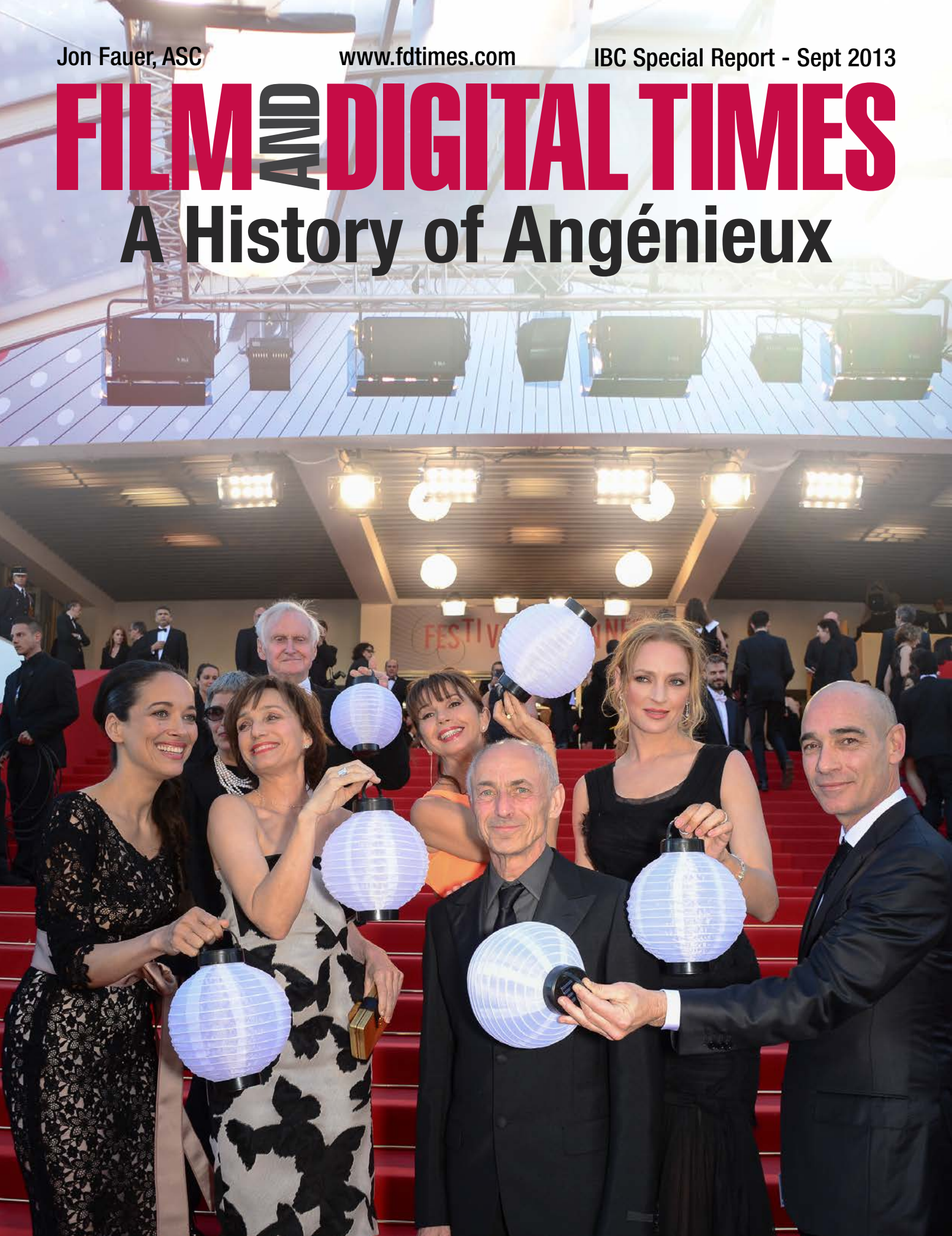
Jon Fauer, ASC www.fdtimes.com IBC Special Report - Sept 2013

FILM AND DIGITAL TIMES

A History of Angénieux



FILM AND DIGITAL TIMES

Art, Technique and Technology

Film and Digital Times is the guide to technique and technology, tools and how-tos for Cinematographers, Photographers, Directors, Producers, Studio Chieftains, Camera Assistants, Camera Operators, Grips, Gaffers, Crews, Rental Houses, and Manufacturers.

It's written, edited, and published by Jon Fauer, an award-winning Cinematographer and Director. He is the author of 14 bestselling books—over 120,000 in print—famous for their user-friendly way of explaining things. With inside-the-industry "secrets-of the-pros" information, *Film and Digital Times* is delivered to you by subscription or invitation, online or on paper. We don't take ads and are supported by readers and sponsors.

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- Madelyn Most: Raoul Coutard, Willy Kurant
- Herb Lightman, "The Angénieux Story," March 1975 *American Cinematographer*.
- Patrice-Hervé Pont, *Angénieux, Made in Saint-Héand,* Éditions du Pécari, 2002.

Interviews, comments, conversations and photos from:

Haskell Wexler, ASC; Pierre-William Glenn, AFC, Willy Kurant, ASC, AFC, Raoul Coutard; Peter Macdonald, BSC; Bill Bennett, ASC; Ron Dexter, ASC, Luciano Tovoli, ASC, AIC. Additional credits with photos.

Contents

About the Cover 3
Haskell Wexler, ASC on Angénieux zooms 5-6
Pierre-William Glenn, AFC 7
Luciano Tovoli, ASC, AIC on Angénieux zooms 10-11
Angénieux History 12-13
Retrofocus 14
1951. The first Cine Lenses 16
We will make no lens before its time 17
1960. The first 35mm Angénieux Zoom. 35-140 f/3.5 21
Angénieux 35mm 35-140 f/3.5 Zoom and first Anamorphics 22
Raoul Coutard 23
Willy Kurant, ASC, AFC 24
1961. 10:1 Zoom for 16mm 25
1962. 10:1 Zoom for 35mm 26
Roberto Rossellini 27
Peter Macdonald, BSC 28
Rich Abel, Gérard de Battista, AFC, Philippe Van Leeuw, AFC 29
NASA to Nixon 30
25-250 HP and HR 31
HR to Optimos 32
Optimo 24-290 T2.8 33
Bill Bennett, ASC, Jon Fauer, ASC 33
Angénieux 75th Anniversary 34
Optimo Lightweight and New Anamorphic Zooms 35
Cannes and other Film Festivals 36
Pierre Andurand at Cannes 37-38
Angénieux at Cannes 40-44
Interview with John Boorman 45
Pierre Angénieux ExcelLens in Cinematography 46-47
Interview with Philippe Rousselot , ASC, AFC 48
Angénieux Optimo Lightweight Zoom Lenses 52
Angénieux 45-120 mm T2.8 53
Angénieux 19.5-94 and 28-340 Optimos 54
Angénieux 19.5-94 and 28-340 compared with 17-80 and 24-290 55
Angénieux Optimo Anamorphic 56-152 mm 56
Laurent Mannoni on Angénieux 57
Angénieux Factory Tour 58-63

Angénieux Special Report

The Angénieux company has been designing and building motion picture lenses for more than 78 years. They have defined the look of many feature films and influenced the way they were shot.

This special report follows a timeline of Angénieux's history, from its founding by Pierre Angénieux in the 1930s to the new lenses that continue to be developed today.

We take some detours to follow the paths of cinematographers and directors working with Angénieux cinema lenses on features, commercials, television shows, series, documentaries and specials.

This report was born in Cannes 2013, where Philippe Rousselot, ASC, AFC was honored for his prolific and amazing cinematography. The award was conceived and created by Angénieux.

It was an equipment-agnostic event. No one counted which films were done on what cameras or lenses. It was, however, abundantly clear that Angénieux's place in the world of cinema was profound, and its history is fascinating.

I hope you enjoy this report.

About the Cover

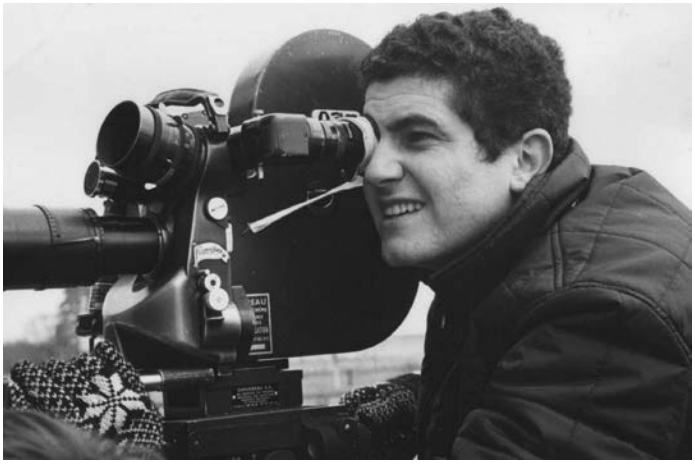
Above: at Cannes, ascending the red carpet to accept the Pierre Angénieux ExcelLens Award: Philippe Rousselot, ASC, AFC surrounded by the lanterns he famously uses as luminaires, and some of the luminaries he's lit (l-r): Carmen Chaplin, John Boorman, Kristin Scott Thomas, Victoria Abril, Philippe Rousselot, Uma Thurman, and Jean-Marc Barr.

Below: (left to right) Jean-Marc Barr, Pierre Andurand, President & CEO of Thales Angénieux, Carmen Chaplin, John Boorman, Philippe Rousselot.

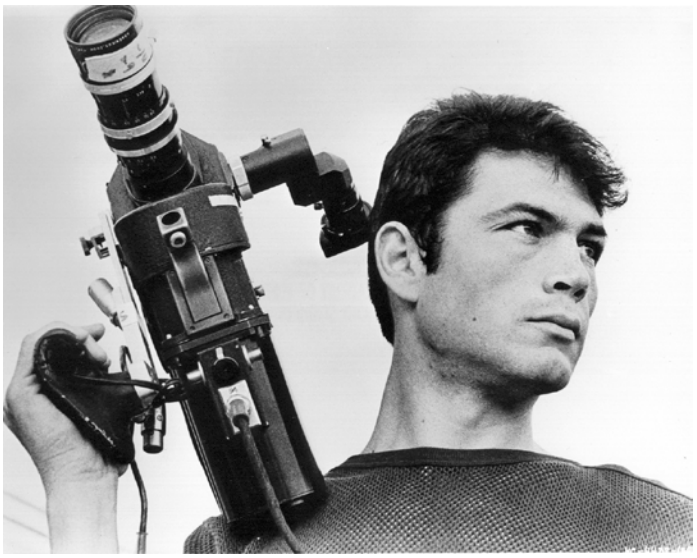
Angénieux 17-80 Optimo Zoom on *Midnight in Paris* (2011). Woody Allen, Director. Darius Khondji, ASC, AFC, Cinematographer.

Angénieux zooms on *Scoumoune* (1972) directed by José Giovanni, with Jean-Paul Belmondo and Claudia Cardinale.

Claude Lelouch with Éclair CM3 and Angénieux 25-250 (and prime lens) on *A Man and A Woman* (1966).



Haskell Wexler, ASC on Angénieux zooms



1969. Robert Forster as a news cameraman, with Éclair 16mm NPR and Angénieux zoom in Haskell Wexler's *Medium Cool*. Haskell wrote, directed and shot the film in 35mm with his Éclair CM3, Angénieux 25-250 and primes. The film was a revolutionary combination of real and dramatic situations using a cinéma vérité documentary style.

I spoke with Haskell by phone. He said:

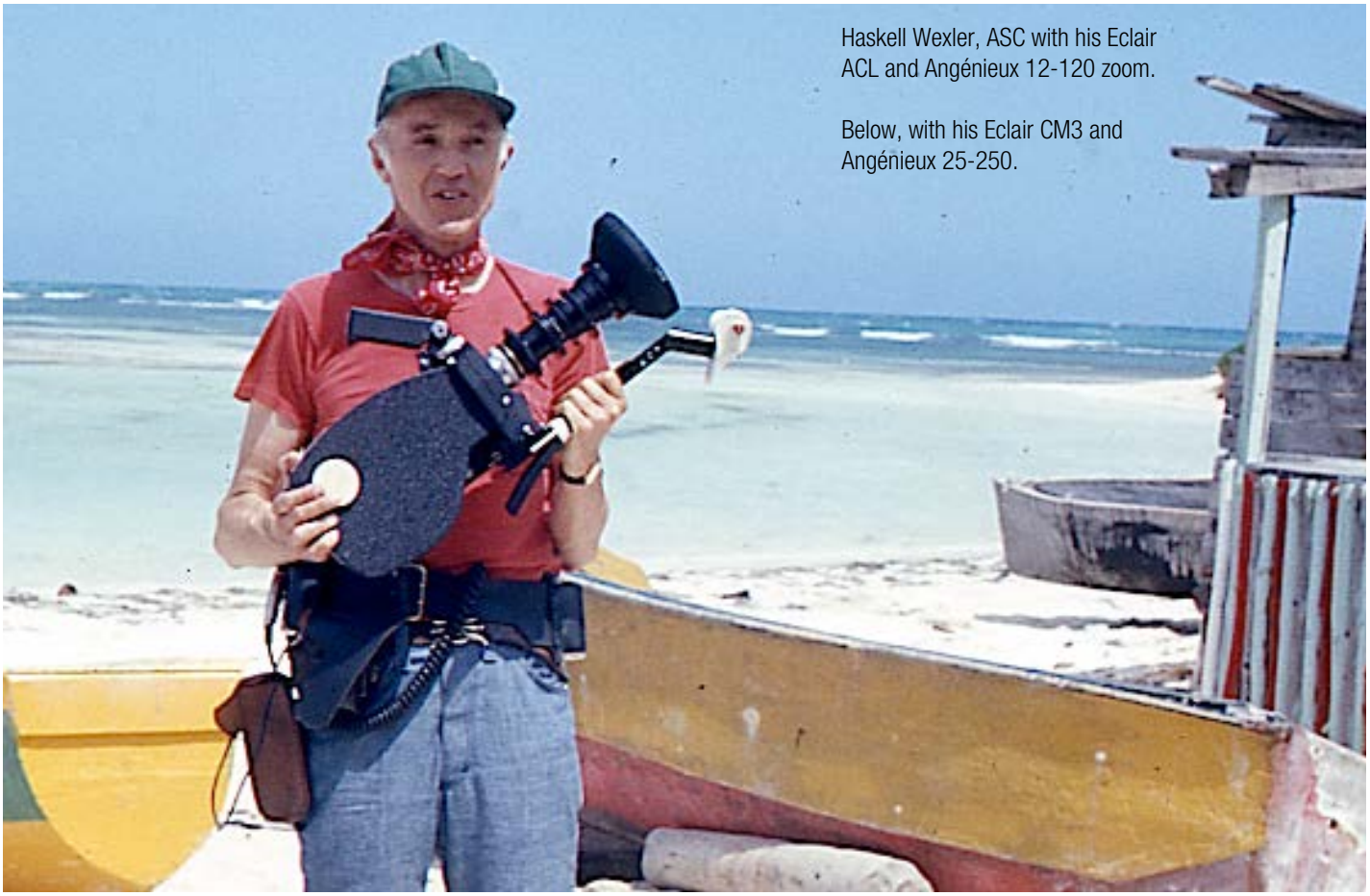
"When we started shooting what was called Cinéma Vérité, the Angénieux 10:1 zooms, the 25-250 for 35mm and the 12-120 for 16mm were the lenses of choice at that time. In the beginning there were maybe four or five shooters in America who had them. After that, everyone did...

"It was part of the shooting style. You'd be able to be on a nice big master shot at the wide end of the zoom, and as the person walks across the room, you tighten up, and then when you pan over you're already in place for a two-shot.

"Nowadays, very few filmmakers use that kind of control but it has its advantages. Of course, there are differences when you do dolly moves.

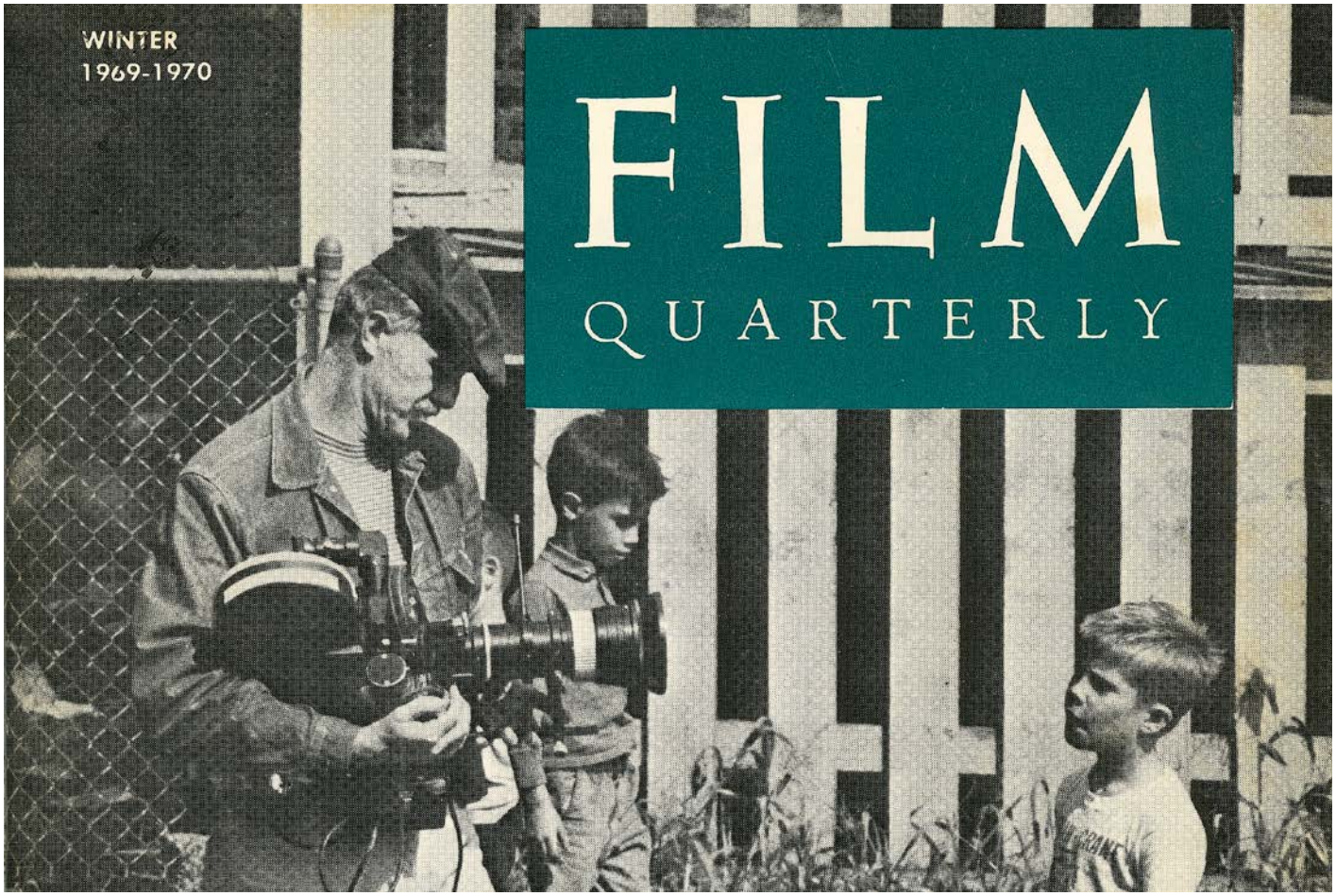
"In documentaries, we would zoom in quickly to get focus, then pull back to the shot. Editors often left that in the cut for drama. *In the Heat of the Night* (1967) daylight shots are all done with the 25-250. We had Angénieux zooms on *Medium Cool* (both in the movie on Robert Forster's NPR, and the one used to shoot the movie.)

"The other thing we did was to put an extender on it so it became a 50-550 mm zoom. It would lose about 2 steps of light, but that made for exciting shots."



Haskell Wexler, ASC with his Eclair ACL and Angénieux 12-120 zoom.

Below, with his Eclair CM3 and Angénieux 25-250.



Pierre-William Glenn, AFC

Pierre-William Glenn, AFC shot some of the iconic films of the New Wave: *State of Siege* (1972, Costa-Gavras), *Day for Night* (1972, Truffaut), *A Gorgeous Girl Like Me* (1972, Truffaut), *Small Change* (1976, Truffaut). He is currently Chairman of the CST, the French Commission for Image and Sound in Motion Pictures.

"In the period called the New Wave, we all worked in 16mm and then Super 16 with the Angénieux 10:1 zoom (12-120 mm) on the cameras we used for "reportage," newsreel and documentaries. I photographed my first 4 or 5 films with that lens on the Éclair Coutant (NPR) camera we all used at that time. They were not very heavy and easy on the shoulder for handholding. I moved on to 35mm pretty quickly and then used the 25-250 mm zoom. We also used a zoom in Scope which required 2 assistants to rack focus to keep both images sharp.

"Different directors used the zoom as an effect, notably Claude Lelouch. But for me and the directors I worked with, Truffaut for example, the principle was to use the zoom discreetly, so that it was unnoticeable. It would blend in with the move of the dolly and the crane and change the perspective of the shot; it was invisible.

"I used the zoom lens in two ways: as a zoom, and to change picture size and frame as part of a moving shot. These lenses offered more possibilities to vary the focal length and perspective. Of course, it was practical, efficient, and saved time. For night shooting, it meant you needed more light to use the zoom (as it had a maximum aperture of 3.5/4).

"For me, the optics of Angénieux lenses are some of the best in the world. The effect of these small zooms was enormous. The New Wave owes a lot to Angénieux… the way we worked so freely and could shoot handheld, having the different focal lengths.

"The Angénieux zoom is wonderful in that the quality and image sharpness of each focal length is as good as a prime lens. For us, this was enormous progress. At that time there were not a lot of lenses that were as advanced and as high performing. The use of the zoom by Lelouch almost became a symbol of the New Wave."

Pierre-William Glenn, AFC

Below left: Pierre-William Glenn on *Une belle fille comme moi*, directed by François Truffaut (at right).

Above: *Pour Une Femme* by Diane Kurys © 2012 Alexandre Films, Rise Films, France 3 Cinema, Rhone Alpes Cinema, New Light Films. Photo: David Koskas

Below: *The Devil's Double*. DP: Sam McCurdy, Director: Lee Tamahori. Photo: Sofie Van Mieghem courtesy of Corsan

Above: Angénieux 24-290 on *Largo Winch*. Cinematographer Denis Rouden, AFC and Director Jérôme Salle. Photo: Thomas Bremond

Below: Guillermo Navarro, ASC, A.M.C

Luciano Tovoli, ASC, AIC on Angénieux zooms

Luciano Tovoli, ASC, AIC, Founder of Imago, with three cameras and Angénieux zooms at Cinecittà Studios in Rome, on *Amici Miei - Come tutto ebbe inizio* (2011), directed by Neri Parenti.

J.L.Fisher
J.L.Fisher

DXCRANE

Above: The Angéngieux factory in Saint-Héand in the 1950s.

Below: Thales Angéngieux factory as seen during the 75th anniversary in 2011.

Angénieux History

About the dates in this timeline: a fair degree of leeway is needed. Lenses and cameras are often first seen as prototypes on film productions, as much as several years before official ship dates. Also, films are usually identified by their release date, even though principal photography may have begun long before.

Above: Angénieux logos over the years.

Below: 1948 ad. Loosely translated: "Precision in the service of Art. Specially designed for small formats (8, 16, 35mm), because of their quality, Angénieux lenses assure the good reputation of the French optical industry worldwide."

1907. Pierre Angénieux was born on July 14, 1907 in Saint-Héand, France—a quiet hilltop village of 4,000 about an hour's drive southwest of Lyon.

1928. He graduated with a degree in engineering from l'Ecole des Arts et Métiers in Cluny. A year later, he received a degree as optical engineer from the Ecole Supérieure d'Optique, where he was enrolled in the optical design class of Henri Chrétien (inventor of the anamorphic widescreen process for motion pictures that became CinemaScope).

1930. Pierre Angénieux joined Pathé, a leading company in the French motion picture business at the time. This was his introduction to the world of cinema, which he never left. Later, he worked with André Debrie, manufacturer of professional cameras and projectors.

1932-1934. Pierre Angénieux worked as a chief engineer of cinema lenses at OPTIS. He and two colleagues then established their own company, ASIOM (Association Scientifique et Industrielle pour l'Optique et la Mécanique), renting space in the building of his former school at 39 rue de Lyon, Saint-Héand.

August 1935. The photography and motion picture business was doing well. Pierre Angénieux, 28 years old, opened a workshop in Paris at 7 rue Henri Murger (19th Arrondissement).

1937. The company grew. A second workshop was set up back in the village school at Saint-Héand. From then on, mechanical parts were manufactured in Paris and optical parts in Saint-Héand.

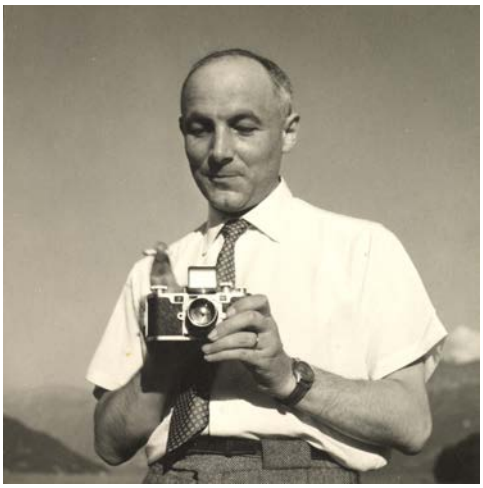
Pierre Angénieux stayed in contact with prominent filmmakers, including Jean Renoir and Abel Gance.

1938. During the war years, Pierre designed and manufactured lenses in limited quantities for 24x36 format still cameras—mainly for the Swiss Alpa SLR.

From 1938, his first lenses were engraved "P. Angénieux PARIS." One was a 50 mm f/2.9 lens; the other a 50 mm f/1.8 for Alpa cameras.

1940. Pierre closed his Paris workshop and relocated all work to Saint-Héand. Although Saint-Héand was located in "unoccupied" France, his work was being carefully "watched." Manufacturing became difficult. He spent much of this time studying new methods of optical calculation.

1946. His methods for optical calculation reduced by a factor of 10 the number of hours necessary to design a lens. This was achieved mainly by calculating the relevant light rays instead of the total.



1950. Design and manufacturing of wide angle Retrofocus lenses for 24x36mm format still photography. These lenses used an inverted telephoto design, with a negative lens group at the front that increased the back focal distance. The first lenses were intended for rangefinder cameras, but the added distance was a boon to accommodate the extra room occupied by mirror mechanisms in the emerging technology of single-lens reflex cameras.

35 mm f/2.5 R1
Retrofocus

The first Angénieux Retrofocus still format lens was the R1 series, 35 mm f/2.5, introduced in 1950.

Angénieux Retrofocus lenses came in focal lengths of 24 mm, 28 mm, and 35 mm. The R11 28 mm f/3.5 came in 1953, followed by the R51 / R61 24 mm f/3.5 in 1957.

28 mm f/2.5 R11
Retrofocus

A single-lens reflex (SLR) still camera requires the lens to be further from the image plane. Otherwise, the camera's mirror would hit the rear element. For example, the flange focal distance of a Leica rangefinder was 27.80 mm, while the flange focal distance of a Praktica SLR was 44.4 mm. This extra distance limited the use of traditional wide angle lenses. Retrofocus lenses solved this by being able to increase the back focal distance.

Pierre Angénieux's Retrofocus design allowed the use of wide-angle optics on the interchangeable-lens SLR cameras that were coming to market at the time: Exacta, Praktica, and Contax in Germany, Alpa in Switzerland, Rectaflex in Italy, and later, Canon and Nikon in Japan.

Angénieux was building around 45,000 Retrofocus lenses a year in the 1950s. It's been said that Angénieux's design inspired the other lens manufacturers to produce wide angle lenses for almost every 35mm SLR and spinning mirror reflex motion picture camera that would follow. Only in the past few years, with the potential of good electronic viewfinders, have we seen a return to shorter flange focal distances.

The 35mm SLR camera Alpa-Reflex came out in 1939. It was called "Alpa" because it was light and presumably could be carried easily while hiking in the Alps or climbing the north face of the Eiger.

Exakta 35mm SLR cameras were first shown in 1936.

The Contax S was introduced in 1949 with its M42 threaded lens mount and pentaprism, which provided an unreversed, eye-level image. Canon's first SLR came a decade later: the 1959 Canonflex. Nikon introduced their Nikon F the same year.

All his life, Pierre Angénieux regretted not having registered the Retrofocus trademark.

However, let's not forget Cooke Optics. Their Inverted Telephoto design for Panchro lenses made the Technicolor "3-strip" motion picture camera processs possible. The Technicolor camera's beam splitter (between lens mount and film apertures) was like an early 3-chip video camera's beam splitter. It took up a lot of space in the camera cavity. A long back focal distance was essential. The original inverted telephoto lens was made by H. W. Lee of Taylor, Taylor and Hobson (British patent no. 355,452, July 12, 1930).

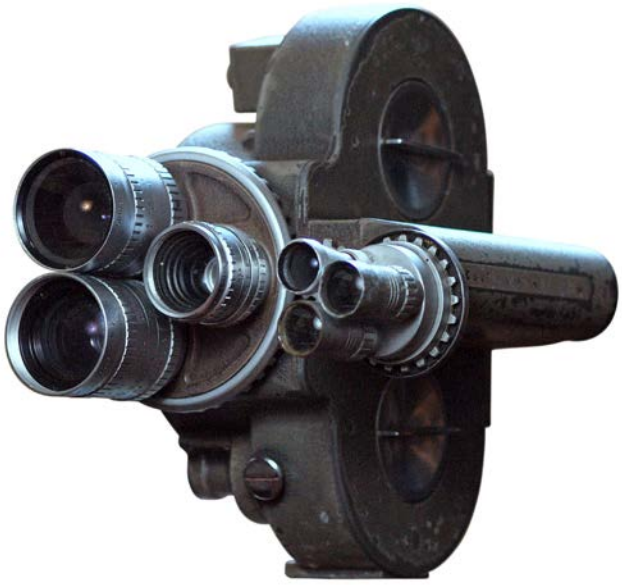
1951. First 8mm and 16mm Cinema Lenses

From 1951, Pierre Angénieux used the Retrofocus design for 8, 16 and 35mm format cinema lenses.

The Angénieux 10 mm f/1.8 (10R21) lens for 16mm cinema cameras was popular model, shown below in a C-mount.

This was the heyday of filmmaking on 16mm and 8mm film—both professional and amateur. Angénieux equipped every camera in the world: Bell & Howell, Kodak (USA), Ercsam, Pathé Webo, Beaulieu (France), Bolex (Switzerland), and Carena (Lichtenstein).

Angénieux provided Bell & Howell with lenses for their popular B&H 70 (16mm Filmo) revolving 3-lens turret camera—consisting of a 10 mm wide-angle lens, a medium 25 mm lens, and a 75 mm telephoto lens—and, of course, the 10 mm f/0.95.



Over the next 37 years, from 1951 to 1988, Angénieux delivered a million and a half lenses. In 1953, 40% of Angénieux's production was exported to the United States.

1951. First Angénieux 35mm Cinema Lens

The 18.5mm f/2.2 (T2.5) Retrofocus R2 prime lens was the first Angénieux lens made specifically for 35mm cinematography. It had 7 elements in 5 groups. Aperture range was f/2.2-16. Minimum focus was .75 m / 29.5 inches.

Here's the Angénieux 18.5mm f/2.2 Retrofocus Type R2 Lens in the popular Cameflex Eclair CM3 Mount:

Willy Kurant, ASC, AFC talks about working with Orson Welles and the wide angle 18.5 mm Angénieux prime lens:

"I was lucky to have the great pleasure of photographing the first completed color movie directed by Orson Welles. I was a great fan of his visual style and in particular his asymmetric framing and composition which always revealed magnificent backgrounds and ceilings. Everyone was trying to imitate him, but failed to get enough depth of field.

"In the 1950s, I bought the 18.5 mm Angenieux Retrofocus wide angle prime. I had a hard time mounting it on my Arri 2-B. I had to remove the matte box and other lenses because everything appeared in the shot, even my fingers .

"On my first day of shooting *The Immortal Story* with Orson, I was operating handheld with an 18.5 mm Angénieux on the Éclair CM3 , moving from Jeanne Moreau to the candles she was lighting and then blowing out—with smoke all over. This was the first shot Orson saw in dailies. He liked my cinematography and also the use of the 18.5 mm, and from that moment on, we had a wonderful collaborative working relationship. Orson had his own CM3 and bought an 18.5 Angénieux lens which we used on *The Deep*, with Jeanne Moreau (again) and Laurence Harvey. Unfortunately that movie was never finished."

We will make no lens before its time

Orson Welles, Jeanne Moreau, and Cinematographer Willy Kurant, ASC, AFC off the coast of Yugoslavia on the unfinished film *The Deep* (1966-1969). It was adaped from the 1963 novel *Dead Calm* by Charles Williams. Philip Noyce directed Sam Neil, Nicole Kidman and Billy Zane in the 1989 film version, *Dead Calm*. Photo courtesy Willy Kurant.

With apologies to Orson Welles for the title above, borrowed from the famous line in his Paul Masson wine commercials.

The Angénieux 18.5 mm lens was introduced in 1951. In this 1958 *Cahiers du Cinéma* interview, Orson Welles talks about shooting with it in the intervening years. What he says sounds familiar today—finding a new lens to define a new look. (Note: the Cooke Speed Panchro Series III 18 mm prime lens was released in 1954.)

Cahiers du Cinéma: Are you using still lenses with a short focus, the 18.5mm?

Orson Welles: Yes, everything is in 18.5. For *Touch of Evil (1958)*, practically everything is in 18.5. There are unsuspected possibilities with this lens. In *Mr. Arkadin (1955)*, not for all the shots, but for most of them. In *Don Quixote (1957)*, everything is with the 18.5.

What goal do you pursue in systematically using the 18.5mm lens and in pushing the editing so far?

I work and have worked with the 18.5 mm lens only because other filmmakers haven't used it. Film is like a colony and there are very few colonists. when America was wide open, with the Spanish at the Mexican frontier, the French in Canada, the Dutch in New York, you can be sure that the English would go to a place that was still unoccupied. It's not that I prefer the 18.5 lens. I'm simply the only one who's explored its possibilities. I don't prefer improvisation. Quite simply, no one was working with it for a long time. It's not a question of preference. I occupy positions that aren't occupied because, in this young medium of expression, it's a necessity. The first thing one must remember about film is that it is a young medium. And it is essential for every responsible artist to cultivate the ground that has been left fallow. If everyone worked with wide angle lenses, I'd shoot all my films with a 75 mm lens, because I believe very seriously in the possibilities of 75. If other artists were extremely baroque, I'd be more classical than you can imagine. I don't do this out of a spirit of contradiction; I don't want to go counter to what has been done; I just want to occupy an unoccupied terrain and work there.

Since you've been using the 18.5 lens for a long time, you must have already explored a good part of this terrain, and yet you persist. Isn't there a certain affinity between you and this lens?

The 18.5 lens is a new, important invention: it's barely been five years that it's possible to find good 18.5 lenses, and how many persons have made use of it? Each time I give it to a director of photography, he is terrorized: but by the end of the film, it's his favorite lens.

From: Interviews with André Bazin, Charles Bitsch and Jean Domarchi in June and September 1958 *Cahiers du Cinéma*. English translations in *Orson Welles: Interviews* Edited by Mark W. Estrin (Feb 20, 2002).

1951. Angénieux 8mm Cine Lenses

Although the Beaulieu TR8 reflex double 8mm camera came out a few years later (1958), this picture illustrates nicely the challenge for Angénieux: how to avoid "seeing" the other lenses when shooting with the wide angle lens. Like the Bell & Howell Filmo, other cameras had a three-lens turret. A regular wide angle lens normally would be shortest, and a telephoto lens would be longest. The Angénieux Retrofocus design positioned the front element of the wide lens further forward—enough to prevent shooting the other lenses. Below, Beaulieu TR8 with 6.5 mm f/1.8, 12.5 mm f/1.8, and 35 mm f/1.8 lenses:

1953. 10 mm f/0.95 lens for 16mm

In 1953, Angénieux managed to master the mythical goal of a lens faster than f/1.0. The lens was a 16mm format 10 mm (shown here in C-mount) with a maximum aperture of f/0.95 T1.1. It doubled the amount of light gathered by previous lenses. It was now possible to shoot color scenes in the Paris Metro or New York subway with available light (and often without permits). Large quantities were distributed under the label Bell & Howell - Angénieux.

1956. L1 — The first Angénieux 16mm Zoom. 17-68 mm f/2.2

In an *American Cinematographer* March 1975 interview with Herb Lightman, Bernard Angénieux explained, "The first zoom lens we designed was a 17-68 mm 4:1, and the idea was to make a zoom lens for the Bell & Howell 16mm amateur cameras." This zoom lens was intended to replace the 3 prime lenses in the Bell & Howell turret: the wide, medium and tele.

To do that, it was necessary to achieve a 4:1 magnification ratio, from a semi-wide-angle focal length and an aperture of f/2, while keeping the image resolution of prime lenses. The weight had to stay the same or be reduced, and the price as well. Angénieux's 17-68 mm f/2.2 zoom satisfied these requirements. It was the first zoom lens with reliable mechanical compensation that held consistently sharp focus throughout the zoom range. The prototype was ready in 1956; production began in 1957, and deliveries began in 1958. 70,000 were made from 1957 until the late 1970s.

The Angénieux breakthrough in 1956 was their mechanical compensation system, enabling precise focus while zooming. This innovation led to further developments, with increased levels of magnification and introduction of zooms for 35 mm format cinematography. The Angénieux zoom lens was a major invention in history of cinema, with considerable influence on style, look, economics and storytelling in motion pictures, documentaries, television, commercials, news and photography.

Publicité Angénieux 1955

1960. The first 35mm Angénieux Zoom. 35-140 f/3.5

1960. The first 35mm Angénieux Zoom. 35-140 f/3.5

Prototypes were used on the 1959 production *Les Affreux*, Directed by Marc Allégret, Cinematography by Roger Fellous.

In his paper "Thales Angénieux: 42 years of cine 35mm zoom leadership" (SPIE 5249, February 18, 2004), Jacques Debize wrote, "The first Angénieux 35mm was born in 1960 and was the first four times mechanically compensated zoom for 35mm cine in the world. Its name...35-140 f/3.5. Let us look at the optical design. In some way, this design was revolutionary. First, the focusing group was an inverted cemented doublet in order to correct the field aberrations at short focal lengths. Each element of variator and compensator is composed of three lenses: one single lens and a cemented doublet in order to compensate field aberrations at short focal lengths and spherical and chromatic aberrations at long focal lengths. The rear group begins with a thick lens in order to compensate remaining astigmatism and also allowed to reach the necessary back focal distance of the camera. Today we can calculate the MTF of this zoom and we can appreciate the performances reached by Pierre Angénieux: around 60% on axis between infinity and 3 m." It's remarkable that this zoom was designed with manual calculations and logarithm tables, not with computers."

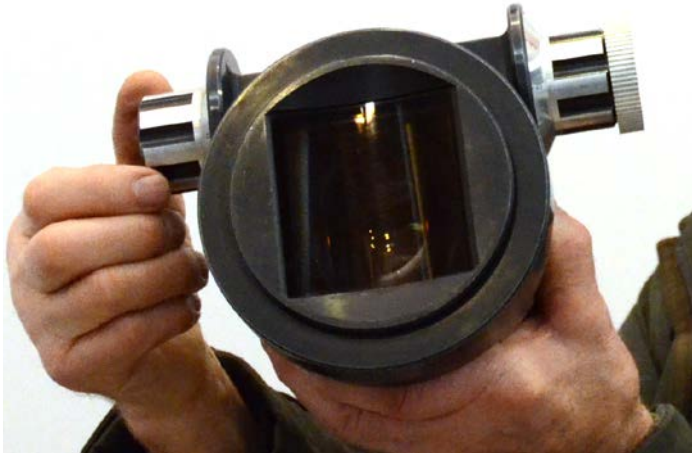
Above: Pierre Fresnay, Darry Cowl holding the prototype 35-140 f/3.5 Angénieux zoom, and Roger Fellous, Cinematographer, next to an Éclair Camé 300 Réflex on the production *Les Affreux* (1959), directed by Marc Allégret.

Below: Angénieux lenses came in beautiful jewelry boxes.

Angénieux 35mm 35-140 f/3.5 Zoom

Franscope Angénieux Front Anamorphic

1961. As soon as the 35-140 zoom appeared, Jean Dicop, Roger Fellous, Maurice Fellous (below), and others began work adding a front "anamorphoseur" element.



FRANSCOPE cinépanoramic FRANSCOPE

a l'honneur d'annoncer la réalisation de quatre grands films français

LOLA

Mise en scène de JACQUES DEMY — Directeur de la photographie : RAOUL COUTARD

UNE FEMME EST UNE FEMME

Mise en scène de JEAN-LUC GODARD — Directeur de la photographie : RAOUL COUTARD

et réalisés par

FRANÇOIS TRUFFAUT

Directeur de la photographie : RAOUL COUTARD

TIRE AU FLANC

Mise en scène de GLAUDE DE GIVRAY

JULES ET JIM

Mise en scène de FRANÇOIS TRUFFAUT

ET MET A LA DISPOSITION DES METTEURS EN SCÈNE ET DIRECTEURS DE LA PHOTOGRAPHIE

LE

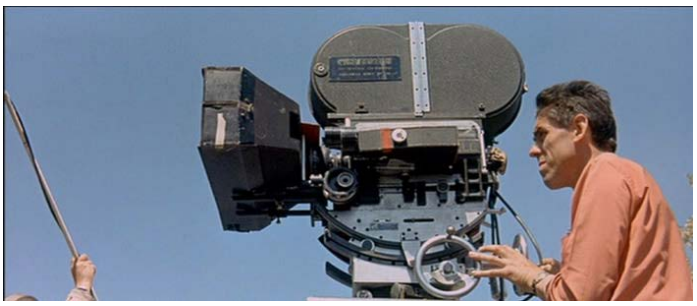
"ZOOM-SUPRÉMATIC"

LE SEUL ANAMORPHOSEUR A FOYER VARIABLE

(focale de 40 à 140 mm.)

CINEPANORAMIC Ste FRANÇAISE - OBJECTIFS DE PRISES DE VUES ET DE PROJECTION

48, Av. Gabriel, PARIS - Tel. : ELY. 12-11 - Adr. Teleg. : FILMPRES PARIS



by Raoul Coutard

Franscope modifications of the Angénieux "Zoom-Suprématic" and other lenses were used on Godard's A Woman is a Woman *(1961), Truffaut's* Jules and Jim *(1962), and Godard's* Contempt *(1963). The incomparable Raoul Coutard was Cinematographer on all three. Coutard, began his career as a combat photographer in Indochina, became one of the most prominent cinematographers of the new wave, and shot more than 75 films.*

Raoul Coutard corresponded with Madelyn Most and spoke to us by phone. I'm including his comments on anamorphic history as well, because, as we shall see later in this story of Angénieux, things come back full circle, and Angénieux will introduce a new anamorphic lens that is much more affordable and intended to bring the format back to the mainstream. But we digress.

The problem with lens manufacturing was the arithmetic. In the beginning, the calculations had to be made by hand. Angénieux had an advantage. Computers were coming in and metallurgy was improving; independently of their optical expertise, Angénieux came up with mechanical mounts that were filleted and had numerous pre-settings.

The Americans wanted to change the usual formats to compete with television and Fox brought out CinemaScope which had been invented by a French optician, Henri Chrétien. It consisted of placing an optic in front of the lens that was not spherical but cylindrical so as to double the width of the image. The problem with this was that the new device was placed in front of the lens, so that the lenses absorbed light and produced optical distortions. The principal difficulty, however, was focusing on the anamorphic lens (a cylindrical block) that was mounted on the front of the lens, requiring a second focus puller and thereby increasing the number of people operating the camera. It also lost about a stop of light. The image was twice as wide. It needed more light and more equipment, so it cost more to shoot in Scope.

The first film I shot in color in Scope was in Afghanistan, *The Devil's Pass* (1958), by Pierre Schoendoerffer, with screenplay by Joseph Kessel. It was also my very first film. I didn't know much about cinema and we stayed on location for 10 months without seeing the rushes. But not knowing all that much was perhaps an advantage. At the time, everything was a mystery, and one didn't get assistance or tuition. We stuck to the techniques of the primitives – one had to understand that there was nothing much to be understood, and in particular that the most important thing was one's "regard" — one's way of looking and seeing.

A simpler system was the Franscope developed by Dicop. One had to focus only the anamorphic element, the spherical one was set on 15 meters. We started with a focus on infinity, but soon realized that most of the lenses could be fixed at the hyperfocal.

This method of focusing from an anamorphotic block made it possible to use the first zoom on Franscope. This consisted of an anamorphoser with an exit lens the same diameter as the Angénieux 35-135. It was tricky to use, particularly with the Mitchell BNC. One already had to be an expert with the latter, as the image in the viewfinder was not all that precise. One had to remember all the misaligned elements, and operate the zoom at the same time.

With the arrival of the zoom, we started to "sketch" (and experiment) but eventually got things into shape. Directors haven't changed for the better: they're still always in a hurry. (So innovations in zooms, such as the 20-120, tended to be welcome.)

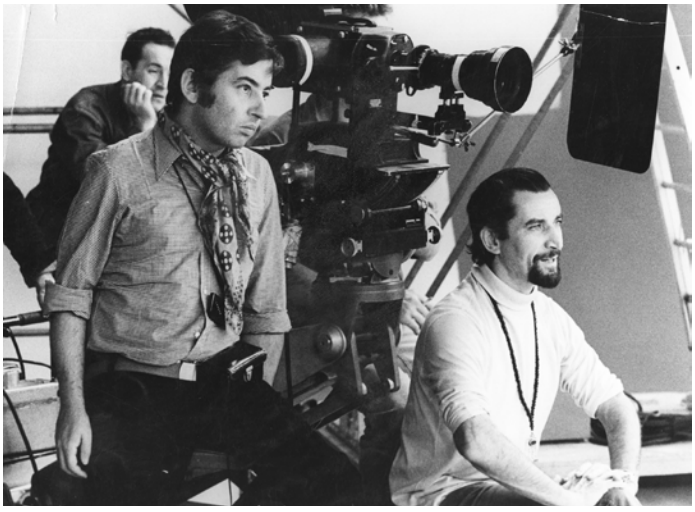
When I was the Cinematographer, I didn't get involved in the "mise en scene" (directing) because that's the role of the Director, who was immersed in the script, with pressure and dealing with the actors. I would, of course, suggest options that could facilitate the shooting and save time and other technical contributions.

A small comment about the role of the Director. For all the films I worked on, the "FILM" was not always what the director imagined. And one tiny word about the Director, because I also did this job (*Hoa Binh, Operation Leopard, S.A.S. à San Salvador*).

A Director is the person who is always right, never tired, never thirsty or hungry, who has temper tantrums and never sees the time go by, does not have a watch, and is always "de mauvaise foi."

("De mauvaise foi" is an existential philosophical term for being under pressure from the forces of society).

The Creatures (1966), starring Catherine Deneuve and Michel Piccoli. William Lubtchansky adjusting the Franscope Anamorphic Angénieux zoom. Agnès Varda, Director, looking through viewfinder of CM3 Éclair. To the right of Varda: Willy Kurant, Cinematographer; First AD Michel Toublanc, with walkie-talkie, script supervisor Élisabeth Rappeneau, and Michel Piccoli. Below: Willy Kurant and Maurice Bejart on *Bhakti.*



Willy Kurant, ASC, AFC continues his discussion on working with Angénieux lenses:

"I shot my first feature for Agnes Varda, *The Creatures*, in Black & White, Anamorphic, with a 35-140 mm Angénieux zoom converted to Franscope by the Fellous brothers and Dicop. Roger Fellous, who had worked with me as an assistant, came to my house to calibrate the lens on the camera. We used this one anamorphic lens for the entire movie. It was of excellent quality.

"I went to Vietnam in '62 with a famous interviewer, Francois Chalais. I was director/cameraman, with an Arriflex S and 12-120 Angénieux. So I had my share of filming interviews with dictators all over the world: Madame Nhu, Ngo Din Diem, Mobutu in the Congo, Fidel Castro and his brother Raul.

"I filmed the Congo during the turmoil and trouble. I was taken prisoner but I finally got out. The influence of Angénieux on 16mm production was immense in news reporting and documentaries all over the world.

"I was shooting interviews with Fidel Castro on the fifth anniversary of the revolution. That was in '64 with a zoom lens made by Angénieux.

"I shot *Bhakti* (1970) with Bejart, the choreographer. We did the entire picture with an Angénieux 10:1. It was during the period of the New Wave. We were using the zoom to adjust the focal length, not to zoom for the sake of zooming.

"I shot the Bee Gee's *Idea (1968)*, directed by Jean-Christophe Averty, and another music film, *Pink Floyd: Live at Pompeii* (1972), which were both shot with Angénieux 10:1 zooms.

"I tried almost every zoom and certainly every Angénieux zoom in the world. As a freelance documentary cameraman, I liked working on the short zoom.

"Angénieux zooms really became influential in Hollywood. Not only in features but also for big commercials."

1961. 10:1 Zoom for 16mm

1961. 12-120 mm T2.2 for 16mm Delivers

Angénieux first began designing the 12-120 mm T2.2 zoom lens for 16mm between 1958-1960. Manufacturing began in 1961.

The 12-120 mm (10:1) for 16mm film was delivered in 1961. The 16mm format had evolved from an amateur to a television, news and documentary medium. Amateurs migrated to the lighter/smaller/cheaper 8mm and Super 8 format.

The 16mm zooms were used worldwide by TV stations for news and documentaries. In the next decade, more than 50,000 12-120 lenses come off the assembly lines in the Saint-Héand factories, making it the best-selling 16mm zoom lens of all time. By 1968, Angénieux had about 800 employees.

In the next decades, Angénieux designed and built 16mm zoom lenses in at least 19 different focal lengths. Among these:

1963: 15-150 mm f/1.9-2.8

1964: 12-240 mm f/3.5-4.8

1965: 9.5-95 mm f/2.2

1966: 12.5-75 mm f/2.2

1967: 10-120 mm f/1.8

1967: 20-240 mm f/2.2

1971: 9.5-57 mm f/1.6-2.2

1977: 10-150 mm f/2-2.8

1962. 10:1 Zoom for 35mm

1962. 25-250 f/3.2 for 35mm Cinema

Laszlo Kovacs, ASC and Director Dennis Hopper with Angénieux 25-250 on *Easy Rider* (1969).

This was the first 10x zoom lens for 35mm cinema with mechanical compensation: 25-250 f/3.2. It was a technical breakthrough and influenced the style of films for a generation. It was extensively used on feature film productions and commercials for more than 23 years. The 25-250 HP was introduced in 1985, but the original model continued to work long after—some to this day.

(The first Cooke 25-250 f/2.8 did not come out until 16 years later: the Cooke Super Cine Varotal was introduced in 1978.)

Like their 16mm counterparts, there were more than 15 variations on focal lengths.

Acts of the Apostles (Atti degli Apostoli) 1968. Mitchell camera, Angénieux zoom, megaphone-like sunshade and interesting counter-weight to balance it all. L-R: Assistant Carlo Fioretti, Director Roberto Rossellini, Cinematographer Mario Fioretti.

Rossellini's Mitchell BNC and Angénieux 25-250 are on display in the small museum at Cartoni in Rome. In addition to their tripod and head business, Cartoni is the distributor of Angénieux in Italy.

by Peter Macdonald, BSC

In the late 60's when I was Geoff Unsworth's Camera Operator (*Cabaret, 2001, Superman, Bridge Too Far, Tess,* etc) the studio camera was a Mitchell BNC and you spent most of the time on complicated shots worrying about the side finder which you operated through. The worry was the parallax, because very often you would line up the shot and in order to get the actor in the frame the way you wanted them, he or she would have to be halfway out of the image in the viewfinder..

This made life difficult and you seemed to be more worried technically than creatively. One day Sydney Samuelson brought down a great big box with something that looked more like a bazooka from wartime. We put it on the BNC and suddenly the BNC turned into a reflex camera.

This wonderful 24-240 mm Angénieux zoom had a side finder with a prism, so when you operated, one saw exactly what was recording on film. Suddenly my life as an operator became much more exciting and creative. The zoom was operated by a circular handle on the side, which was a bit antiquated but was perfect. It meant you could do delicate moves and you could mix in very complicated zooms with tracking shots or crane moves.

This was new to everyone at the time. When the directors saw this monstrosity on the camera, they went ashen, but within a day were falling in love with it because it added another dimension to filming.

The quality was superb, it had a gentle look to it. With the big 6" mattebox, Geoffrey could use his fog filters and diffusions and grads and pola screens. From my point of view as a young operator, almost overnight my life and job became much easier , much more exciting, and more creative.

I did a ballet film, *Don Quixote*, in Australia with Rudolf Nureyev directing and we had to do 9-10 minute takes and the Australian camera assistant who did the zooms said to me he could remember the first 20 zooms but forgot the last five. You could be so involved with the shooting and do so many little intricate moves that I just found it transformed filmmaking for me and for a whole generation.

This was long before video playback, so only the operator saw the shot in those days. Nureyev could look through the actual camera during rehearsals and I could look through the side tube finder. I could operate the whole shot for him and he could see exactly what we were getting and agree on what the shot was.

I will always thank Angénieux for making my life easier and more creative. We used the 24-240 with side finder on at least 15 films until reflex cameras came in.

The principle of the 24-240 zoom was that it fit on the BNC camera. The camera had to be racked over when you were shooting, and the wonderful thing about the Angénieux was that its side finder let you operate through a prism so you saw exactly the same shot, the composition, that was being recorded on film. Life suddenly became much easier; there was no parallax to worry about. If they were in picture, they were in picture.

We would very often do a complete film with just this one lens, the 24-240 zoom plus an 18 mm prime lens for extra wide angles. Geoff would light to T4 which was the aperture on the lens and we would shoot. Simple as that.

Rich Abel on Angénieux

It seems to me that every 16mm camera owner had either a 9.5-57, a 12-120, or both. Lenses needed regular maintenance both mechanically and optically in order to insure top performance. It was not uncommon for owners to hand select their lens based upon its individual optical characteristics and performance. Lenses varied subtly in different areas such as resolution across the field, overall sharpness, flare, zoom tracking and zoom curve (back focus through the zoom range).

Peter and I were taught much about lens service by Len Shore who was one of the Senior Angénieux technicians in Hauppauge, Long Island. During that time the trade of a lens technician was more common and was a high art form that required the steadiest hand, tremendous patience and a very critical eye because testing equipment was not as advanced. In those days classical music and lens repair went hand in hand.

Notable owners of the time were:

Chuck Levey, who owned both lenses and shot many docs. Al Maysles customized his lenses and shot many docs. Mark Benjamin hand-selected his 9.5-57.

Also, remember the Chrosziel fluid drives which helped to make for a smoother zoom and prevented zoom creeping.

Pete and Rich Abel are the owners of AbelCine.

Gérard de Battista, AFC

I have many memories of using the mythical 12-120 zoom. It was like a cult. This lens was totally "married" to the Eclair 16mm camera. One could almost say no documentaries were shot without the 12-120!

There were also some variations of the 12-120: a few rare 15-300 and also the 12-240 mm—so useful on documentaries and magazine format television shows during the 1970s. You could rent a 35mm modification of these lenses at Chevereau: a 25-500 mm zoom for 35mm format.

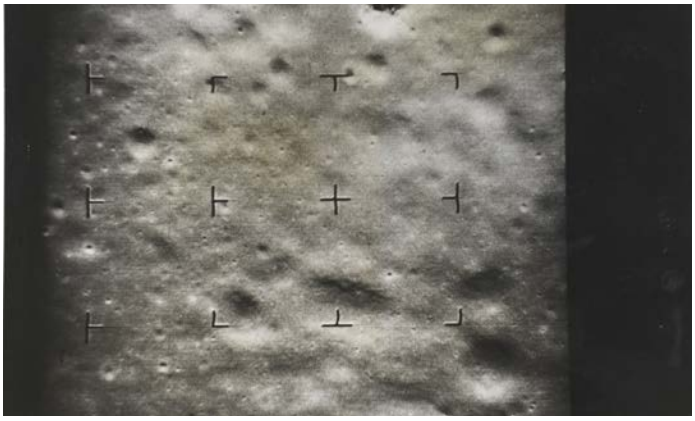
François Reichenbach had a 35-140 mm zoom permanently on his Caméflex.It was compact and lightweight. I could almost make an Arriflex 35BL as effective and efficient as an Eclair 16 by equipping it with a 25-100, almost as light as the 35-140 (there were only two Paris). In short, much to tell ...

Philippe Van Leeuw, AFC

The 12-120 mm was the zoom that all camera operators at RTBF (Radio Télévision Belge Francophone) used. I was an assistant at the time and I was amazed to see the virtuosity with which Manu Bonmariage, Maurice Denis, Henon Raymakers and others were able to hold the camera with one hand, and with the other, could focus, zoom and adjust the iris all at the same time. They were real filmmakers who committed their lives to images that were not only eloquent but beautiful.

Above: Pierre Angénieux and staff watching Angénieux lenses land on the moon during the Apollo XI mission in 1969.

Right: Princess Beatrix of the Netherlands at the 1964 Tokyo Olympics with Beaulieu R16 wind-up 16mm camera camera and Angénieux zoom.



July 31, 1964. The moon was photographed for the first time at close distance by the Ranger VII space probe. The pictures were taken with an Angénieux 25 mm f/0.95 lens on an RCA Vidicon tube camera. The Ranger program (9 missions altogether) prepared NASA for the landing of a manned craft on the moon. NASA and Angénieux continued to work together on the Gemini and Apollo programs.

July 20, 1969. Angénieux lenses captured man's first steps on the moon. The Apollo XI mission, one of the most viewed televised events of all time, used a special zoom lens that was small, light, easy to operate and compatible with the Westinghouse camera equipped with a 25 mm sensor. Angénieux converted a 6 x 12.5-75 mm zoom into 25-150 , and adapted it to work in the zero gravity of space. Angénieux developed a special lubrication process for the mechanical assemblies, because normal lubrication evaporated in space and covered the lenses with a fine mist. It was also necessary to develop a new way of treating optical surfaces to protect the equipment from solar radiation.

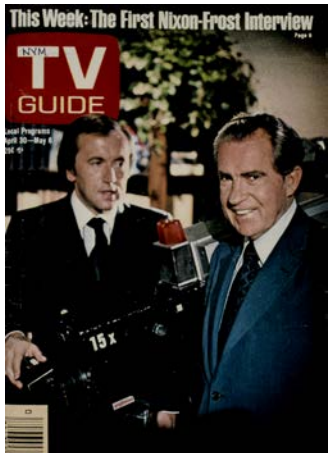
1969. Richard Nixon with Robert Peterson, journalist of WTTG-TV. Arriflex S and Angénieux 12-120 zoom.

25-250 HP and HR

1974. Pierre Angénieux retired to Switzerland but continued to stay active with affairs of the company. His son-in-law, Jean Moret, took over the administration of the factory. His son Bernard Angénieux was put in charge of international trade as the head of Opticam, (Angénieux International) in Geneva and Angénieux Corporation of America in Miami.

1977. Nixon-Frost interview

Shot with Angénieux 15x18 zoom



1979. The development of new zoom lenses for professional filmmaking and television continued. Angénieux developed a beam splitter for the first CCD camera in the world, the Hawk-eye.

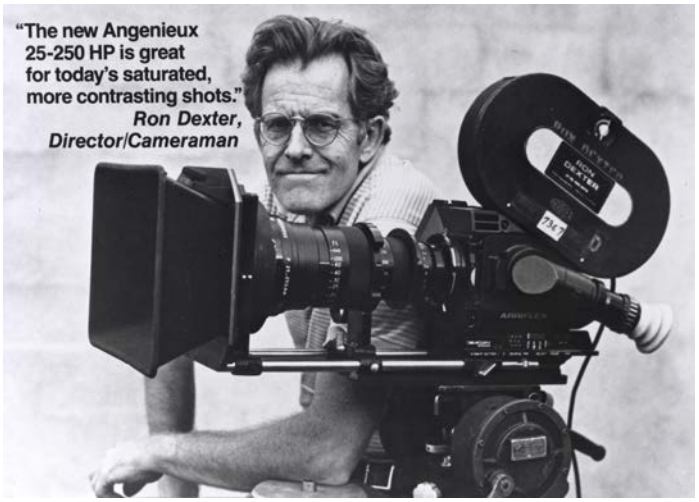
The collaboration with the NASA continued and Angénieux equipment was onboard the Skylab flight as well as the Apollo-Soyuz American-Soviet missions.

1985. Improved 25-250 f/3.2 - f/4 HP

Angénieux developed an improved 25-250 mm 35mm zoom lens: the 25-250 f/3.2 - f/4 HP (High Performance), delivered in 1985.

(This was undoubtedly in response to Cooke's improved Cine Varotal 25-250 Mark II T3.9.)

Ron Dexter, ASC used Angénieux 25-250 zooms for most of his award-winning commercials.



NASA. Angénieux kept working with NASA. Angénieux zoom lenses were part of the camera equipment package on every space shuttle (Enterprise, Columbia, Challenger, Discovery) until the last flight in 2011.

1986. Essilor acquired 58% of Angénieux's shares. From 1986 to 1991, more than 320 employees were let go.

1991. The 25-250 f/3.2-4 HR (High Resolution) zoom was the third generation 10:1 zoom for 35mm. This one had better mechanics, with smoother movement of the barrels.

Jacques Debize said, "New fluorophosphate glasses available at the time allowed us to decrease drastically the secondary chromatic aberrations by using more elements in the focusing group. At the same time, by adding a UV filter in front of the lens, internal focusing was possible, providing a constant volume lens in order to keep the inside body free of dust or condensation when focusing."

HR to Optimos

The 25-250 HR's constant volume meant that the focus barrel did not trombone in and out. It was relatively airtight—making it particularly practical on difficult and dusty locations. Hundreds of these lenses were sold around the world.

(Cooke responded in 1992 with their improved Cinetal 25-250 T3.7 Mark III).

July 8, 1993, Essilor sold Angénieux to Thomson-CSF, which later became Thales. Angénieux abandoned the still photography market but continued building lenses for cinema and television. The company became officially known as Thales Angénieux, although filmmakers continued to called it Angénieux.

1998. Pierre Angénieux died on June 26, 1998. He was 90 years old.

2000. By 2000, many motion pictures used Angénieux zoom lenses. The Optimo product line was created. Customer requests for new lenses were listened to: wider wide end, tighter telephoto, larger aperture, higher MTF, closer MOD, less breathing… and oh, yes, lighter, smaller, cheaper.

September 2001. The first 24-290 T2.8 Optimo zoom lens was introduced. It was the first 12x zoom with a T2.8 aperture, and the most advanced Angénieux zoom up to then. There is no aperture ramping and almost no breathing. The minimum object distance is 1.22m / 4' (object field of 67 x 49 mm at 290 mm). The 24-290 zoom weighs 11 kg / 24.25 lb. Image diagonal is 30 mm. It comes in PL, Panavision, Canon, and Nikon mounts.

This zoom is seen on most features and commercials today.

2004. The 17-80 Optimo was added to the Angénieux line.

June 2005. The first prototype of the new Optimo 15-40 was shown by Steve Manios and Angénieux at Cine Gear Expo in Hollywood.

2006. Angénieux launched the 15-40 mm T2.6 Optimo, the first lightweight, handheld zoom lens in the Optimo product line. This 2.7x zoom lens with a T2.6 aperture weighed less than 2 kg, and represented a major technological achievement. It was designed for shoulder-resting, handheld and Steadicam-mounted cameras.

2007-2009. Angénieux introduced the 28-76 Optimo lightweight zoom, which is used extensively today on all kinds of motion pictures, commercials and shows. The Optimo 16-42 DP and 30-80 DP were also specifically developed for filmmakers using the new generation of lower cost digital cameras.

Bill Bennett, ASC

"The 24-290 mm and the 17-80 mm Optimo lenses have been the workhorses of my shooting kit for many years, with the 25-250 HR and the 17-102 playing those roles in the generation before that. I guess I could say that Angénieux lenses have been a significant contributor to my work for my entire career."

Jon Fauer, ASC

"It's no exaggeration to say that the Angénieux 24-290 Optimo zoom worked on most of my productions. This sharp, fast, versatile lens could shoot a long lens telephoto scene, a medium two-shot for dialog, a dramatic close-up, followed immediately by an extreme macro effects close-up. Not having to change lenses meant saving time, speeding setups, pleasing production and providing beautiful images. I don't think any other single zoom lens has done so much."

Angénieux 75th Anniversary

December 13, 2010. On a cold and windy morning, with snow clouds blowing over the hilltop of Saint Héand, more than 300 guests from France and around the world arrived at the Angénieux factory to celebrate the company's 75th anniversary.

Philippe Parain, Angénieux President (2005-2011) gave a welcoming speech to the large audience of dignitaries, staff, colleagues, and prominent cinematographers assembled in the theater. He began with a history of the company founded by Pierre Angénieux, followed by screenings. Denis Rouden, AFC talked about his experiences as a cinematographer using Angénieux lenses on his many feature films, including *Le Petit Nicolas* and *Largo Winch*, a big budget action thriller just released.

Above, left to right: Dominique Rouchon, Angénieux International Sales Director with Denny Clairmont, inaugurating Angénieux's new studio. The studio will be used by Angénieux development teams to test the lenses in true operational conditions and to help create new products.

At right: François Rochebloine, member of parliament, and Philippe Parain.

2011. The 45-120 completes the line of Optimo lightweight zooms, providing cinematographers with a full range of versatile compact lenses for all sorts of shooting situations. Although it was first delivered in March 2012, the 45-120 has already been used on numerous feature productions.

2012. The 19.5-94 and 28-340 Optimo zooms were designed for the latest generation of Super 35mm motion picture cameras.

2013. Angénieux showed the first 56-152 prototypes of its future Optimo 2S line of lightweight 2x anamorphic zooms, with the first lenses scheduled to be delivered in early 2014.

Above: Tony Martin, 1st AC and Jason Blount, Camera Operator with 28-76 Optimo on *Vegas*. Below: 45-120 Optimo.

With the 56-152 anamorphic Optimo zoom, Angénieux showed that an anamorphic lightweight zoom could provide the same cinematic quality as their existing spherical Optimo zooms. The full 2S series of lenses, announced to be ready by 2014/2015, could change the way we shoot anamorphic films.

Cannes and other Film Festivals

Since 2011, Thales Angénieux has been taking part as a sponsor of film festivals. Although the company has been widely recognized with AMPAS Sci-Tech, Emmy, Cinec, SOC and other major awards, they have also been giving back to the industry. Just as Pierre Angénieux made a point of staying in touch with prominent filmmakers like Abel Gance and Jean Renoir, the company stays involved at festivals: in touch with filmmakers, producers, cinematographers, camera operators, assistants, actresses, actors customers, and equipment rental companies.

Angénieux has been an official sponsor of the 2011 and 2012 Singapore Rendezvous with French Cinema and the 2012 and 2013 Cabourg Romantic Film Festival. They participated in the 2013 Clermont-Ferrand International Short Film Festival.

As an official partner of the Cannes Film Festival in 2013, Thales Angénieux wanted to honor Cinematographers by creating a specific tribute, named the "Pierre Angénieux ExcelLens in Cinematography Award." On May 27, 2013, the first in this continuing homage was awarded to Philippe Rousselot, ASC, AFC, for his major contributions to the profession. Angénieux made a point that Philippe Rousselot was honored by some of the colleagues, directors, actors and actresses with whom he had worked.

L-R: Carmen Chaplin, John Boorman, Kristin Scott Thomas, Victoria Abril, Philippe Rousselot, Uma Thurman, and Jean-Marc Barr

Pierre Andurand, President and CEO of Angénieux since the end of 2011, was very pleased to offer to Philippe Rousselot, on this very special occasion, a 28-76 Optimo zoom, specially manufactured (and engraved with his name) by the craftsmen and craftswomen at Thales Angénieux.

Several buses filled with Angénieux workers from Saint-Héand drove to Cannes to show their support of the cinema professionals who use their products. Everyone from Angénieux was extremely proud to have contributed, each in his or her own way, to the work of cinematographers. The artistic and technical knowledge of cinematographers has been essential to the success of Angénieux's 78 years of history with lenses. Pierre Andurand said that cinematographers are rarely put in the spotlight. Although movies wouldn't exist without them, he felt it was important for Angénieux, in this way, to contribute to exposing them to the bright lights of Cannes, a major film festival.

Pierre Andurand, President and CEO of Angénieux, added that Cinematographers are rarely put in the spotlight. Although movies wouldn't exist without them, he felt it was important for Angénieux, in this way, to contribute to exposing them to the bright lights of Cannes, a major film festival.

In addition to participation in film festivals, Angénieux is also very active in working with La Femis and Louis Lumiere film schools in France by offering professors and students, as well as young cinematographers, the possibility to work with professional equipment in the Angénieux Saint-Héand Studio.

Academy Awards 2013.

Films using Angénieux zooms that were honored during the Oscar ceremony this year included: *Argo* (Ben Affleck), *Life of Pi* (Claudio Miranda), *Silver Linings Playbook* (Jennifer Lawrence) and *Les Misérables* (Anne Hathaway).

May 2013. Cannes Film Festival.

The Palme D'Or winning film *Blue is the Warmest Color (La Vie d'Adèle)* was shot with two Angénieux 28-76 mm Optimo zooms. Directed by Abdellatif Kechiche, Cinematographer was Sofian El Fani.

Other films at Cannes that used Angénieux zooms:

Inside Llewyn Davis. Directed by Joel and Ethan Coen (cinematography by Bruno Delbonnel), won the Grand Prix du Festival and used Angénieux zooms.

The Immigrant. Dir: James Gray, Cinematographer: Darius Khondji (Arricam anamorphic)

Wara No Tate / Shield of Straw. Dir: Takashi Miike, Cinematographer: Nobuyasu Kita (Arricam LT, Zeiss Ultra Primes, Optimo zooms)

La Grande Bellezza / The Great Beauty. Dir: Paolo Sorrentino, Cinematographer: Luca Bigazzi (Arricam LT, 435, 535, 535B, Zeiss Ultra Primes, Angénieux Optimo Zooms, Kodak Vision3 500T 5219)

Grigris. Dir: Mahamat Saleh Haroun, Cinematographer: Antoine Héberlé.

Zulu. Dir: Jérôme Salle, Cinematographer: Denis Rouden (Arri Alexa Studio, Codex Arriraw, Hawk V-Lite, V-Plus, V-Series and Angénieux Optimo Zooms)

Les Salauds / Bastards. Dir: Claire Denis, Cinematographer: Agnès Godard.

Blood Ties. Dir: Guillaume Canet, Cinematographer: Christophe Offenstein.

Philippe Rousselot and Pierre Andurand at Cannes

Pierre Andurand at Cannes

Pierre Andurand, President and CEO of Angénieux, above, welcoming a gathering hosted by the CST. We spoke at Cannes the day before the tribute to Philippe Rousselot, ASC, AFC. Angénieux was a sponsor and partner of the 2013 Cannes Film Festival.

JON FAUER: Why is Angénieux at Cannes?

PIERRE ANDURAND: The question should be, "Why have we not been part of Cannes before?" That was my first impression when I arrived to manage the company one and a half years ago. Although Angénieux is a small company, it has a long and rich history in cinema—more than 75 years. Cannes is a very big international festival, and it took some time to discuss our participation with the festival organizers and with our parent Thales group. But this was important because Cannes represents an image we share about our company and the products we are developing and manufacturing for the cinema industry.

A large part of our success comes from the proximity we have with our users. Many helped us understand their requirements, needs, and the kind of products they would like us to develop. You don't always find this proximity to cinematographers, directors, operators, assistants and rental houses at an exhibition like NAB or IBC. Cannes is a very important festival where we can have direct contact with a lot of people coming from all over the world.

Did users influence the design of the new anamorphic zooms?

Our new anamorphic zooms are very compact, lightweight, and have a range of focal lengths that will allow the user to shoot many setups a day, very rapidly. But our foremost intention was to provide cinematographers with a lens that will help them make movies in 'Scope. The rental companies have been in direct contact with some of the users, provided feedback and advice. Particularly in Hollywood. What surprised us was the large number of orders for this product. We did not expect such a big success.

Why not? I thought anamorphic has historically been the next big thing after each wave of 3D?

Anamorphic was forecast to be a niche market. I had a feeling when I arrived that it would be bigger than that. I didn't understand why people were saying it's a niche product. The idea was a lens that users could afford, that would be easy to use, and practical. It was really something new. If you compare it to the anamorphic lenses of the past, when you wanted to shoot in 'Scope, most of the zooms were very large and heavy. So our new lens was welcomed, not only in America and France, but also worldwide.

Why do you think that is so?

Probably because today filmmakers want to make movies that can differentiate them from the films made by their colleagues. That means working with artful compositions, which you can do in 'Scope more often than in standard format. From my point of view, it is also more difficult for the DP.

More difficult to shoot in anamorphic?

Yes, to learn how to shoot in 'Scope. It requires more experience, so it's something aspirational as well. What can differentiate one film from the next? If you're the director, it's the ability to tell a great story. For the cinematographer, it's surely the possibility to build images in a different artful manner. This will result in bringing different emotions. But you are a cinematographer, so you can probably understand this best.

Agreed. Lenses distinguish cinematographers.

I'm pleased to see that Angénieux is now in a position to provide all filmmakers with all kinds of lenses. Personally, what I want to see is a beautiful movie on a big screen with a beautiful image. And I really think that the lens is one of the biggest components of the final result.

Tell me a little bit about the Angénieux events at Cannes.

When we were invited to become a sponsor of the Cannes Festival, we realized that we had to do something not for Angénieux but something that would celebrate the competence of the Cinematographer—something that had not yet been sufficiently exposed to light.

That's interesting. I just realized that there is no "Best Cinematography" category in the Cannes Festival.

In France generally and in Cannes particularly. There has been some recognition in the past. But it's a pity, because when you look at the Academy and in Hollywood it's clear that the cinematographers are honored. I think that the Cinematographer is among the most important people on a movie. Of course, you have the producers, writer, director and actors. But the DP is the essential one to help the director move the images from script to screen and to do incredible things with light.

And why should we have all those people and this big event here in Cannes and nothing about the DP? So we met with the festival organizers and said, "Okay, we would like to be a sponsor, but it's very important for us to do something for the profession and the people we are working with. The idea was to give a lifetime achievement award, to bestow an honor. We did not want to enter into some sort of competition with a jury. We began with a list of more than 60 cinematographers at the start.

Philippe Rousselot was chosen. I'm very pleased because everybody said that this was a fantastic choice. Philippe Rousselot is very international. He's a French guy who spent a big part of his career in the United States and elsewhere and worked with a lot of important directors and stars.

Some of whom will help present the award?

Yes. We see this as a really big event. Following the award, we will have a dinner off the Croisette with them. We want to associate Directors with Cinematographers.

From Angénieux: Dominique Rouchon, Eva Paryzka, Pierre Andurand, Chris Beauparlant

Like a wine pairing: fine directors with fine DPs.

Tomorrow, we will climb the red carpeted stairs, have a reception, and then present the award to Philippe Rousselot. Some of the Directors and Actors he has worked with will introduce him. We have invited Directors John Boorman and Stephen Frears. Actors are coming from abroad. This is a celebration of a DP. We put aside Angénieux; it's not a marketing event.

It is going to be highly emotional for Philippe Rousselot. He will have some surprises when he sees all the people we have invited.

Who else will be there tomorrow?

It still depends on schedules and other screenings. But, Uma Thurman, Kristin Scott Thomas, Victoria Abril, Jean-Marc Barr, Carmen Chaplin…many people will be with us at the dinner and the after-party. I also hope Guillaume Canet, who is a very famous actor and a director here in France, and is married to Marion Cotillard, will come. He's in competition in Cannes with the movie *Blood Ties*, which was shot in New York with Angénieux optics.

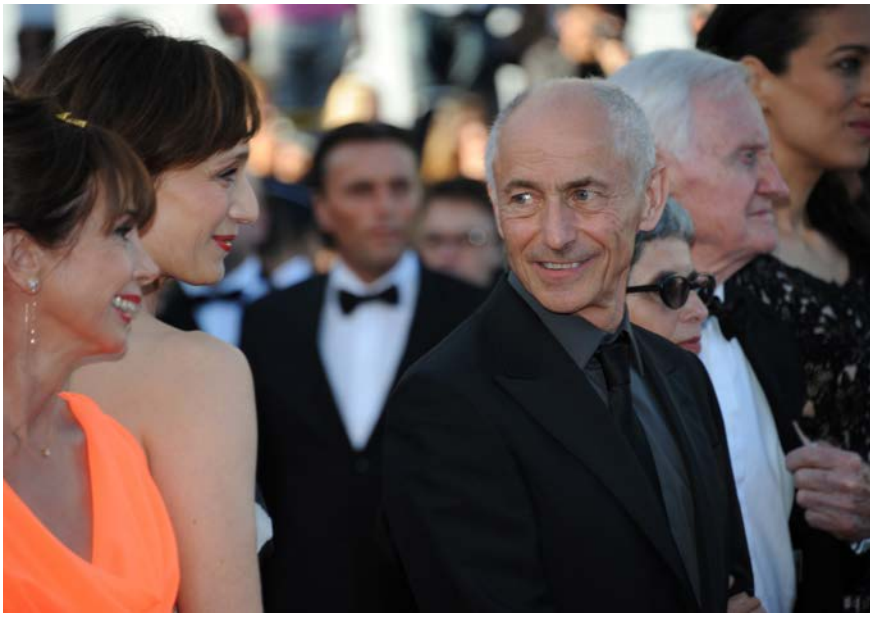
I think Philippe is seen as one of the DPs who has contributed a lot in terms of changing the standards, breaking out new ideas and innovating. He has been taking risks and it has been clearly successful. The spectrum of Philippe Rousselot's work is wide. There is a great variation in terms of his styles. He's not somebody who has been defining one way to shoot, and only one way. This is interesting and I suppose this is part of his appeal and the recognition he receives from his colleagues.

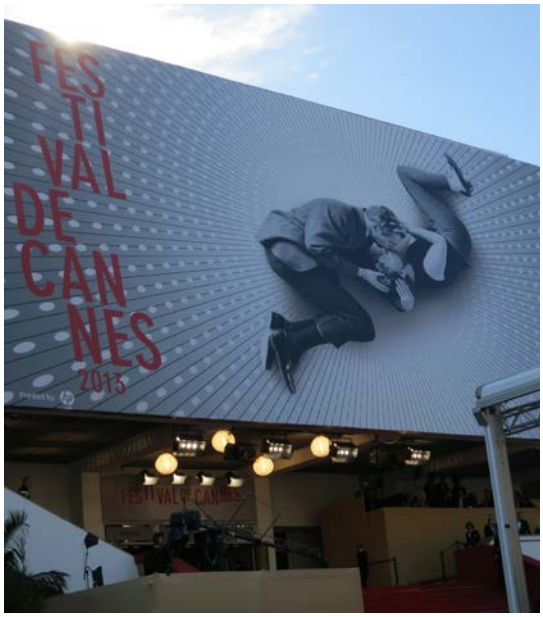
And it's also interesting that he's done a lot of anamorphic movies, including Robert Redford's *A River Runs Through It*, for which he received a Best Cinematography Oscar.

I really hope that this will be a beautiful evening for everybody. I'm already looking forward to next year.

Pierre-William Glenn, AFC, President of CST, and Philippe Rousselot, ASC, AFC, on the balcony of Cannes Festival Hall

Angénieux at Cannes





Cannes photos by Pauline Maillet, Dominique Charriau, Romain Bassenne, Traverso, and Jon Fauer

Angénieux Optimo zoom lenses with model Petra Nemcova and Chopard jewels on Chopard videos at Cannes. Chopard designed the *Palme d'Or* and has been a prominent sponsor of the Cannes Film Festival for the past 15 years.

Above: Linda Carriel and Pierre-William Glenn, AFC

Below: Pierre Andurand interviewed by Franck Dalmat of Puzzle Media. Photo by Pauline Maillet.

Above, left to right: Francine Levy, Director of ENS; Pierre-William Glenn, AFC; Angénieux model Linda Carriel; Jean-Yves Le Poulain, Angénieux Product Manager and Cinematographer; Christian Guillon, Visual Effects Supervisor.

Below: 2013 Cannes Camera d'Or winner, *Ilo Ilo*. L-R: Nicolas Meallier of Angénieux; Anthony Chen, Director; Miss Tng Siew Moï, CEO of Cine Group; Benoit Soler, Cinematographer; Dominique Rouchon, Angénieux International Sales Director. Photo: Romain Bassenne.

Interview with John Boorman

Photo: Pauline Maillet

"I always say about Philippe that he doesn't light the actor, he lights the character."

JON FAUER: Where and how did you begin working with Philippe Rousselot?

JOHN BOORMAN: I met Philippe when we were making the film *Nemo* (1984) and I got to know him quite well. He had done a lot of mountain climbing and that impressed me because I was going to do *Emerald Forest*. I saw him working and I'd seen some of his French films.

Acting on instinct, I invited him to do *Emerald Forest* (1985) which was a very difficult film. He said, "Okay. If you give me the job, I'll learn Portuguese." Which he did. And then we did a lot of tests. The thing about the rainforest is that it's very dark. The canopy is closed off with just a few rays of sunlight breaking through. I had been out there for quite some time, and I said, "We're going to need a lot of light in the forest." Which we did. And Philippe did a terrific job of simulating sunlight breaking through. It was shot in Brazil, in the rain forest.

The thing about Philippe is that he's someone you want working with you, particularly during *The Emerald Forest*. Sam Fuller said 'Film is war,' and that film certainly was like war. And if you're going to be in the trenches, you'd better chose wisely the person next to you. Philippe has an extraordinary sensibility, a delicacy and strength, and I always say about Philippe that he doesn't light the actor, he lights the character. And he lights accordingly. And he is adored by all the actors and actresses. He makes them look good. He makes them look good. Yeah. And what about your relationship or the way you work with a DP, how does that work?

How do you prepare for a film?

I always do a lot of preparation, so we would discuss each scene and what it would look like look like, so all that would be done in advance, not on the set. And, and then, I always propose the compositions and I break down the scene and shots again, all that is done beforehand. On a Monday morning, I bring a list of shots. Philippe always is meticulous in his planning and takes notes, so when you come on set, everything is there that you discussed. He's a wonderful man. He has a modesty and he's able to do things quietly. Many cameramen need to be more aggressive, ordering people about in loud voices, instructing the gaffer or whatever. But Philippe never shouts.

How important are lenses in the look and feel of what you do?

I always like to work with the cinematographer testing lenses. To find a good portrait lens is very important. I choose lenses for the shots and make the compositions. The way of working with Philippe is a kind of osmosis. We function together in subtle ways. It's hard to describe.

I don't shoot a lot of film. I don't like doing many takes. It goes back to my time when I didn't have very much film. But, I find if you're precise, it helps you to concentrate. If you shoot a scene from all angles, the actors say, "Well this probably won't be in the film."

So I tell my actors, everything we shoot is going to be in it.

Cannes Film Festival

The Pierre Angénieux ExcelLens in Cinematography tribute began with speeches by Thierry Fremaux, General Delegate of the Cannes Film Festival, Pierre Andurand, President and CEO of Angénieux, and Eric Garandeau, President of the CNC (Centre national du cinéma et de l'image animée). Eric Garandeau said:

Dear friends—it is truly a pleasure to be with you this evening, as the President of the CNC, for the first "Pierre Angénieux ExcelLens in Cinematography" tribute.

This tribute provides a tremendous opportunity to emphasize just how much the excellence of French savoir-faire contributes to cinema creation around the world. This excellence is double, as it is embodied both by Philippe Rousselot and by Angénieux.

First of all, my most sincere congratulations to Philippe Rousselot, one of the greatest French directors of photography, who also single-handedly embodies cultural diversity.

He has worked with the best, on both French art house films and ambitious Anglo-Saxon productions: Jean-Jacques Beineix, Alain Cavalier, Jean-Jacques Annaud, Robert Redford, John Boorman, Stephen Frears, Patrice Chéreau, Bertrand Blier, Tim Burton—so many famous figures, some of whom are here with us this evening.

They bear witness to the incredible range of films that Philippe Rousselot has illuminated with his talent, enhanced by his training at the École Louis Lumière.

The gift that is being offered to him today will be in its rightful place among his considerable collection of Césars and Oscars, and will be the pride of the directors of photography associations to which he belongs, whether the AFC in France or the ASC in the United States.

I would also like to pay tribute to the undisputed know-how of the Thalès-Angénieux company and, through it, to the memory of Pierre Angénieux, who was himself an Oscar-winner for his work, and to whom the cinema world owes so much. Angénieux zoom lenses are an essential reference for cinema professionals around the world; as evidence, it is sufficient to note the large number of films selected each year at Cannes that were shot with Angénieux zoom lenses. The 66th Festival is no exception.

Now a subsidiary of the Thales group, Angénieux remains a gem, I would even say a green emerald to please John Boorman, in the forest of French technical industries, as it always was during Pierre Angénieux's lifetime.

Last February, I had the opportunity to visit the Angénieux production site, located in the French village of Saint-Héand. It was a fantastic experience to meet, along with Pierre Andurand, high-level technicians and engineers who reconcile high-precision craftsmanship and industry processes in order to address a global market.

The company still does credit to the memory of its creator today, particularly with the presentation of this tribute, which I hope will become the first in a long series.

I once again offer my heartfelt congratulations to Philippe Rousselot and the Angénieux company, represented this evening by Pierre Andurand, both symbols of French savoir-faire benefiting cinema creation around the world.

Above: Eric Garandeau, President of the CNC
Below: Thierry Frémeaux, Délégué Général of Cannes Film Festival

L-R: Philippe Rousselot, John Boorman, Jean-Marc Barr, Kristin Scott Thomas, Victoria Abril, and Carmen Chaplin

Interview with Philippe Rousselot , ASC, AFC

"When I started working, just out of school in 1966, the 'Eclair 16' had just came out, one of the first handheld, noiseless cameras with a synch connection, and with the first portable sound recorders. It was a revolution.

"I started as a camera assistant, loader, driver, electrician, for television documentaries. It was a great time in my life because it was very interesting. I worked with absolutely brilliant people. We were doing documentaries in black and white, and the only lens we used was that little 12-120 zoom. That was my first lens.

"The Eclair 16 cameras were used with the 12-120 Angénieux zoom, already an optical and mechanical marvel. It was a marriage made in heaven, the Eclair 16 and the 12-120, which I used on and on, year after year, for documentaries as well as features, shot in 16mm. One could have believed there was no other lens worth using but this one.

"Some people are born with a silver spoon, I was born with the 12-120 Angénieux zoom.

"Then came all kinds of Angénieux zooms, some of them adapted for anamorphic, all the most precious and reliable tools of my trade for over 40 years.

"A lot of my films have been anamorphic. I always loved anamorphic for two reasons. One is that, you tend to use longer lenses. And the other thing is that it gives more freedom in the composition, more possibilities. It's not constrained like 1.85:1. It gives more proximity to the characters. They stand out a little bit more, a little bit better."

photo: John Bramley

2013
Pierre Angénieux
EXCELLENS
angēnieux

The entire Angénieux contingent at Cannes,
and some guests. Denis Rouden, AFC, directly above

Angénieux Optimo Lightweight Zoom Lenses

Optimo 15-40 mm T2.6

Minimum Object Distance: 0.6m / 2'
Weight (approx): 1.92 kg / 4.2 lbs
Length: 186 mm
Front diameter: 114 mm
320° focus rotation; over 50 focus marks
2.7x zoom ratio
Covers Super 35mm: 31.1 mm image diagonal
Mounts: PL, Panavision, Canon, Nikon

Optimo DP 16-42 mm T2.8

Minimum Object Distance: 0.6m / 2'
Weight (approx): 1.9 kg / 4.2 lbs
Length: 190 mm
Front diameter: 114 mm
320° focus rotation; over 20 focus marks
2.6x zoom ratio
Covers Super 35mm Red 5K aperture: 32 mm image diagonal
Mount: PL. For digital cameras.

Cannot be used on mirror-shutter camera—rear element protrudes 27 mm beyond lens flange.

Optimo 28-76 mm T2.6

Minimum Object Distance: 0.6m / 2'
Weight (approx): 1.95 kg / 4.4 lbs
Length: 205 mm
Front diameter: 114 mm
320° focus rotation; over 50 focus marks
2.7x zoom ratio
Covers Super 35mm: 31.1 mm image diagonal
Mounts: PL, Panavision, Canon, Nikon

Optimo DP 30-80 mm T2.8

Minimum Object Distance: 0.6m / 2'
Weight (approx): 1.9 kg / 4.2 lbs
Length: 186 mm
Front diameter: 114 mm
320° focus rotation; over 20 focus marks
2.7x zoom ratio
Covers Super 35mm, Red 5K aperture: 32 mm image diagonal
Mount: PL. For digital cameras.

Cannot be used on mirror-shutter camera—rear element protrudes 31 mm beyond lens flange.

Optimo 45-120 mm T2.8

Minimum Object Distance: 0.94 m / 3 ft. 1 in
Weight (approx.): 4.3 lbs / 1.95 kg
Length: 203 mm
Front Diameter: 114 mm
320° focus rotation; over 50 focus marks
2.7x zoom ratio
Covers Super 35: 31.4 mm image diagonal
Mounts: PL, Panavision, Canon, Nikon

Angénieux 45-120 mm T2.8

45-120 T2.8

Zoom Ratio: 2.7X
Focal Length: 45-120 mm
Aperture: T2.8
MOD: 3 ft. 1 in / 0.94 m
Internal Focus
Image Diagonal: 31.4mm
Image Coverage: Super35
Weight (approx.): 4.3 lbs / 1.95 kg
Length: 203 mm
Front Diameter: 114 mm

The French New Wave—Godard, Truffaut, Lelouch, Coutard, Rouch, Resnais—released cameras from their studio boundaries and found new freedom with handheld cameras and lightweight zoom lenses.

Angénieux's New Wave continued with the introduction of a lightweight 45-120 mm T2.8 Optimo zoom. This lens was the third in the line of short, light and fast zooms that are the darlings of camera crews everywhere. Small and light enough for handheld cameras, Steadicam or crane, long enough for close-ups, the 45-120 was a new tool, a new "word" in the cinematographer's lexicon.

The 45-120 Optimo zoom lens joined the award winning 15-40 mm and 28-76 mm family, classic top-of-the-line Optimos that fit on PL cameras with or without spinning shutters. All 3 lenses have a 2.7 times zoom range. They all deliver extremely fast apertures, outstanding contrast and true, matching color reproduction.

With the 45-120 Optimo, you can use Angénieux interchangeable mounts for direct mounting to APS-C format DSLR cameras: Canon 7D, 1D-Mk IV, Nikon D3000, D7000, and more. The 45-120 complements the other lightweight Optimo zooms as part of a unique, three lens system with total combined focal range of 15 mm to 120 mm. You can also think of these three lenses as a complete "variable prime" set from 15 mm to 120 mm that fits in one small case.

What's the difference between Optimos and Optimo DPs?

There are five Optimo Lightweight zoom lenses on the previous page.

The set of three **Optimo lightweight hand-holdable zoom lenses** (15-40 mm, 28-76 mm and 45-120 mm) are the top-of-the line in performance and specifications. They fit 35mm format film or digital cameras and will not interfere with spinning mirror shutters.

The two **Optimo DP Series zoom lenses** (16-42 mm and 30-80 mm) are specifically designed for 35mm format format digital cameras. They are based on the classic lightweight Optimo zooms, with several exceptions. They are more affordable, optically excellent but not equal, and have a rear element that protrudes 31 mm past the PL lens flange. This is very important: DP lenses cannot be used on cameras with spinning mirror shutters: ARRI D-21, all ARRI film cameras, and the ARRI Alexa Studio.

Angénieux 19.5-94 and 28-340 Optimos

Optimo 19.5-94 mm T2.6

New Angénieux Optimo 19.5-94 mm T2.6 and 28-340 mm T3.2 zooms were shown at NAB 2012. They are based on the same design as the venerable Optimo 17-80 and 24-290 mm, but have a newly expanded image circle of 31.4 mm. This will cover Super35 and RED 5K formats.

The 12x Optimo 28-340 mm T3.2 zoom has more than 70 focus witness marks (available in choice of feet or meters) and a 327° focus barrel rotation. It weighs 24.4 lb / 11.1 kg. Front diameter is 162 mm, and it is 454 mm long with PL mount. Close focus is 4' 0.5" (1.23m).

First deliveries in the US of the 19.5-94 began in August 2012, ahead of schedule. The 4.7x Optimo 19.5-94 mm T2.6 zoom has more than 50 calibrated focus witness marks (available in choice of feet or meters) and a 329° focus barrel rotation. It weighs 12.3 lb / 5.6 kg. Front diameter is 136 mm, and it is 335 mm long with PL mount. Close focus is 2' 0.5" (0.62m).

Both zooms are available in PL mount (Panavision PV mount on request) and are compatible with Angénieux's 1.4x and 2x extenders.

Optimo 28-340 mm T3.2

New Angénieux 19.5-94 and 28-340 Optimos compared with 17-80 and 24-290 Optimos

Optimo 19.5-94 mm T2.6

19.5-94 mm

- Zoom Ratio: 4.7x
- Max Aperture: T2.6
- Close Focus: 2'0.5" / 0.62 m
- Image Coverage: 31.4 mm diagonal
- Weight (approx.): 12.3 lb /5.6 kg
- Length: 335 mm (PL)
  330 mm (Panavision)
- Front Diameter: 136 mm

Optimo 17-80 mm T2.2

17-80 mm

- Zoom Ratio: 4.7x
- Max Aperture: T2.2
- Close Focus: 2 ft / 0.6 m
- Image Coverage: 28 mm diagonal
- Weight: 12.1 lb / 5.5 kg
- Length: 326 mm (PL mount)
- Front Diameter: 136 mm

Optimo 28-340 mm T3.2

28-340 mm

- Zoom Ratio: 12x
- Max Aperture: T3.2
- Close Focus: 4'.5" / 1.23 m
- Image Coverage: 31.4 mm diagonal
- Weight (approx.): 24.4 lb / 11.1 kg
- Length: 454 mm (PL)
  449 mm (Panavision)
- Front Diameter: 162 mm

Optimo 24-290 mm T2.8

24-290 mm

- Zoom Ratio: 12x
- Max Aperture: T2.8
- Close Focus: 4 ft / 1.22 m
- Image Coverage: 30 mm diagonal
- Weight (approx.): 24.2 lb / 11 kg
- Length: 440 mm (PL mount)
- Front Diameter: 162 mm

Angénieux Optimo Anamorphic 56-152 mm

April 2013. Angénieux debuts the first in their 2S Series of lightweight, compact 2x anamorphic zoom lenses at NAB 2013.

The 56-152 mm T4 Optimo Anamorphic zoom has a focus barrel with 50 marks. It rotates 320 degrees and focus scales can be easily changed from feet to meters. There is no ramping (change of exposure) throughout the zoom range, and there is no breathing (shift of image when focusing).

The Angénieux 2S Series will consist of the 56-152 mm and two additional compact anamorphic zooms that together will cover a range of 30 to 240 mm. The first zoom (56-152) will be available early 2014. The two others are planned for 2014—my guess is they will be 30-80 mm and 90-240 mm.

The 2S anamorphic series will be completely new lenses, not existing Optimo zooms with adapters. They will share popular characteristics of the Optimo Series: light and compact for handheld or Steadicam work. The designers tell us they render a cinematic, dimensional quality to the image with superb optical performance and low distortion.

Angénieux Optimo Anamorphic 56-152 mm T4 2S Series Zoom

Zoom ratio:	2.7x
Vertical focal length:	56-152 mm
Aperture:	T4
MOD:	2'1" / 0.63 m
Weight (approx):	4.8 lb / 2. 2 kg
Focus:	320˚ rotation, 50 marks, interchangeable feet or meters
Length:	210 mm / 8.3 " (actual size is the width of this page)
Front diameter:	114 mm / 4.5"
Image coverage:	28.8 mm diagonal (18.6 x 22 mm)
Anamorphic squeeze:	2x horizontal squeeze
Format:	35mm "4 perf." scope
Mounts:	PL mount, PV mount available on request

Angle of View

for 35mm "4 perf." format (18.6 x 22 mm)

Focal length	56 mm	152 mm
Horizontal angle of view	42˚50'	16˚24'
Vertical angle of view	18˚41'	7˚05'

Laurent Mannoni on Angénieux

By Laurent Mannoni, Director of Scientific Heritage and Technical Conservator, the French Cinémathèque.

Pierre Angénieux (1907-1998), was an optical engineer and manufacturer whose company, created in 1935, has remained at the top of the world cinema market. Its headquarters are in Saint-Héand, 10 km (6 miles) outside Saint-Etienne.

Born to a modest family, Pierre Angénieux graduated from l'Ecole Superieure d'Optique in 1929 (where he was a student of Charles Fabry). It was in this trade school that he took courses in optical calculations taught by Prof. Henri Chrétien, who was the inventor of CinemaScope.

Inspired by movies, Pierre Angénieux started working at Pathé Studios (on a color film process for 9.5mm film that never came to fruition). In 1932 with some friends, he launched a small optical company and worked on another color film project for the Francita Company. But his first business venture collapsed when the arrival of Technicolor supplanted his complicated process.

The young engineer, encouraged by his contacts in the now flourishing world of photography and cinema, decided in 1935 to launch "Pierre Angénieux Establishments." In 1936 he obtained a contract from the Ministry of Defense which allowed him to strengthen the business. In 1937 Angénieux opened a workshop in his home town of Saint-Héand in an old building where he had attended elementary school.

In quick succession, Angénieux received visits from manufacturers (like André Debrie with whom he would work), filmmakers, like Abel Gance, the famous director of the 1927 *Napoleon*, who was always looking out for new devices. In 1937, Gance wanted to create an economical system that would combine real actors with miniature set designs. This was the "Pictographe," conceived by Angénieux, whose original lenses are now part of the permanent collection at the French Cinémathèque. Those lenses were carefully restored between 2008 and 2009 by the Angénieux Company itself.

Working in Saint-Héand with a few employees during the Occupation, Angénieux produced camera lenses and 24x36 camera bodies, notably for Alpa in Switzerland, and worked on new processes. The rapid rise of the company came in 1953 with the construction of a modern factory, staffed by 175 employees. Kodak-Pathé became one of his first major clients after the war.

The company's first major innovation was the "Retrofocus" R1 for a 24x36 reflex 35mm camera, opening to 2.5. Leica notably adopted it on their cameras.

The second innovation, truly the company's standard-bearer, was the creation and manufacture of the zoom lens. With the help of calculations by a Gamma 3 computer, the "Angénieux Paradox" was perfected. This permitted the stable movement of a group of movable elements inside the zooms. In 1956, the company delivered its first zoom lens, the K1, with mechanical focus. Remarkably, 70,000 K1 lenses would be manufactured by the Saint-Héand factories, where 600 employees were working. At the same time, Angénieux would cease making prime lenses for the cinema—a market already saturated in France by SOM Berthiot and Kinoptik—in order to concentrate on zoom lenses.

The zoom lens was not a new invention when Angénieux decided to perfect it. There were already old trademarks on the product in the U.S., England and France.

Angénieux was able to use the principle of mechanical focus and perfect its power to zoom, utilizing 11 lenses and a nicely-conceived mechanism. Three different zoom models were available from the Angénieux Company by the end of 1958, the L1, L2 and L3. These lenses, for 9.5mm and 16mm film, were the first variable focus lenses (17 to 68mm) coupled with a reflex viewfinder. A 35mm zoom lens was released in 1960. Angénieux ended up winning the battle with SOM-Berthiot with lenses that had the greatest power (42x in 1976, 72x in 1994).

Angénieux, specialist in zoom lenses, was drawn to perfecting the multi-layer treatment of each lens' surface, which would reduce the loss of light when passing through each lens. Angénieux lenses were so well-regarded for their high-quality technique that they seduced NASA. (Initially chrome, Angénieux lenses would become black to avoid the risks of reflected light during their use).

The company tip-toed into the world of CinemaScope. Angénieux had worked on the "Zoomscope" process with Maurice and Roger Fellous and the Franscope Company. Angénieux diversified production in 1968 with the 45-90 zoom lens for Leicaflex, because working with Leitz made Pierre Angénieux personally proud. In 1969, Angénieux released a line of 4 x 20 and 10 x 15 zooms with remote controls. They also delivered a series of remarkable lenses for television cameras, with 10x, 15x and 42x zooms, the latter fabricated especially for the 1980 Olympic Games of Moscow.

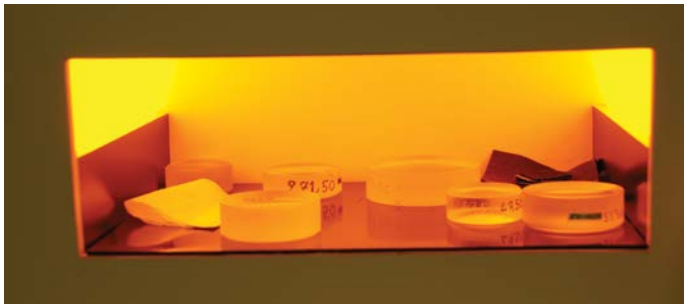
For the first time, a single length permitted coverage in an uninterrupted way with all focal lengths between 16mm wide-angle and 672mm telephoto.

A close working relationship was established between Eclair and André Coutant. The Eclair 16 was equipped by 1965 with a 12-120 mm lens that would be utilized for a long time. By covering 15 mm, 25 mm, and 75 mm, that zoom would solve the problem of the rotating lens turret and little by little supplant it (like the one used in 1947 by the Cameflex). Angénieux would furnish many camera manufacturers like Bolex-Paillard, Ercsam, Beaulieu, Nizo, Christen and Heurtier (headquarted in Saint-Étienne). The 12-120 zoom lens was widely used on the 16mm Aaton cameras and a 11.5-120 mm lens was conceived for the advent of Super 16.

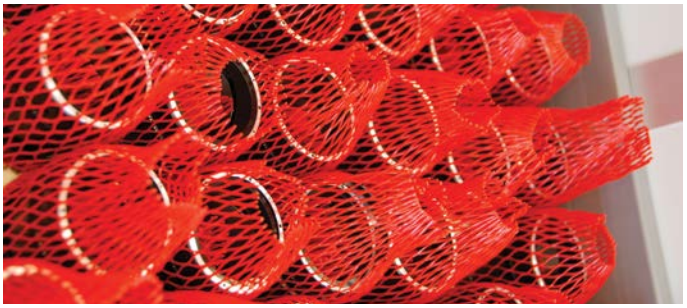
Any lens coming out of the Angénieux factories was a sort of scientific and technical work of art, the final result of complex calculations, drawings and market previsions. Different types of glasses could be utilized, either as bars, sheets or molds, shaped perfectly to the manufactured item. For certain infrared applications, Germanium was required. Blending aluminum, tin, steel and magnesium into various forms (tubes, bars and plates) was key to the structure of the lens. Thanks to computers working in real time, the treatment of the lens surface would be able to attain, by 1982, 48 successive coatings to a ½ millionth millimeter accuracy. Naturally, every lens would be calibrated, tested and quality-controlled before it left the factory.

The French Cinémathèque contains a collection of Angénieux lenses.

Angénieux Factory Tour

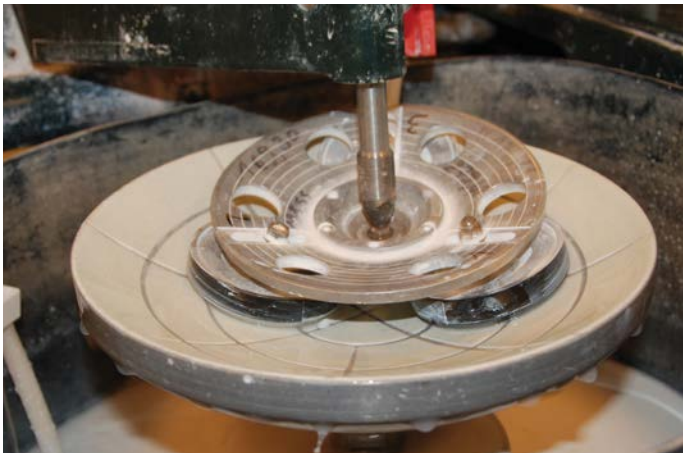


Building a lens starts with pieces of glass and barrels of aluminum. Optical elements start out as blocks of glass that are shaped, sliced, cut, polished and coated. They are polished into concave, convex or aspherical elements.



The barrels are machined, fitted with cams and components and cam followers to hold and move the optical elements.

Modern zoom lenses require precise mechanical and optical design and manufacturing, as well as accurate metrology (measuring). Aspherics can make lenses smaller and lighter. *Below*: A robotic tool "box" selects the right implement, and an automated parts "elevator" delivers components quickly.



Although state of the art QED polishers can precisely send a magnetic fluid to a specific spot on an aspheric lens, there is still a place for traditional polishing. *Below*: As they say about lenses, if you can't measure it, you can't make it.

Clockwise, from above:

1. The lens calibration room is long enough to measure and inscribe each witness mark on the focus barrel, even from 1 to 65 feet on the Optimo 24 - 290. The lens projector rolls on a calibrated track, and optimum focus for each distance is confirmed by a sensor that measures contrast. For extra long lenses, the back wall of the room opens up for distances to 130 feet, since there are two of these rooms back to back.

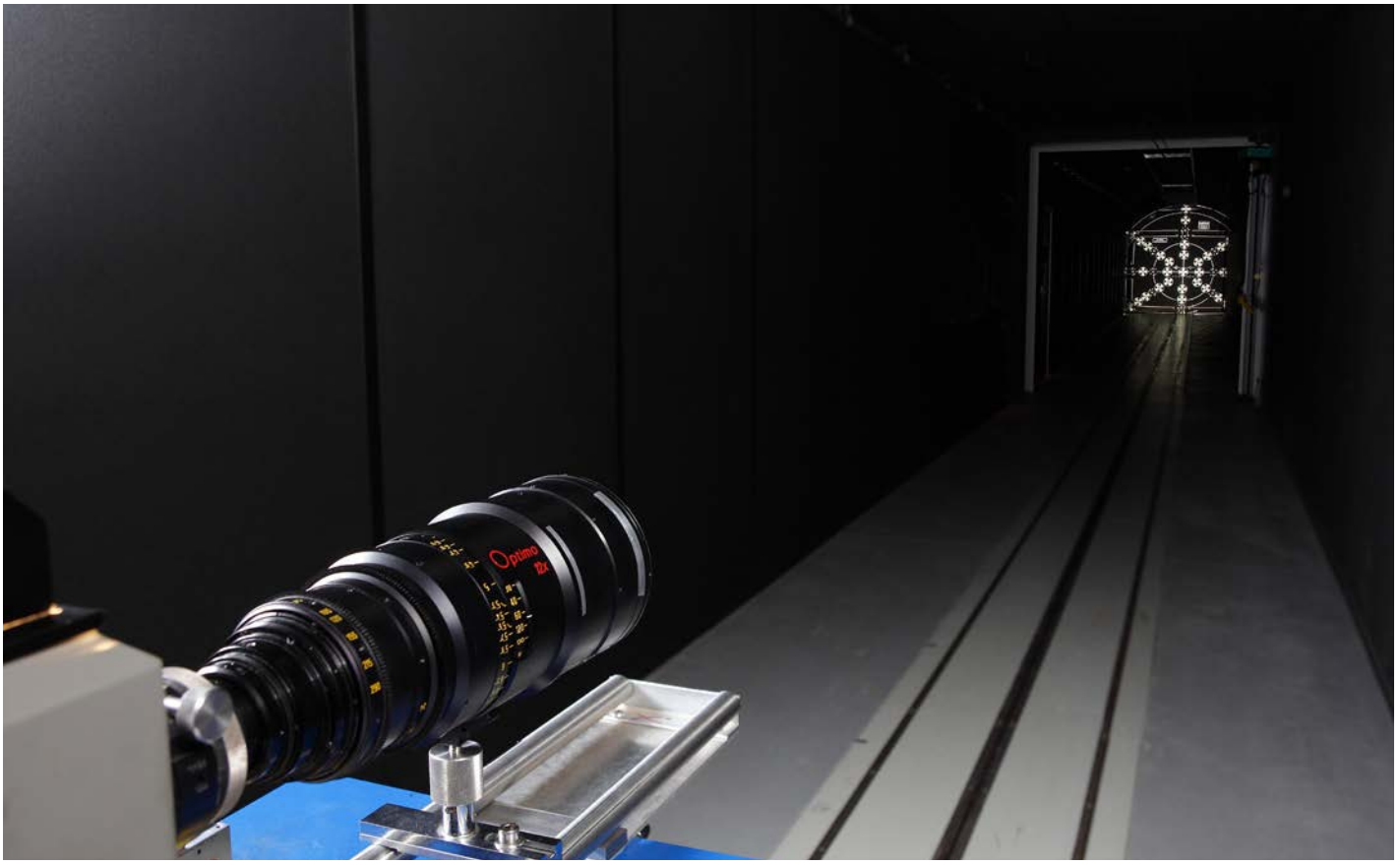
2. After the witness marks are scribed on the barrel, it is then sent for engraving and finishing.

3. The mechanical components of the barrels are carefully checked.

4. Rear assembly of an Optimo 24 - 290 zoom is mounted.

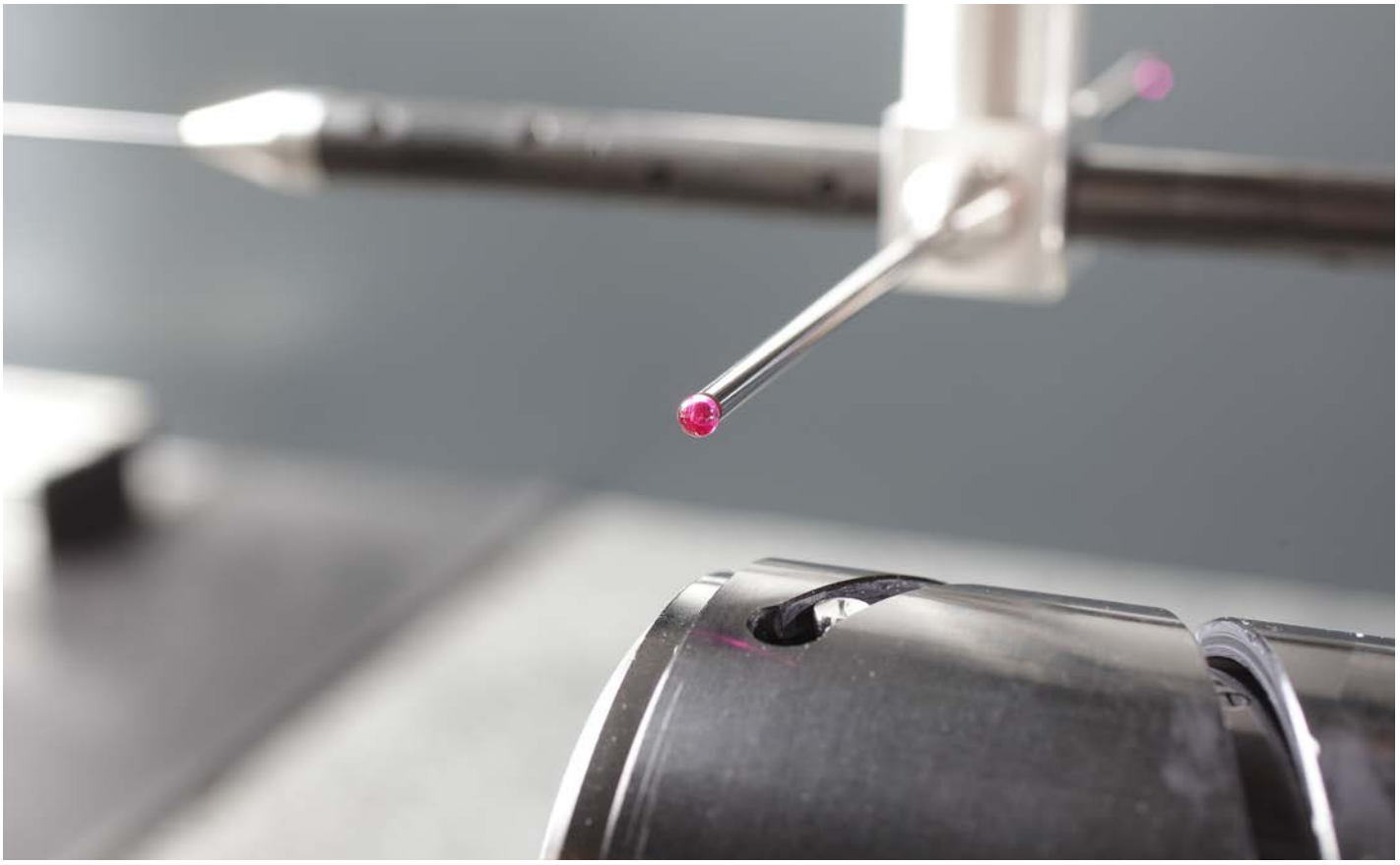
5. The lens assembly room is clean and bright.

Crafting Lenses at Angénieux



OptoTech
SPK 50 CNC-DT
OptoTech
BROCHE 1
OptoTech
100 CNC

Crafting Lenses at Angénieux



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