

Jon Fauer, ASC

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# FILM AND DIGITAL TIMES

Art, Technique and Technology in Motion Picture Production Worldwide



# 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, ASC, 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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Cover: Keisen Hama's bamboo sculpture and musician with Shakuhachi bamboo flute in the Tokyo Peninsula Hotel lobby.



# Above, Below and Bottom Line



The phone rang. “Mr. Starr on the line.” My pulse quickened to 120 fps. Maurice Starr, studio chieftain and latest tycoon, is a constant critic of *Film and Digital Times*.

The barking began, “Whaddaya, whaddaya got—delusions of Dickens? Are they paying you by the pound of paper? Just give me two pages of coverage so I don’t have to read the rest.”

Monty is accustomed to summary. The scripts upon which his head rests are covered, SUMMARIZED! by a squadron of readers.

News from the *Times*, *FDTimes*, *Hollywood Reporter*, and *Variety* is culled by a team of interns who cut, with SCISSORS! and paste the headlines on sheets of paper.

The usually predictable Hollywood weather is reduced to a one-liner by Driton the driver, “Nice day today, sir.”

Box office, studio fortunes and the latest disasters are dispatched perfunctorily. Tycoons like Starr have little time for 80 pages of wisdom on the technique and technology of the business. Tycoons are interested in getting down to the business of the business.

This nascent column was conjured up during a subsequent phone call from Volker Bahnemann, my mentor with the most prescient predictions. He said, “How about writing something for film executives and business people? Executives and decision makers of our industry may base some of their investments and planning on your well informed writing. They depend on understanding the technology and trends that you cover.”

So, here’s *FDTimes* condensed coverage from the business of the business point of view. We remain neutral as the Swiss, names are respected, NDAs (Non Disclosure Agreements) are scrupulously protected, Off the Record comments are withheld, and idle speculation is avoided. Welcome to our newest addition to this edition: “Above, Below and Bottom Line.” I have included headlines for the job security of Maurice Starr’s scissor-wielding interns.

## Sensors will get bigger

This is the year we will see more 24 x 36 mm sensors from the full frame DSLR world appear in digital motion picture cameras.

## Multi format digital cameras

Format is the size of the image on the sensor—shown by the framelines and aspect ratio. (Format can also mean file type or compression format, like RAW JPEG, ProRes—but not now.)

The idea of multiple formats goes back to the beginning of film history. 35mm film was a universal standard for more than a hundred years. But many different formats were available within that standard. All you had to do was put a mask in the gate and change to a different groundglass. In fact, there are so many selectable film formats, they fill a 98-page online Ground Glass and Format Guide from ARRI and a 96-page guide from Clairmont Camera.

And not only 35mm. Want a larger format to get people away from their tiny home TVs and back into movie theaters? If it’s 1954 and you’re Douglas Shearer at MGM, Robert Gottschalk, president of Panavision, or Mike Todd, you call Kodak and get a commitment for 65mm and 70mm film negative and prints. Even earlier, 70mm film was used at the Henley Regatta in 1896 and the Paris World Exposition in 1900.

Cut to January 2014. We basically have 35mm digital motion picture cameras with aspect ratios of 4:3 (ARRI Alexas), 16:9 (Sony, Canon, Blackmagic, Nikon, GoPro, Phantom Flex 4K) and 2:1 (RED Dragon). Gaze into the haze of the tea leaves for NAB and IBC 2014. You are delighted if your cameras have sensors 18 mm high—which do not crop the huge selection of new anamorphic 2x lenses coming out. If your digital motion picture cameras are using sensors 13.8 mm high or less, your customers are probably beseeching you to provide cameras that will accommodate all these new anamorphic lenses. So, what’s a designer to do?

My guess is that rather than try to stretch a mere 3 mm more in height, there will be a leap directly to sensors with 24 mm height. After all, that’s a ready-made sensor size (24 x 36 mm) in the digital still arena, and there are millions of them being fabricated.

RED, of course, predicted the digital motion picture paradigm of DSLR technology at 24 fps and faster, with larger sensors, selectable formats, and increased resolution.



And what of the R&D departments in Munich, Hollywood and Woodland Hills? I look to 1954 and remember that history repeats itself. Formats even larger than those available to mere mortals are always intriguing. Mere mortals buy; Tycoons rent.

The most important thing about designing selectable format CMOS sensors, I think, is to accommodate the lowest common denominator. So if you are planning to put 16mm or B4 lenses on your camera, those formats should have at least HD capability. You then do the math up from there.

## PL and PV Predominate (for now)

Lest these pronouncements produce dispepsia among lensmeisters in Leicester, Oberkochen, Wetzlar, Saint-Héand, and Saitama, they can take comfort in hearing that 95% of high end features and commercials are using PL or Panavision mount lenses on variations of the Academy format. But I wouldn't be complacent. Read Dr. Winfried Scherle's interview.

## Things will get sharper

Jon Thorn of AJA writes, "Consumer electronic introductions often help define when an emerging technology is about to become a standard. While many Ultra HD/4K monitors were introduced at CES this year, perhaps more importantly, new content creation devices and content delivery services were also revealed."

Mr. Maeda of Canon says, "Imagine if you had a baby today, you would think about the future of this baby, and you would want to record everything in 4K. Once we see a better picture, we don't want to go back to a lower level. That's what we saw with the Standard Definition to High Definition transition. Nobody today would want to see SD anymore."

Bryce Button of AJA writes that the emergence of 4K and Ultra HD as primary capture sources for projects moving forward is well established today. This evolution makes a lot of pragmatic sense as the resolution available finally meets a digital alternative to the film negative that has been the cornerstone of media mastering for over a century.

## Fastest Computers Win

In *Who Owns the Future*, Jaron Lanier writes, "In the past, a revolution in production, such as the industrial revolution, generally increased the wealth and freedom of people. The digital revolution we are living through is different." Companies with the fastest computers and largest storage succeed. This will be true for cameras, post production, and delivery.

## Omikuji

O-mikuji are fortunes written on strips of paper at Shinto shrines and Buddhist temples in Japan. Tengenjutsu is another form of divination, established in the Edo period by the Buddhist monk Tenkai, who served several Shoguns.

By the way, the provenance of 3 billion fortune cookies made in the US each year may be a bakery near a temple outside Kyoto, according to an article by Jennifer Lee in the *New York Times*. "The bakery has used the same 23 fortunes for decades. In contrast, Wonton Food in Brooklyn has a database of well over 10,000 fortunes."

This edition of *FDTimes* is a tale of several cities: Tokyo and Kyoto, Jena and Oberkochen, Munich and Paris, New York and Hollywood, and many more places. Our journey begins in Japan, not to dabble in divination, but to study the state of our art and learn about the state of production there. There were some surprises.

InterBEE had been described as "a small, local show." It turned out that this local show gets more than 30,000 visitors. Here in the land of Sony, Canon, Fujifilm and electronic giants, 40% of high-end production is still shot on film. There are 5 film labs running in Tokyo—more than any other city, I think. 98% of high-end digital motion picture production was done on a German camera, the ARRI Alexa, and more than 300 features were produced last year. Maybe this should not have been such a surprise. Many of the film production executives drove in German cars. The skilled optical workers at Canon and Fujinon lens factories are called Lensmeisters. There is a fascination with European brands and French food...and perfection.

# Canon's Utsunomiya Lens Factory



Above: Early in the process—rough grinding an optical element.  
Below: Lens polishing. Opposite page, bottom: cleaning elements before coating.

90 million Canon EF interchangeable lenses for EOS cameras delivered by May 2013—approaching 100 million soon. 87 different models of EF lenses for still photography and cinema, as well as broadcast and industrial lenses. Incredible numbers.

Mr. Masaya Maeda had pointed out that Canon is one of the few companies where digital cameras are made 100% in-house: sensors, software, image processors, and lenses. “To take the best shot under any conditions,” continues to be the goal.

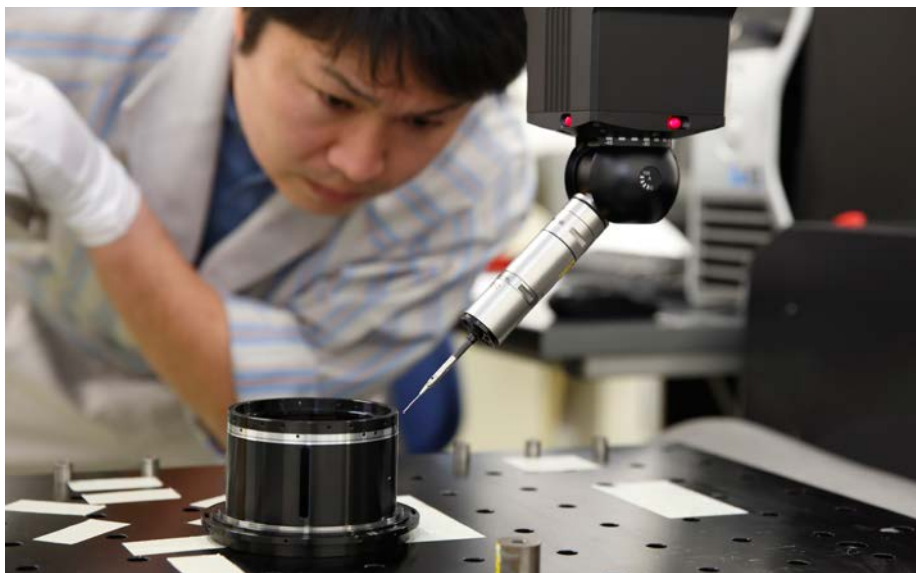
Canon's Utsunomiya Lens Factory is the magical place where the high-end lenses are made: 50 minutes north of Tokyo on the high-speed Yamabiko-129 train, 30 seconds to scramble for the train's exit at Utsunomiya. The aroma of Gyoza (dumplings filled with meat or vegetables) permeates the station. Our destination is a few miles away. It's a “company town” of 1 million people. As mentioned earlier, like Shangri-La, Canon's Utsunomiya Lens Factory has been open to few mortals (except those who work there.)

Canon's Utsunomiya industrial park of factories is enormous. The lunch room is the size of a football field. To build 90 million lenses, you need a lot of space.

The large rooms filled with grinding, polishing, smoothing, centering, and coating machines are immaculate. Something unique among all the lens factories I have visited is how quietly these machines run.



# The 5 Micron Art of Canon Lens Making



Setsuko Sotome (above) is an assembly artisan at the Utsunomiya factory. She specializes in Canon Cinema EOS high-end zoom lenses.

Cinema EOS lenses are assembled in “cells.” This is, after all, Japan—where the concept of cell production was born. The idea is that one person pretty much builds the entire lens. Ms. Sotome assembles a 14.5-60 or 30-300 zoom lens in about a day.

Cine lenses, of course, require special care, extra attention to detail and hand assembly. Like an island in this vast sea of millions of lenses, the cine lens department is like a high-end jewelry boutique.

It takes a couple of years to acquire the skills necessary to even begin working on a cine zoom or prime lens. It takes 25 years to become a “Lensmeister,” an exalted master of the opto-mechanical craft with a German title.

I noticed that Ms. Sotome used the same focus barrel on every lens. She didn’t select from a batch of different scales. She didn’t even mark the scales by eye, then to be custom engraved. Each lens was perfect. Each focus barrel was the same. I had never seen anything like this. “How is this possible?” I asked Ms. Sotome.

“Each lens is almost perfect,” she said. “We are accurate to 5 microns. Imagine a thin foil of gold leaf—that’s how accurate each lens is.”

Titans of the Industry



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