Optomechanix

Camera Design Case Study for Optomechanics Part 2

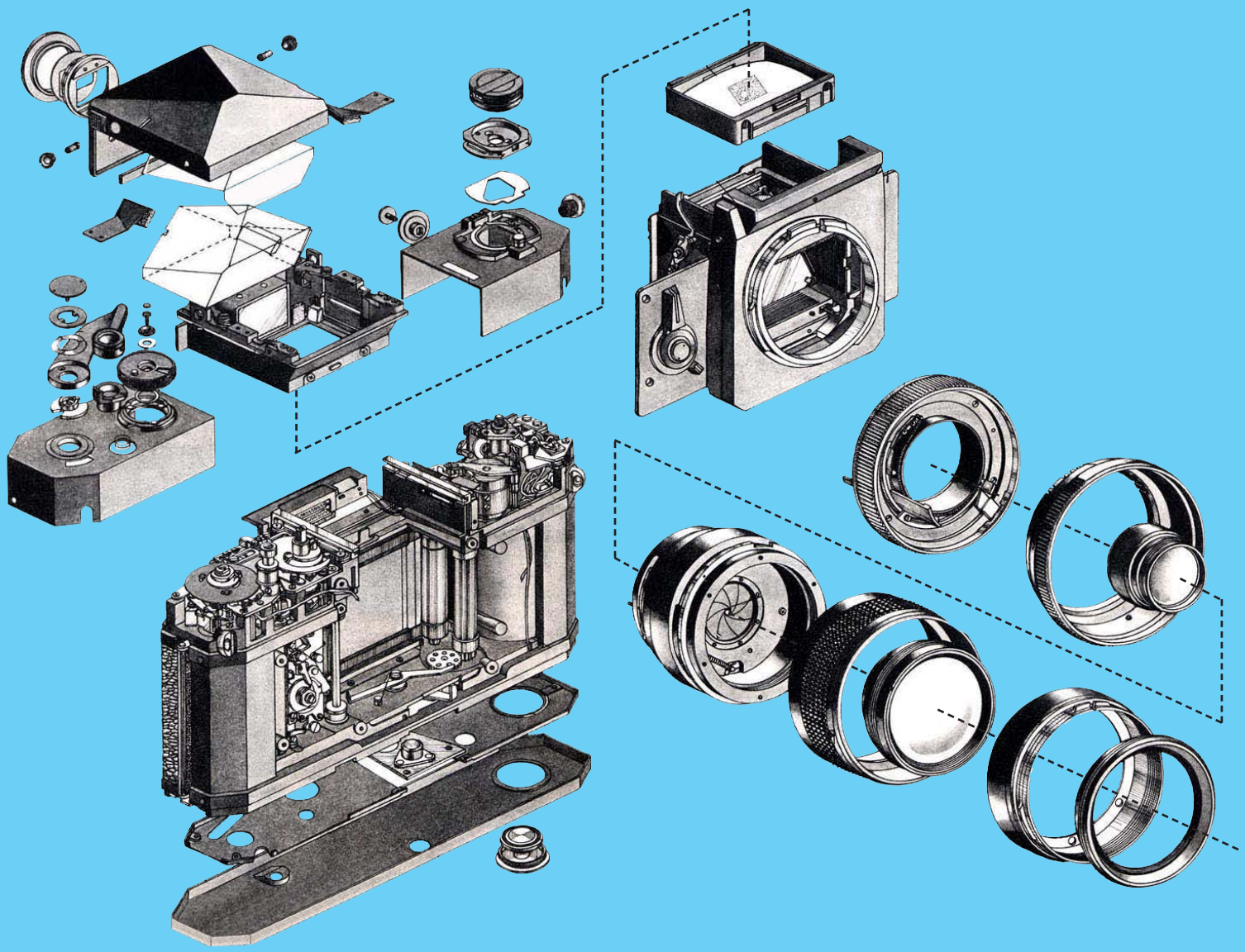
Camera manufacturers: Bob Shell Shares Memories

Instrument Design with new Optoform II

Psychology of achievement: Alternative Spirit of Losing

Camera desgin case study for Optomechanics Part II

July-Sep 2022



Technical journal of OMiD, Opto-Mechanical Institute of Design

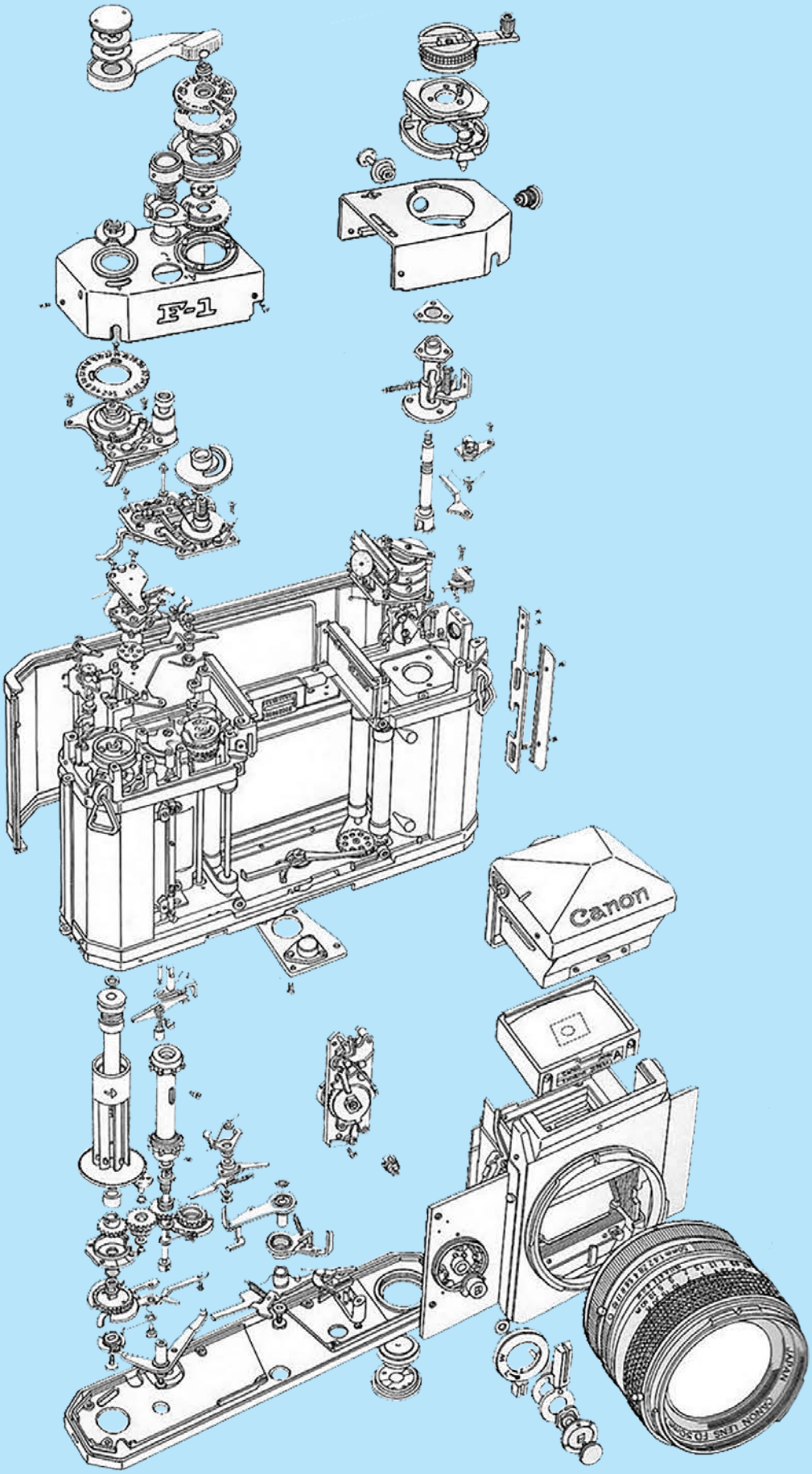
Canon F1

The F-1 was one of the most reliable 35 mm cameras manufactured in the 70's. Japanese camera manufacturing began with Leica copies, but then took off, and became one of Japan's major industries.

Japanese camera design centered on lowering cost, while keeping high quality. The parts produced in Japanese cameras were made mostly from bent sheet metal but extremely well made. The sheet metal in Russian made cameras had raw metal finish whereas the inner parts of Japanese cameras were shiny, almost polished steel. The machines that produced those parts such as the Swiss made Ebosa also made watch parts.

The stamped body shells in Japanese cameras were also better formed than, i.e, French Foca, or Russian Kiev. Japanese utilized more steps in forming the sheet metal to achieve sharp corners, like the pentaprism cover in Nikon-F.

The driving force to produce high quality cameras could only be passion. Several countries grew big in the camera industry just like the Swiss who made the world's best watches. Japan certainly was one of them, right after Germany. As Japanese cameras appeared in US market, and they got better, and better, German companies like Leica were caught off-guard with this new comer, just like American car industry towards Japanese made cars.



Canon F-1 was created by Canon design team led by M. Kakunodate, committed to no design change for 20 years

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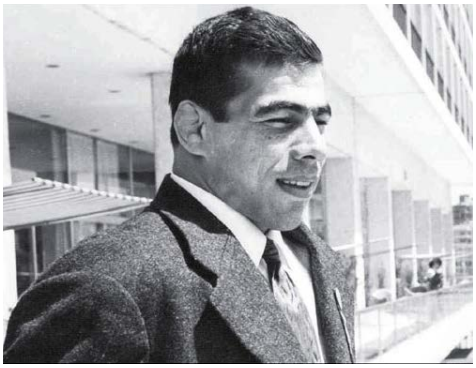
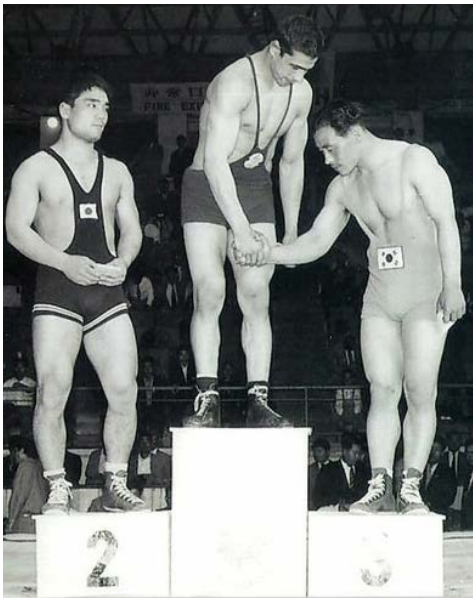


Gholamreza Takhti



Takhti winning gold at the Olympics

This issue Dedicated to:

Gholamreza Takhti (1930 - 1968), the most famous wrestler in Iranian history. The legend was known for his chivalry and sportsmanship and continues to symbolize the essence of sports to the Iranian people.

Takhti won the gold medal in the 1956 Olympic Games in Melbourne, defeating Boris Kulayev from Soviet Union in the final match. He also claimed two Olympics silver medals in 1952 Helsinki and 1960 Rome. Takhti won two World Championships gold medals in 1959 Tehran and 1961 Yokohama. The freestyle wrestler has also seized a gold medal in the 1958 Asian Games held in Tokyo, Japan.

In 1961, a terrible earthquake occurred in Boein Zahra in western Iran, killing 45,000. Takhti was deeply touched by the suffering. Already one of Iran's biggest stars, he began to walk one of the main avenues of Tehran, asking for assistance for the victims. He inspired other champions to follow in his footsteps, and thousands gave donations to alleviate the suffering.

Another example of his character comes from a match in Moscow. After defeating the then-world cham- pion Anatoli Albul, Takhti saw the sorrow on the face of Albul's mother. Takhti went to her and said, "I'm sorry about the result, but your son is a great wrestler." She smiled and kissed him.

There is another memory that sheds more light on his character. Once he had a match with Russian wrestler Alexander Medved, who had an injured right knee. When Takhti found out that he was injured, he never touched that leg. Instead, he tried to wrestle with him by grabbing his other leg. Takhti finally lost the match.

Alexander Medved has visited Iran many times over the years to pay respect to the champion at his grave.

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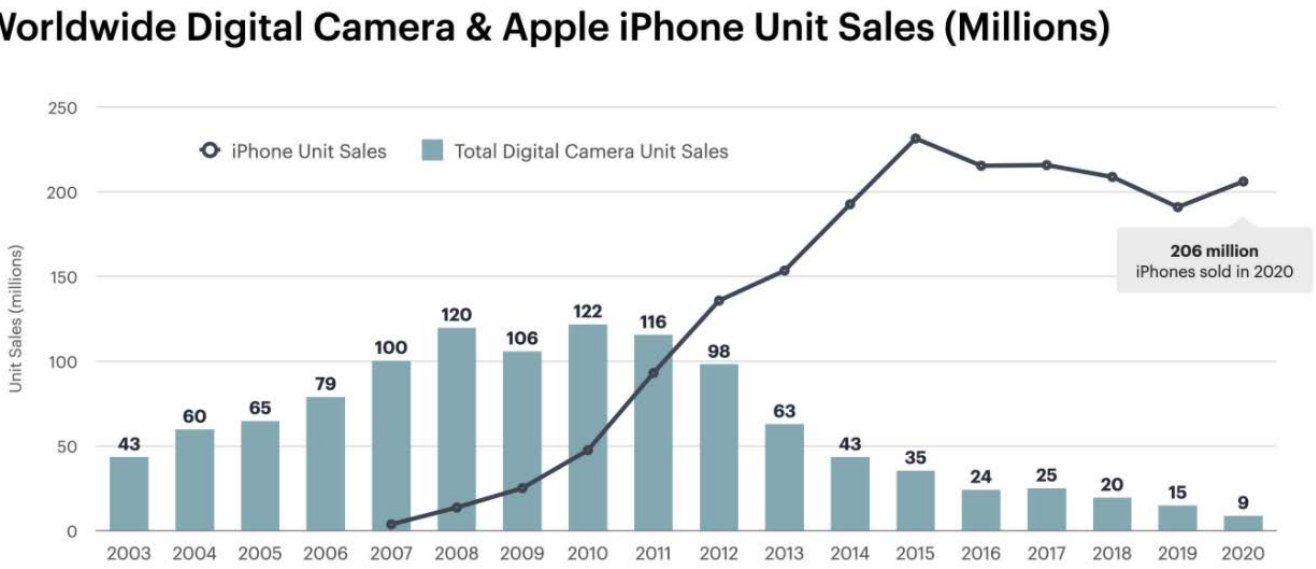
Cover page photo: Canon F1 opto-mechanical layout
Front back: More detailed exploaded view of Canon F1

Camera Design Case Study for Optomechanics, Part II

In the last issue we covered some camera manufacturing, and marketing history as told by Bob Shell. If I could name a few influential people who contributed in making me a writer, it would first be Dr. Iwao Ogura of University of Tokyo, after he saw my hand made camera, and a small book I had written to explain its design. He encouraged me to write my first illustrative book about cameras. When I sent a copy of that book to Shutterbug magazine for publicity release, its editor, Bob Shell, invited me to write for them. Bob, and I became friends over the years. It's ironic that I once was a contributor to his magazine, and now, he is a contributor to mine.

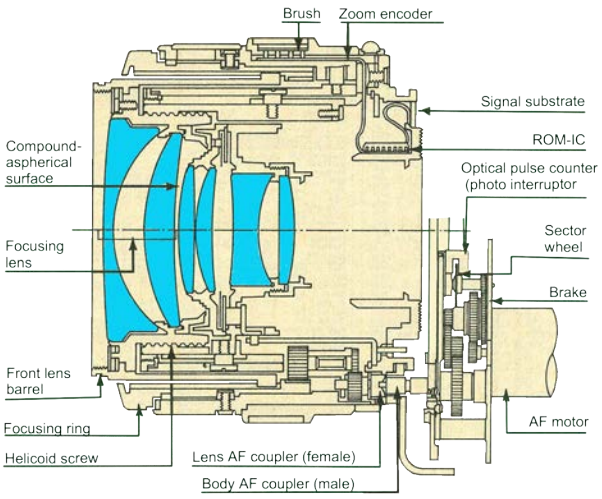
Magazines are put together by those who are passionate about something and find a need for it in the market. Sometimes I can't believe how I have been putting out these issues, and why. I want to preserve a trade that not only I'm so passionate about, but I think it's losing its very roots. With this work, I am leaving behind something that perhaps next generations will understand. Preserving the history of camera design, has no one on its side, perhaps because the optical engineers think it's up to the mechanical engineers to do so, and vice versa; and the electronic and computer engineers are added to the mix. Bob Shell recalls from his memory the faith of the most recent photo magazines:



"Modern Photography: The first issue was in September 1937. Originally it was named Minicam and published in Cincinnati, Ohio, building up a subscriber base of 110,000 quickly. At that time 35mm cameras were called minicams. The name was changed to Modern Photography in July 1949. George R. Hoxie was Associate Editor and became Editor in July 1949 when the name was changed, so he was the first Editor of Modern Photography under that name. In 1989 the publishers of Popular Photography, under Herbert Kepler's direction, bought Modern to get the subscriber list, and promptly shut it down. This was known in the industry as "Burt's Revenge," because Kepler had been forced out at Modern and moved to Popular Photography as Editorial Director, taking his protege' Jason Schneider with him as Editor.

My good friend Barry Tanenbaum was the last Editor of Modern. After Modern was shuttered, I brought Barry over to Shutterbug, where he remained. He will continue to write for the website now that the print magazine has been shut down, an act of amazing stupidity. Shutterbug had over 100,000 subscribers, certainly enough to sustain a print edition. Many magazines do quite well with less.

Back in 1997 Shutterbug was sold for the first time. Glenn Patch had started it as Shutterbug Ads in 1973 as a buy/sell/swap newspaper for photo equipment. I still have issue number one. I wrote my first article for them around 1974. By the early 80s I had been made Technical Editor. Glenn wanted an Editor but I didn't have the time so I called Norman Rothschild and he suggested George Berkowitz, former Editor of Popular Photography. We hired George and changed the



Cross Section of Minolta Maxxum Auto Focus Lens
(see page 25)

name to Photographic News. Subscribers didn't like the name change so after about a year George left, we renamed it Shutterbug, and never changed the name again. The next disaster was when Glenn decided to publish twice a month. That almost killed the magazine. At one point things were so bad that Glenn had to borrow money from the writers to pay the postage bill! The next Editor was Jack Naylor, extremely wealthy camera collector. He owned companies world-wide that make auto parts, and donated his salary to charity.

He didn't want to live in Florida, so flew down for one week each month to put the magazine together. After a year or so he got bored and quit. The magazine limped along with no Editor for a while, with me doing most of what an editor would do, and in 1991 they offered me the job. By then they could pay enough to support me and my wife, so I took the job and sold my photographic import business to Jack King in Charlotte, NC., kept my photo studio, and took over the magazine. Like Jack Naylor I didn't want to live in Florida, so I insisted on a contract that let me work from home. That worked fine until the end of 2000 when the new owners fired me and put in a new Editor. I went up to their headquarters in NYC and made some threats (a number of advertisers agreed to pull out their ads if I said the word), and they agreed to let me stay on as Editor At Large and write a regular monthly column called "At Large.". The new contract allowed me to write for other photo magazines, and I was soon writing for most of them. The only US photo magazine I never wrote for was Popular Photography.

The company that bought the magazine from Glenn Patch was ...., and I never met a bigger bunch of idiots. They knew nothing about the photo business and would not listen to those of us who did. Since then, there have been two other owners, each stupider than the one before. I don't know who this latest bunch of ..... are, but they seem to be real winners! To date, no one has made money on an Internet only magazine.

Shutterbug was sold in early 2018 to a British media conglomerate. First, they fired the best people the magazine had. Then they announced in the June issue that they were taking the magazine bimonthly with the July/August issue. I then got a letter from one of the writers that they decided not to publish the July/August issue and have shut the magazine down. Why buy a successful and profitable magazine and shut it down? Makes no sense. I feel like an old friend just died."

My love of cameras is because I consider no other design in optomechanics that has displayed so much passion, and unparalleled genius. Nothing else comes even close to camera design for incorporating such wide range of technologies. Microscope design is way behind cameras, and same goes for binoculars, and rifle scopes, etc. Only telescopes might come close to cameras for their 400 years history in development, and humanity's long fascination with the universe.

Ali Afshari
Editor in Chief
Optomechanix

The Afshari camera, built in June 1983. 10 years later, I named the company I founded "AF Optical Company".

Remembering the photo industry Part 2

By Bob Shell

In the last issue, we discussed camera manufacturing by Rollei, Alpa, and some other important brands of the film era, and this is the 2nd part of that discussion:

Cosina-built Zeiss-Ikon Rangefinder

Because I have some German ancestry on my father's side (the rest being Irish and Cherokee) I've always loved German-made and German-designed things. I wanted one of the Zeiss-designed Cosina-built Zeiss-Ikon rangefinder cameras and associated lenses, but the price was always too high. I looked at one, and it seemed solid and well built.

Vigtlander VSL3E (Same as Rollei SL35E)

Going back to Rollei and their problems, I have a Voigtlander VSL3E made by Rollei in Singapore (essentially the same as the Rollei SL35E. with some styling changes) that I bought brand new very cheap because it didn't work. The reason it wouldn't work was that there was no spring on the second shutter blade set. It never could have worked, but passed quality control. The poor quality of the Singapore cameras and lenses killed Rollei and forced them into bankruptcy. The saddest part is that the SL35E is an excellent camera. I have the repair manual and it is an impressive design. If Rollei could have just gotten control of their quality issues they would have been very successful. I have the power winder for my SL35E, and opened it up out of curiosity. The internal parts are Canon branded! I also had the rare motor drive, but was talked into selling it to a German friend who collects Rollei.

Contax RTS

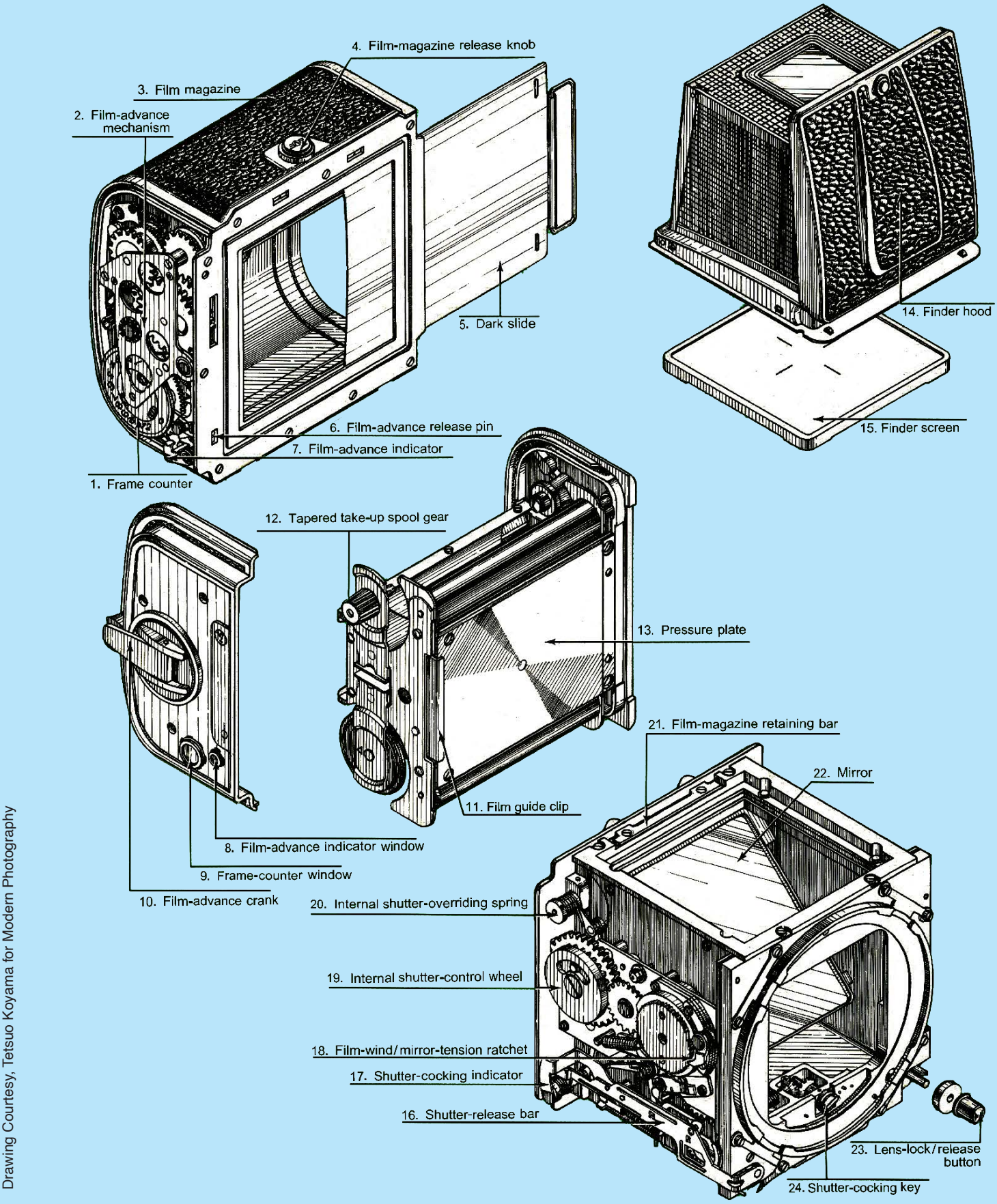
I used my SL35E for years before switching to a Contax RTS system when that camera came out. The original Sugaya shutter had a fatal flaw, though. The shutter curtains were pulled by silk cords that ran on small delrin pulleys. If you used the camera long enough, eventually one of those cords would slip off a pulley and the camera would lock up. Simple to put the cord back on the pulley, but required a major strip down of the camera to get to it. The RTS II remedied this problem by switching to shutter tapes on wider pulleys like everyone else used. The RTS was always difficult to work on because there were many wires to unsolder if you had to go deep into the camera. Not like Nikon F2 which was very easy to disassemble, perhaps the easiest.

Regula Reflex

Regarding Regula Reflex; Miller Outcalt was a very good friend of mine. He died some time ago. He owned Kalt Corporation, one of the largest photographic import/distribution companies in the U.S.A. He was the official distributor of Regula cameras in the 60s and 70s. He was active until he sold the business and retired. Until he died he sent me a holiday gift every December. We talked a few times about his frustration with King and Bauser. The camera was doomed in the US because K&B insisted on selling it with a 50mm Isco lens. One of the photo magazines reviewed the camera and gave it a thumbs down because of the "execrable" quality of the lens, which failed all their tests. Miller wanted to buy the cameras with a better lens, a Schneider, but the price with the better lens was much too high. As it was, with the awful lens the camera was quite expensive. I probably still have the Kalt catalog page with that camera on it.

Yes, the styling was quite modern and unique for its day. I believe The Camera Craftsman had an article about the camera. The story Miller told me was that the camera was based on a Zeiss-Ikon prototype that K&B bought and developed. It was certainly the only advanced camera they ever built. Everything else they made were simple point and shoot amateur cameras.

I used my Regula Reflex for years with a variety of lenses. Then one day I was in a serious car accident and the camera was badly damaged. Miller helped me send it back to the factory where it was completely rebuilt, just like new, at a very nominal price. The camera had been out of production for years, but they still had parts and were willing to make major repairs. That really impressed me.



Drawing Courtesy, Tetsuo Koyama for Modern Photography

Victor Hasselblad created the concept by not designing it himself. He rewarded a year's salary to his employees who developed the camera. While these visionaries had their own high expectations for the outcome, they had the guts to

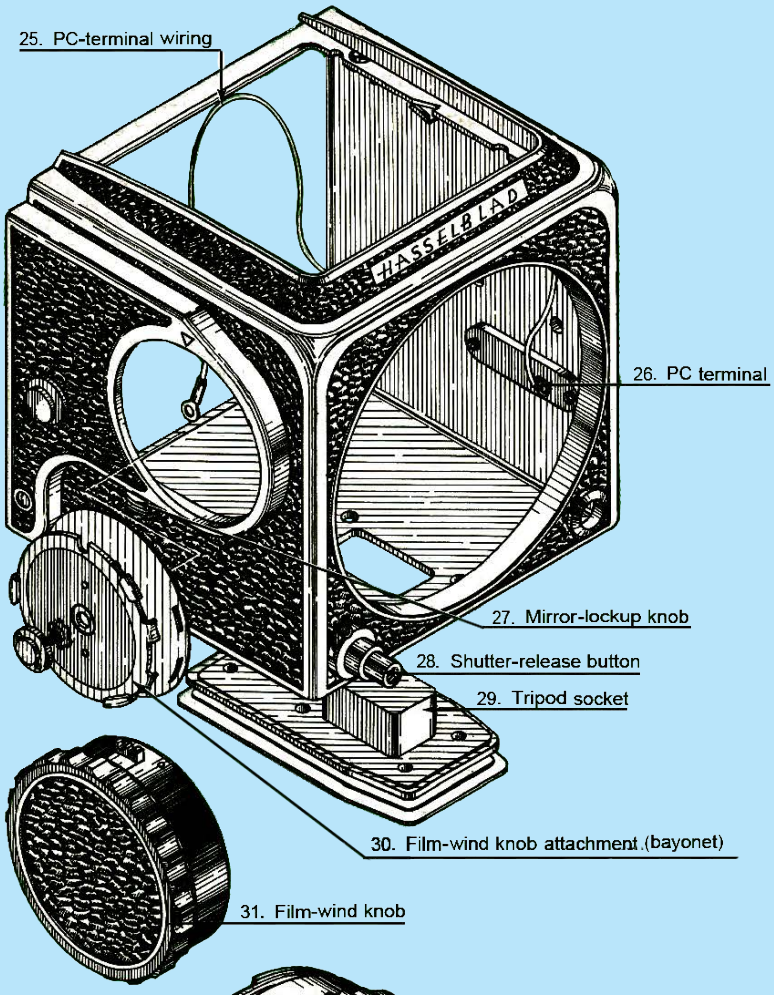
Hasselblad 500C/M

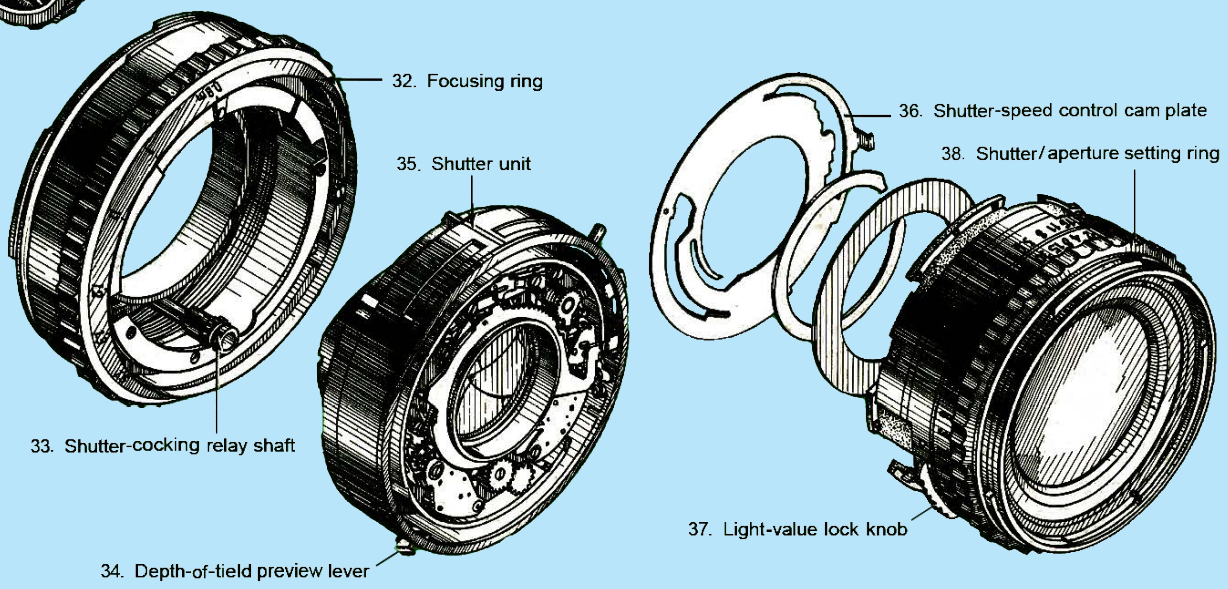
Hasselblad was extraordinary in its minimalist design. Hasselblad's modular design allowed interchangeable backs, viewfinders, winding knobs, lenses, and focusing screens. The Hasselblad system was the most versatile camera concept of its time, followed by Bronica, Mamiya, and Rollei. All medium format cameras were actually miniaturized copies of Graflex 6x9 cm format camera introduced in early 1900s.

To disassemble the camera, the wind (30), and tripod socket (29) are first removed, then its rigid body shell pulls off from the front.

Hasselblad's difficulties with its large focal plane shutter forced its designers to switch to leaf shutter design. According to Victor Hasselblad, when they requested Compur (their shutter manufacturer) to offer them a leaf shutter for their SLR, they said it couldn't be done.

Hasselblad team made a prototype of the shutter to convince Compur it could be done. They began producing it for Hasselblad with the condition that they could also offer it to other camera manufacturers. As it turned out, Synchro-Compur shutter became the favorite choice for many other cameras. The way this is accomplished is by a coupling key (33) between the lens, and the camera body (24).





eliminate mediocrity in their design group to allow their best talents to flourish. Victor Hasselblad was so humble to note he had very little engineering knowledge.

Henry Froehlich Imported Konica

So much knowledge of the early photo industry in the USA has been lost when old men died without writing things down. I knew many of them. Henry Froehlich was a good friend. He was first to import Japanese cameras (Konica) into the USA after WW II, and designed the range/viewfinder of the Koni Omega camera and held a patent on the design.

Joe Ehrenreich Importer of Nikon

Joe Ehrenreich, someone I knew but not really a friend, was first to import Nikon. His company, Ehrenreich Photo Optical Imports (EPOI) also distributed Rollei and Bronica. Later, EPOI became Nikon Inc., and dropped the other product lines.

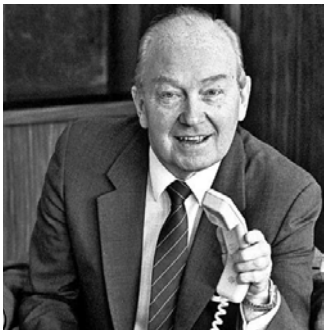
Paul Klingenstein Mamiya Corporation of America

Paul Klingenstein, founder of Kling Photo and later Berkey Marketing Corp., was another good friend. Paul died in early 2003. He and Henry together founded Mamiya America Corp., now renamed the MAC Group. Those old men were storehouses of photo history, but were too busy to talk about it most of the time. Paul, I know, started out as a stock boy at Willoughby-Peerless in NYC, one of the largest photo retailers in the early 20th Century. He was a multimillionaire when he died. So was Henry.

Zenzaburo Bronics S2A

In the early 70s I owned a Bronica S2a outfit with the superb Nikkor lenses. Great camera for tripod use. Hand held it vibrated too much. Catchlights in people's eyes were rendered as elongated ovals! I met Mr. Zenzaburo at photokina one year as a very old man. He explained through an interpreter that Bronica was an abbreviation of Brownie Camera, since 120 roll film was called Brownie film in Japan, after the old Kodak cameras. He had a prototype of a compact 35mm rangefinder camera he was showing people and getting opinions about. I liked it. I guess not enough others liked it, since it was never put into production.

Ken Corfield



I've spent a good bit of time with Ken Corfield, maker of Periflex and the Corfield Reflex 120 camera. He thought the prices collectors pay for those are "silly.".

Agiflex

Do you know about the Agiflex cameras made in England. I've never owned one, but there used to be a Johnson's Collector's Camera shop across from the British Museum on Great Russell Street and I saw one there.

Kiev 90

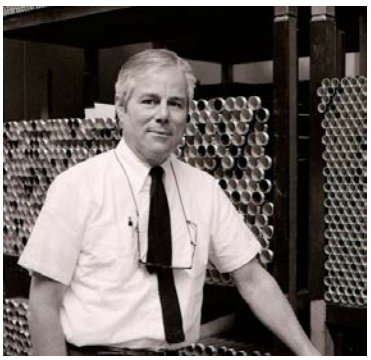
Also a Kiev 90, probably the rarest Soviet production camera, 645 format, interchangeable film magazines. eye level prism viewfinder. auto exposure, setting the shutter speed automatically, and using the same lens mount as the Pentacon Six/Praktica 66/Praktisix cameras. I have a full set of Carl Zeiss Jena lenses for that mount: 40, 50, 80, 120, 180, 300 all late multicoated. I used them on my Pentacon Six and Kiev 88 and Kiev 645 cameras, and on my Mamiya 645 Pro via a Zorkendorfer adapter. Excellent lenses! When I still had Rollei SL66 cameras I had Herwig Zorkendorfer adapt one of the Jena 180/2.8 for that camera and used it for portraits for years.

Contax RTS III

One of the nicest cameras I ever owned was the Contax RTS III, with the ceramic pressure plate designed by Sugaya that used vacuum to suck the film flat to take advantage of those superb Zeiss lenses. Unfortunately, about the time I got it my eyesight was failing due to cataracts, and I had trouble focusing it.

Lino Manfrotto

I do have a good memory for friends and enemies. I forget everyone else!! Another great loss was Lino Manfrotto, the Italian "Tripod King" who died recently. I spent some wonderful times in Italy with Lino and his son Abramo. Nice people with that Italian charm. We toured Venice together in the 90s. Lino was a commercial photographer who got frustrated with the quality of the studio equipment available, and built his own. Other photographers saw or heard about it and wanted to buy. Soon the studio equipment business grew so much that he gave up photography to devote full time to it.



Lino Manfrotto

Lester Bogen

Another name you should look up is Lester Bogen. He was also an early major player in the photo industry in the US. Another was Fred Spira, whose products were branded Spiratone. Charlie Satter is another, as is Steve Hess of Saunders-Omega, major maker of darkroom equipment.

Canon Pellix 14 fps, EOS RS

Canon 14 fps with Pellix mirror

Don't forget the Canon Pellix and High Speed Motor Drive cameras with the pellicle mirrors, and the later EOS RS with its semi-silvered mirror. Maybe there were other cameras with non-moving reflex mirrors.

Alpa

Have you looked at the Alpa cameras? I sold them in my camera shop and owned and used several. Alpa used a mirror mechanism on some models that did not raise the mirror by spring action, but a somewhat long throw shutter release button that directly levered the mirror up when depressed and let it back down when you released the pressure. This meant that you had to keep the button depressed for long exposures. The early ones had SLR viewfinder and coupled rangefinder with the two rangefinder windows displaced vertically. The system was strange, but worked very well. I loved the 100mm f/2 Kinoptik Apochromat. Some of my best photos were taken with that lens mounted on an 11si camera.

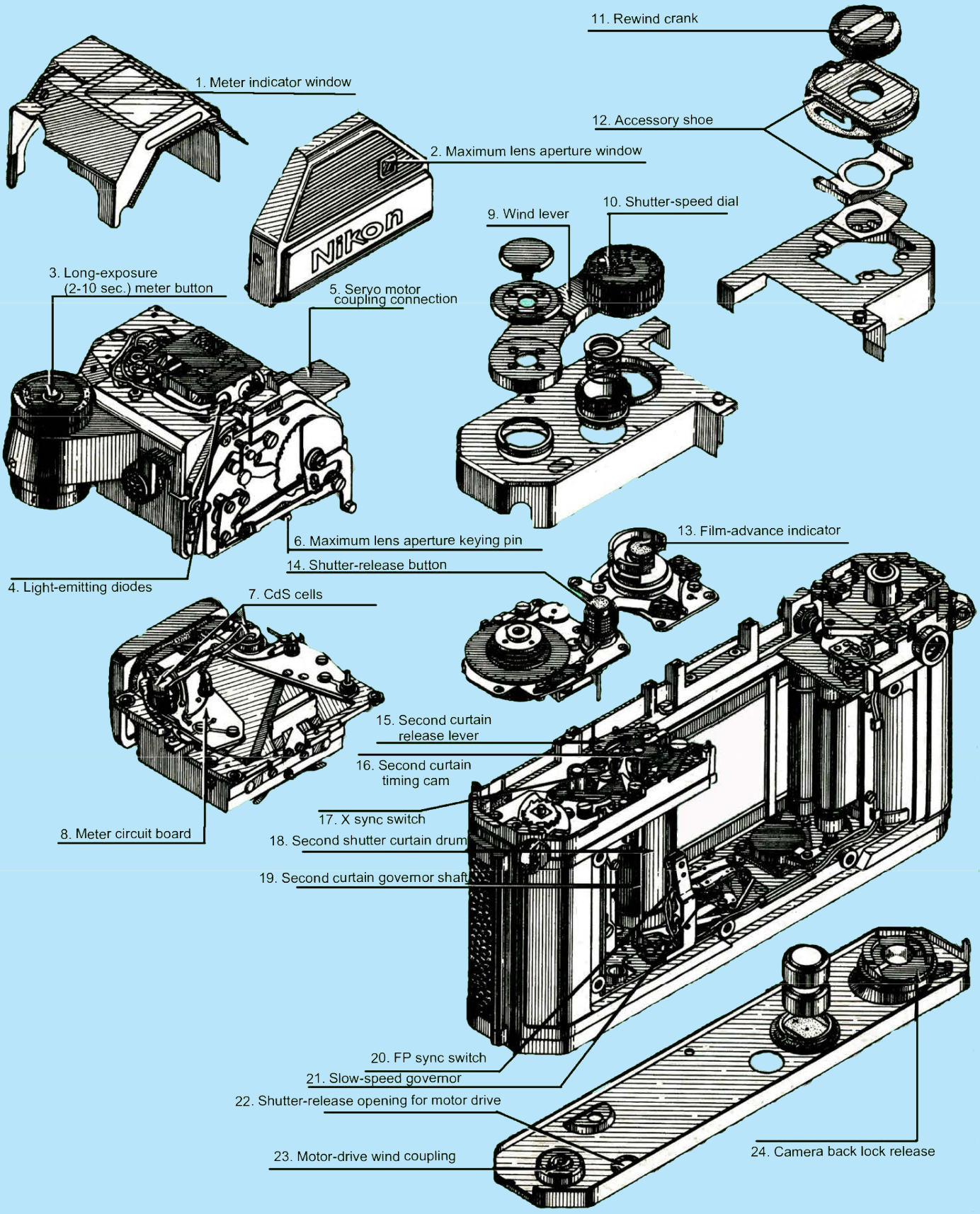
Leica Solms

Many years ago I visited the Alpa factory in Ballaigues, Switzerland and saw women assembling the cameras, just as when I visited Leica and saw the M camera final assembly by women (everything but final assembly/calibration was done in Portugal, with just enough work done at Solms that the cameras could be labeled "Made in Germany.") I was told that women have a finer sense of touch and do precision work better.

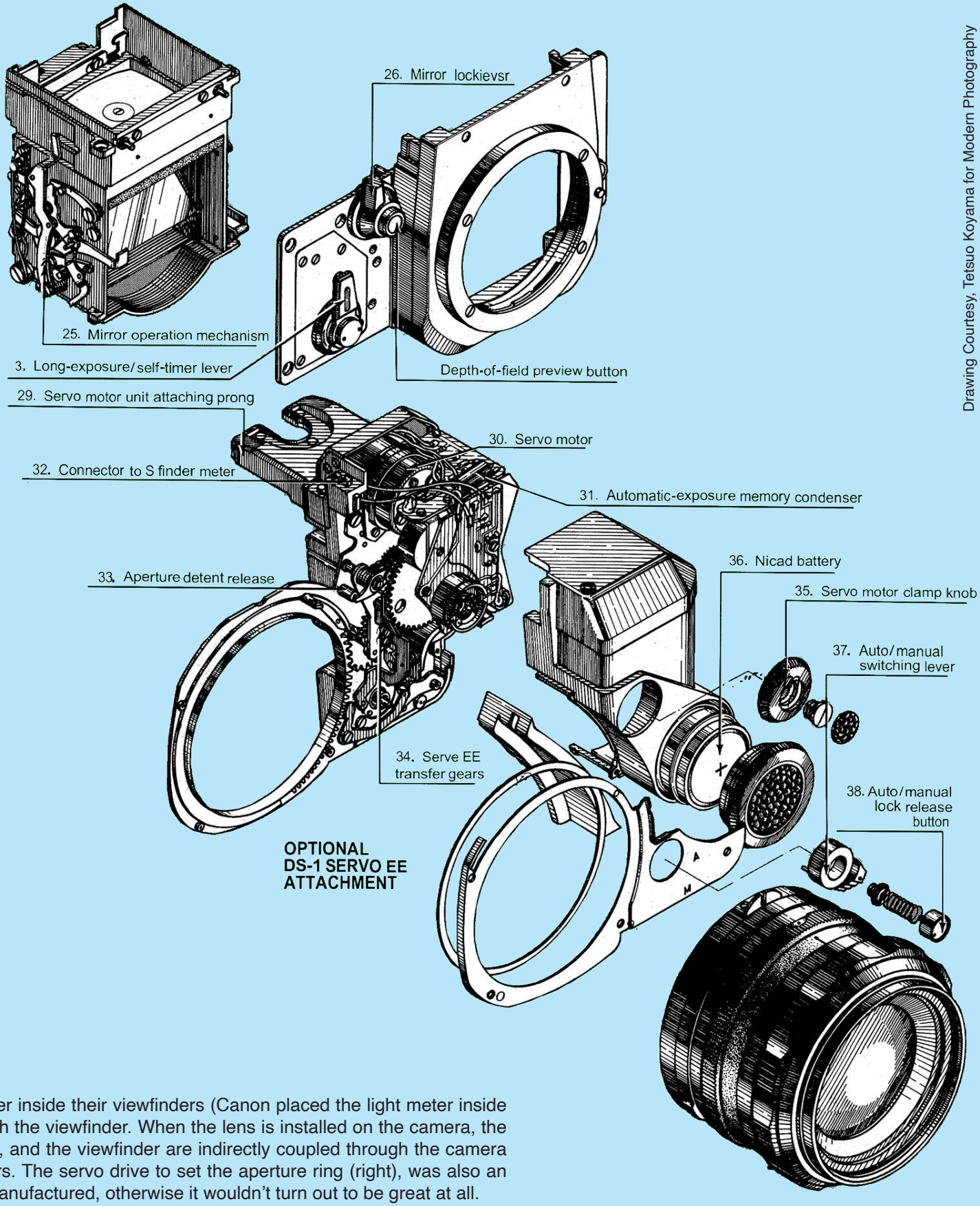
Did you know that Leica bought the Kern factory in Switzerland, that used to make lenses for Alpa and Bolex? I have a very nice pair of 7 X 35 Leica binoculars made there. You can distinguish them easily. The binoculars made in Germany have a red Leica badge, the Swiss ones have a pale blue Leica badge. I've seen no difference in quality, but the Swiss ones cost less.

Contarex

The mirror mechanism on the Contarex camera is also unique. The mirror is moved by a rotating drum with a slot that engages a lever that moves the mirror. Almost no vibration! The sound a Contarex makes when you fire it is absolutely unique.



Nikon F2AS is one of the masterpieces of opto-mechanical engineering. As we saw in the last issue, Nikon housed their light their F1 camera). The aperture ring in Nikon lenses have an iconic aperture keying prong that mates with a coupling pin (6) be aperture ring has to be rotated back and forth to register the new lens with the camera. The difficulty of this design is that the body. Yet Nikon engineers made it work so well that it was not brought up as a problem in the hands of professional photogra optional accessory that was so reliably engineerd. Just having a great idea isn't good enough. It has to be well implemented, a



Drawing Courtesy, Tetsuo Koyama for Modern Photography

meter inside their viewfinders (Canon placed the light meter inside eneath the viewfinder. When the lens is installed on the camera, the lens, and the viewfinder are indirectly coupled through the camera aphers. The servo drive to set the aperture ring (right), was also an nd manufactured, otherwise it wouldn't turn out to be great at all.

Norita

Have you ever seen the mirror mechanism of a Norita? Also very low vibration for the size of the mirror. The mirror doesn't just flip, it swings backward and up so it can clear the back of some lenses (like Minolta SRT-101). Now there was a great camera that failed due to poor marketing. I've seen early ones with the Rittreck name, and very late ones with the Warner nameplate. Warner showed a range of Zeiss lenses for the camera, but I don't think they went into production.

Norita 6x6 Med Fornat camera

Weber 35

There was also a Weber 35mm SLR made in Germany shown at photokina, but never produced. It accepted Contarex mount lenses for auto exposure. You really should attend photokina. There's one this fall. Get press credentials under the name of your museum, and you can attend press conferences.

Pentax Auto 110

One of my favorite SLRs is the cute little Pentax 110 SLR. I have the complete set in a fancy presentation box. Like the Rollei 35, that camera was designed by an outsider who took the prototype to Pentax. You know, its too bad that Zeiss ended up at Yashica after the joint venture with Pentax didn't work out. Pentax would have built better Contax cameras. They ended up with multi coating and the K mount, but could have had so much more.

Pentax Auto 110 camera with telephoto, and wide angle lenses

I'd been putting together my camera collection since the 70s, and had gotten some really rare items, most of which had to be sold. I had a Contarex Super Electronic with both of the Zeiss zoom lenses and the 85mm f/1.4 T* Sonnar. Very few of those were made with the T* multi coating right before Zeiss-Icon went out of the camera business in the early 70s. I was a dealer then and picked up some things I knew would be collector's items years later, like the Hologon camera. I had an early Contax rangefinder camera with the winding knob on the front instead of the top. Zeiss collector Mead Kibbey said it had the lowest serial number he'd ever encountered.

One of my favorite lenses that I had to sell was my 300 mm f/2.8 Zeiss Tele-Apotessar, a very rare German made lens. I got something like $ 8,000 for it from a collector in Japan. I had a Rolleiflex SL 3000 outfit with several film backs and the 50mm f/1.4 Zeiss lens, made in Germany not Singapore. I had a rare German-made King and Bauser Regula Reflex CTL 2000 (Mine with the Pentax/Praktica thread mount. I was never able to track down one of them with Nikon mount, although the factory says a few were made. You would have liked the unusual shutter design that preformed the shutter slit and had separate timing cams for each shutter curtain.). I wanted a Warner Reflex medium format SLR with a range of Zeiss lenses, but never found one.

Heinz Kuppenbender designer of Contax

I did have a Combat Graphic, a 6 X 9 motorized rangefinder camera that looks like a giant Contax. I had a Konica Hexar RF with all three lenses. (Did you know that Konica wanted Leica to sell that camera with Leica's name on it? True. I was at photokina standing by the Leica stand when the red-faced Konica people came rushing out after Leica said "NO!". They were very upset because they had lost face in front of the Leica designers who were not impressed with their camera.) I had a Yashica Samurai half frame camera, a transparent display model showing all the internal workings. Everything worked on it, but you could not take pictures with it because it was transparent. I had an original model Leicaflex.

Similarly, I kept my Soviet cameras because they were hard to get. The nicest is the Almaz (Diamond in Russian) made to be a professional SLR by the Leningrad Optical-Mechanical Works (LOMO). It's very strange beast with a body styled after Minolta's pro camera, a Pentax bayonet lens mount, a shutter

copied after the Copal Square shutter, and a prism housing styled like a Nikon F2 (right). It is very well made with coupling for a motor drive that may never have been produced. It has interchangeable focusing screens (I have two different ones), but no light meter. But the camera has a serious mechanical design flaw. If you set the self-timer without first cocking the shutter the camera jams and must be disassembled to unjam. For this reason many of them have had the self-timer lever taken off.

Almaz camera by LOMO

I also have some Chinese cameras from the 1980s. Seagull DF-1, a copy of a Minolta SR-1, Peafowl DF-1, quite similar but from a different factory, and one of only two Seagull DF-1 ETM cameras ever taken out of China. It uses full aperture metering via a follower on the aperture ring, similar in concept to Minolta but not compatible, with LEDs to indicate over, under, and correct exposure. Of course I also have a Great Wall DF-1, a medium format SLR with, of all things, Leica thread mount for the lenses. I also have the hand grip and extension tube set for it. I got all of these Chinese cameras direct from China in the early 80s, by way of Zhing-zhi Kwan, a friend who owned Chinese restaurants in California. I was hoping to import and sell some of these, but the ex-factory prices were too high. I did import the Seagull medium format TLRs for a couple of years but quit because delivery was too slow and there was no quality control. In a shipment of 100 cameras, maybe 75 could be sold without repairs. The Haiou shutter was the weak point. A copy of an old Compur but made from inferior materials.

Kiev Camera from Bob Shell's collection

Contax RX

I switched to the Contax RX with focus indicator. Anyway I then added the AX for Autofocus with my existing lenses. Very unusual design, like one camera inside another. Also very delicate. I had to open mine up and unjam the AF system after a bump. I also had the Contax autofocus "rangefinder" camera with all of the lenses (even the Hologon). I was really upset when Kyocera killed the product line as I was just starting the text for the Contax 645, and wanted one of those. Kyocera's decision took Zeiss totally by surprise, and still makes no sense to me today. The Contax division was showing a profit, as was Yashica. The shutdown put a lot of good people out of work. I got to borrow a Contax 645 for a couple of months, with three lenses. It was an amazing camera, very advanced. I kept hoping some other company would buy Kyocera's photo assets and put it back into production.

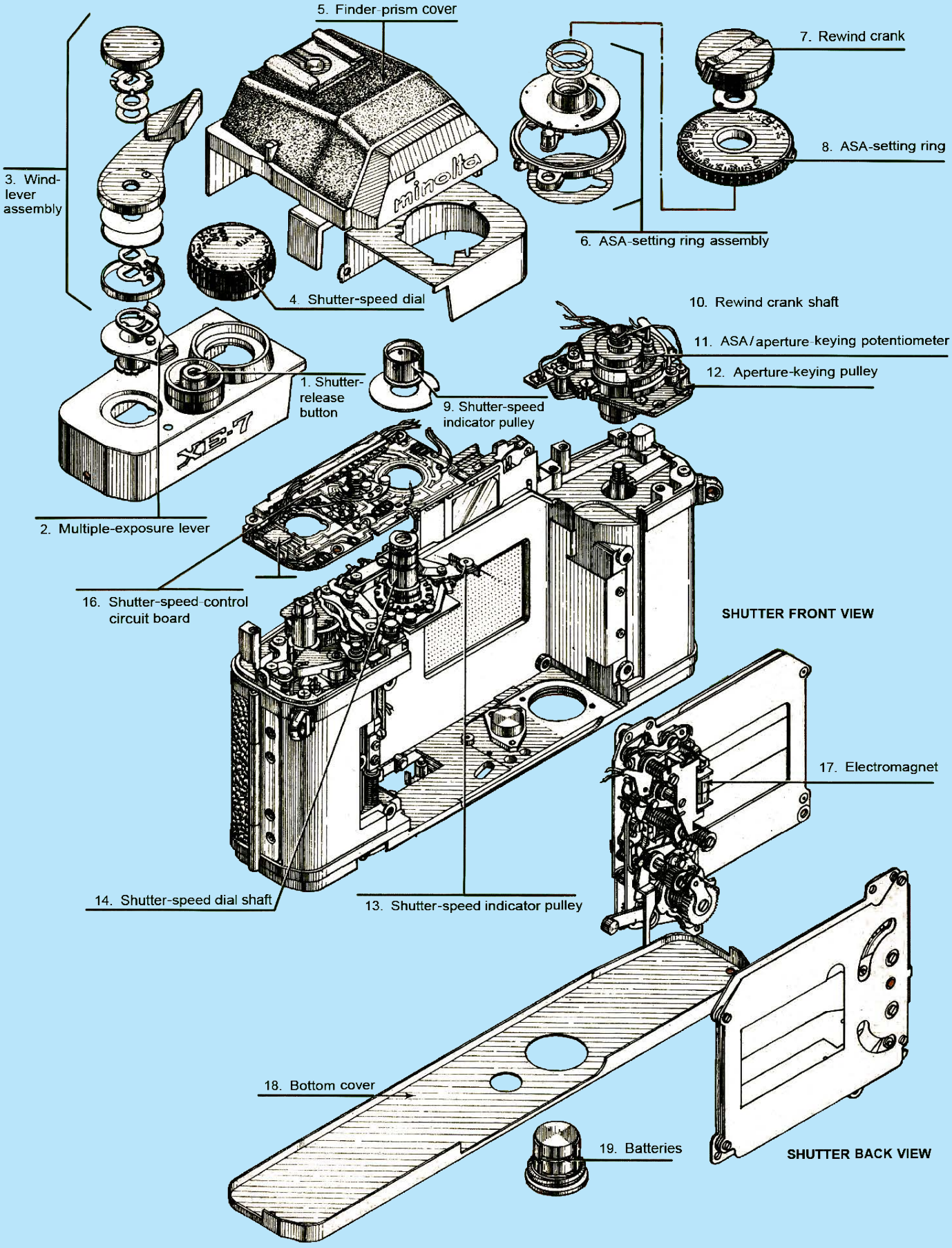
Going back to Rollei and their problems, I have a Voigtlander VSL3E made by Rollei in Singapore (essentially the same as the Rollei SL35E. with some styling changes) that I bought brand new very cheap because it didn't work. The reason it wouldn't work was that there was no spring on the second shutter blade set. It never could have worked, but passed quality control. The poor quality of the Singapore cameras and lenses killed Rollei and forced them into bankruptcy. The saddest part is that the SL35E is an excellent camera. I have the repair manual and it is an impressive design. If Rollei could have just gotten control of their quality issues they would have been very successful. I have the power winder for my SL35E, and opened it up out of curiosity.

Rollei SL35E from Bob Shell's collection

The internal parts are Canon branded! I also had the rare motor drive, but was talked into selling it to a German friend who collects Rollei. I used my SL35E for years before switching to a Contax RTS system when that camera came out. The original Sugaya shutter had a fatal flaw, though. The shutter curtains were pulled by silk cords that ran on small delrin pulleys. If you used the camera long enough, eventually one of those cords would slip off a pulley and the camera would lock up. Simple to put the cord back on the pulley, but required a major stripdown of the camera to get to it. The RTS II remedied this problem by switching to shutter tapes on wider pulleys like everyone else used. The RTS was always difficult to work on because there were many wires to unsolder if you had to go deep into the camera. Not like Nikon F2 which was very easy to disassemble, perhaps the easiest.

Contax 645

I actually was allowed to have one of the late, nonfunctional Contax 645 preproduction cameras built for show, and given permission to disassemble it. Everything was there except the electronics. I was impressed by the big Copal shutter (same as in the current Fuji-built Hasselblad cameras as well as in the last Mamiya 645 cameras). The mechanical design of the rest of the camera was impressive, too. Does anyone have repair parts for them now?



Drawing Courtesy, Tetsuo Koyama for Modern Photography

Minolta XE-7

Minolta XE-7 Developed by Minolta design group, its design was copied in Leica R3, making it Leica's first successful SLR. This is the perfect example of Japanese camera body design:

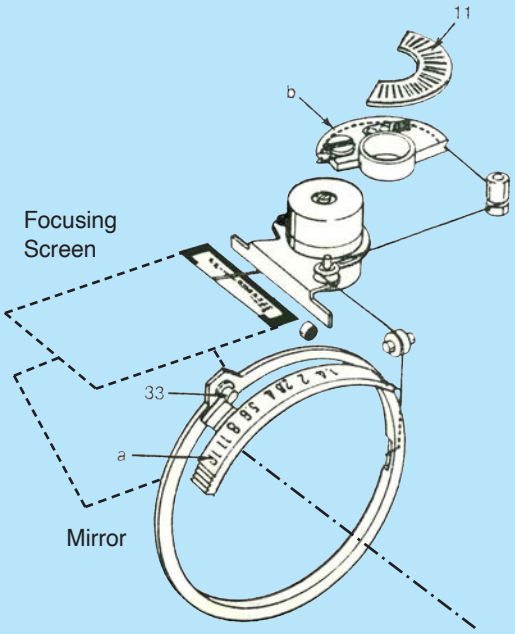
1) The mirror mechanism secures the focusing screen, the pentaprism, and the meter cell.

2) The shutter unit, in this case, an electronically controlled metal blade shutter made by Copal, goes between the main body, and mirror housing.

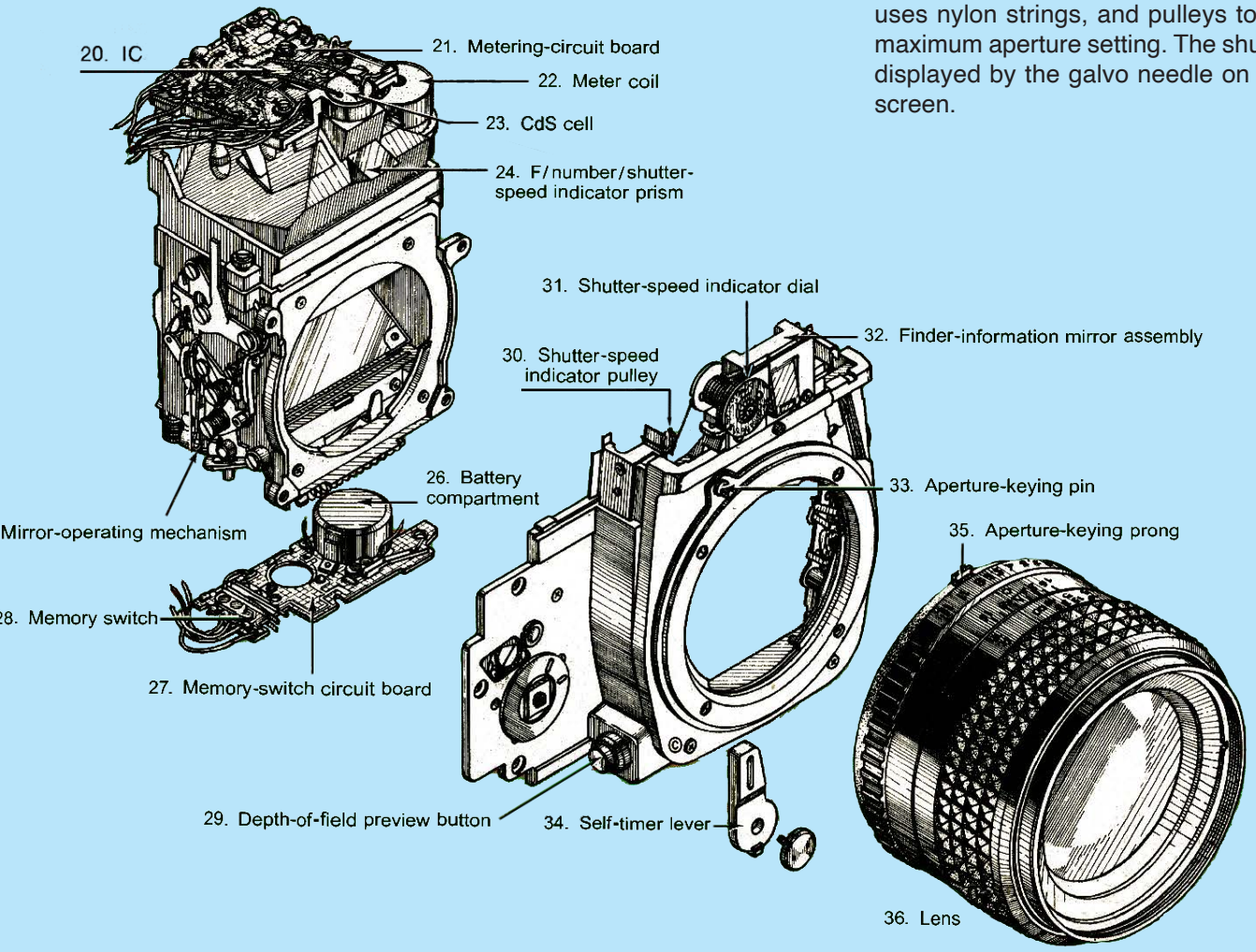
3) The diecast body contains the film advance gears, and the galvo assembly, and some of the shutter control electronics.

4) all the camera controls such as the shutter speed dial, the ASA setting ring, film advance lever, and shutter release button go through the top plate to mount to the main diecast body.

5) Top, bottom, and back cover plates are all made of pressed sheet metal.



XE7's aperture ring (a) to body coupling pin (33) uses nylon strings, and pulleys to transfer the maximum aperture setting. The shutter speed is displayed by the galvo needle on the focusing screen.



I was really upset when Kyocera stupidly killed the camera. I've heard that many are still in use today with digital backs. I saw a bunch of photos in Rangefinder magazine recently credited as taken with Contax 645. I think it was a better camera than current Hasselblad and Mamiya cameras. As for design, the only name I heard associated with it was Sugaya, and the person who said that, an employee of Contax USA, might not really have known. The last technical Representative at Contax was a man named Blake Ziegler. I'll see if anyone can track him down for me. We were pretty good friends back then. He was really bitter about losing his job when Contax USA shut down. Last I heard from him he was looking for a new job in the photo industry.

Contax 645 4.5x6 cm format camera

Canon

Most of the Canon people I knew well have either retired, moved to other companies, or died. There's a good picture of Chuck Westfall on the Shutterbug website with the remembrance Jason Schneider wrote. I first met Jason around 1980. There's a photo of me at home that he took in Rochester, NY in the mid-90s with a Kiev rangefinder camera. He and Burt first got me interested in Soviet cameras and watches I met Ken a few times, I think. If it's the same Ken, he has a liking for American pizza and loud rock music. I'll have to start over in meeting people. One friend worked for Canon USA for years, then went to Nikon USA for several years, then went to Sony's camera division, and then to Panasonic! Another friend was with Leica, then went to Contax, then to Durst, and finally to Sinar, which he left to start his own camera shop and picture framing business.

I wrote two main Canon books, Canon Compendium and Canon Classic Cameras. I never liked the name Compendium, which was the publisher's idea. I wanted to call it Canon History, The History of Canon, or something like that. It's more for collectors and photo history fans. The Classic Cameras book is for people who want to use the cameras. (A friend still uses the T90!). I also wrote a bunch of user's guides to specific cameras from Canon, Nikon, and Olympus. Those were "formula" books, all basically the same. The last one of those I wrote was on the Canon EOS Rebel Ti. Those user books were easy money. But after the Ti they stopped doing them. All of my books were done in German editions, the users books done with German co-authors. I'd write my part in English and my co-author (Heiner Henninges for most of them) would put it into German; he'd write his part in German and I'd put it into English, and the books were published simultaneously in both countries. But due to a dispute between the English and German publishers I never got a penny in royalties on the German books. I was supposed to get 1/3 of what the Germans paid, but they never paid. Last I heard the matter was still in the German courts, which move even slower than ours. I'll be surprised by a check one day.

Hasselblad X-Pan

Do you know the story of the Hasselblad X-Pan? It was, of course, made in Japan by Fuji. It was sold in Japan with Fuji's name on it. It was beautifully made and the lenses were exceptional. I had one on loan for review and loved it, particularly that you could switch back and forth between standard and panoramic pictures anywhere in a roll of film. Then it abruptly disappeared from the market, even though it was selling well. What happened?

The answer was that the European Union suddenly banned any electronics assembled with lead-based solder. The X-Pan and all other Fuji cameras made at that time were suddenly banned from sale in the EU. It was too expensive for Fuji to switch to a new type of solder, so all those fine cameras that contained very tiny amounts of lead were discontinued. Sad story of stupid and excessive regulation. I really wanted one, but even at Hasselblads.

Hasselblad X-Pan 35 mm Camera

Alpa 11Si

There's more to the Alpa story. I'm pretty sure that the company fell apart on the death of Mr. Bourgeois, since he was the driving force. The other directors just didn't care about photography. Digital had nothing to do with the demise, as Alpa had fallen apart long before digital came along. Alpa's problem, at least in the USA, was lack of a committed distributor and sales force after Karl Heitz died. Gitzo was also near collapse until Lino Manfrotto bought it. The last Swiss Alpa, the 11si, was built to even higher standards than the previous Alpa cameras. When I took the top off one, the mechanism was just beautiful! You didn't have to unsolder any wires, as all were fitted with elegant little gold-plated plugs and sockets! I never saw that in any other camera. The camera was designed for ease of service.

In the late 80s or early 90s, Alpa showed a new modular shutter they had developed. I saw it at photokina one year. It was vertical travel with plastic curtains and could maintain an accurate slit width for 1/4000 second! It was designed for a motorized camera. A whole new camera series was planned around this shutter. But the company collapsed before they could be produced. I'm sure someone has the prototypes. I'd love to see them. I'm sure Alpa would have gone to an internal auto aperture on those cameras and lenses. We can only imagine what they would have been like. Maybe an internet search would turn up pictures of the prototypes.

Alpa 11Si 35 mm Camera

I once bought an Alpa 10d that had fallen into a lake. Paid $ 50 for it with Macro Switar lens. I cleaned the lens and bought a set of new diaphragm blades from Martucci to replace the rusted ones, and the lens was fine. Sold it for a lot more than I paid for camera and lens. I got the camera cleaned up internally and the shutter working and calibrated. Couldn't get the meter to work and a new meter cost too much, so sold the camera meterless. Also bought a Hasselblad 500CM that had been in water. I rescued the lens, but the camera was too badly corroded. I gave it to a friend who put it in his fish aquarium!

Back to prototypes, at Solms I saw the Leica prototype collection in a glass display case in their main lobby. There were some interesting ideas there. I wanted photos for an article, and they promised them but they never sent them.

Minolta

I have three Minolta cameras in my collection. One is the pro Maxxum with stainless steel outer covering, one is a self contained zoom digital (I don't recall the model, but with the right filter it takes great infrared photos), and one is a really beautifully designed little digital pocket camera. To make it tiny the zoom lens points up and uses a mirror to look forward. Unique design. The President of Minolta liked me and was always gifting me with cameras.

Mamiya SLR

Was it one of those with the retard mechanism under the mirror, and you had to remove the bottom plate of the mirror box to get to it? I always hated to work on those! Those, Petri and Kowa SLRs were my least favorite things to see come in the door of my shop.

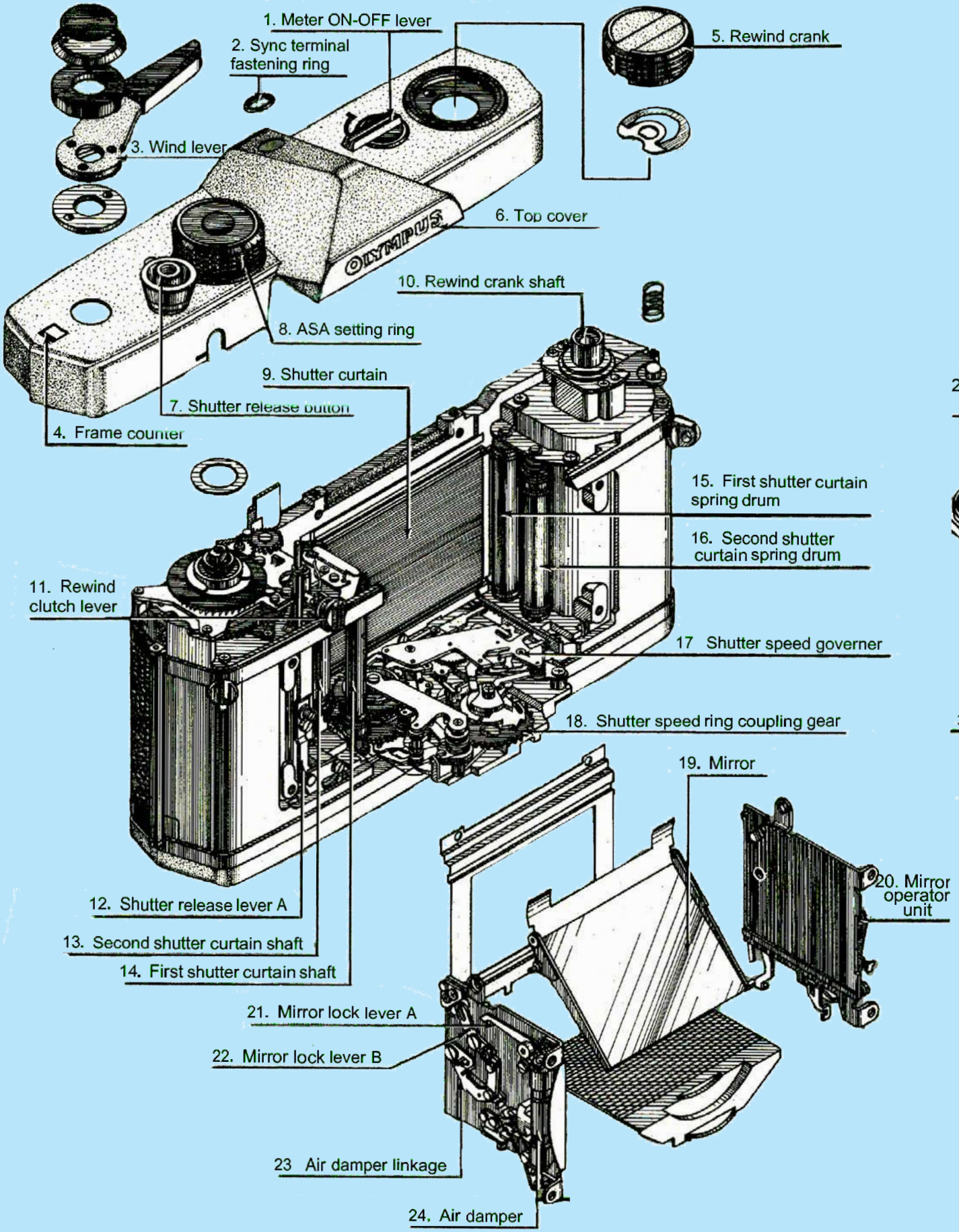
I guess it was time to do away with the reflex mirror, which predates photography by hundreds of years. I've seen a Renaissance camera obscura with mirror and ground glass screen on top of the box. It is said that Leonardo may have used one, and it is certain that Jan Vermeer did. I've handled those giant SLR cameras that Graflex and others used to make. They shake like hell when that big mirror flips! At one time Arca made a 4 X 5 SLR that I saw at trade shows, and I believe that Cambo also made one.

Canon EOS RT

I have in my collection an EOS RT with non-moving semi-silvered mirror, Canon's second version of the non-moving reflex mirror, after the Pellix and High Speed Motor Cameras. Those pellicle mirrors were just too fragile. The RT works great and automatically compensates for the light loss the mirror creates. I did a lot of photography with it. I believe Sony borrowed this idea for their SLR cameras with "translucent" mirrors before they went mirrorless.

Canon EOS RT

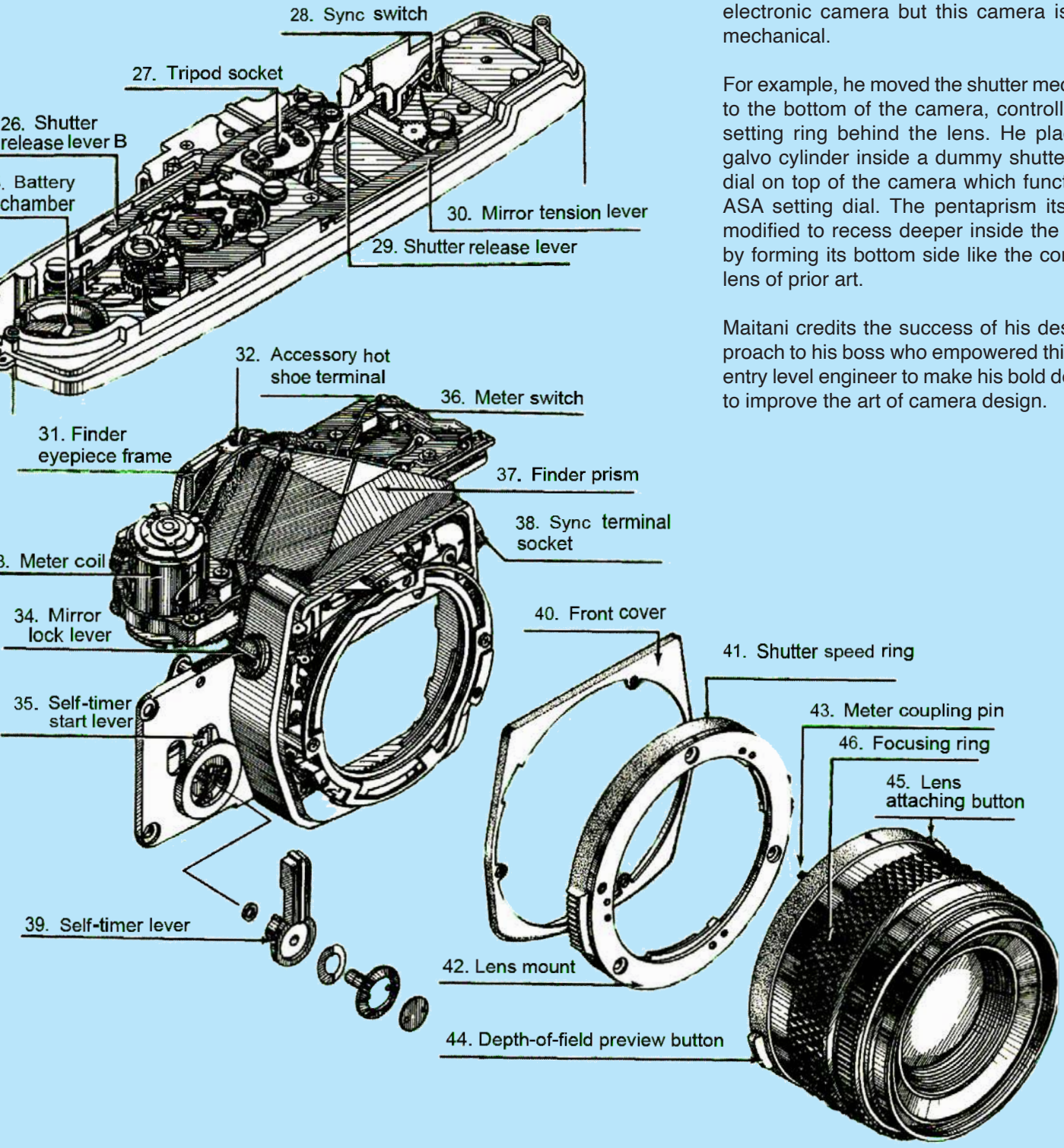
I'd heard about the mirrorless EOS full frame camera from a friend, but knew no details. Sounds interesting, particularly if I could use my existing lenses on it. I had the first generation 28-70 f/2.8. It was very fragile. A slight bump broke the internal metal lens barrel and converted it into a tilt lens!! Wasn't cheap to fix. I was afraid of breaking it again so I put it on eBay and got rid of it. I hope these new lenses with big, heavy glass and thin barrels don't have the same weakness. I think with today's rush to get products to market, sufficient field testing often isn't done, resulting in problems like that. (I heard from one of my contacts inside Canon that they had so many problems with that lens that they rushed through a redesign of the internal barrel.)



Drawing Courtesy, Tetsuo Koyama for Modern Photography

Olympus OM1

The most compact, light weight 35 mm SLR ever built. OM-1 is a system camera, featuring interchangeable lenses, focusing screens, motor drive option, and 250 exposure film back.



As much as Oscar Barnack started the 35 mm photography by inventing his focal plane shutter in 1924, Maitani contributed to the most innovative designs for 35 mm format. He dared to implement folded optics normally used in 16 mm cameras inside his half frame 35 mm camera, Olympus Pen-FT. He also dared to relocated everything inside the camera to save space inside his marvel of engineering, Olympus OM-1. Moving around the inner components isn't a big deal if you are designing an electronic camera but this camera is purely mechanical.

For example, he moved the shutter mechanism to the bottom of the camera, controlled by a setting ring behind the lens. He placed the galvo cylinder inside a dummy shutter speed dial on top of the camera which functions as ASA setting dial. The pentaprism itself was modified to recess deeper inside the camera by forming its bottom side like the condenser lens of prior art.

Maitani credits the success of his design approach to his boss who empowered this young entry level engineer to make his bold decisions to improve the art of camera design.

Praktica

Sir John Noble. John's family owned Kamera Werkstatten (maker of Praktica and Practina cameras) in Dresden before WW II. John went there after the war to try and get it back and was taken to Russia and thrown in prison in Siberia for years even though he was a U. S. citizen. After German reunification he was released and eventually got the factory back. He began production of the Noblex panoramic cameras there, with lenses from Zeiss Jena. The man who could tell you the whole story is John's son, John Jr. I don't know how to contact him, but Mark Tahmin of RTS company would know. He's an old friend who used to be USA importer of Noblex (and Sekonic, Multiblitz, and many other products). I hope RTS is still in business. Is Jack Naylor's museum still there? That was Naylor Collection Number Two. He sold Collection Number One, and missed it so much that he started over again and rebuilt it. I think the first one was sold to a collector in Japan.

Praktica Super TL

KEH was started by King Grant, a really nice and very honest man. The initials KEH are the initials of the first names of his three children. I used to visit him whenever I was in Atlanta, and browse the shelves of his warehouse. In 1995-96 when I was writing Canon Compendium he helped me track down some rare Canon cameras, and had one of his staff take excellent photos for me. I hope he and his family are doing well these days.

Minolta SRT cameras were really nice, but those little silk cords were always slipping off the pulleys. I've lost count of how many I've repaired, and that was usually the problem. The official repair manual is illustrated with funny little cartoons. Besides the Minoltas, the best built Japanese cameras in those days, in my opinion, were Pentax and Topcon, but not the Unirex series. The first Rollei 35mm SLR, the SL35 is a blatant copy of a Spotmatic mechanically. Germans copying the Japanese, now there's a change. But my long familiarity with the Pentax cameras made repairing the Rollei easy. I even used Pentax viewfinder optics in place of the Rollei parts because they were cheaper and better! I had a Rollei SL350 for a little while. Very rare because few were made and the price was ridiculous. Just like the SL35 but with built in hotshoe and open aperture metering.

Alpa:

I once visited the factory, Pignons SA, in a mountain chalet in Ballaigues, in the French-speaking part of Switzerland. I was surprised that the people assembling the cameras were all women! They explained that women had better hand-eye coordination. In the US, Alpa was distributed by Karl Heitz, who also distributed Gitzo tripods, Robot and Tessina cameras, and a few other things.

In the late '70s, a group of businessmen wrested distribution from Karl, and started TAG, The Alpa Group, to sell Alpa cameras and lenses. They convinced the Alpa people to contract with Chinon to build the two models of Japanese Alpa cameras. They were Chinon Memotron cameras with a cast metal top plate, but otherwise identical to the Chinon models, and with M42 thread mount, but much more expensive. They didn't sell at all. Alpa bought bunches of lenses from Rollei Singapore and fitted them with replacement name rings and a front ring to take 49mm Alpa snap-on filters. I had a 35mm f/2.8 Alfitar that was actually a Singapore Rollei Distagon.

I was an Alpa dealer during this period, too. The people who formed TAG were crooks, and drove Pignons into bankruptcy. It's a very sad story. Alpa was planning a super camera at the time, showed prototypes of the shutter at photokina, but didn't ever get it into production. The shutter could produce an accurate 1/4000 second, and used lightweight composite blades. The prototype was motor actuated, and I believe the camera would have had built in motor drive. I've often wondered what happened to those prototypes and the engineering drawings for the camera. I asked the people who bought the Alpa name at photokina once, but they were ignorant of it. I loved Alpa cameras as I loved Citroen cars, both examples of highly individualistic design. I had DS cars from 1966 to 1972, when they pulled out of the US market.

Retail Pricing and sales

In the early '70s I worked for a while for the F.W. Woolworth Company. In their Woolco discount stores they sold a special version of the SRT-101 camera made just for them. It was a stripped down SRT with 1/500 second as its top speed. I repaired them for the company. Big companies could buy cameras cheaper because the suppliers offered volume discounts. Some company like K-Mart could sell a camera at retail for less than my wholesale price because they bought hundreds

and I only bought five or six. A group of independent small dealers sued Pentax over this and won. Pentax, etc., were required to sell to all at the same price. The camera companies retaliated by making special models, like the Minolta SRT-101 that I mentioned, that they only sold to big buyers. So the small dealer, like me, still got screwed. My shop was put out of business in 1973 by the OPEC oil embargo. My customers couldn't buy gas for their cars, much less cameras!

Minolta SRT-101

Rolleiflex SL35 E, Voigtlander VSL- 3

These cameras were not easy to work on! I was a certified Rollei repair shop when the Rollei SL 35 M and SL 35 ME , Voigtlander VSL 1, VSL.2, and VSL 3E, and VSL 3 astronomical camera with built-in reciprocity correction for long exposures were current. I had the repair manuals for all the Rollei cameras I was authorized to repair. I repaired a few SL2000F cameras. The reflex mirror often came unglued from its hinged support, a problem that also afflicted the SLX and successors, although in those the mirror was held to its support by screws, not glue.

Camera Manufacturers

Camera companies 'farmed out' parts manufacturing to many smaller companies, and some larger ones. Mamiya made parts for many, making camera backs for Nikon, Pentax, and many others. (Mamiya also made the Rolleinar SLR lenses). Tokyo Optical (Topcon) made parts and subassemblies for others. In Germany, Gossen made light meter movements for all the others.

Kyocera, in the former Tomioka Plant, made lenses for Leica, Nikon, and others. Goko made point and shoot cameras for Nikon and others. I knew the owner, Mr Goto. Talked to him many times at photokina. Haking was another company that made point and shoot cameras sold under many names. The woman who owned Haking was aloof and hard to talk to. She bought the Ansco brand name when GAF sold it at auction. Someone else bought the Argus name, but I don't recall who they were.

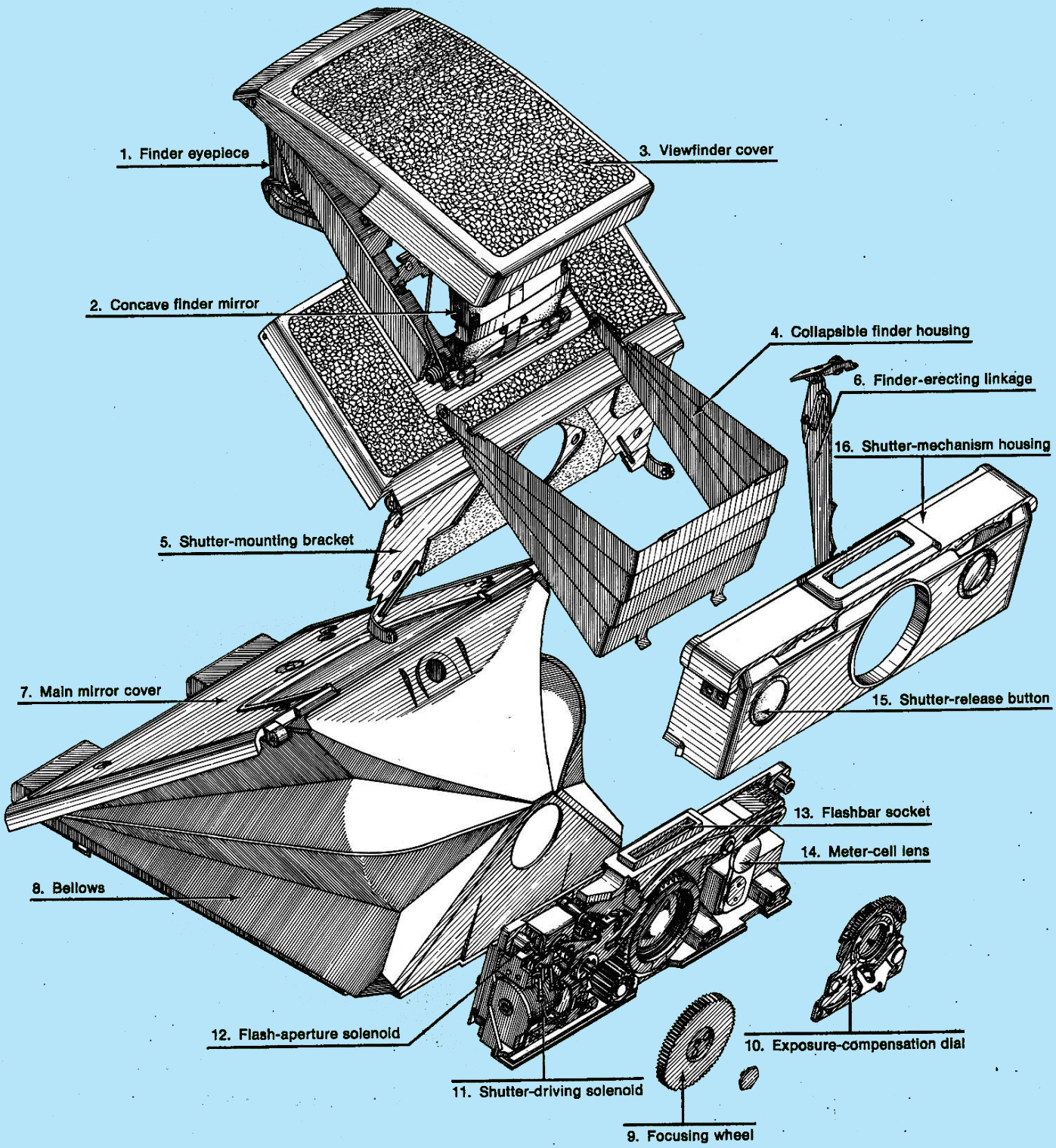
In Japan companies worked together in ways American companies never did to share the market. Another good camera Woolworth and Kresge sold in their US discount stores (Woolco and K-Mart) was Miranda. They were excellent cameras. Allied Impex Corp. was their US distributor, also sold Soligor brand lenses. You know about Vivitar. Their P&S cameras and flash units came from National Panasonic, their SLR cameras and lenses came from Cosina, while the Series One lenses originally came from Kino Precision. Sigma made cameras and lenses for many, including Leica. The camera back issue is a good case in point. Why should Nikon, Pentax, Minolta, etc., buy the press and have the dies made when Mamiya already has them. Backs for 35 mm cameras don't vary much, so it's far more cost effective to just let Mamiya make them for you. Same goes for other parts that don't vary much from camera to camera.

If you look inside European cameras, you'll find the Inkabloc logo on the die cast body shells and other parts. I assume this company made the die cast parts for companies like Alpa, Zeiss Ikon, and Rollei where I've seen the logo. When Minolta made a TLR years ago, it had the Inkabloc logo on the body casting, too. When I was in Japan once, I watched Nikon lenses coming off the assembly line at the old Tomioka factory, then owned by Kyocera. At the same time Nikon was running ads saying they made all of their own lenses! The little Nikon TI compact camera was built by Kyocera, which Nikon denied when I mentioned it in Shutterbug, but I'd seen the production line on one of my visits to Kyocera. All of Nikon's other point and shoot cameras were made by Goko.

In the '90s, I don't remember what year, I visited the Durst factory in South Tyrol. South Tyrol is part of Italy, the very northern part, but the Tyroleans speak a dialect of German and don't think of themselves as Italian. Durst, as you probably know, means 'Thirst' in German. Anyway, the Durst people were experts in die cast metal parts and metal stampings. When I was there, they were busy making stamped metal car doors for Opel, dipping the stamped parts in big tanks of anti-rust coating and then spray painting them.

Kodak Ektachrome 35 mm Film ISO 64

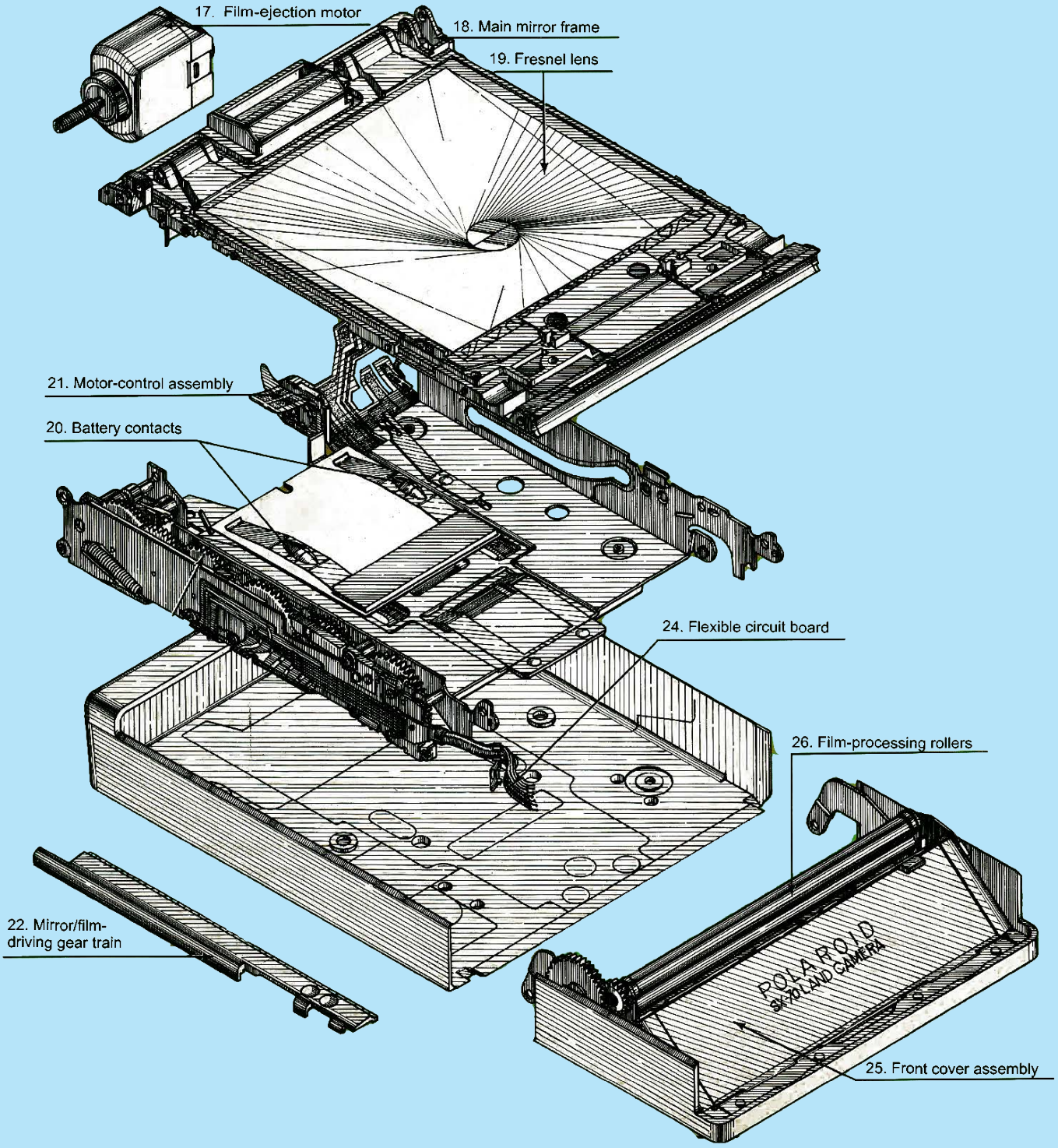
They told me they made many parts for Opel, trunk lids, hoods, underbody panels, wheels, etc. Darkroom was already on decline and they were looking to the future when there would no longer be a market for their beautifully made enlargers. They were also in the final testing phase of their big Lambda printers that took one meter wide rolls of Cibachrome and used RGB lasers to expose the image. The results were spectacular! For one photokina they wrapped a whole building in prints made with the Lambda. That printer filled a large room and sold for about $ 250,000!



The battery back in Polaroid SX-70 resides below each film pack. The two rollers (26) below the lens burst a chemical bag at the bottom portion of each picture frame, and spreads in between the negative film, and the paper back. The film develops in one minute with vivid colors. The chemistry behind Polaroid cameras is still wonderous to watch to this day.

Polaroid SX70

Designed by Dr. Land's design team, this SLR camera revolutionized polaroid photography by allowing it to focus down to 15 cm close-ups, with an ingenious foldable design. Its square, Hasselblad picture size became the most accepted format in Polaroid photography.



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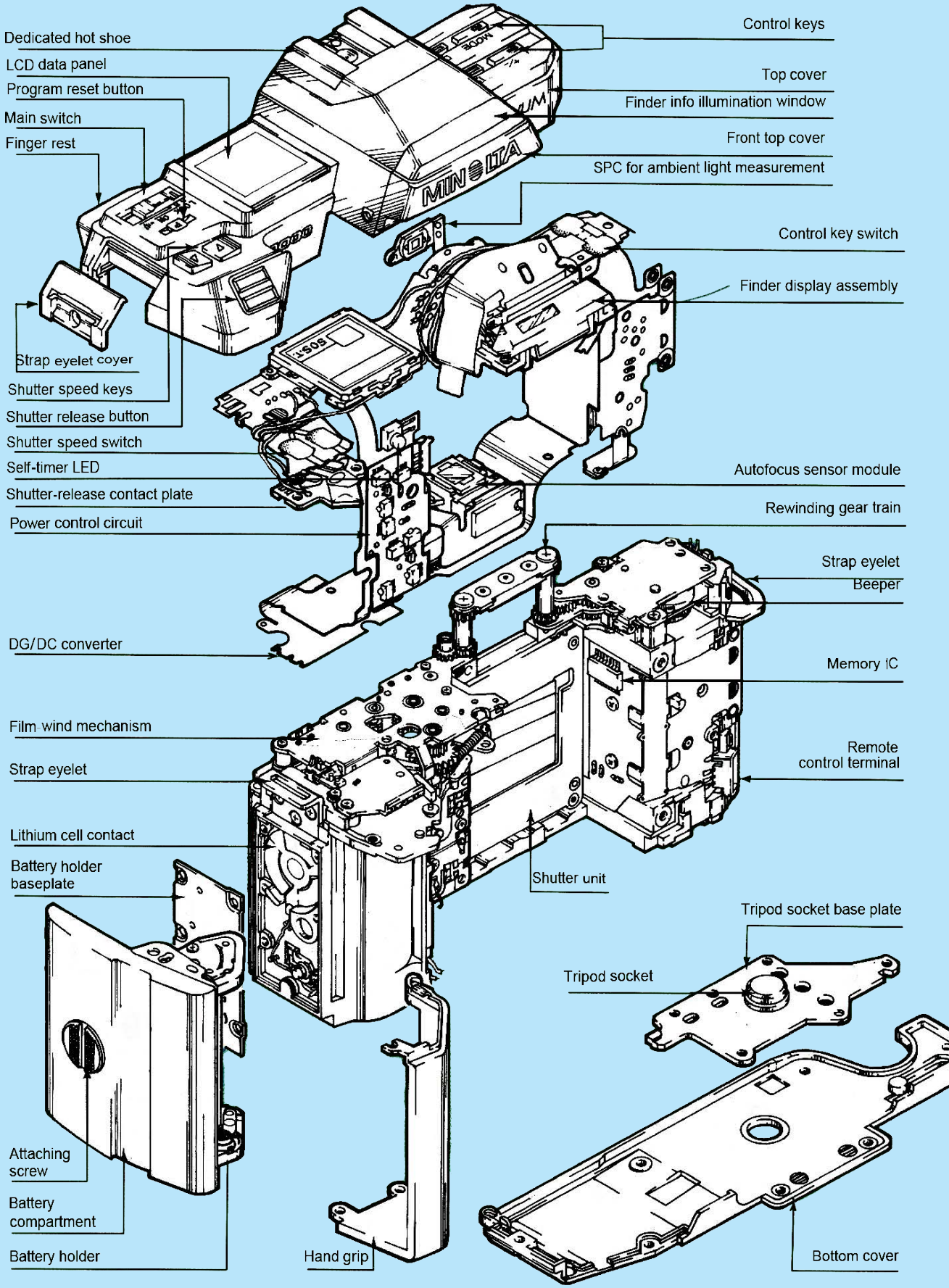
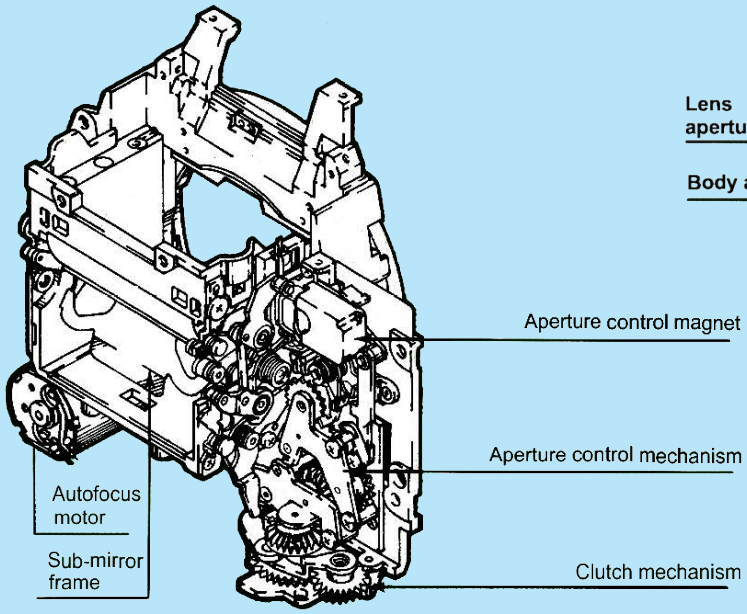
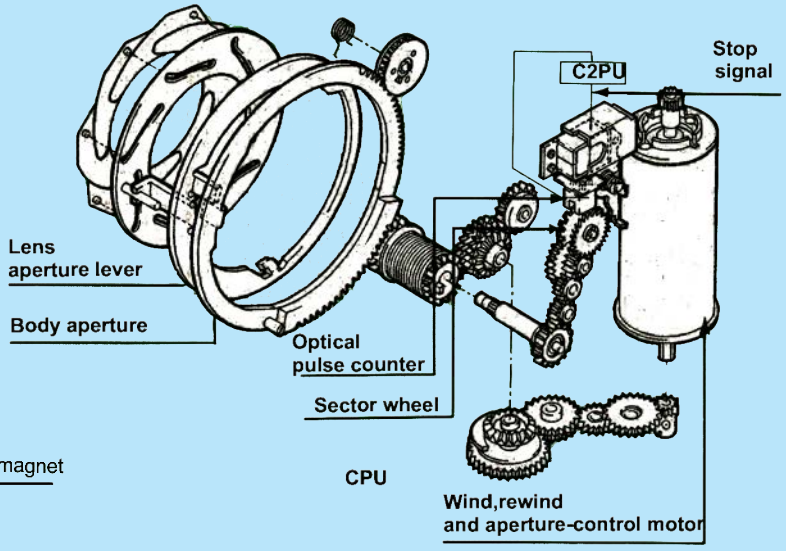


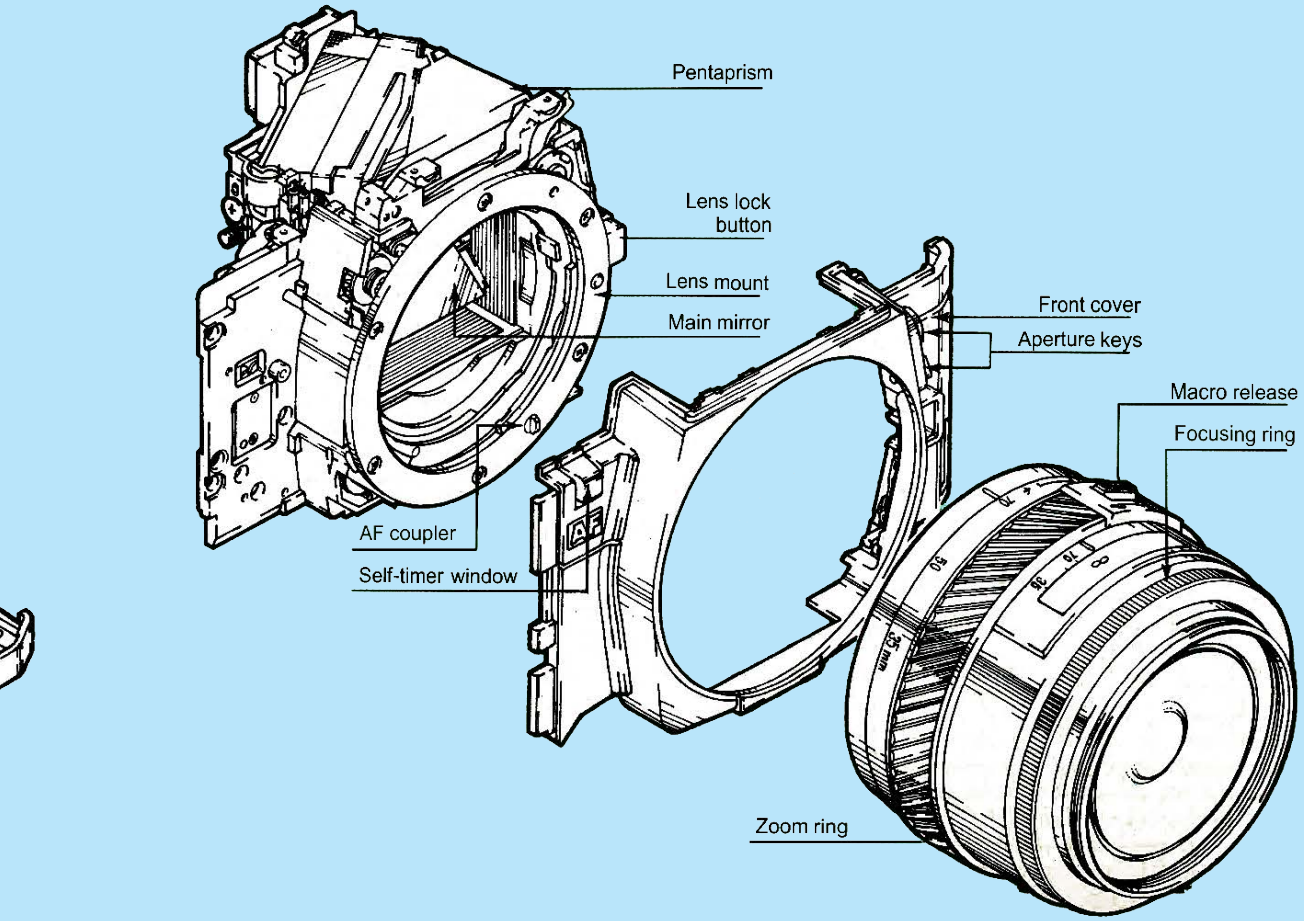
Minolta Maxxum 7000 hit the market in late 1980's with a revolutionary autofocus capability. The camera was heavily electronic with countless plastic gears. The main drive motor was placed inside the film take up spool. It wound the shutter, and advanced the film by rotating in one direction. During shutter release, it turned in the opposite direction to lift up the mirror, and to close the aperture, and to release the shutter charging gear. The aperture closing was then con-

Minolta Maxxum 7000





Back view of Autofocusing drive, with the motor inside the camera body, driving the lens focusing ring through AF coupling shaft.



Drawing Courtesy, Tetsuo Koyama for Modern Photography

trolled electronically via a stop magnet, and so was the release of the first, and 2nd shutter blade magnets. The rewind operation utilized a long train of 22 plastic gears to rewind the film! In 1924, Oscar Barnack made the shutter mechanically sequential, and after 60 years, cameras became electronically sequential, controlling the Auto Focus, Aperture setting, shutter setting, and a zoom flash to properly cover the field of view covered by the zoom lens.

Repair of Misaligned Binocular Observation Head

By Ali Afshari

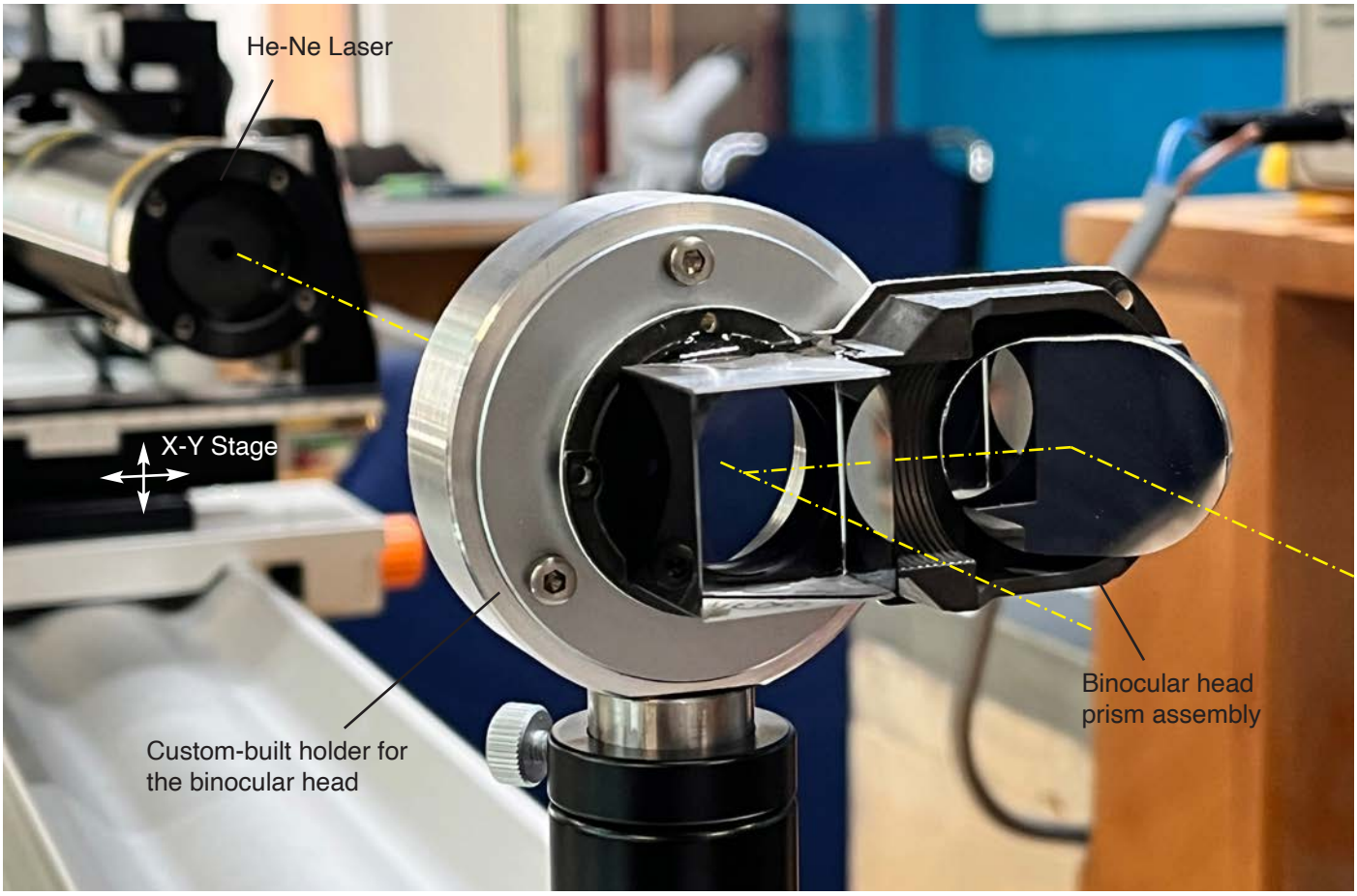
During my career in microscope image improvement, I have come across several cases where binocular microscopes were in need of optical alignment. There are basically three different types of misalignment in binocular observation heads:

1) Rotation Error: One eyepiece has a rotated image with respect to the other.
2) Lateral Error: One eyepiece has an image shifted to the right or left with respect to the other.
3) Vertical Error: One eyepiece has an image shifted up or down with respect to the other.

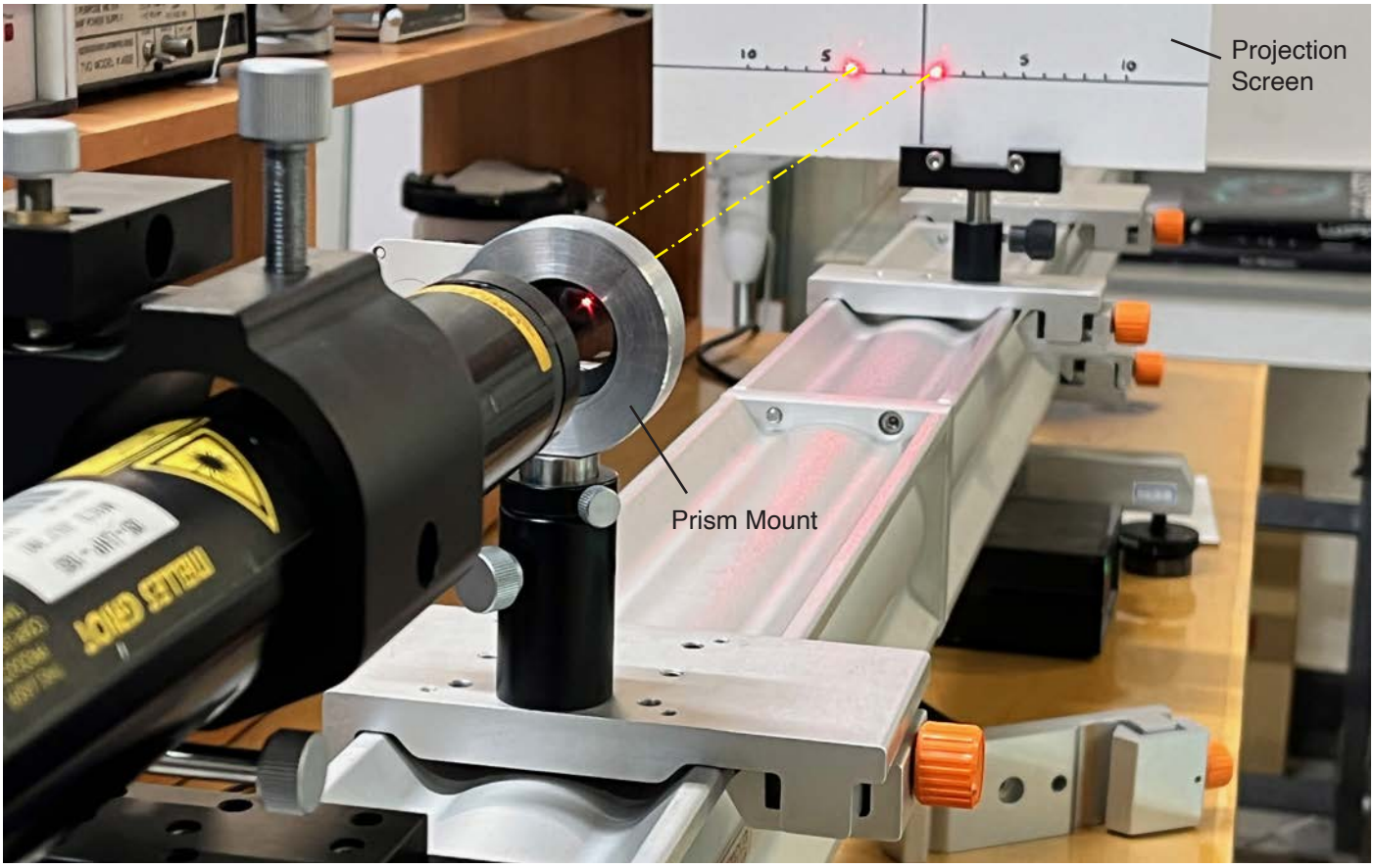
In case of the rotation error (1) or Vertical error (3), it would be impossible to see a clear image. In case of lateral error (2), the user would experience fatigue or headaches using that microscope. In this issue we'll discuss the most severe case of misalignment such as a dropped unit that sometimes would happen in a lab. As you will see, to perform the alignment of a dropped binocular head that is completely bent on its optical axis, the binocular head has to be first disassembled, and its prism be cemented back in place (if separated), and mechanically brought back to its original alignment. To do so, an optical rail (such as a X-95) would be needed and a custom-built holder for the binocular housing, in this case, a Zeiss Axiomat microscope (below).

As the beam goes through the binocular head, the beam splits onto two separate beams, and is projected on a white screen (opposite page). After straightening the parts, and reassembling them, the beams will not become automatically parallel. There are micro-adjustments inside the prism housing to realign the beams. Basically, the projection screen is brought close to the prism assembly, and then moved away as far as it could along the optics rail. If the beam remains parallel (same distance between the spots), the alignment is correct. Then the horizontality of the beams could also be corrected between at the two measured distances.

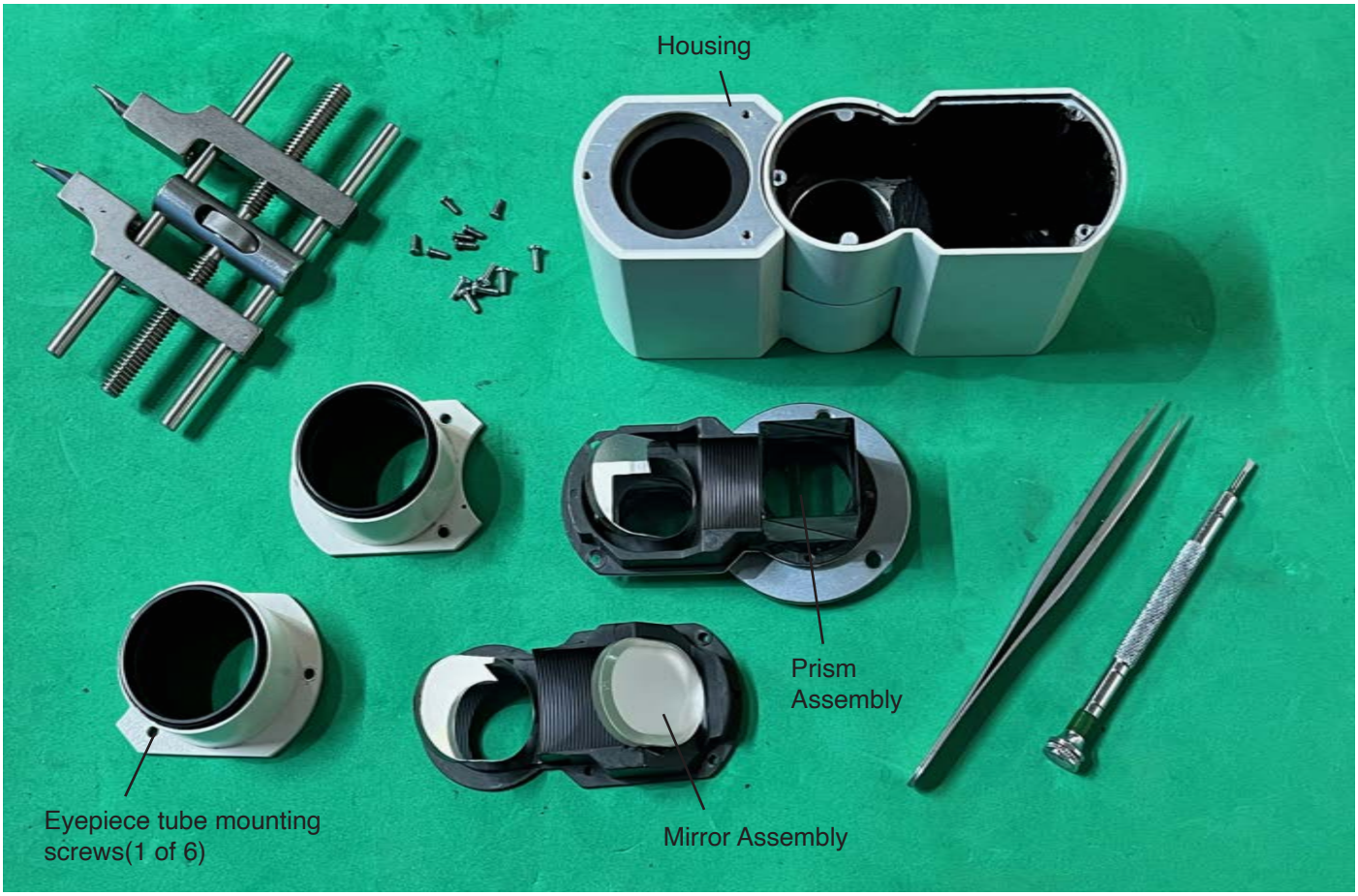
Building the binocular adapter for its mounting on the optical rail is essential part of this alignment, otherwise the beams could not be aligned correctly because the binocular head could not be held exactly parallel to the optical rail. After its final assembly, fine adjustment of the binocular head can be performed by utilizing eyepiece tube mounting screws. These screws would secure each eyepiece at its best viewing position.



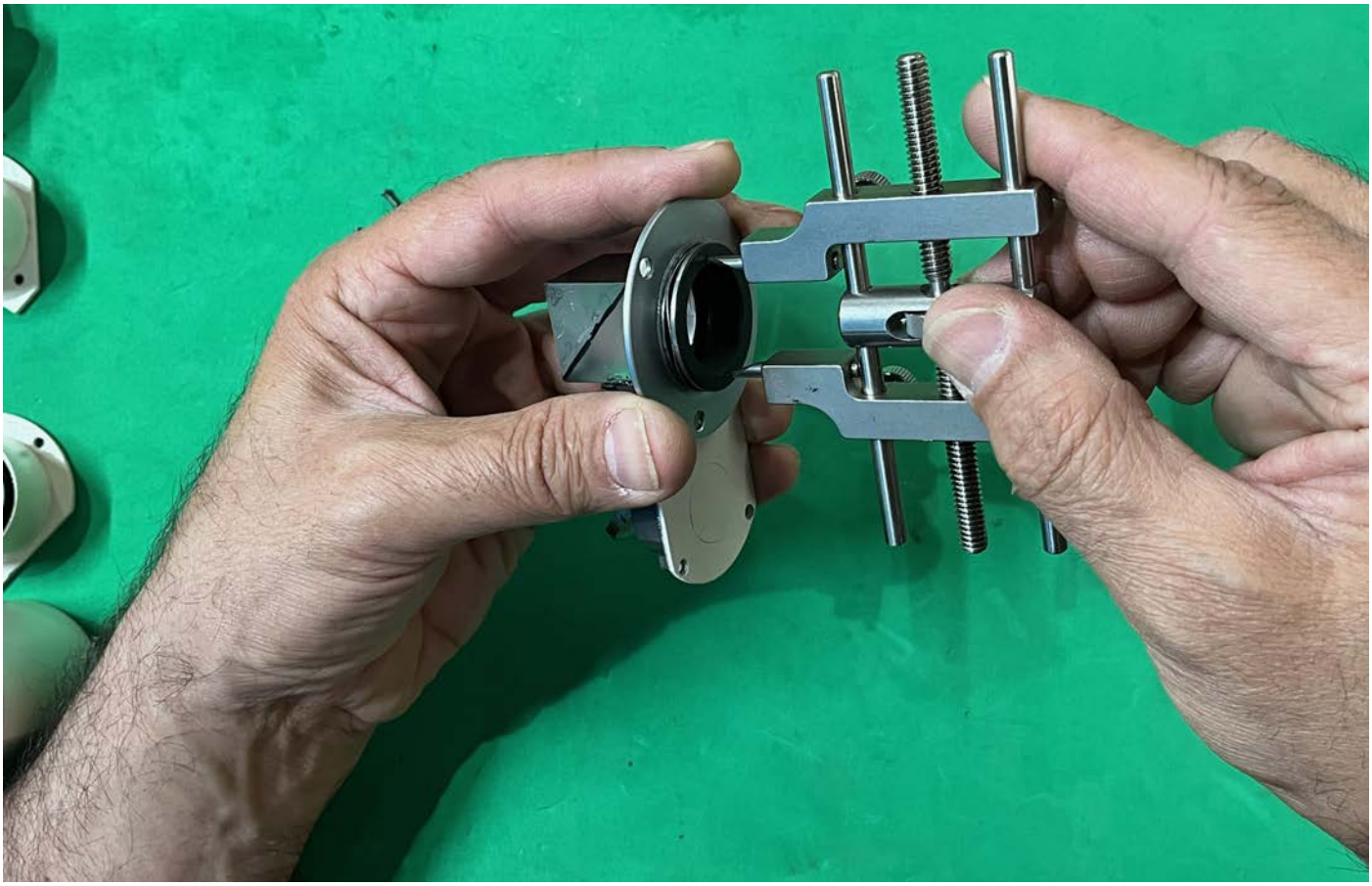
The laser beam may be seen through the air by striking the microparticles floating in the air.



Basic components of a binocular head: You'll have to find its hidden screws to disassemble it.

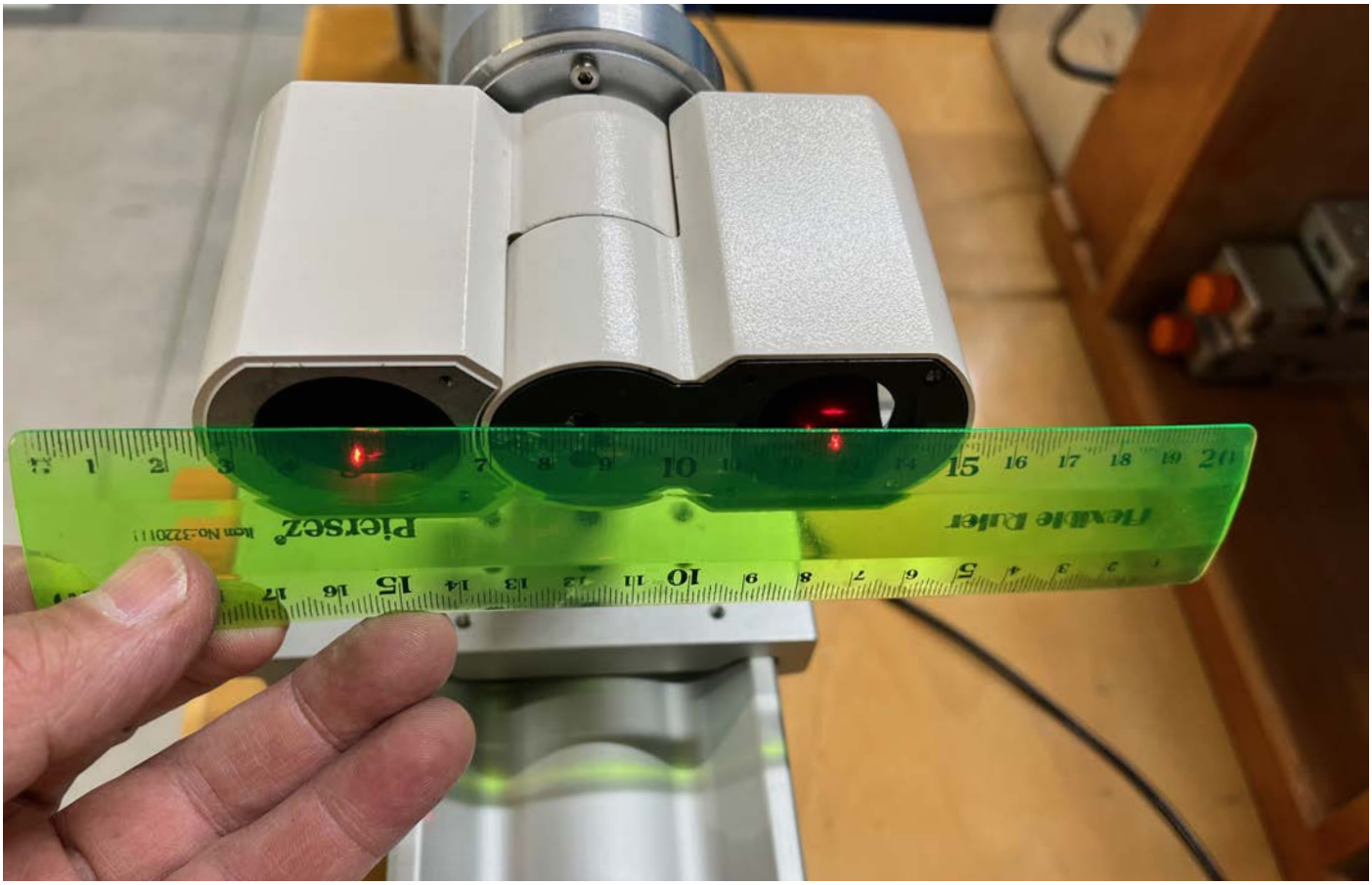


Basic components of a binocular head: You'll have to find its hidden screws to disassemble it.

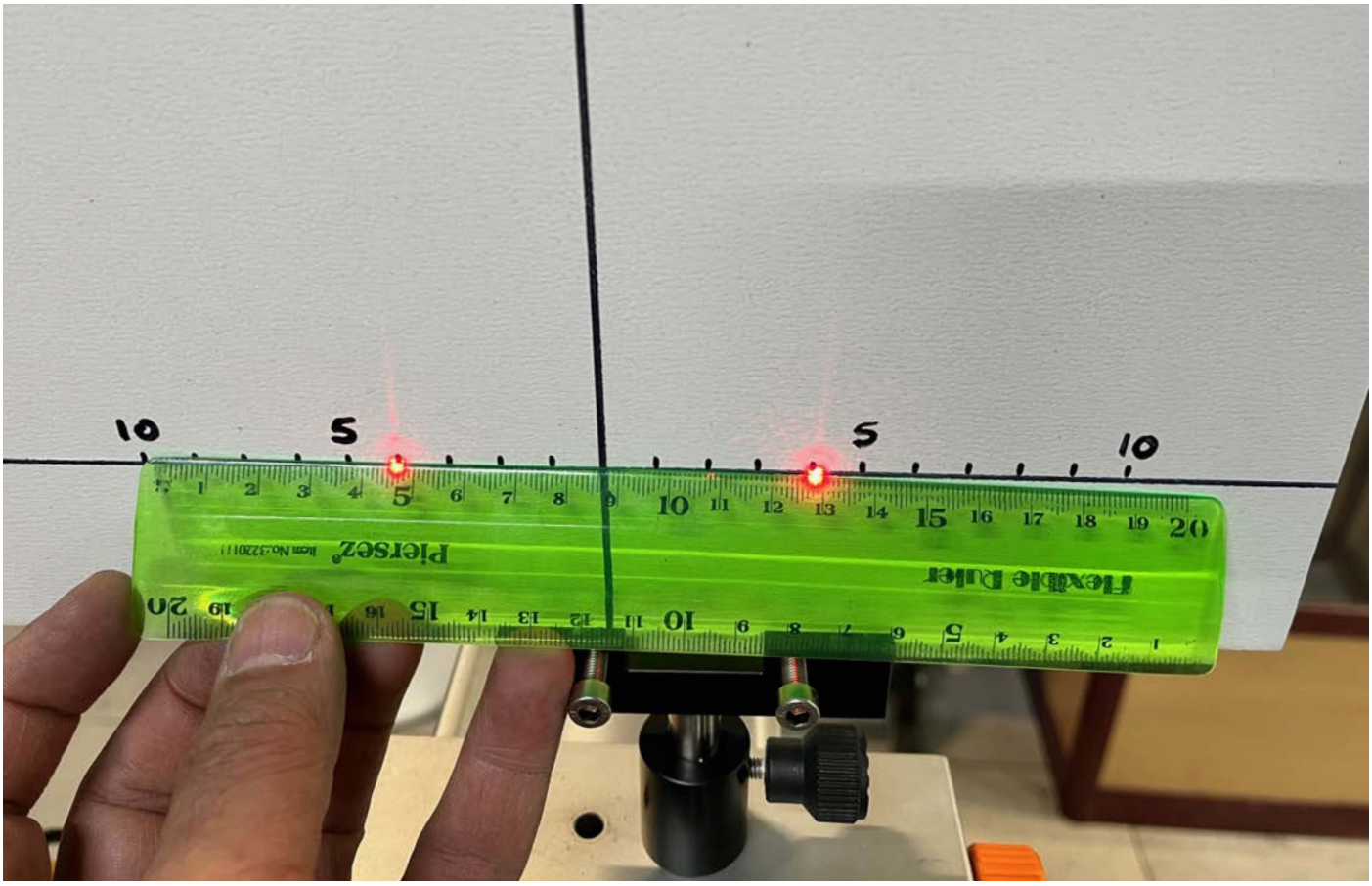


Disassembling the binocular head to straighen its bent parts.

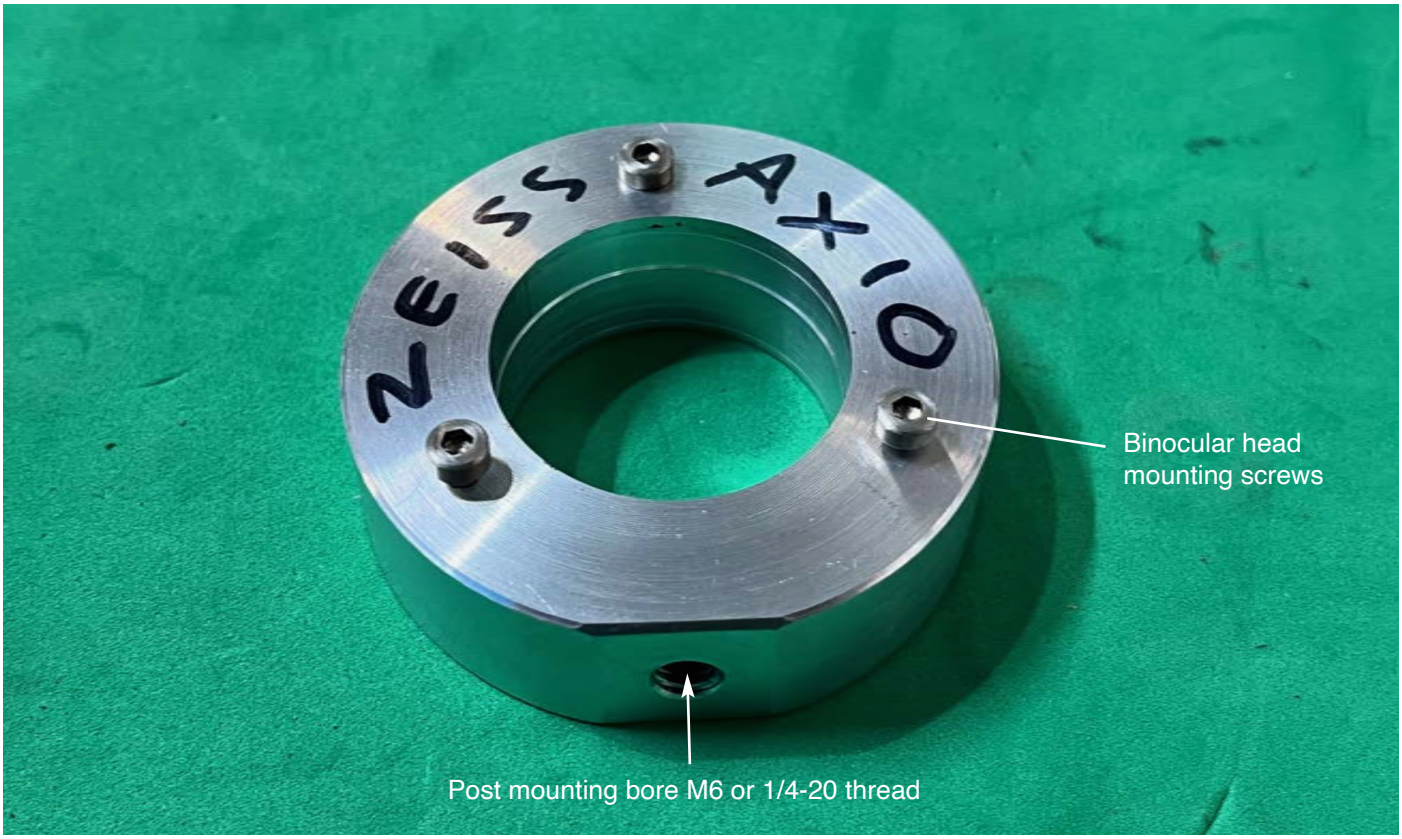
Reassembling the binocular head.



Eye distance measured at binocular head.



Eye-distance measured at the projection screen.



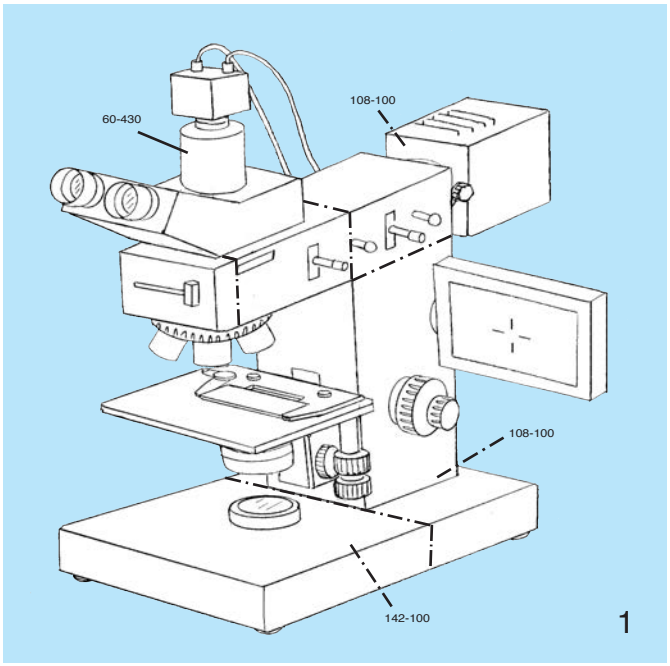
Binocular head mounting ring custom built for Zeiss Axioplan microscope.

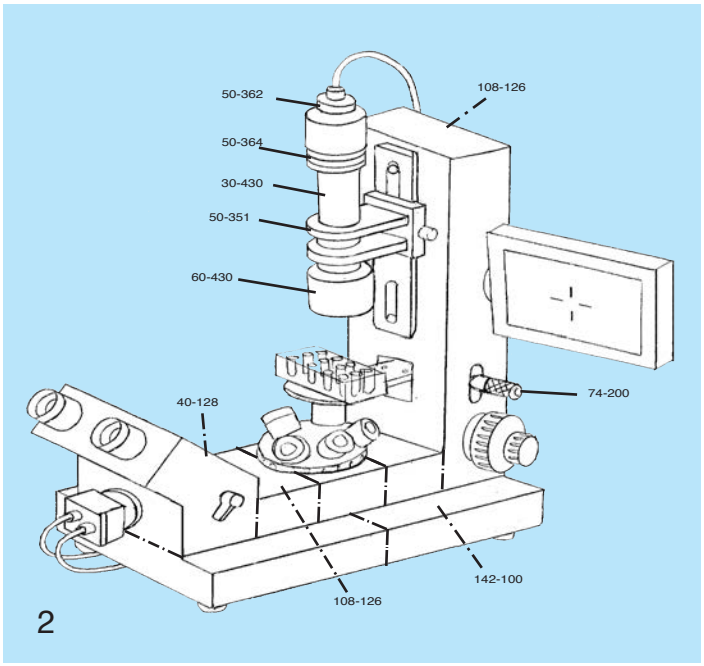
Prism adjustment screw has a very short range: It fine adjusts the vertical error of image overlap between eyepieces.

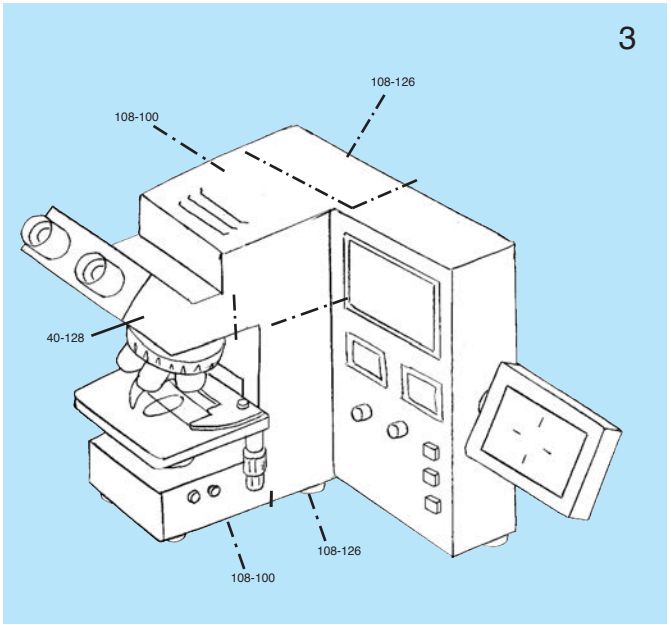
Contructing Optomechanical Instrumentation with Optoform II

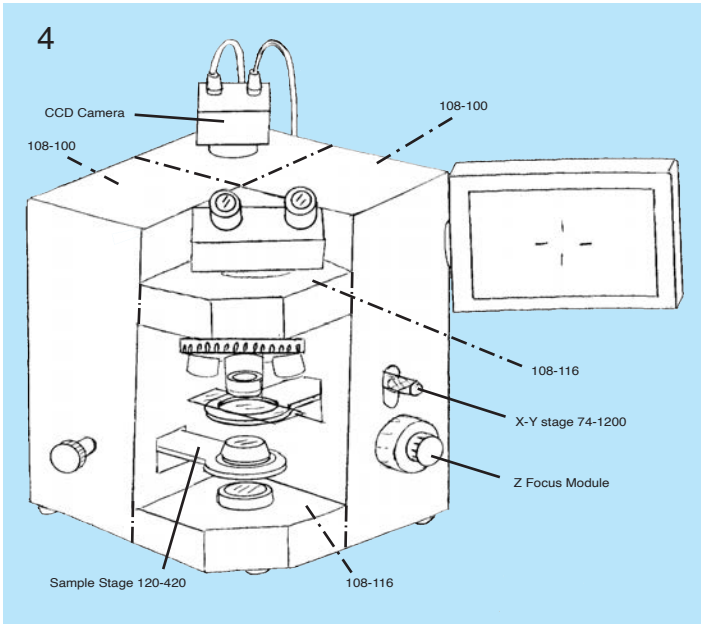
In the past several issues we have shown many types of microscopes being built with Optoform II. These microscopes have body coverings made of thin Aluminum sheets to provide structural rigidity, and a light seal for their inner light path, as well as proper aesthetics of a professionally made instrument. Almost every three months, some new microscopy techniques are introduced in optics journals, and the philosophy of Optoform is it will accept any challenge to build the new optomechanical structure utilizing its off the shelf subassemblies.

In this issue, we'll cover some other instruments found in an optical testing lab such as the MTF tester, interferometer, autocollimator, and the lens projector. Because new Optoform is a system level opto-mechanical construction system, we have been showing the instruments in their outer look rather than their inner components. Anyone trained in our philosophy, who has hands-on experience building Optoform assemblies could figure out their inner design, and will know how to construct them (below). To change the design from one to the other, many sub-assemblies may be kept intact. For example, the lamp housing is the same for all four examples. The viewfinder is also the same. The focusing unit, and the display will also remain the same. In these examples, the components could either be built with Optoform, or be brought in from an outside vendor such as the viewfinder, nosepiece or the sample stage, etc. We will continue with the optical lab instruments in the upcoming pages.





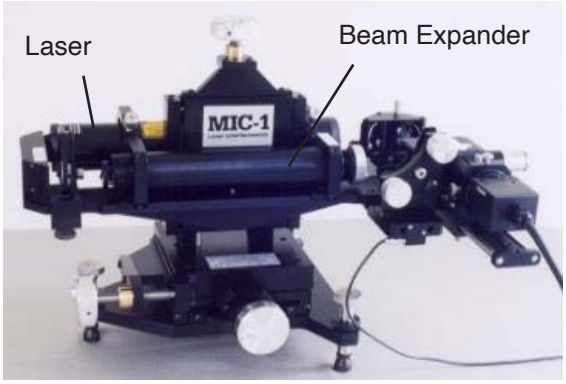


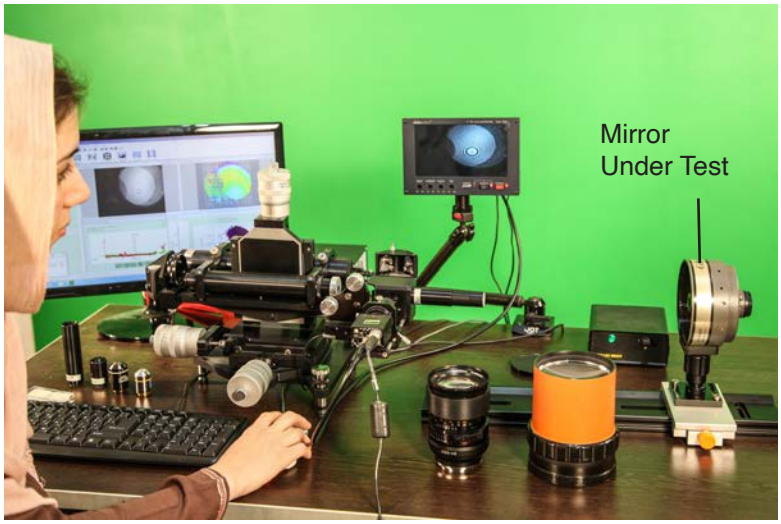


Microscopes built with Optoform II system.

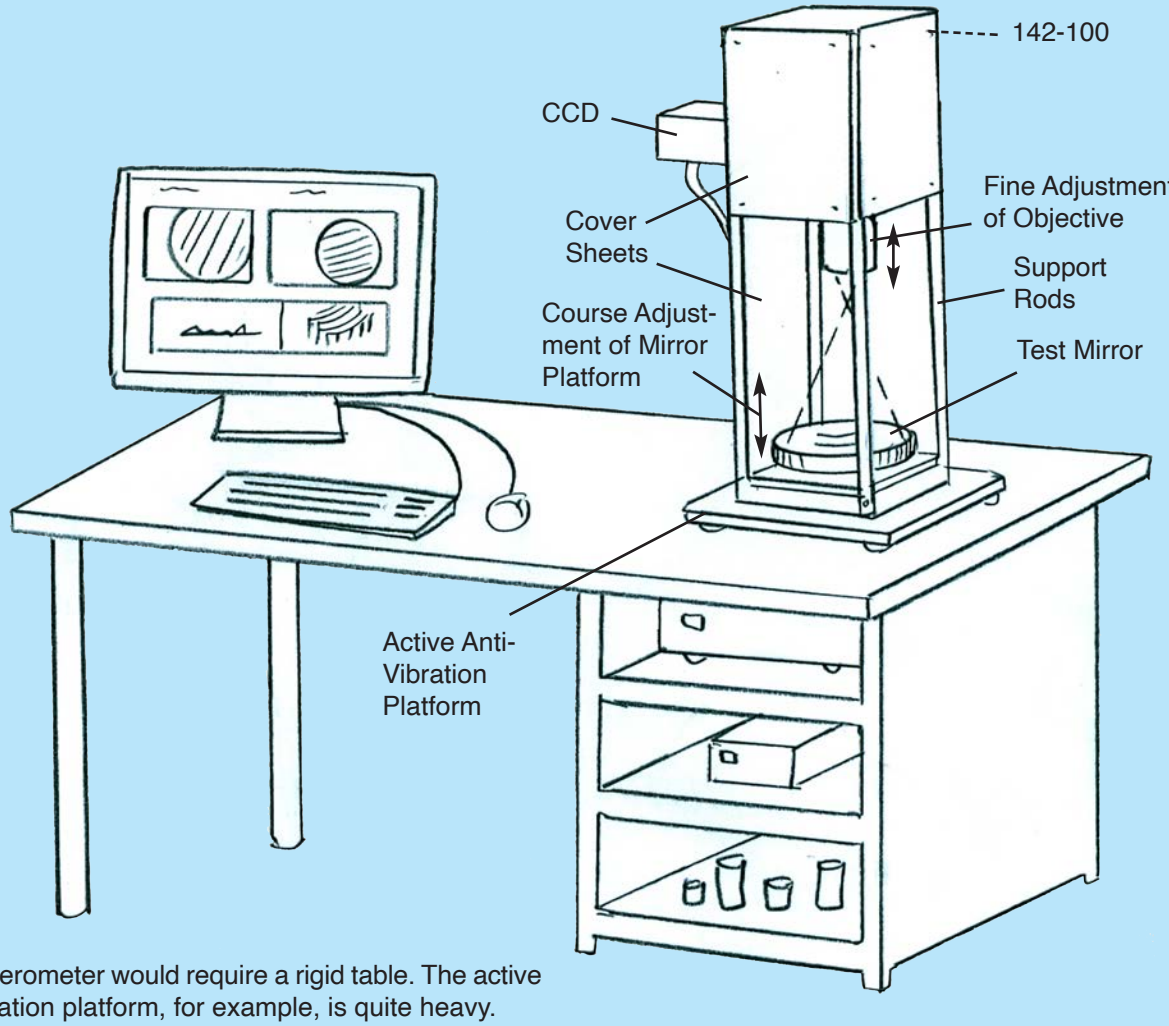
Interferometer

An interferometer is useful for testing mirror surfaces, and lenses. One common application is testing telescope mirrors. The Schmidt-Cassegrain mirror is especially easy to test because its primary mirror is spherical. Building this instrument with Optoform II requires a four-rod structure, built with 142 mounts (142x142 mm square). Cover sheets are especially useful in building large structures for their light weight, and their effective rigidity over the entire structure. Vertical orientation of the interferometer simplifies testing large mirrors, in this case, up to 150 mm in diameter. The mirror base, of course, needs to utilize a tilt platform. This assembly also needs an active anti-vibration system.





Above, Buccini Interferometer. Right, using the interferometer to measure the suface accuracy of Celestron C90 spherical mirror.

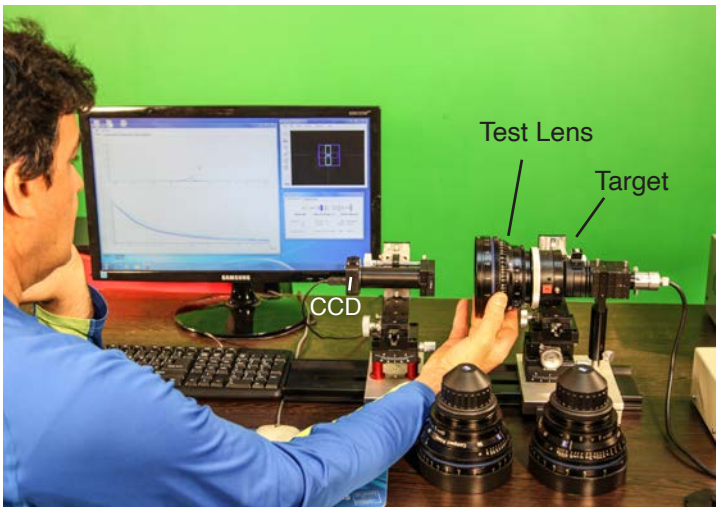


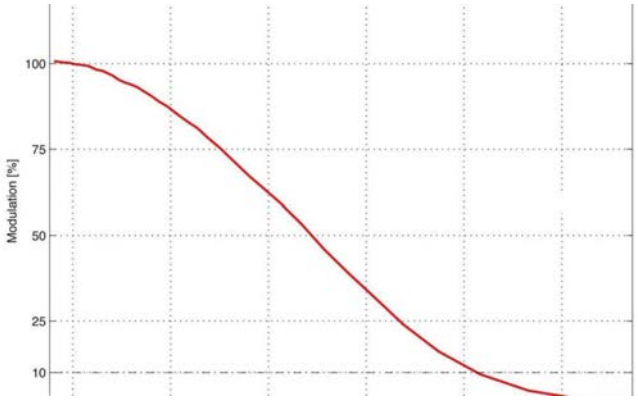
An interferometer would require a rigid table. The active anti-vibration platform, for example, is quite heavy.

MTF Tester

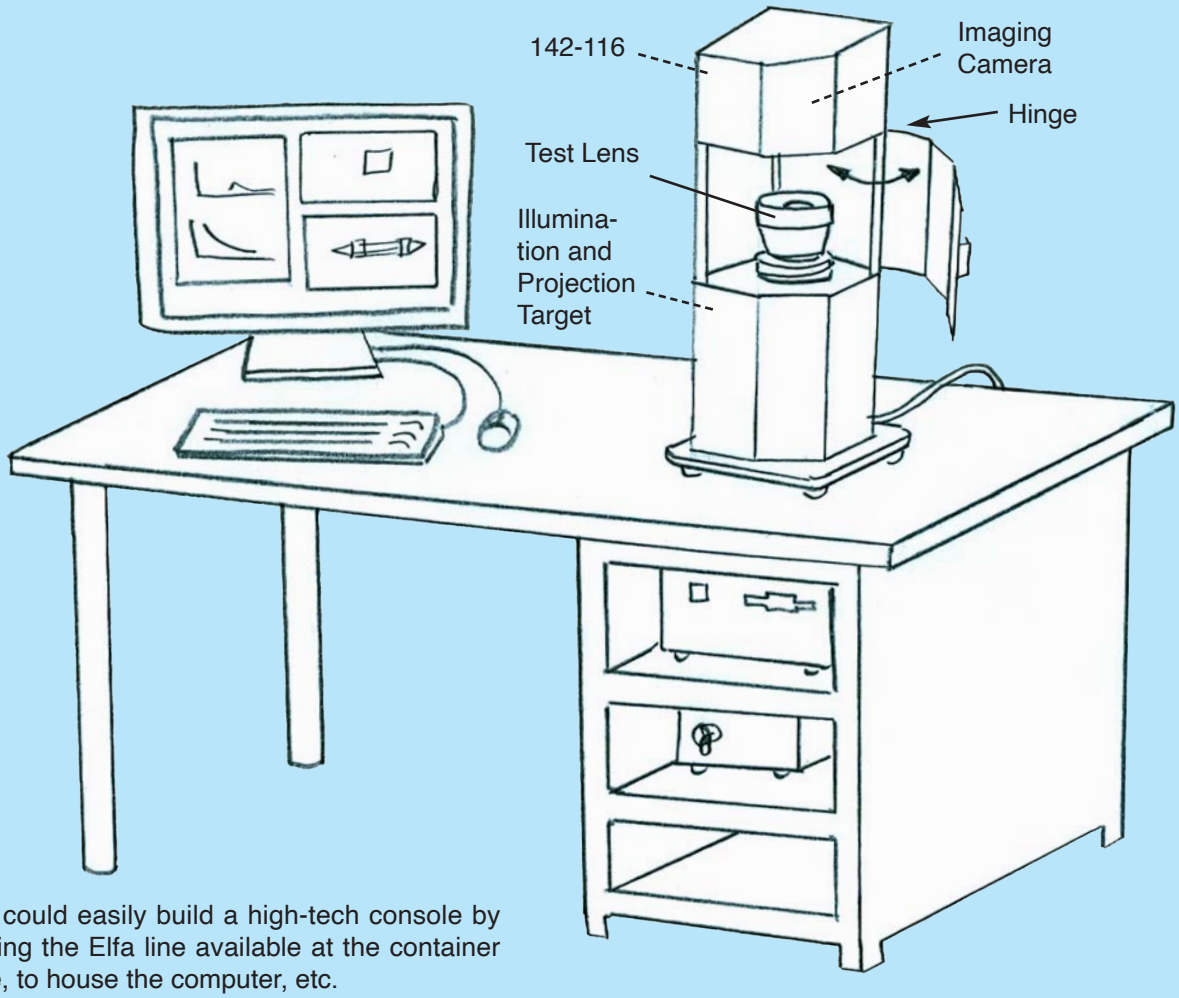
MTF testing is a good measure of the quality of cinema, and photographic lenses. A test pattern is projected by the lens on a CCD camera whose image is evaluated by MTF software to determine its ability to reproduce good image contrast at its focal plane. This instrument could be built with Optoform II, utilizing 142 mounts and a 3-rod arrangement.

Test target (left), and its image by the lens (right)





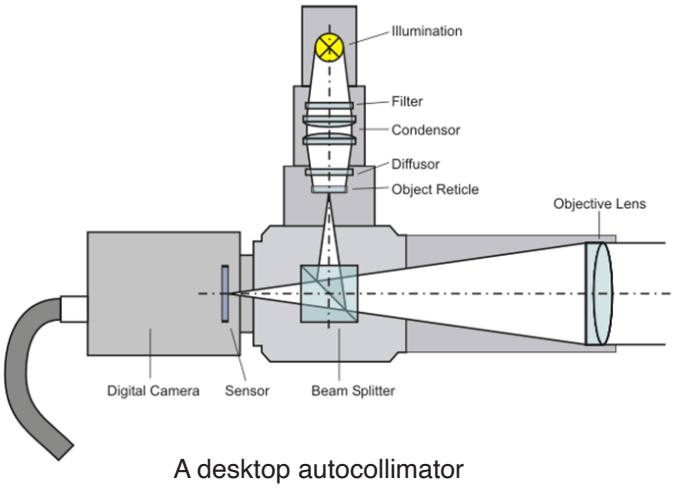
Above MTF Testing of a Zeiss lens, Graph: The high contrast 100% rolls off as lines per mm increases towards right



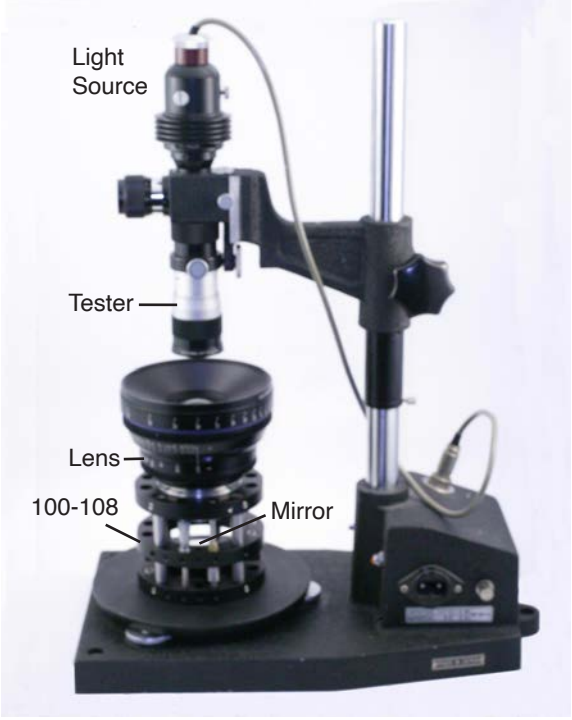
One could easily build a high-tech console by utilizing the Elfa line available at the container store, to house the computer, etc.

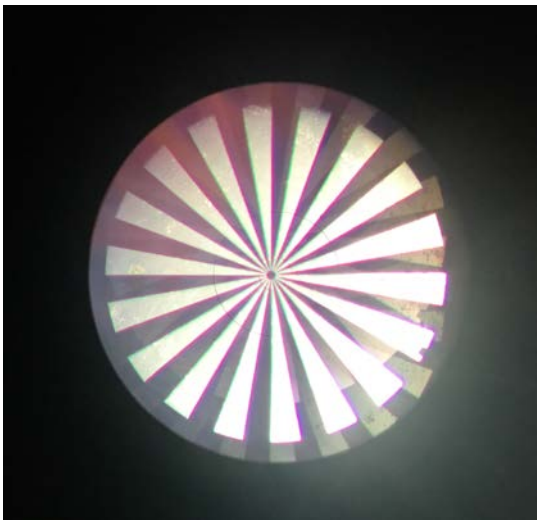
Autocollimator

Autocollimators are useful in testing the infinity focus of photographic, and cinematic lenses.

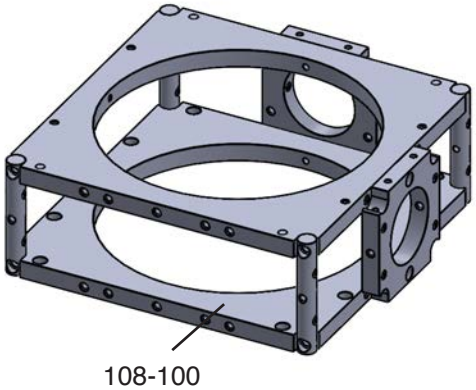


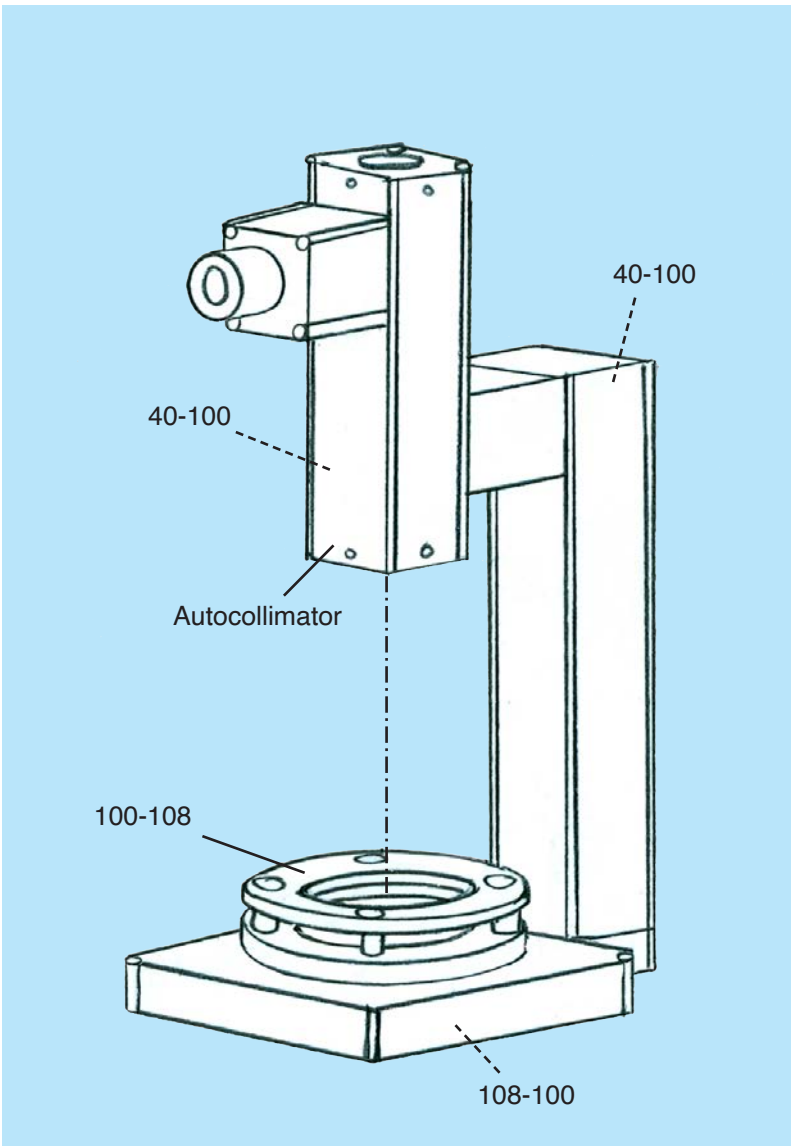
A desktop autocollimator





Above, Actual image seen through an autocollimator to check the focus accuracy of a test lens at infinity. For a detailed description of the autocollimator built with Optoforn 40 please refer to July-Sep 2019 issue of Optomex, page 18.

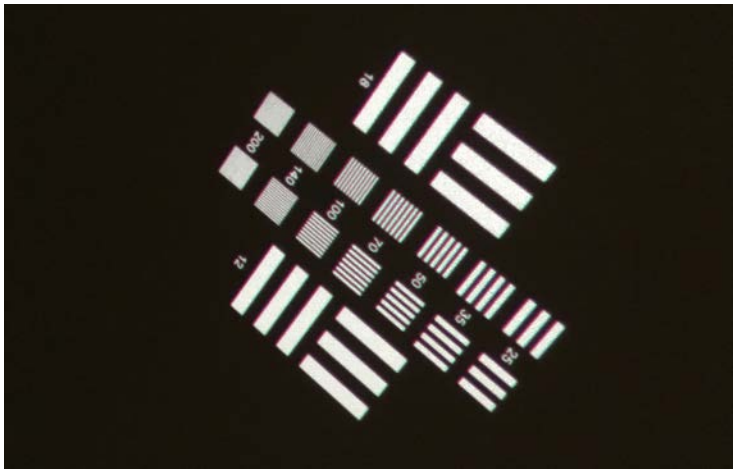




Resolution Tester

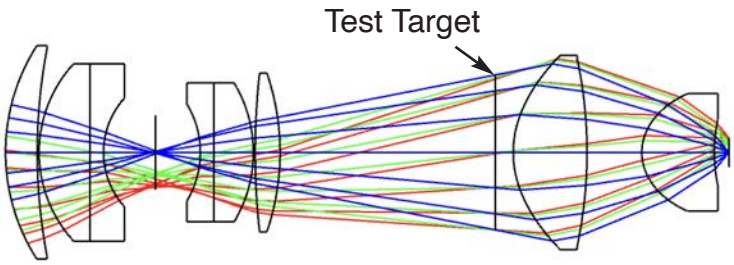
The resolution tester is a lens projector with a high contrast resolution slide (Chrome on glass) that could be read directly on a projection screen to determine a lens's optical resolution, i.e., at its center, and at all corners.

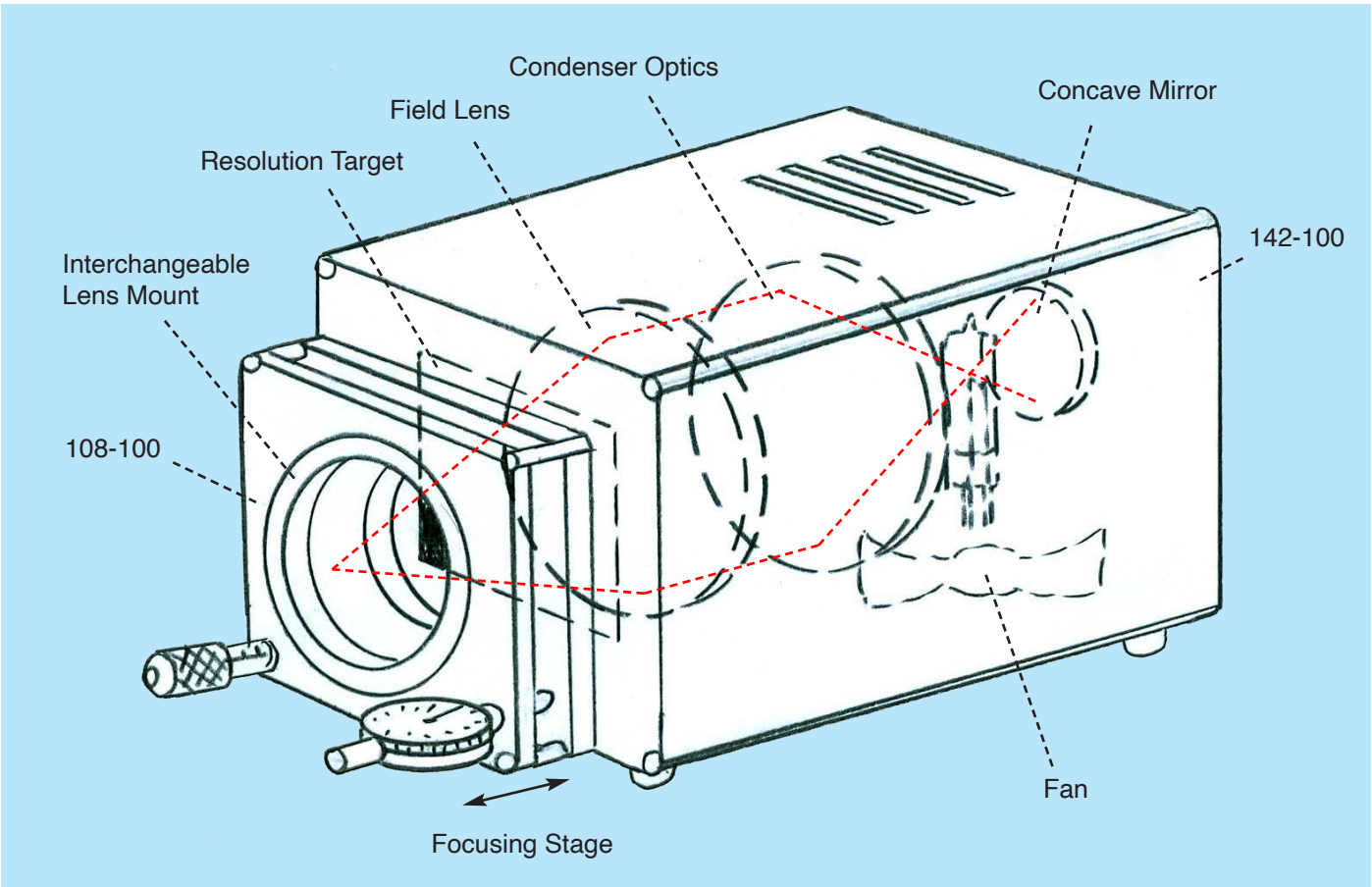
Chorsziel lens projector with PL mount adapter



Actual projected image of the target showing lines per mm.

Right, Zemax ray tracing of lens projector with the test lens placed on the left, the condenser lens on the right, and the lamp filament on the far right. For uniform corner to corner illumination, the filament is focused at the center of the test lens. An IR filter is normally added to this design to cut off the heat generated by the lamp.





Psychology of Achievement: Alternative Spirit of Losing

By Ali Afshari

It's interesting how our perspective of life changes as we'd get old, and how we'll become more aware of our surroundings. Those who are so buried into consumerism, have a never ending crave for buying. Most people would never outgrow that. Having a rich life experience though, is a lot more than that. Human being wants to know more, and specially about one's self. We have a light within us that wants to shine. In entrepreneurship, it's so crucial to get to know about the self to survive life's hardships. As we saw in Enneagram, one has to learn to watch out for type 3's. Unethical type 4's could even be scarier to stay away from.

Throughout our whole life, we are taught to always win. But as much as we succeed in following that route, we still suffer from being neglectful of our own self. There's an inner voice that asks: "What about me?" That self is not the you people see in in a selfie. People could only see the "I", while we could see the "Me". That's why we always avoid staring at our own eyes in a mirror while fixing our hair or a tie. The me gets more and more clarified at very old age, but that's too late. Most old people wish they had more courage in their youth or they wish they knew what they know in their 70's much earlier in life.

To tune in with the self, we should first reexamine our moral values. Otherwise, we could never dig deep within ourselves to find a true, and lasting inner peace. Moral values are what we first learn from our parents, and then the society we live in. When parents talk to a newly born child, they won't talk back until age 2. This shows in those 2 years, they have been listening. We also pick up our moral values from people we associate with. I am a documentary film maker, and in documentary films, you'd see in most part, the pain truth. That's the goal of documentary film making, otherwise it would just be like watching your state or corporate sponsored Television. As Allen Watts says, instead of emphasizing on morality, we always say: "There ought to be a law for that". As a result, if we could get away from the law, we're usually ok. I would like to share two stories. Just try this strategy once, and it might change your perspective about losing. Remember, it would only count if you have the upper hand!

Once upon a time in Persia, there was a legendary wrestler called Pouria Vali, and he was a great champion far ahead of his time. One of his famous stories is about his match in India with an equally famous wrestler. The evening before the match, as he was sight-seeing the city, an old lady approaches him, offering dates, and tells Pouria that her son will be wrestling tomorrow, and I have heard my son would most likely lose: "Please pray for my son so he wins. We all live by his income, and if he loses, he will lose his title".

The next day came, and the match began. The basic rules of wrestling are if the back of one of the opponents touches the floor on both shoulders, he'd lose the match. He began wrestling with his opponent and found him to be much weaker, but pretended to challenge him. At one point in the match, he intentionally let him to push his back against the mat. In that moment, he said: "The most unimaginable peace entered my heart". Pouria's story is well known in Persian history, as Takhti's match with Russian wrestler Alexander Medved (whom this issue is dedicated to). The movie "Peaceful Warrior" by Victor Salva touches on this concept in fighting your opponent.

Those of us who have seen wars, have come to grasp the meaning of morality much closer than it could ever be expressed in words. The Vietnam war was a good example, and also today's war on Yemen, and Ukraine. I don't have a political agenda in bringing this up but on our discussion about the self-awareness, I am being more and more skeptical about the justifications of war. In America we have free speech radio like Pacifica, and sure enough, there is an Iranian version called IRIB English radio (although state founded). Back a year ago, I happened to tuned in, and at the time, King of Saudi Arabia was visiting Pakistan, and it didn't go the way the interviewer was expecting:

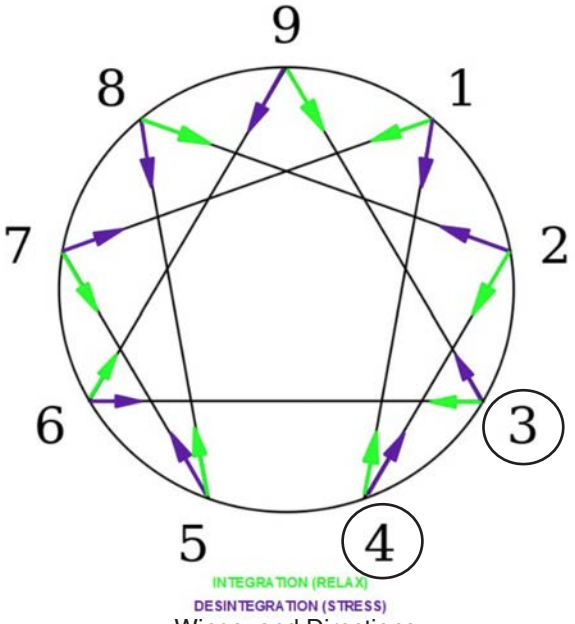
She said because of the atrocities of Saudi Arabia in Yemen, there are demonstrations in every major university in Pakistan, and now we are joined by a professor from university of Karachi. Professor, what do you think of these demonstrations? He said: "We have no problems here! Just bunch of Shiites who are making trouble here, and there. We are so honored that his majesty is visiting our country. He's spending 2.5 Billion dollars on our petroleum industry." "So you

don't care about Saudi Arabia's war crimes in Yemen, killing innocent civilians?" the interviewer asked. He said: "We can't afford to think about Yemen right now. We have to worry about our economy". If you think about it, this is not about one man's opinion. That's the philosophy we have lived with all our lives. The philosophy of wining no matter what. Charles De Gaulle said: "Politics is serious a matter to be left to the politicians".

If you have ever watched documentaries by Michael Moore, Gillo Pontecorvo's "Battle of Algiers", or Noam Chomsky's "Manufacturing Consent", they all reflect a different picture of the world we live in. Michael Moore in "Bowling for Columbine" says how do we expect our children to behave, if we have been behaving badly all over the world? Children listen to what we do, not to what we say.

My last story is about a couple with an autistic child. Every night the father came home, he wished to connect with his son but he couldn't, so he would read the newspaper instead, or occupy himself by solving puzzles. The mother, on the other hand, takes him to the park so other children would play with him. No one did. He was always standing lonely next to a tree, or sitting by himself on a bench. One day the child discovers there were some elderly playing chess, so he goes closer to watch. Pretty soon he learns the game, and they start playing him, and the next thing the mother hears is their cheers for her young boy. She asks them why, and they tell her: "No one could win your son! We have no idea how he comes up with his moves. Your son is now a champion chess player!"

That evening, the mother can't wait until her husband gets home. She asks: "Have you played chess with your son?" The father shows her a long face, and says: "He doesn't know how", so she says: "Why don't you try". As soon as they sit around a table with a chess board, the son starts placing the players on their right spot, and the father says: "Wow, you know how to play chess". Now I could teach you how to play! The mother was curiously overlooking their game, and notices the son keeps losing to his father. The mother asks why? He replies: "Because his need to be my teacher is more important than my need to win".



Wings, and Directions

Type eight's might beat you up during an argument, but watch out for unethical type 3, and 4.

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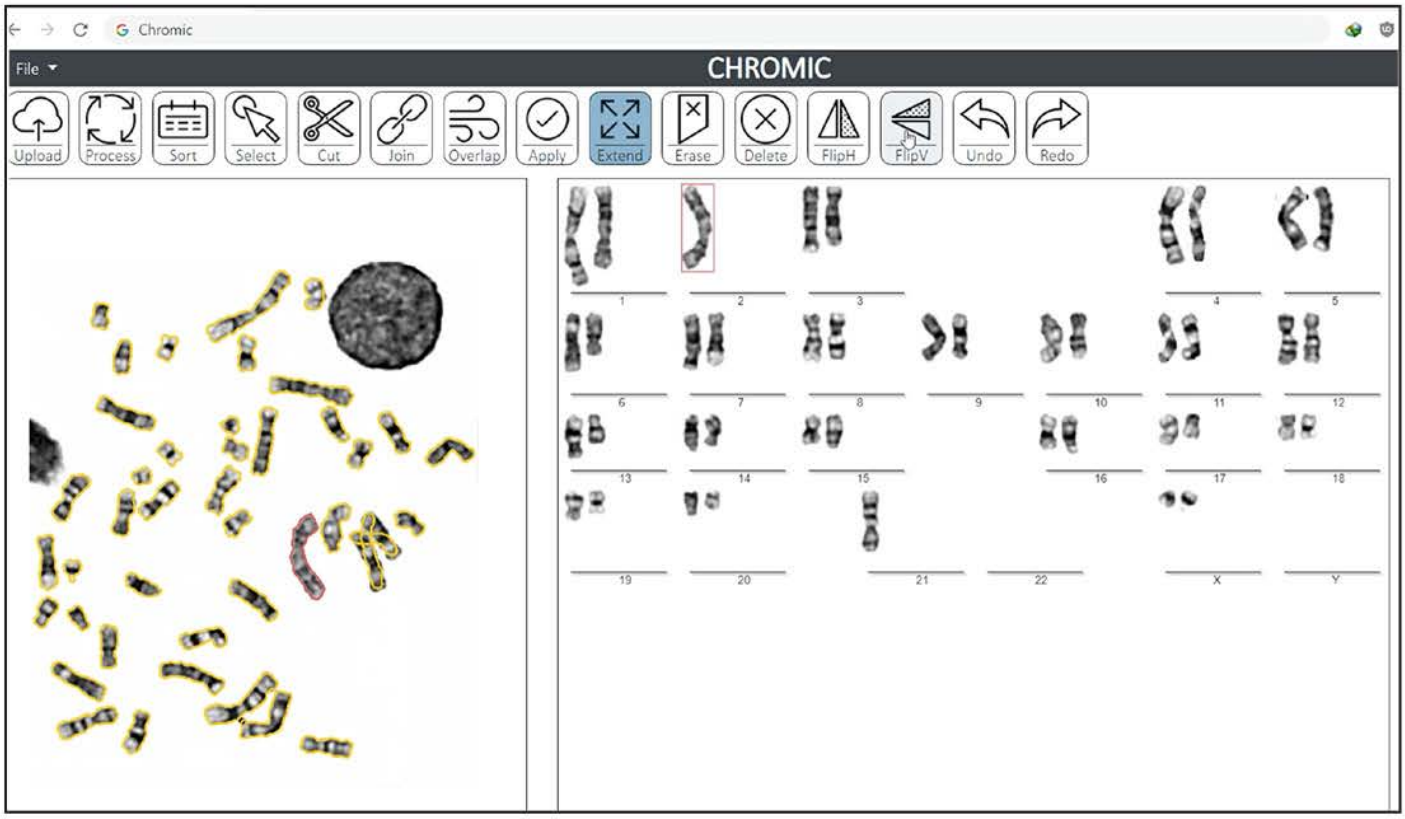

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