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MODERN PHOTOGRAPHY

Leica
M4-2
Test
Report



modern
tests

newest cameras, lenses & important accessories

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modern tests

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LEICA M4-2: A LEGEND GETS A MOTOR WINDER

MANUFACTURER'S SPECIFICATIONS: Leica M4-2 35mm rangefinder camera. Body No. 1469511. **LENS:** 50mm f/2 Summicron in Leica M bayonet mount, apertures to f/16, focusing to 28 in. (0.7 m), accepts 39mm accessories. **SHUTTER:** Horizontal cloth focal plane with speeds of 1-1/1000 sec. plus B, MX sync. **VIEWING:** Combined optical range/viewfinder with projected, auto-indexing, auto-parallax-compensating bright frames for 35mm, 50mm, 90mm, and 135mm focal lengths, manual frame-selection control. **FEATURES:** Accepts accessory Leica Winder M4-2 for battery-operated film advance, X-sync hot shoe. **PRICE:** \$1470 with 50mm f/2 lens; Leica Winder M4-2, \$360.

What is most remarkable about the latest version of the rangefinder Leica, the M4-2, is not that it is the first M-series model to be graced with an integrated, Leitz-made motor winder—although that is surely good news for Leica fans. More unbelievable is the fact that the camera to which the Leica Winder M4-2 can attach is virtually a carbon copy of the original Leica M-3, which debuted at the 1954 Photokina exposition. Is this incredible record of longevity attributable to the renowned conservatism of E. Leitz Wetzlar? Not entirely, for Leitz strived mightily to create a meterized M-series Leica (the M5) and a beautifully wrought compact model with built-in meter (the CL). By any measure, these now-out-of-production, meterized rangefinder Leicas must be considered successful designs, although the M5 did not sell quite as well as expected.

In a sense, what is partly responsible for the demise of both these behind-lens-meter Leicas is not any technical shortcoming, but rather the omnipresent shadow of the classic, meterless M4, a camera widely regarded (with considerable justification) as the finest interchangeable-lens rangefinder 35 ever produced. Now that the other rangefinder Leicas are gone, as is the erstwhile competition provided

by such great cameras as the Nikon SP, Canon 7S and the Contax IIa, the Leica M4-2 is, more than ever, in a class by itself. What sterling virtues enabled this camera to endure as the sole exemplar of its breed, and what are the imperfections that prevent it from being perfect? Hopefully, you will get a clearer idea of both as we put this peerless machine through its paces.

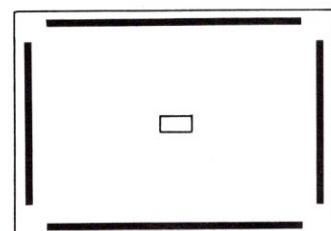
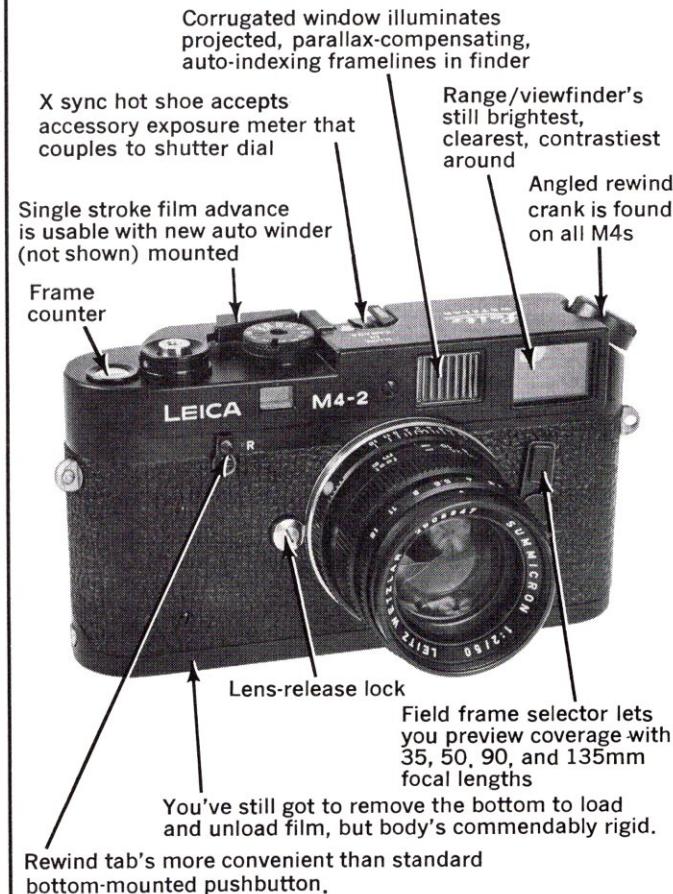
Aside from its motor winder compatibility, the M4-2 is, to put it succinctly, a black chrome Leica M4 minus one self-timer and plus one X-sync hot shoe. Such familiar features as auto-indexing, projected framelines in the finder, and an angled rewind crank are present and accounted for. As before, the viewfinder framelines automatically move downward and to the right as you focus closer to compensate for parallax throughout the normal focusing range of each lens. They're bright white and visible even in quite poor light, since they're illuminated by a vertically-striated, light-collecting grid placed in between the rangefinder and viewfinder windows. When you bayonet in either a 50mm or 90mm lens, only the frameline covering the proper focal length will be visible in the finder; but when a 35mm or 135mm lens is inserted, both the 35mm and 135mm framelines appear simultaneously. As for the rewind crank, it remains its old smooth, convenient self.

Bring the M4-2 to eye level and you're greeted with a bright, clear, almost distortionless view—the standard by which other rangefinder cameras have long been judged. The central, rectangular rangefinder patch and secondary, superimposed-type focusing image are easily discernible even in conditions of near darkness. And when you

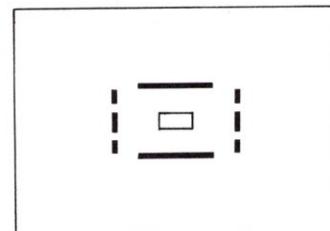
combine these desirable characteristics with the ultra-smooth focusing helicals of Leitz lenses and the focusing precision afforded by a 68.5mm rangefinder base, it becomes clear that the Leica's swift, precise focusing is one of its most endearing features. True, the inherent focusing precision of the old Leica M-3, with its .9X magnification range/viewfinder surpasses even the M4-2, which has the identical rangefinder base but a .72 lifesize viewing image. However, as a result, the M-3's finder framelines only cover 50, 90, and 135mm

perhaps, been sufficiently emphasized. First of all, with the exception of the nearly-finder-filling 35mm frame, the framelines allow you to do what cannot be done with any SLR we know of—that is, view a subject before it enters the picture-taking area. This may not sound too impressive if you've never tried to follow a rapidly-moving subject, but it's one of the major reasons why newspaper photographers and assorted photojournalists have long worshipped at the Leitz altar. The other nice thing about the Leica frameline system is that

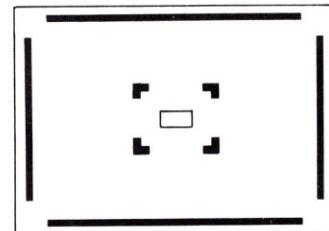
Leica M4-2: Features at a Glance



Field-of-view frame lines in finder with 50mm lens on camera.



Push field-of-view selector lever inward to preview 90mm framing.



To preview 35mm and 135mm, push selector lever outwards.

lenses, while the M4-2's (and the recently-discontinued M4's) include the important 35mm focal length frameline as well. The current arrangement is, in our opinion, clearly the preferable one.

As long as we're still on the subject of the Leica's framelines, we ought to point out a couple of facts about them that have not,

it allows you to preview the field of view of a lens before you mount it on the camera. For example, if you're shooting with the 50mm normal lens and you want to see what you'll get on film with a 35mm or 135mm lens, just pull the vertical lever under the viewfinder window out toward the edge of the camera body and

these frames will appear. To view the 90mm frame you push the same lever inward toward the lens barrel. Needless to say, pre-viewing of this type is one luxury feature not likely to be found on future SLRs.

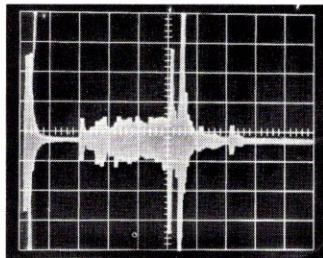
Before we depart the M4-2's finder, let's say a final word about that superb rangefinder. While photographers and writers alike have been quick to praise the brightness and contrast of the Leica M series rangefinder, few have extolled one of its chief virtues—namely the precise cut-off at the borders of the rectangular focusing patch. While other rangefinder cameras—even the "prestige" brands of the past—have focusing patches which are blurred at the edges, the Leica's focusing area is very sharply defined throughout. It is thus possible to align the viewfinder image of the edge of a building, a pole, or other hard-edged object with its adjacent rangefinder image, thereby using this classic superimposed-image rangefinder in the manner of split-image rangefinder. Since it is generally held that a photographer's focusing accuracy with a split-image rangefinder is five times as great as it would be with an ordinary superimposed-image type (all things being equal), this is obviously quite important. Indeed, even if you don't con-

sciously employ this technique when focusing the Leica, it becomes automatic with many types of subjects and focusing precision is enhanced.

Now that we're all suitably impressed with the M4-2's viewing and focusing systems, let's load the camera (sans motor) and take a few pictures. In the time-honored tradition of Leica loading, you've got to turn a hinged handle on the bottom of the baseplate one-half turn counterclockwise and lift the baseplate off. While this bottom-loading procedure undoubtedly contributes to the rigidity of the Leica body and its excellent lens-to-film-plane alignment, it is also clumsier and slower than loading a conventional hinged-back camera, and has been roundly criticized by generations of Leica fans. Oh well, at least the central position of the camera back is hinged (and easily removable) so you can verify that the sprockets are engaging the film properly. Also, with the back flipped up you can admire the Leica's beautifully finished, diecast body, beautifully polished film-guide and film-plane rails, and the commendably rigid mounting and nicely rounded edges of the oversized pressure plate.

To actually load the M4-2, you turn the open camera upside down, insert the film cartridge in

the left-hand receptacle, and slide the tongue of the film in between two sections of the three-pronged "quick-loading" take-up spool. If you're careful to pull the film out of the cartridge to the point where two sprocket holes are visible past the cutout portion of the leader and you follow the diagram clearly engraved on the fixed bottom plate (making sure that the take-up is in the same orientation as it appears in the

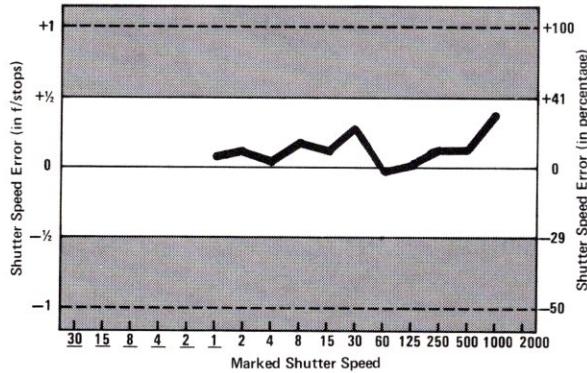


Oscilloscope pattern above shows Leica M4-2's noise output at 1/125 sec. Total scanning time (width of graph) is 1/20 sec., and maximum amplitude recorded (in decibels) was 66 dB—quieter than any 35mm SLR and somewhat quieter than most rangefinder cameras. Peak at left shows release of first shutter curtain; middle and right-hand peaks indicate release of second, and closing of both curtains.

This oscilloscope tracing shows noise output of Leica M4-2 operated with motor winder. Shutter speed used is 1/125 sec. Maximum amplitude recorded (in decibels) was 68 dB, much quieter than average for a winder-equipped 35mm camera of any kind. Peak at left shows shutter firing; extended, two-pulse central pattern shows motor start, stop, and recock shutter.

SHUTTER-SPEED ACCURACY

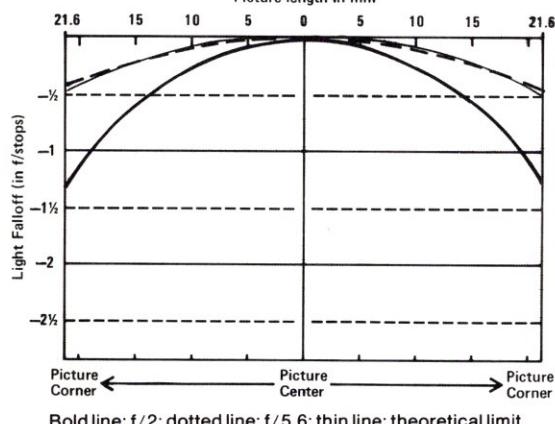
White area indicates tolerance limits.



LIGHT FALLOFF (50mm f/2 Summicron)

Standard: At f/5.6; within 1 stop of theoretical limit.

Picture length in mm



Bold line: f/2; dotted line: f/5.6; thin line: theoretical limit

GENERAL PERFORMANCE

Checkpoints	Our Standard	As Tested
FINDER:		
Apparent viewing distance of frameline	Between infinity and 20 in. (0.5m)	2m (79 in.)
View area compared to film area	Vertically and horizontally more than 85% less than 100%.	Vertical: 92% Horizontal: 91%
Parallax error compared to film	Vertical: 0.95mm Horizontal: 1.61mm	Vertical: 0.1mm upwards Horizontal: 0.2mm towards right
Focusing accuracy at maximum aperture	Within depth of focus	No discrepancy
Image magnification	0.72X \pm 0.1	0.74X
PICTURE SIZE: 24 \pm 0.6 x 36 \pm 0.9mm		
SHUTTER:		
Curtain travel evenness	\pm 0.33 stop	+ 0.30 stops
Camera insulation from sync	More than 7 megohms	X: infinity M: infinity
Sync contact efficiency	More than 60%	X: 80% M: 92%
Synchronizer delay time	X: within full opening M: 16-20ms.	X: okay M: 19ms.
Shutter curtain bounce	Not allowed	None
LENS:		
Focal length	50mm \pm 5% (47.5-52.5mm)	52.1mm
Maximum aperture	f/2 \pm 5% (f1.9-2.1)	f/2.04
Distortion	\pm 1.5%	less than 1%
CAMERA SIZE: Body: 138mm wide; 35mm high; 77mm deep (5.4 x 1.4 x 3.1 in.) Lens: 51mm diam.; 43.5mm long (2 x 1.7 in.)		
WEIGHT: Body: 539g (19 oz.) Lens: 273g (7.5 oz.)		

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Once you've loaded the Leica and clicked off two or three film-positioning exposures (so the film counter reads zero), you're in for a real treat—namely doing all those simple little things you do with any camera, but that the Leica does so well. Let's begin with the film-advance lever. Its operation is super smooth. Its hinged plastic tip contours perfectly to the edge of your thumb (aided by a couple of "gripping teeth" at its end). It won't poke even left-eyed users in the eye or nose. And finally, it's ratcheted, so you can advance the film one frame in a single 180° stroke or a number of shorter strokes if you prefer. To sum up, the Leica's film-advance lever is quite simply the best in the business. Others come close but, in the opinion of most of our staff, none quite equals the Leica's in silky feel, flawless mechanical operation, and anatomical excellence.

The same is true of the shutter-release button, that small but



Carrying strap fits through slots on metal eyelet clips. It's slow to put on, but will never fall off.



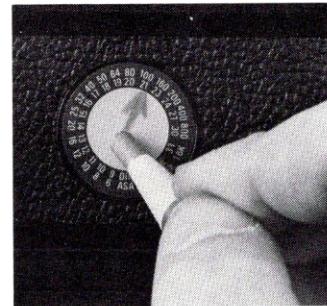
Lift and turn key at right to remove baseplate (rather than opening the back) to load film.

crucial device nestled in a dished recess at the center of the film-advance lever pivot point. It is very smooth and predictable, without being a hair trigger, and its vertical travel (before the shutter fires) appears precisely calculated to give you the smoothest, most jar-free release possible—it's not too long or too short, but just right. There is no magic formula we know of for calculating such an optimally placed shutter-release button with such a beautiful action—it is

the product of long mechanical experience and top-notch construction. Small wonder that the Leica's shutter release has been universally praised, and that most photographers who try it prefer its feel even to that of the latest electromagnetic releases.

A bit more than an inch to the left of the Leica's shutter-release button is a control that engendered mixed reviews among our staff—the shutter-speed dial. Its flatness certainly contributes to keeping the M4-2 vertically compact, and it certainly clings tenaciously to any speed setting you select with little chance of accidentally knocking it off its setting. However, its small diameter (about $\frac{1}{8}$ in.) makes it somewhat harder to turn than the shutter-speed dials on most SLRs—despite its nicely milled edge—and it's a bit tricky to grab onto. As with previous M-series Leicas (except for the M5), there's a notch in between the $\frac{1}{2}$ - and $\frac{1}{4}$ -sec. settings on the dial for coupling an accessory Cds meter that slides into the accessory shoe. We'll get to the meter a bit later.

Now that we've dissected some of the camera's individual features and loaded up with



Mark your film's ASA on indicator dial, but you have to remember which film you're using.



Diagram shows how to load film. Place cartridge at left and leader through slot in take-up spool.

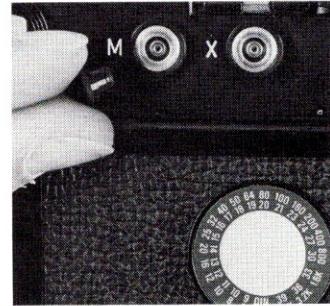
some film, let's shoot a roll of pictures. Before you even bring the Leica to eye-level, you notice that despite the feeling of solidity, it's quite light (26 $\frac{1}{2}$ oz. with 50mm f/2 normal lens) and fashionably compact (see dimensions in chart on page xxx). This impression is reinforced by the Leica's rounded ends, which contour perfectly to your grip, and by the camera's exceptionally good balance. Indeed, all the lenses we tried—from 35mm to 135mm—balanced extremely



In today's SLR world, the Leica fits between full size and compact. Lack of pentaprism makes it look more massive than it is.

well on the camera, the sole exception being the big, fat 50mm f/1 Noctilux, which made it feel front-heavy. (Of course, the f/1, see "Modern Tests," March, 1976, page 114) is such a remarkable lens that few will complain about this minor deficiency. Suffice it to say that the Leica's agreeable shape and weight, combined with its (for the most part) excellent controls, make it one of the world's best handling cameras.

Ah, but what happens when you attach the Leica M4-2 Winder to this gloriously balanced, elegantly dimensioned machine? Well, for starters, once you file your plain baseplate under "B" and replace it with the winder unit and bottom-mounted battery pack, you add 14 $\frac{3}{4}$ oz. (including batteries) to the cam-



Dual sync terminals are a vanishing extra on cameras, but M4-2 has M, X and hot shoe as well.

visible raised black letters against a black background and, curiously, the "motor attached but turned off" position is not marked at all. Perhaps the theory is that since there's no battery drain until you actually press the shutter release, you may as well keep your mounted Leica Winder in the on position.

Speaking of batteries, the $\frac{1}{8}$ -in.-high plastic compartment holds four alkaline penlight (AA) batteries and keeps them in position with a hinged metal clip. To mount the battery holder onto the bottom of the winder unit, you snap a pair of male and female snap fasteners over their opposite counterparts on the base of the motor section, and then screw on the right-hand end of the battery pack into the $\frac{1}{4}$ -in. tripod socket on the bottom of the motor section. The bottom of the battery compartment itself has no tripod socket whatsoever.

This raises an interesting question: How are you supposed to shoot with your motorized Leica if you want to put the whole rig on a tripod? Granted, this is no problem when shooting with the 90mm f/2 Summicron lens which has its own tripod socket, but what if you're shooting with another focal length? Well, Leitz has an answer for this, but it's not an answer that everyone likes. When you buy a Leica Winder, you automatically get a 40-in.-long cord with appropriate snap



Removable camera back swings open to aid in positioning sprockets to holes on film.

era's weight and just under 2 $\frac{1}{4}$ in. to its overall height. The mounting procedure is painless—just hook the metal "eye" on the baseplate's left-hand end over the mounting stud on the camera body, press the opposite end of the motor up against the camera's right side, and flick a lever counterclockwise until it moves past a little notch. To turn the motor on, you simply push the very same lever to the back as far as it will go. This latter position is marked "on" in none-too-

fasteners on its ends so you can attach the battery pack to the winder unit. The cord not only lets you mount the camera plus motor on a tripod, but also allows you to slide the battery holder into a handy inside pocket so you can keep it warm. In this way you can keep firing away even in extremely cold weather conditions, confident that you won't be afflicted with sub-freezing battery poop-out. Clever, but this doesn't answer the gripes of pros who'd like to use their Leicas for re-

mote-control applications without leaving their batteries (and contacts) exposed in a half-open holder. Oh well, at least the battery compartment snaps off and stores easily for photographers content to manually advance their tripod-mounted exposures.

After all the structural analysis is said and done, the most important fact about any motor winder is how well it works on the camera. Well, we're happy to report that we were generally very well pleased with the M4-2's winder's performance. It reliably advances the film to the next frame as you relax your finger pressure on the shutter release after you fire; and while it's not super-rapid compared to a true motor drive unit (or some of the latest continuously-firing auto winders we've examined), it will nevertheless advance film at the rate of about 21 exposures every 15 sec. at a shutter speed of 1/125 sec. In our opinion, four AA cells should be capable of advancing at least 40 36-exposure rolls through the camera, but it's important to remember that we're talking about a one-shot-at-a-time winder—you can't obtain a continuous run by keeping your finger on the shutter button.

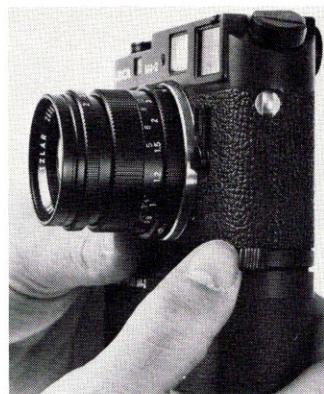
Since the Leica M4-2 is blessed with such a magnificent manual film-advance system, perhaps you're wondering (as we did), "Is this winder really necessary?" Perhaps it isn't, strictly speaking, necessary in most photographic applications, but it is often a big help in just those shooting situations where the Leica excels—namely pictures of active people in their natural habitat. We've said it before, but to reiterate, there's nothing like a motor drive (or one-shot-at-a-



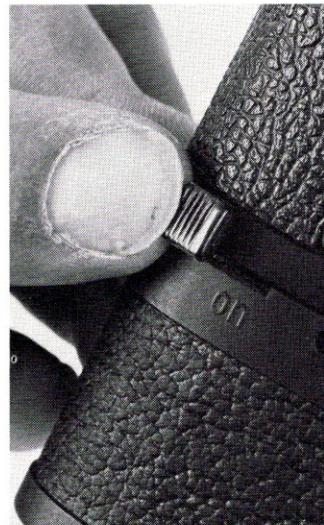
After removing baseplate, M4-2 winder can be attached, but of course you must remove film first, or fog it.

time winder) when you want to shoot action sequences. It allows you to cradle the camera serenely at eye-level as you focus and fire in one smooth operation. Camera steadiness, accurate framing, and the ability to capture the "decisive moment" are undoubtedly enhanced.

Mechanically, the Leica Winder acquitted itself very well in our field tests. It is undoubtedly one of the quietest winders around (though not quite as quiet as the pre-production prototype we saw at Photokina 1976), and thus far less likely than most to attract undue attention to the photographer. And while some staff members grumbled about the "torque reaction" transmitted through the camera body as the film was being advanced, this would have little effect on picture sharpness since it occurs after the shutter fires. In any event, the slight judder was not of sufficient magnitude to affect



After fitting winder to camera body, push tab around to back of winder (to unmarked off position) to lock on securely.



Motor-locking lever serves as on/off switch for motor. Positive detent assures you won't remove winder when turning it off.



Top view shows well-positioned controls that seem to fall right under your fingers. Wind lever is one of the smoothest.



Batteries clip onto winder base via "9-volt transistor-radio type" clip. Thread thumb-screw into tripod socket to secure.



Battery pack securing screw has knurling and coin slot, but you screw it into the camera's only tripod socket.

Would you like to test your own lens? Get MODERN's Lens Test Kit, \$4.95. Write to Lens Test Kit, MODERN PHOTOGRAPHY, 2160 Patterson Street, Cincinnati, Ohio 45214.

camera steadiness. Our only other winder criticism concerns the aforementioned mounting/on-off lever which requires a very un-Leicalike amount of finger pressure to operate. However, we have no gripe about its location and it certainly appears to be durable. All in all, the Leica Winder is a very successfully executed device that should prove quite popular among Leica M4-2 enthusiasts. The price for automatic film advance is \$360.

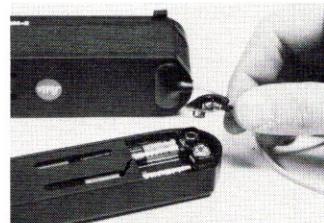
If the Leica M4-2 is inevitably a bit less elegant and less perfectly balanced with the winder mounted, at least the winder's virtues more than make up for its added bulk (and the camera's balance and feel are still remarkably good). Also, there are numerous shooting applications where the winder is unnecessary, and you can simply dispense with it. Unfortunately, there's another little less-than-elegant appendage in the Leica arsenal that is, in our view, considerably less dispensable—the aforementioned Leica MR-4 meter. Yes, the Leica M4-2 is a meterless camera, and despite howls of protest by professional photo-journalists and advanced amateurs, we'll go right out on a limb and say it—it's a damn shame that a camera as incredibly good as the Leica M4-2 doesn't have a built-in meter.

Far from being an effete gadget that's not really needed



Winder and battery pack are taller than those for other SLR's we've tested. Camera will fall down if you let go.

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To use tripod with motor, attach 40-in. connecting cord. You should still seal semi-open battery pack against the elements.

by "real" photographers, we believe it's pretty clear by now that where exposure meters really belong is in the camera—where they can read (directly or indirectly) through the lens.

Even if some experienced photographers are able to guess their exposures with reasonable accuracy when shooting black-and-white film in familiar shooting situations, this is really beside the point. You might get away with seat-of-the-pants exposure settings some of the time (espe-

modern tests

cially when shooting Tri-X or even Kodacolor 400), but can such a haphazard procedure adequately cope with color transparency films? And, more to the point, is it really up to the photographic standard set by the Leica system itself?

Well, as we said before, you can't entirely blame Leitz for not being able to deliver us a built-in meter camera that embodies all of the M4-2's enviable physical characteristics. And they've at least made the college try at giving us a competent, coupled, add-on meter.

The latest MR-4 Leica Meter is certainly commendably small, measuring only $2\frac{1}{8} \times 1\frac{1}{4} \times \frac{3}{4}$ in. and weighing $2\frac{1}{4}$ oz. In this bon-bon-sized package they've engineered a CdS meter with an acceptance angle of about 27° (same as the 90mm lens), having high and low exposure ranges, and covering f/stops from f/1.4 to f/16 and ASA settings from 8 to 1600. Once you slide the meter into the accessory shoe, turn its shutter coupling control until a spring-loaded prong on its underside engages with the slot in the Leica's shutter dial, and select the high or low range, all you must do to get a reading is to push in the spring-loaded meter activating switch on the unit's left side (in shooting position). While the film-speed scales are a bit crowded, the meter face and shutter-speed scales are quite legible. And when you push the meter-on switch, the white meter needle will point to the correct-exposure aperture for the film speed and lighting conditions. To hold this reading, just relax pressure on the switch and the reading will lock in. We found the Leica MR-4 meter to be reasonably sensitive (down to f/2 at 1/15 sec. with ASA 400 film) and quite accurate (within a half stop) over the entire range. But, however admirable its performance, or agreeable its appearance (we couldn't get a black chrome one to use with our camera at the time of our tests, but they should be available by the time you read this), the Leica's add-on meter does not deliver the overall performance or convenience of a contemporary built-in, behind-lens unit.

Turning to a more pleasant topic, let's take a look at the black-finished 50mm f/2 Summicron normal lens supplied with our M4-2. Like most late-model 50mm Summicrons, it lacks the once traditional tab on the focusing ring (which is just as well, since most of these were positioned for right-handed focusing). At any rate, the finely knurled $3/16$ -in.-wide focusing collar takes the lens down to its



Leica MR-4 meter slides into hot shoe. Pin on meter couples to shutter-speed dial.



Push tab and twist lens counter-clockwise to remove. Lens and body have red orientation dots for mounting.



Push in tabs on both sides of sun shade to clip it on lens. A bit of shade can be seen in finder corner with 50mm Summicron.

minimum focusing distance of 28 in. (0.7 m) in an extremely smooth, backlash-free turn of approximately 200° . The depth-of-field scale atop the lens barrel is very complete and legible, as are all markings on the lens. The frontmost control on the lens is the aperture ring, which works with equal felicity in controlling the 10-bladed lens aperture, and provides click-stops at whole and half-stop settings throughout the f/stop range.

Finally, mounting and removing lenses is another simple everyday operation that the Leica transforms into a graceful, esthetic experience. To remove the 50, you first push the spring-loaded lens-release button with your thumb as you turn the lens about $\frac{1}{2}$ turn counterclockwise and lift it out. To mount a lens,

you line up the raised red dot at the rear of the lens barrel with a red dot adjacent to the lens-release button and swiftly bayonet it in. Does this procedure sound ordinary? The superb fit, finish and design of the Leica M-series bayonet mount makes it seem anything but.

On the Optical Bench: This lens shows extraordinary image quality even at f/2. A very slight zonal spherical aberration can be seen, but it hardly detracts from the compactness of the color-free central image. Off axis, this lens

Clearly, it is much more than a magnificent anachronism—its extraordinary lens line alone marks it as a supremely practical instrument. And its focusing system offers much greater inherent precision than any SLR in focusing wide-angle lenses. On the other hand, you need accessory finders to view lenses below 35mm, a reflex housing with the longer teles, and an accessory-shoe-mounted meter (unusable with an accessory finder in place!) to get the right exposure. And, on this \$1000 camera body, you don't even get a self-timer!

Of course, ultimately, these criticisms (except for the last) are in the nature of the beast. And few would argue, for example, that the M4-2's "meterlessness" makes it inferior to the M5 or CL—if anything, its classic dimensions and mechanical perfection are more important than anything as mundane as a meter. After all is said and done, what renders the Leica M4-2 a timeless classic even as it is being born, is that it is beyond logic in terms of today's camera technology. It is a camera that serves as a cogent reminder that today's assemblers of sophisticated electronic circuitry and digital readout systems do not have all the answers stored in their computers. Perhaps that is why a certain breed of photographer will continue to be entranced by the Leica's siren charms, to take a little extra time and care in setting his exposures manually, and to pay a pretty stiff price for the privilege of doing so. After all, when one is lucky enough to drive a vintage Rolls-Royce, it is poor form to complain about the lack of automatic transmission and air conditioning—or the ticking of the clock.

Resolution

at 1:50 magnification

f/no.	Center Lines/mm	Corner Lines/mm	
2	Good	50	Exc. 40
2.8	Good	56	V/Good 50
4	Good	63	Good 50
5.6	Good	63	V/Good 50
8	Good	63	V/Good 56
11	Good	56	Exc. 56
16	Accept	50	Good 44

Contrast

at 30 lines/mm

f/no.	Center %	Corner %	
2	Low	42	Medium 32
2.8	Low	50	Medium 40
4	Low	56	Medium 50
5.6	Low	58	High 54
8	Low	58	High 52
11	Low	54	High 48
16	Low	46	Medium 42

is even better. There is almost no coma, astigmatism or lateral color which can be detected, even at f/2. Only a weak butterfly-shaped skew-ray flare is seen, and it is gone when the lens is stopped down to f/2.8. At f/4, the images all over the format are extremely sharp and free of any noticeable softness or flare.

In field test slides: Color transparencies obtained with this lens on a Leica M4-2 are about as good as any we have ever obtained. At f/2, images are very sharp and contrasty, and the dark areas are free of haze or softness even away from the central area of the format. At f/4, the image sharpness seems to be limited by the grain of the film, and not by the lens. We noticed no variation of illumination in any corner, and the exposure is essentially uniform (within half a stop) over the entire format.

Note: It is obvious from the optical and contrast figures above that Leitz's prime design goal was to obtain evenness of image quality across the entire format. This represents a departure from MODERN's verbal evaluation criteria, which assume better performance at the center than at the edge of the field.

In the end one is faced with a paradox in trying to place the latest Leica, the world's last (and probably greatest) interchangeable-lens rangefinder 35.

35MM f/1.4 SUMMILUX BY LEITZ CANADA

Mounts: Leica M bayonet

Filter size: 41mm screw-thread

Apertures: f/1.4 to f/16

Min. focus dist.: 0.9m (3 ft.)

Features: Accessory sun shade, quick-focusing tab

Serial no.: 2768830

Size: 52mm diam., 28mm long (2.05 X 1.10 in.)

Weight: 198g (7 oz.)

Price: \$333; may be available at a discount price



Plastic finger tab aids in focusing this tiny 35mm wide-angle lens.

Practical Comments: The 35mm f/1.4 Summilux focuses to its relatively long 3-ft. minimum distance in a very smooth turn of just under 100°. Focusing speed is aided considerably by a finger-notched focusing tab affixed to the focusing ring, and this control is nicely positioned for either left or right-handed focusing. As we mentioned in the body of our Leica M4-2 report, the ability to focus fast wide-angle lenses accurately is one of the chief virtues of a rangefinder camera, and this 35mm f/1.4 certainly fits that description to a "T."

While the Summilux is physically very compact, and balances beautifully on any M-series Leica, its shortness does create a couple of problems. With the lens shade in place, it's hard to grab the aperture-ring tabs and, though the shade had three arc-shaped cutouts, it still protrudes into the viewing area of the 35mm frame. As you'd expect, the numerals on the barrel are very legible, and the Summilux is beautifully finished in satin black.

Performance

Our Standard	Tested
Focal length: ±5% (33.25-36.75mm)	35.2mm
Max. aperture: ±5% (f/1.33-f/1.47)	f/1.43
Distortion: ±2.5% less than 1%	
Light falloff: at f/5.6 ± 1 stop from theoretical limit (-0.93 stops)	-0.69 stops
View area compared to film area: (Vertically, at least 85%; Horizontally, not more than 100%)	V: 95% H: 94%
Parallax error compared to film (at 7m):	
V: 0.6mm H: 1.08mm	V: 0.4mm downward H: 0.25mm to right

tral image with the lens wide open. However, no color or color flare was seen, and the image became excellent at f/4. We did find a focus shift of about 0.14 mm between the sharpest image wide open and at f/4. This is still within acceptable limits for a 35mm focal length lens. Off axis, we saw a slight amount of astigmatism which disappeared at 22°, this being the so-called "anastigmatic point." There was a slight skew ray flare which vanished when the lens was stopped down to f/2. No coma or lateral color was observed, and the off-axis image became excellent at f/4. In field test slides: Our color film exposures showed the sharp and crisp images we expected, with only a slight softness and contrast loss when the lens was set at f/1.4. The evenness of illumination over the entire format was very good with less than one stop loss in the very extreme corners. At f/2 and slower, the lens produced color transparencies with image detail and contrast at an excellent level.

90MM f/2 SUMMICRON BY LEITZ CANADA

Mounts: Leica M bayonet
Filter size: 48mm screw-thread
Apertures: f/2 to f/22
Min. focus dist.: 1m (3.3 ft.)
Features: Retractable sun shade, tripod socket
Serial no.: 2792091
Size: 65mm diam., 103mm long (2.6 x 4.1 in.)
Weight: 624g (22 oz.)
Price: \$423; may be available at a discount price



Fast (f/2) short telephoto surprisingly features a non-rotatable tripod mount.

Practical Comments: While this fast medium tele presents a formidable appearance, especially with the "foldable drinking cup" lens shade fully extended. The lens is nevertheless reasonably light, very handy in the field, and it balances superbly on any M-series Leica. The 90 focuses very smoothly to its 3-ft. minimum focusing distance in a just-under-180° turn of its finely knurled, 1/2-in.-wide focusing collar, and the 5/16-in.-wide aperture ring near the front of the lens has click-stop detents at all full and half stops.

The 90mm Summicron also features a very sturdy built-in, non-rotatable tripod socket located about 1/2 in. in front of the lens mount. However, the lens is

Performance

Our Standard	Tested
Focal length: ±5% (85.5-94.5mm)	90.4
Max. aperture: ±5% (f/1.9-f/21.)	f/2.04
Distortion: ±2% less than 1%	
Light falloff: at f/5.6 ± 1 stop from theoretical limit (-0.16 stops)	-0.22 stops
View area compared to film area: (vertically, at least 85%; horizontally, not more than 100%)	V: 90% H: 85%
Parallax error compared to film (at 7m):	
V: 1.2m H: 2.7mm	V: 0.4mm upwards H: 0.13mm to right

Resolution

at 1:51 magnification			
f/no.	Center Lines/mm	Corner Lines/mm	
2	V/Good	46	Excellent 36
2.8	Good	46	Excellent 41
4	V/Good	51	Excellent 41
5.6	V/Good	51	Excellent 46
8	Excellent	58	Excellent 51
11	Excellent	58	Excellent 51
16	Good	46	Excellent 46
22	Good	46	Excellent 41

Contrast

at 30 lines/mm			
f/no.	Center %	Corner %	
2	Low	34	Low 32
2.8	Low	42	Low 36
4	Medium	55	High 52
5.6	Medium	58	High 56
8	Medium	57	High 54
11	Medium	54	Medium 50
16	Low	46	Medium 45
22	V/Low	37	Low 35

so easy to hand-hold that we wish they would have put it on a longer optic such as the 135mm.

On the Optical Bench: When we examined the point image produced by this lens, we found a moderate amount of red flare, due to spherochromatism, which is a change in spherical aberration with color. It is not a focus shift due to color. When the lens is stopped down to f/4, the central image is white and completely free of color flare. We found less than .04mm focus shift between f/2 and f/4, which is well within tolerance limits. Off axis, this lens shows a small astigmatism mixed with color, which shows that the optical engineers at Leitz have achieved an interesting and good balance of the residual off-axis aberrations.

At 8° off axis, the astigmatism diminished, and only a very slight coma remained, which became unnoticeable at f/4. Overall, this lens shows a remarkable balance of image sharpness with emphasis toward better off-axis image quality. **In field test slides:** Our color film test exposures revealed that the slight red flare we found in the optical bench tests was not very noticeable, with only a slight softness in the

central image area with the lens at f/2. The image quality for the outer parts of the format were, as expected, extremely sharp with only a slight astigmatism detected at f/2. At f/4, the overall quality of the color transparency images was excellent. The exposure was very uniform over the format, and over-exposed pictures taken in a darkened room with a bright lamp near the edge of the format revealed no strong ghosts or light flare. This indicated the effectiveness of the multilayer antireflection coatings used on the elements of this lens.

135MM f/4 TELE-ELMAR BY LEITZ WETZLAR

Mounts: Leica M bayonet
Filter size: 39mm screw-thread
Apertures: f/4 to f/22
Min. focus dist.: 1.5mm (5 ft.)
Features: Accessory lens shade
Serial no.: 2654539
Size: 59mm diam., 104mm long (2.3 x 4.1 in.)
Weight: 510g (18 oz.)
Price: \$693; may be available at a discount price



Classic long-focus design makes 135mm slightly long, but it's comfortably slim.

Practical Comments: The 135mm f/4 Tele-Elmar is a classic long-focus design and, as a result, the lens extends slightly more than 4 in. from the camera body. But although it's long, the Tele-Elmar is comfortably slim, and it feels extremely well balanced on the Leica M4-2.

The 135 focuses to its minimum distance of just under 5 ft. in a very smooth, 180° turn of its lightly knurled, 15/16-in.-wide focusing collar; and the front-mounted, 3/16-in.-wide aperture ring has click-stop detents at whole and half stops down to f/22. And, as expected, all numerals are extremely legible on the satin black finish.

While the small size of the M4-2's 135mm finder frame limits the viewing precision of distant objects when compared to an SLR, it works very well for subjects in the 25-50 ft. range, which are more commonly shot with a 135. And, as icing on the cake, the Tele-Elmar's optical elements unscrew from the focusing mount quite easily, so you can use them with a bellows or reflex housing.

Resolution

at 1:48 magnification			
f/nc	Center Lines/mm	Corner Lines/mm	
1.4	Accept	38	Excellent 34
2	Good	43	Excellent 38
2.8	Good	54	Excellent 48
4	v/Good	61	Excellent 48
5.6	v/Good	61	Excellent 48
8	Excellent	68	Excellent 54
11	Excellent	61	Excellent 54
16	v/Good	54	Excellent 43

Contrast

at 30 lines/mm			
f/nc	Center %	Corner %	
1.4	Low	26	High 38
2	Low	36	High 40
2.8	Low	51	High 50
4	Medium	66	High 60
5.6	Medium	68	High 68
8	Medium	63	High 58
11	Medium	60	High 56
16	Low	48	High 50

On the Optical Bench: We found some undercorrected spherical and zonal aberration in the cen-

modern tests

Performance

Our Standard	Tested
Focal length: $\pm 5\%$ (128 $\frac{1}{4}$ -141 $\frac{3}{4}$ mm)	135.4mm
Max. aperture: $\pm 5\%$ (f/3.8-f/4.2)	f/4.1
Distortion: $\pm 2.5\%$	Less than 1% (pincushion)
Light falloff: at f/5.6 ± 1 stop from theoretical limit (-0.07 stops)	-0.16 stops.
View area compared to film area: (Vertically, at least 85%; horizontally, not more than 100%)	V: 92% H: 91%
Parallax error compared to film (at 7m):	V: 0.96mm V: 0.25mm downward H: 1.61mm H: 0.4mm toward right

Resolution

at 1:49 magnification				
f/no.	Center Lines/mm	Corner Lines/mm		
4	Good	39	Excellent	35
5.6	V/Good	44	Excellent	39
8	V/Good	49	Excellent	44
11	Excellent	55	Excellent	49
16	V/Good	49	Excellent	44
22	V/Good	44	V/Good	39

Contrast

at 30 lines/mm				
f/no.	Center %	Corner %		
4	Low	38	High	50
5.6	Medium	48	High	51
8	Medium	53	Medium	48
11	Medium	50	Medium	44
16	Low	45	Low	38
22	V/Low	34	V/Low	31

On the Optical Bench: We observed less color flare and less zonal spherical aberration than we might expect in a 135mm tele. No axial color was detected, and the central image became nearly diffraction-limited (the theoretical perfect image) when the lens was stopped down one stop to f/5.6. The point image on the optical axis appeared round, with no tail or one-sided flare to indicate any decentering or tilted lens elements. Off axis, the point image was observed to have only a slight astigmatism, but no lateral color or coma. A very small and faint skew ray flare was seen, but this vanished when the lens was stopped down to f/5.6. Overall, the lens should produce very good to excellent image quality.

In field test slides: when this lens was used to take color transparency pictures, the images were found to be very sharp at f/4, and even better at f/5.6. There was little to choose between central and off-axis image quality. A slight softness and astigmatism became undetectable only $\frac{1}{2}$ stop down from maximum aperture (f/4.5). Close-in images were also very sharp and with excellent detail and contrast even in dark areas of the subject. We found a barely noticeable loss of sharpness at the extreme edges and corners when the lens was at f/4, but this improved at f/5.6. For a non-multicoated lens, residual ghosts and flare were very well controlled.

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