Mono Lake

EVANESCENT LIGHT

Photography by Ian Parker


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blurb

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One of the oldest lakes in the western hemisphere, Mono Lake is hauntingly beautiful, reflecting the snow-capped Sierra Nevada in its shimmering blue waters. An immense inland sea, the 70 square-mile lake fills a natural basin, 700 square-miles in size. The lake has no outlet, so the lake level is determined by the balance between inflow and evaporation.

Tufa Towers

Although the lake and its setting already make a photographer's dreamscape, what make Mono Lake truly unique are the unusual rock formations around the shores, known to geologists as tufa (too'-fah). The greatest concentration of these towers is located at the South Tufa grove just off of Hwy 120 East, at the south end of Mono Lake.

Tufa is essentially common limestone. What is uncommon about this limestone is the way it forms. Typically, underwater springs rich in calcium mix with lake water rich in carbonates. As the calcium comes in contact with carbonates in the lake, a chemical reaction occurs resulting in calcium carbonate--limestone. The calcium carbonate precipitates around the spring, and over the course of decades to centuries, a tufa tower will grow. Tufa towers grow exclusively underwater, and some grow to heights of over 30 feet. The reason the tufa towers around Mono Lake are visible today is because the lake level fell dramatically after water diversions began in 1941. At the present (2016) lake level, springs can be seen bubbling out at the foot of tufa towers that are now left high and dry on the shore.

In addition to the high tufa towers, much smaller sand tufas formed quite differently. Beneath the surface of the ancient lake, calcium-rich groundwater rose up through brine-saturated sand layers, forming cemented pillars of sand. Later, the lake waters receded, leaving this area high and dry some distance back from the water's edge. Then wind eroded away the sand layers, exposing fluted sand tufas which resemble the columns of some ancient ruined city. Only somewhat protected by their top harder layer, these delicate formations are being continually weathered away, and new ones are exposed. In view of their fragility the locations of the best sand tufas are not advertised, and I do not not reveal them in this book.

Lake level and the Los Angeles DWP

The tufa towers became exposed when the city of Los Angeles diverted four of the five streams flowing into Mono Lake. Deprived of its freshwater sources, the lake volume dropped by half, exposing nesting colonies of gulls to predation and again doubling the lakes salinity. The entire eco-system began to collapse. In response David Gaines formed the Mono Lake Committee, a citizens group that was formed to reverse this trend and save the lake. In 1994 the California Supreme Court mandated that the lake should rise to a level of 6,392 feet, partially restoring the ecosystem and migratory bird habitat. For several years after the lake rose, reaching about half way to the mandated level, but from 2012 a record drought has erased these gains, with the level in 2016 (6378 ft) being only 2 ft higher than in 1994. During the 30 years that I have visited Mono Lake the shoreline has thus changed enormously, with tufa towers emerging, becoming submerged than then re-emerging from the waters.

Mono Lake birds

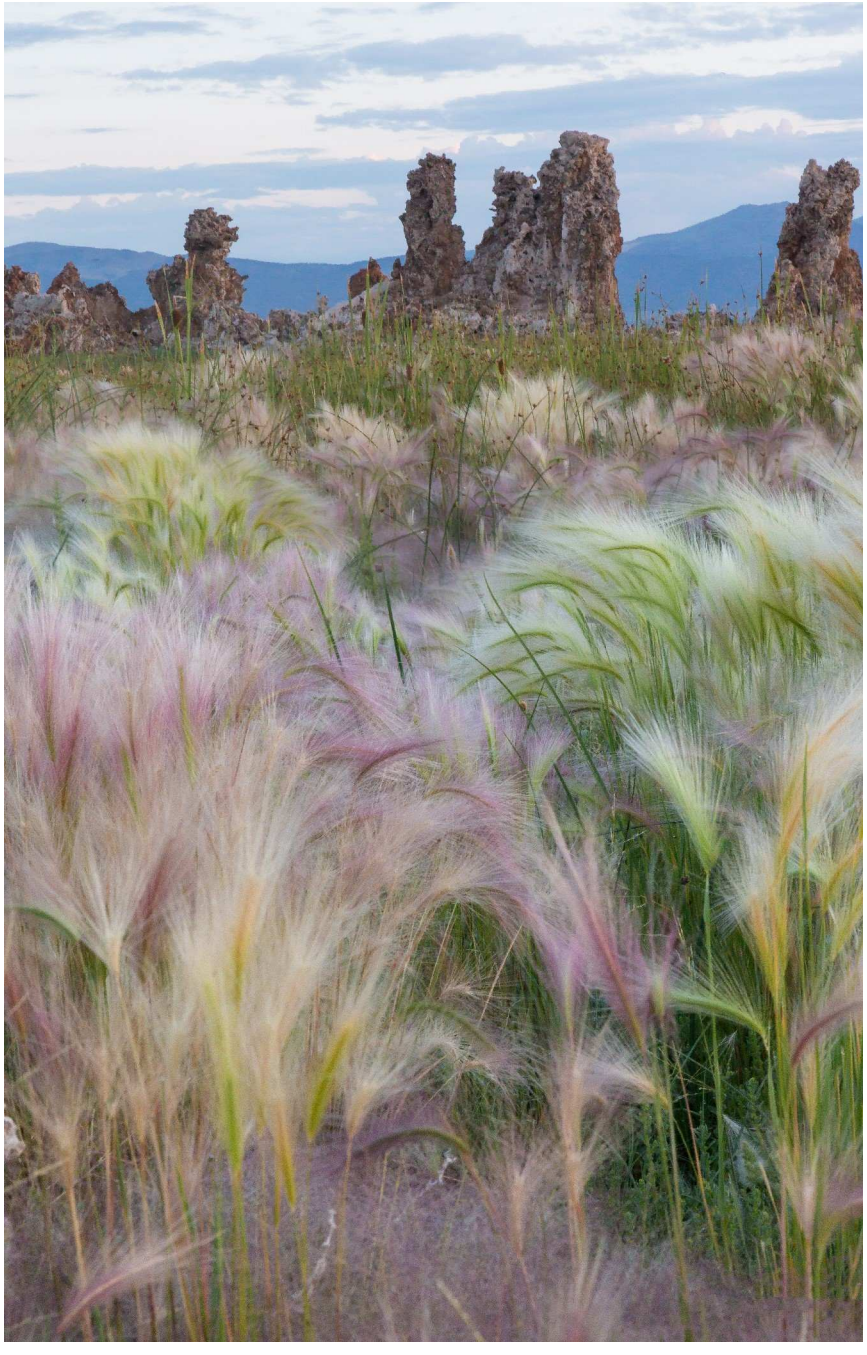
Mono Lake is a vital resting and eating stop for migratory shorebirds. Nearly 2,000,000 waterbirds, including 35 species of shorebirds, use Mono Lake to rest and eat for at least part of the year. Some that depend on the resources of Mono Lake include American avocets, killdeer and sandpipers. Late every summer tens of thousands of Wilson's phalaropes and red-necked phalaropes arrive from their nesting grounds, and feed until they continue their respective migrations to South America and the tropical oceans. In addition to migratory birds, a few species spend several months to nest at Mono Lake, including the second largest nesting population of California gulls, second only to the Great Salt Lake.

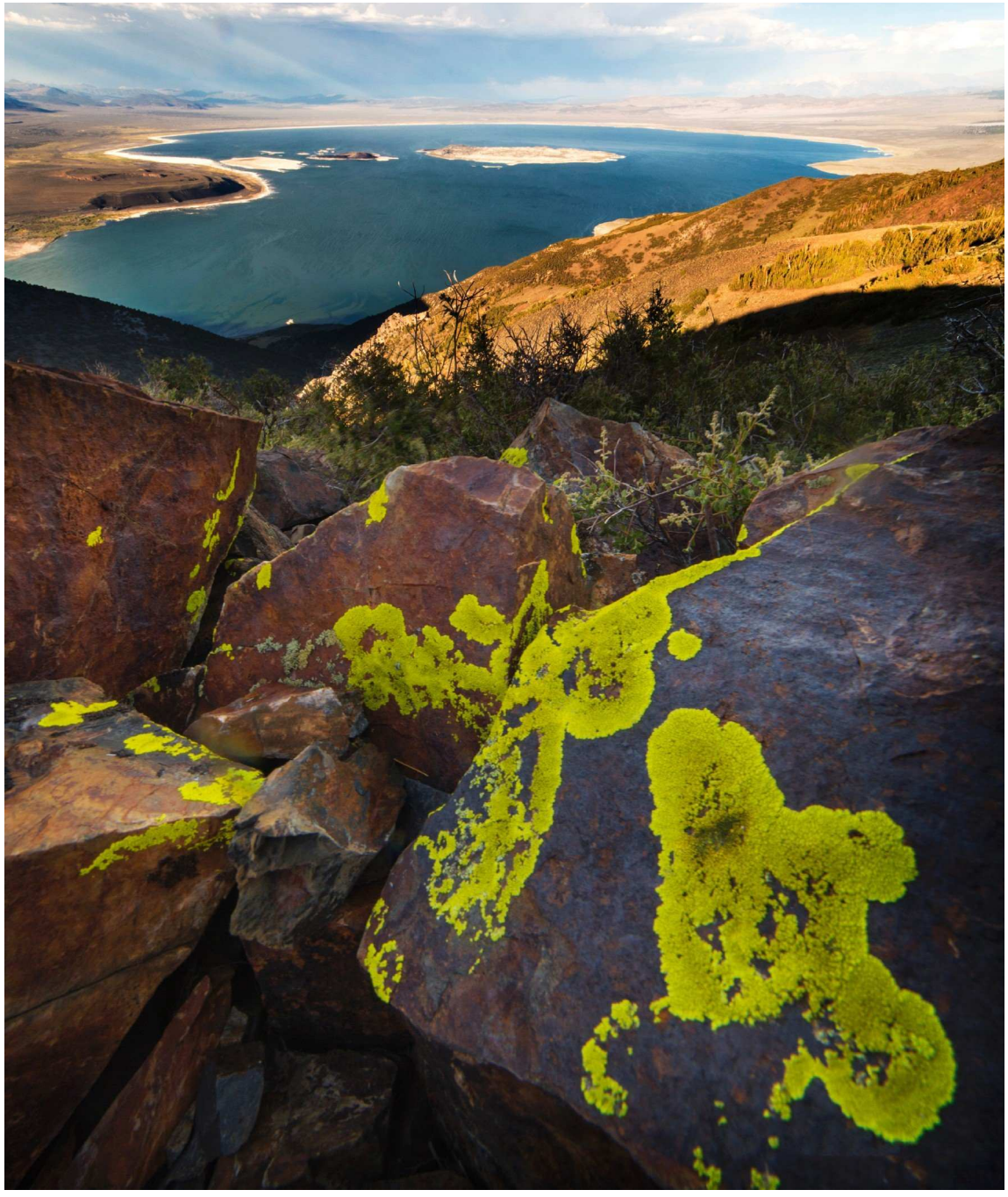
Mono lake water is too saline to support fish. Instead, the birds depend upon a food chain based on the single-celled planktonic algae in the photic zone of the lake. These algae reproduce rapidly during winter and early spring, and are the food for the endemic Mono Lake brine shrimp that multiply to an estimated 4–6 trillion during the warm summer months. Birds also feed on the alkali flies that congregate in black, buzzing clouds along the shores and walk underwater, encased in small air bubbles to graze and lay eggs.

About this Book

I took the photographs in this book over a 12 year period, beginning when I first acquired a digital SLR camera. Mono Lake is one of my favorite locations on earth to photograph - with the bonus that it is within a weekend driving distance from my home. The tufa and ancient saline lake are the foundation for creating striking images, but importantly the conditions are always different on each repeated visit. Situated in a high (6000 ft elevation) bowl beneath the Sierra Nevada mountains Mono Lake gets plenty of weather; on several occasions I have arrived during an afternoon thunderstorm that providentially cleared just in time for sunset. Mono Lake truly combines stunning scenery with evanescent light.

The images are arranged as a 24 hour chronology, capturing the changing colors and moods of Mono Lake through day and night.





NOTES ON THE PHOTOGRAPHS

Cover
I was fortunate to be at Mono Lake when a clearing storm created a spectacular sunset. At first I was engrossed in photographing the sky, but then noticed that the tufa formations, inherently a muted grey, were taking on some beautiful color. To capture this to best effect I walked along the beach toward the eastern end of the South Tufa, where there is a concentrated 'cityscape' of slender vertical towers. The photo is a panorama, stitched together from a series of vertical shots. The light was fading rapidly, and I could get only one sequence, taken from a quickly chosen vantage point with sufficient elevation to look down onto the formations.

Frontispiece
I had this scene in mind for some time, following an earlier trip up to the Log Cabin mine high in the mountains above Mono Lake. The rough dirt road to the mine accesses a spectacular viewpoint looking due east over the lake. It occurred to me that this should provide a good astrophotography shot with the Milky Way arching directly above the lake early in a moonless summer night. Leaving the camera set on the tripod while I got some sleep, I re-photographed the exact same scene when the first glimmers of light and color appeared on the eastern horizon. A composite of the night and pre-dawn images thus provided both a sharp sky and a clearly outlined image of the lake with added color.

Page 4
Dawn often brings winds that raise waves on Mono lake. The soft sounds of water lapping on the beach are an evocative memory of my walks down to the tufa, alone in the early morning stillness. Here I used a long (30 second) exposure to blur the water, creating a diffused mirror of the sky. The sun would not rise for an hour but its light already cast a red band, which I supplemented by light-painting the tufa.

Page 5
The sand tufa of Mono Lake are among the most surreal locations I know of. Unlike the better known carbonate tufa formations in and around the water-line of the lake, the sand tufa are small structures, only two or three feet high, but are sculpted into fantastically delicate filigree patterns. Owing to their delicacy, the sand tufa are not widely advertised, and thus are infrequently visited. The grey sand tufa appear mundane under sunlight. But catch them an hour or so before sunrise, and it is a different matter. For this photo faint orange glow in the east preceding the rising sun cast a subtle, diffuse front light and a full moon provided a highlight in an otherwise uniformly blue sky.

Pages 6,7
The hour before dawn is the best time to visit the tufa. I value solitude and silence; people - even the most ardent photographers - tend not to arrive until just before sunrise. The simple panorama here captures this stillness, silhouetting the tufa formations against the red band the appears and then fades before the sun itself makes an appearance.

Page 8
Despite may previous visits to the sand tufas, I usually have to cast around in the dark of night to find them amidst the featureless sand and grasses of the relicted lake bed surrounding present day Mono Lake. I took this photo as the eastern sky began to brighten, light-painting the formations so they did not appear as mere black silhouettes.

Page 9
The sand tufa are small, only about 3 feet high, so to get a good photo you need to get down on the ground; a kangaroo rat's eye level view. Wriggling around on my tummy in the soft sand, I positioned myself in anticipation of where the sun would rise, aiming to create a sunstar between the filigree columns. Such back-lighting is dramatic, but the extreme contrast required strong post-processing to restore shadow details.

Page 10
From Mono Lake the sun rises over low, distant hills to the east, and sunlight reaches the high summits of the Sierras well before the time of 'official' sunrise. The light then gradually creeps down the mountains, and by the time it reaches the lake the intense color has already faded a little. Nevertheless it brings out a strong orange glow from the tufa towers. This photo of the formations curving along the western shoreline was taken at the instant they became illuminated, while the lake itself was still in shadow.

Page 11
As the rays of the rising sun reach the lake they are skimming horizontally, highlighting clumps of sagebrush while the ground below is still in shadow.

Page 12
On this morning the Sierras were still draped by lingering low clouds an hour after sunrise, when the higher elevation of the sun brought out the cerulean blue of the lake and the yellow-green tints of a tufa shelf revealed by the low water level.

Page 13
These tufa towers would have submerged before diversions of the intake streams began in 1941. Even though I took this photo far back from the present lakeshore, the ground where I was standing would then have been 30 ft below the surface. During the intervening decades the exposed lake bed has become extravagantly colonized by salt-loving plants.

Page 14
For many years the formations to the west of the South Tufa were islands well out in the lake, but in 2014 they became connected to the land by mud flats. At first goopy and treacherous, the land-bridge dried as the water level dropped, and by 2015 was carpeted by pastel grasses.

Page 15
I first noticed this threesome of geese [not a gaggle; that term applies only to 5 or more geese] at the far (east) end of the South Tufa area. From there I followed as they slowly and gracefully swam around the lake, emerging to shake themselves off and venture to feed among the grasses of the newly formed land-bridge. The sun angle from my position gave beautiful back-lighting, though I needed care to shield the lens to avoid flare.

Pages 16,17
A remarkable dissimulation of Wilson's phalaropes! Mono Lake is a crucial stopover and refuelling station for phalaropes on their long migration to South America. They stay for only a month during summer, but in that time eat enough alkali flies and brine shrimp to fuel their three thousand mile onward journey. Their numbers are estimated at around 100,000. It seemed as if all that number were congregated here, in a dense pack of birds that would simultaneously take off, wheel around and fly to a new part of the lake seeking more brine shrimp. I found it hard to conceive how they did not collide.

Page 18
Alkali flies form dense, buzzing clouds along the shoreline. They are the major food source for nesting California gulls, who run along the shoreline with their beaks open. Although the flies try to get away, the gulls can run faster. The flies also avoid people. You can walk among them, quite untouched but preceded by a black cloud.

Page 20
"What's good for the goose is good for the gander". The alkali flies are a high-protein food source for many bird species at Mono Lake. Back-lighting in this photo highlights the profusion of flies.

Page 20
An osprey landing to feed chicks in a nest on a tufa tower. There are about 10 osprey nests at Mono Lake, and the birds have successfully raised chicks every year since 1987. The tufa towers offer safe nesting sites, but their location in a saline lake supporting no life larger than brine shrimp means the osprey have to fly to nearby freshwater streams and lakes in the Sierras for their fishing.

Page 21
A pair of American avocet, in the fresh water of Rush creek where it enters Mono Lake.

Page 22
Violet-green swallows (in the right light they really are a vivid violet and green!) nest in small crevices among the tufa towers.

Page 23
Mono Lake adopts many different moods under different conditions of light and weather. On an overcast day without any dramatic clouds I was having a hard time finding something to photograph; the diffuse light made the tufa look like grey rubble. But there *was* color to be found. At the tip of the South Tufa the receding lake level had exposed a flat rock shelf tinted in subtle shades of yellow. To make this photo I used a wide lens, setting up my tripod low among slippery saline pools. Water shoes or Wellies make useful photographic accessories.

Page 24
Lichen patterns on rocks at the overlook high in the Sierras accessed by the road to the abandoned Log Cabin gold mine. This photo was taken from a viewpoint close to that of the nighttime shot on page 1.

Page 25
Afternoons are when the sky over Mono Lake may start to go wild. On this visit a lenticular cloud formed, looking like a giant tongue licking over the tufa.

Page 26
Classic chiaroscuro light. An afternoon storm brought black storm clouds, with transient beams of sunlight just breaking through to illuminate the tufa formations.

Page 27
The 'Sierra wave'. Winds blowing across the Sierras form lenticular clouds on the leeward side of the mountain range. These clouds can remain stationary for many hours, and on this afternoon formed an abrupt bank running due north-south along the foot of the mountains. The sky remained perfectly clear to the west, allowing me to create a sunstar between two tufa pillars.

Page 28
Two more views of the Sierra wave cloud; exposing to reveal details in the tufa. The iridescent colors in the cloud are natural - not an aberration of the camera or lens - and arise by diffraction of the sunlight by small ice crystals.

Page 29
Gloomy, moody light over the lake. The day had been overcast and dark, but in the late afternoon the sun began to show through low clouds that sufficiently attenuated its light to allow a shot directly into the sun.

Page 30
Afternoon storm clouds over the 'spiky' towers at the tip of the South Tufa. These clouds are known as mammatocumulus, for the cellular pattern of pouched hanging under the cloud base. There was little color in the scene, so I chose to render the photo in black and white, giving leeway to enhance the contrast and yield a more menacing feel to the image.

Page 31
Lightning over Mono Lake. A frequent weather pattern in summer is for clouds to start building around noon in what began the day as a perfectly clear, blue sky. At first they are fluffy, white and innocent, but soon coalesce to darken the sky and bring rain and sometimes lightning. I created this photo as a montage of several shots, using a lightning trigger to open the shutter in synchrony with each bolt. As the lightning drew closer I quickly retreated to the safety of the Faraday cage formed by the bodywork of my car.

Pages 36,37
A long wait in the rain was rewarded by a most amazing sunset and rainbow. I took this shot a few hours after the lightning photo on page 31. I had retreated to my car, and sat reading as the rain poured down. The parking lot at the South Tufa emptied completely, but I thought it was worth staying on the slim chance that the clouds would clear to the west and allow the setting sun to break through. Indeed, about 100 pages into my book, some faint color appeared above the lake and I quickly ran down to the shore in diminishing rain. I was privileged to be the only person to witness (and photograph) this wonderful scene.

Page 38
Lenticular cloud catching the last sunset light. The most spectacular colors are usually seen looking directly toward the sunset, but its always worth turning around to look for more subtle light to the east.

Page 39
Sunset light through a sand tufa tunnel. The camera can be used to play useful tricks and remove all sense of scale in a photograph. In this scene the tufa formations are tiny, only a couple of feet high. There was not enough room for a tripod, so to position my camera within the tunnel formation I had to rest it directly on the tufa shelf, using small fragments of broken tufa as wedges to adjust the level and angle while watching the composition on the lcd screen .

Pages 40, 41
The flip side of a sunset. I took this panorama just a few minutes after the photo on pages 36,37. The clouds had lit up with a beautiful, diffuse red glow, and I ran across to capture this light illuminating the tufa spires before it faded.

Page 42
Pink sunset and turquoise water. In 2016 the water level in Mono lake fell to its lowest point in 20 years. That is not good for the vast numbers of birds nesting on islands that would become vulnerable to predators crossing a land bridge exposed by only a slight further drop in water level. It does, however, mean that the shoreline has been continually changing; tufa islands become connected to the land along sandy isthmus; most attractively, the low level has exposed an area of flat rocks at the tip of the South Tufa area, lapped by shallow translucent water that takes on yellow-turquoise tints.

Page 43
Sand tufa sunset. These small formations are intricately shaped, but in most light appear as only a muted grey. To make a good color photo something spectacular needs to be happening in the sky...

Page 44
Sunset rays above a recently exposed tufa shelf. I made this photo using a 17 mm tilt-shift lens, utilizing a small tilt setting to increase depth of field, but primarily using shift to gain a wider field of view. Also, by combining two vertically shifted shots with the camera in landscape orientation I could obtain a final image in a square format, which makes a nice change from the exaggerated 3:2 aspect ratio of the standard 35 mm frame.

Page 45
A second tilt-shift composite image, that I captured a few minutes after that on the facing page. I moved the camera position a little so as to more effectively frame the color in the clouds and their reflection in the still, shallow water.

Page 46
A spectacular lenticular Sierra wave cloud at sunset. This cloud had formed earlier in the afternoon, but remained remarkably constant in position and even shape for hours, until it finally gratified my expectations by catching the sunset light.

Page 47
Lenticular wave cloud (the same as on page 46) above a light-painted tufa island. I took a shot of the cloud at sunset and then, with the camera locked on the tripod, waited until the light had faded enough to allow me to light-paint the tufa formation with a flashlight. The final image is thus a blend of two shots, taken about an hour apart.

Page 48
Another light-painted photo; a single exposure, taken during the 'blue hour' with stars just beginning to be visible in the darkening sky. I took this photo in 2007 when the tufa formation was well out in the lake. It is now (2016) high and dry on the shore

Page 49
Noctilucent cloud over Mono Lake. Noctilucent clouds are the highest clouds in the Earth's atmosphere, composed of tiny crystals of ice. They are normally too faint to be seen, but can be observed when the sun is well below the horizon but the clouds are still sunlit.

Page 50
The Milky Way and a meteor over the tufa towers. This is a 30 second exposure - long enough to capture the stars in the Milky Way, brief that the stars did not begin to trail with the Earth's rotation. The meteor was a happy coincidence.

Page 51
Star circles around Polaris. I planned this shot by framing tufa towers in a view looking directly toward the North Star. Moreover, I wanted to capture reflections of the stars as they circled during a long exposure. Mono Lake itself would not serve, because even during a still night ripples on the water would blur the reflections. Instead I found a small lagoon, where the shallow water remained mirror still. This photo has proven to be my most profitable, having been chosen as the front cover artwork for a popular college physics textbook.

Mono Lake Overview

South Tufa Area

Imagery Google Earth