CHAPTER 9
THE CROWNING OF NATURE

The 1780's was a wonderful decade for fireworks. The nighttime skies of Northern Europe and America were illuminated by the most spectacular and frequent displays of the Aurora Borealis in over 150 years. In 1783, two great volcanoes erupted - Laki in Iceland from June to November, and Asama in Japan in August. Together, they filled the stratosphere with enough dust to lower temperatures appreciably and hide the summer sun across Europe until it was about 17° above the horizon. For months, the dust laden stratosphere produced glorious, deep red sunrises and sunsets throughout the northern hemisphere.

Manmade fireworks added to the fun. In 1781, London was treated to the opening of Philippe Jacques de Loutrebourg's entertainment palace, Eidophusikon. Eidophusikon consisted of a series of dioramas, complete with audiovisual effects that simulated nature's powers and wonders over the course of a day. It included an English sunrise, a London thunderstorm complete with manmade lightning, an Italian sunset and even the roaring Niagara Falls.

Fireworks were also set off in the political arena. The decade ended with the opening of the French Revolution, which spread until it enflamed all the skies of Europe.

These fireworks enraptured Europe's youth and revealed Nature to them as a vibrant, romantic organism rather than an impersonal, regulated clock. They watched their elders struggle with failing powers to hold the reins of the world, and knew they could do better. When their time came the youthful generation impetuously opened whole new romantic vistas. It is no coincidence that most of the earliest romantic devotees of nature - William Wordsworth, Samuel Taylor Coleridge, Ludwig von Beethoven and the painters, John Mallord William Turner, John Constable, and Caspar David Friedrich - were born between 1770 and 1775 and were youths of the 1780's.

The Romantics were not wanton profligates. Although some expressed disdain for the failed synthesis of Newtonian rationality, they worked deliberately and with scientific discipline to imbue their artistic creations with an aura of cosmological mystery. In the fall of 1797-1798, the poets, Coleridge and Wordsworth undertook a literary project to accomplish just this aim. It was designed to capitalize on the power of exciting the sympathy of the reader by a faithful adherence to the truth of nature....and to excite a feeling analogous to the supernatural by awakening the mind's attention from the lethargy of custom and directing it to the loveliness and the wonders of the world before us; an inexhaustable treasure, but for which, in consequence of the film of familiarity and selfish solicitude we have eyes, yet see not, ears that hear not, and hearts that neither feel nor understand.

With this view I wrote The Ancient Mariner.


The Romantic painters had the same aims. Detailed knowledge of science and intimate contact with nature were central to all their creative efforts, so that it was the explorers, naturalists and scientists who first opened their eyes. Coleridge is a prime example, for he never saw any of the exotic places his mariner described. In The Road to Xanadu (1926),
John Livingston Lowes proved that Coleridge depended entirely on accounts or journals of sea voyages for virtually all the natural observations and even some of the expressions used in The Rime of the Ancient Mariner.

The artists eagerly absorbed all they could from the scientists they were so wary of. Thus, we find that in 1816, Goethe wrote poems praising Luke Howard, one of the two scientists who independently derived the first cloud classification schemes in 1802-1803. And this brief but intense love affair worked two ways, for it was an artist who finally used the chemists' light-sensitive silver salts to invent photography.

The camera resulted from a deliberate effort to improve the sense of realism in art. In its turn, it exercised an immediate and profound impact on painting. It freed the artist from reliance on the frail memory of a fleeting scene by providing a complete record of the moment that revealed whole new worlds of form and detail. Its impartial eye redoubled the call to 'realism', or detailed objective description, in all the arts.

The mere existence of the camera warned artists to examine and describe everything more carefully. Painters were forced to treat the camera as an informer that could expose their ignorance of nature's infinite wealth of form and detail. Thus, even without camera in hand, the artists' probing eyes grew more discerning than ever before. They quickly discovered many of nature's long kept secrets and revealed them for all to see. During these years of discovery, Nature came to be venerated more than ever, and during these years the crown she wore was the sky.

**Infinite, Romantic Skies**

The young romantics of 1800 were not the first romantics. They got their ideas directly from James Thomson, Burke, Hume, von Haller, Rousseau, Goethe, Schiller and a host of other poets, philosophers and even scientists.

Unwittingly, the botanist, Carl Linne, better known as Linnaeus, planted one of the first seeds of the Romantic flowering. From early childhood Linnaeus had been fascinated with flowers and, by the age of eight, was dubbed the little botanist. In 1735, aged 28, he issued his Systema Naturae, the first modern plant classification. A confirmed classifier, he later extended his method to the animal and mineral kingdoms as well.

Soon after the early biologists mastered the Linnaean method they began to use it to categorize other aspects of nature. Thus, it was through biology that scientific order was first brought to the chaos of clouds. Two scientists thought of a scheme almost simultaneously. The first, in 1802, was Jean-Baptiste de Monet Lamarck, the man who coined the term, biology. The second was a British chemist named Luke Howard, who independently devised a similar cloud classification system in the winter of 1802-1803.

Lamarck named the clouds according to their basic morphology. The forms he recognized included clouds in sweeps, dappled clouds, sheet clouds, heaped clouds and clouds in flocks. His scheme is eminently sensible but was overlooked and never adopted for a variety of extraneous reasons. To begin with, he made the tactical error of using French names rather than Latin. Then, he published his scheme in a rather disreputable journal that included astrological weather forecasts. Lamarck's forecasting techniques were also discredited by the scientific community even though he actually established a network of weather stations and suggested the need for weather maps. Napoleon himself joined the majority, bluntly telling Lamarck to give up his meteorological researches and stick to natural history.

Luke Howard's scheme was given a better reception. Howard was born in 1772, during the same five year period as so many of the other Romantics, and was also a child of the 1780's. Years later, he recalled how, as a
youth, he had been guided toward meteorology by

the many Northern Lights, the passing phenomena of the meteor of the year 1783 as well as the summer haze of the same year [due to the eruptions of Laki and Asama].

Howard decided to classify clouds and other atmospheric phenomena "for the benefit of Agriculture and Navigation". His approach was to apply to the sky the Linnaean method he had mastered during his studies. He saw his work on clouds only as a preliminary effort intended to facilitate further improvements in weather forecasting, but it was to have a fundamental impact in fields no one anticipated.

Howard presented the scheme to his friends of the Askesian Society during its winter session of 1802-1803. The resulting paper, On the Modification of Clouds, appeared in several installments during the summer and fall of 1803, but did not begin to attract worldwide attention until about a decade later. His scheme (Table 9-1) still forms the basis for the cloud classification system used today.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Base (km)</th>
<th>Howard’s Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cumulus</td>
<td>Puffy often with flat base</td>
<td>&lt; 3</td>
<td>Cumulus</td>
</tr>
<tr>
<td>Cirrus</td>
<td>Trails of falling ice crystals twisted by winds</td>
<td>&gt; 5</td>
<td>Cirrus</td>
</tr>
<tr>
<td>Stratus</td>
<td>Cloud layer with low base</td>
<td>&lt; 2</td>
<td>Stratus</td>
</tr>
<tr>
<td>Stratocumulus</td>
<td>Flattened cumulus confined to a thin layer</td>
<td>&lt; 3</td>
<td>Cumulostratus</td>
</tr>
<tr>
<td>Altocumulus</td>
<td>Patterned high layer of small cells or waves</td>
<td>2 – 5</td>
<td>Altocumulus</td>
</tr>
<tr>
<td>Cirrostratus</td>
<td>Patterned higher layer of tiny cells or waves</td>
<td>&gt; 5</td>
<td>Cirrostratus</td>
</tr>
<tr>
<td>Altostratus</td>
<td>Layer clouds with ripples and watery sun</td>
<td>2 – 5</td>
<td>Altostratus</td>
</tr>
<tr>
<td>Cirrostratus</td>
<td>Layer clouds often with halo</td>
<td>&gt; 5</td>
<td>Cirrostratus</td>
</tr>
<tr>
<td>Cumulonimbus</td>
<td>Towering thundercloud with anvil top</td>
<td>&lt; 2</td>
<td>Nimbus</td>
</tr>
<tr>
<td>Nimbostratus</td>
<td>Layer cloud producing precipitation</td>
<td>&lt; 2</td>
<td>Nimbostratus</td>
</tr>
</tbody>
</table>

Table 9-1. Luke Howard’s and Present Cloud Genera

In 1815, Howard’s work was translated into German and appeared in the Annalen der Physik. This brought it to the attention of Johann Wolfgang von Goethe and made a lasting impression on the poet-scientist. Goethe had always counted Linnaeus as one of the three most influential thinkers in his life (the others were Shakespeare and Spinoza) and he appreciated the value of applying the Linnaean method to other fields. Many years earlier, he had made drawings of rare cloud shapes but the fact that clouds had classifiable forms escaped him. To Goethe, Luke Howard was the first to hold fast conceptually the airy and always changing forms of clouds, to limit and fasten down the indefinite, the intangible and unattainable and give them appropriate names.

Perhaps Goethe should have given Jan van Eyck, Piero della Francesca, Albrecht Altdorfer, Peter Paul Rubens, Jacob van Ruisdael and other painters a bit more credit, for they had discerned many of the basic cloud forms long before Howard and Lamarck were born. Still, Howard was the first scientist to methodically categorize and draw attention to the existence of order in the phenomena between the earth and the heavens.

Armed with his new knowledge, Goethe felt the time had come for painters to capture
the sense of atmospheric order. He began to lobby for an improvement in sky art. In the following year (1816) he tried to commission Caspar David Friedrich to execute a series of cloud studies. Friedrich rejected the offer, possibly fearing that such a methodical approach might diminish his power to capture the mystical essence of nature. Undaunted by this and other rejections, Goethe was finally able to enlist Johan Christian Clausen Dahl for the job. Despite these early signs of a growing emotional rift between artists and scientists, Howard's work had a documentable effect on painters, for never again could they deny the existence of cloud forms.

But the Romantic artists had glimmerings about the cloud forms even before they learned of Luke Howard. In the last quarter of the eighteenth century, a number of British painters were beginning to look at the skies above their native land and were impressed by the forms they saw. In 1785, Alexander Cozens published and illustrated a treatise that drew attention to the natural forms in the landscape. He also produced a drawing entitled The Cloud (c. 1775-85), which is an excellent rendition of a towering white cumulus surrounded by some dark stratocumulus. In France, Pierre Henri de Valenciennes executed some interesting studies of clouds and fog even while maintaining the primacy of history painting. In Denmark, Jens Juel, who may well have been inspired by the active skies of the 1780's and who taught a number of Romantics such as Caspar David Friedrich, painted the Northern Lights (Ny Carlsberg Glyptotek, Copenhagen) around 1790.

Philippe de Loutherbourg, creator of the Eidophusikon and an accomplished landscape painter, was an immediate predecessor of the Romantics. He seemed to accept the primacy of nature unleashed, as in An Avalanche in the Alps (Tate Gallery, London) where the scale of human effort is dwarfed by the workings of nature. But de Loutherbourg also maintained that technology resulting from human ingenuity was beginning to move the world. His Coalbrookdale by Night (1801, Science Museum, London) is one of the few landscapes of the early Industrial Revolution. It shows the fires of man lighting the night sky and producing smoky red billowing cumulus that dominate nature's cumulus. The manufactured clouds soon created an atmospheric pall that helped dampen enthusiasm about the blessings of industrialization.

De Loutherbourg also helped redirect attention from cloud effects to cloud forms. An immense, towering cumulonimbus fills the sky of A Distant Hailstorm Coming On and the March of Soldiers With Their Baggage (Fig. 9-1), yet is still growing. The incipient anvil and ragged cloud fragments called scud, which are created as they are drawn into intense thunderstorm updrafts, are among the classical signs of a growing cumulonimbus. Angry hailswaths already darken the sky beneath the growing cloud's flat base, obscuring all that lies beyond. Any soldiers who cross the hail swath will emerge battle scarred at best. De Loutherbourg, master of effects, was exposing a clearly defined cumulonimbus about to enter its most violent phase. It was surely a scene he had encountered.

Hail is a truly romantic (i. e., devastating) meteorological element. It is one of the noble
offspring of intense thunderstorms and admits no other parent. Hailstones are usually less than an inch across but can grow larger than grapefruits and kill the animals or people they fall on. The largest documented single hailstone, fell at Coffeyville, Kansas on September 3, 1970. It was over six inches in diameter and weighed 1.7 pounds. A few unverified reports tell of even larger stones and many accounts attest to the incredible damage of these storms.

The Bible contains one of the earliest reports of damage caused by hail, for hail was one of the ten Egyptian plagues. In his autobiography, Benvenuto Cellini also gave a vivid account of a hailstorm he witnessed when travelling through France.

One day when we found ourselves a day's distance from Lyons (it was nearly two hours before sunset), we heard the crackling of thunder and noticed how very clear the sky was: I was a bow's shot in front of my companions. After the thunder we heard such a tremendous, fearful noise reverberating in the skies that I was convinced it must be the Day of Judgement. I paused for a while, and there was a fall of hail, without a drop of water. The water was bigger than pellets shot from a blow-pipe, and when it hit me it was very painful: little by little its size increased till it was like the bullets from a crossbow....The hailstones grew to the size of large lemons. I sang a Miserere and while I was praying to God in this devout way a hailstone fell that was so large that it smashed a very thick branch from the pine under which I thought I was safe....

In the same way one of them fell on poor old Lionardo Tedaldi who, as he was kneeling down like me, was forced onto his hands....The storm continued some while, and then stopped: we had all been given a pounding....Then a mile in front we found such a spectacle of ruin so much greater than our own misfortune that it defies description.

All the trees were stripped and smashed; all the animals around had been killed, as well as a good number of shepherds. We saw a mass of stones which were so large that it was impossible to get both your hands round them.

Autobiography of Benvenuto Cellini.

How is it possible for the atmosphere to produce and support such large meteors? Hailstones grow by accretion, reenacting the way the Earth formed over 4.5 billion years ago. Intense thunderstorms have violent updrafts of warm, moist buoyant air that may exceed 100 miles per hour. Droplets produced in these updrafts are swept aloft, cooling with the air to temperatures far below freezing. Despite the subfreezing temperatures, only a select number of the larger droplets freeze into ice pellets, or graupel. The larger graupel offer more resistance to the updraft and are not swept aloft quite so rapidly as the smaller droplets. The rapidly rising small droplets then collide with the graupel, freezing to them on contact and adding to their mass. As the stones grow larger their terminal velocity increases, so that they collide with droplets more frequently and grow more rapidly. Within minutes, graupel can grow to the size of small hailstones.

Once hailstones grow large enough they either fall out of the updraft or fall despite it. On the way down they encounter warmer air and begin to melt or evaporate, but can reach the ground so long as they grew large enough in the first place and so long as the warm air layer is dry and not too deep. Then they will convince people of the divinity in nature.
Caspar David Friedrich sought through his paintings to reveal the divinity in nature. Using a complex iconography, he wove deeply religious and natural themes into a single fabric. A ruined cathedral in Friedrich's iconography symbolized the fact that, the splendor of the Church and her servants is a thing of the past; a different time, a different yearning for clarity and truth have emerged from her ruins.

Friedrich wrote these words to explain a now lost early painting in which a Protestant clergyman was "gazing thoughtfully up at the clouds floating lightly in a blue sky" while standing on the cathedral's ruins. God was now revealed to man through the cathedral of nature. Friedrich once remarked to a friend who was examining one of his studies of reeds, "God is everywhere, even in a grain of sand. Here I have revealed him in the reeds." More often, he chose the sky.

Friedrich was extremely sensitive to the grandeur of the sky and had an uncanny ability to enlist meteorological phenomena to reinforce or even establish the mood of his landscapes. Frequently, that mood had sad overtones.

Friedrich was born in 1774, the year Goethe's Sorrows of Young Werther launched the German Romantic movement. Goethe had been inspired to write Werther by the suicide of a friend. Friedrich also suffered deeply from a similar but even sadder and more personal loss. On December 8, 1787, the parish register of St. Nicholas in his hometown of Greifswald records that Caspar's brother, Johann Christoffer, "was drowned while trying to save his brother who had fallen into the water."

It is easy to read a feeling of loneliness or isolation into many of Friedrich's works, for often a solitary spectator or small group is shown with backs to the viewer, surveying the infinite panoramas before them. A number of other themes, such as the ruins of Gothic Cathedrals, blasted oak trees stripped of all leaves, and almost inconspicuous Crucifixions atop the vast mountains appear with haunting frequency to reinforce an almost mystical mood even though they are rendered with photographic accuracy. He could even use the sunset to evoke a mournful note. In the Ships in the Harbor of Greifswald (before 1810), the encroaching shadow of night, a darkened strip of sky just above the horizon, engulfs the distant town and all but one of the ships.

Later in his career, Friedrich's meteorology was almost flawless but early on he made a few notable meteorological errors. The nature of the errors indicate he temporarily abdicated his genius for observations and unalloyed perceptions, and allowed himself to be swayed by preconceptions and injudicious scientific reasoning.

In an early oil painting, the Tetschener Altar or the Cross in the Mountains (1807-08 Gemaldegalerie Neue Meister, Staatliche Kunstsammlungen, Dresden), the Crucifixion takes place under a sky filled with pink altocumulus clouds that reflect the light of the setting sun. The entire scene has been transplanted from Golgotha to a German hilltop, complete with pine trees. The hill blocks the direct light of the setting sun and seems to be the source of the three glaring crepuscular rays. The rays diverge correctly from a single point behind the hill, but fade as if they had been produced by the spreading beacon of a searchlight. Since crepuscular rays are actually all parallel they do not fade with distance from the source according to the inverse square law, but rather fade in a complex manner that depends on the angular distribution of light scattered by dust and air.

In the Mountain Landscape With Rainbow (c. 1810, Museum Folkwang, Essen), Friedrich contaminated the meteorology with a strong dose of iconography. He inserted an opaque, crescent-shaped bow into the nocturnal, moonlit scene as an unfortunate afterthought. The moonlight appears behind the bow through gaps in a deck of stratocumulus, an error
considering the source of light for all rainbows is behind the viewer. Most bows are brightest near the horizon but Friedrich's bow tapers to obscurity on both sides.

Friedrich's meteorology improved after 1816, when he first learned of Luke Howard's work. He began to devote far more care to the detailed form of his beloved altostratus and altocumulus, and no longer put his iconographic goals at odds with his meteorology.

Much of Friedrich's inspiration derived from the mountains. Even though he never saw the Alps, steadfastly refusing on nationalistic grounds to set foot in Italy, he was a frequent visitor to the nearby Harz Mountains and also travelled to the Riesengebirge near Prague. There, wandering among modest peaks, he discovered aerial truths formerly known only to the Chinese painters.

Fig. 9-2. Caspar David Friedrich. The Wanderer Above the Sea of Mist. c. 1817-1818. Hamburger Kunsthalle.

These truths he revealed to the Western World in a series of paintings beginning with the Morning Fog in the Mountains (1808, Staatliche Museen Heidecksburg, Rudolstadt). Perhaps the most famous of these is The Wanderer Above the Sea of Mist (Fig. 9-2), which is almost certainly based on an actual observation. The wanderer stands boldly atop one of the peaks of the Harz Mountains, surveying the sea of fog below and the ocean of clouds above.

The sky is covered with a layer of thin, barely opaque altocumulus. Friedrich periodically restated the observation that even a very thin layer of middle clouds can block the feeble and low sun of central and northern Germany and dim its landscape. Such skies occur in more tropical climes but do not last long enough to inspire poetry or create a philosophy, for a high and healthy sun soon burns them out of the sky and erases them from the memory. Friedrich was a child of the North and may have been saying that we may witness and contemplate nature's dark forces only while she remains content to brood; should she ever choose to unleash herself, we would surely be engulfed in the Gotterdammerung.

Fig. 9-3. Fog filling the valleys. Need with shear. ***

But on the day of the wanderer's hike, nature chose to show a gentle face. After a quiet night, fog has filled all the valleys. Only
the peaks, aggrandized by comparison with the almost microscopic trees, emerge into the clear air and appear more distinctly than their bases.

Friedrich notes that visibility in the mountains often depends more on altitude than on distance. When fog fills the valleys, distant mountain peaks are often perfectly visible while nearby slopes and valleys are totally obscured. Chinese painters had been celebrating this inverted variant of normal atmospheric perspective for centuries but Friedrich went several extra steps by revealing the wavy or shredded structure often seen at the top of seas of valley fog, particularly if there is strong wind shear (Fig. 9-3).

Fog is a regular occupant of the valleys during mornings around the autumnal equinox. At this time of year, the prevailing westerly winds bring relatively warm and humid air over Europe from the nearby Atlantic Ocean. The ocean, with its enormous capacity to draw heat from its depths, remains warm long after the sun has started south, while the motionless land surface cools rapidly as the nights lengthen. Even before the sun sets, the mountainsides begin to chill the air they touch. When this air is humid, even slight cooling will quickly bring it to its condensation point and produce fog. Then the cool veneer of dense, foggy air drains downslope into the valleys.

By dawn the valleys can be filled with a veritable sea of fog, from which only the mountain peaks emerge. And while the sun is still low in the sky it will be too feeble to penetrate even a relatively thin layer of clouds, giving the entire landscape a gray tone. In the distance the gray fog will seem to merge with the gray clouds and can obliterate the normally distinct division between earth and sky. On most days the sun will reheat the mountainsides and burn off the fog by noon. For a few hours, however, the early riser in the mountains may well compare himself to a Noah or think in terms of the vastness or ultimate unity of the cosmos because the scale seems truly colossal and the solid earth has essentially merged with the firmament.

So, the *Wanderer Above the Sea of Mist* is a very religious and philosophical landscape. Indeed, to Friedrich, as to the Chinese, the very act of artistic creation constitutes a religious experience.

It is not the faithful representation of air, water, rocks and trees which is the task of the artist, but the reflection of the soul and emotions in these objects.

This is reminiscent of the words and spirit of the eleventh century Chinese painter, Fan K’uan.

Since so many of Friedrich's meteorological and philosophical themes closely resembled those of the Chinese artists, it is tempting to ask if he plagiarized. Where else but in Chinese art had men so routinely retreated to the mountains and where else had they been portrayed contemplating the moon? The Chinese had long thought of the universe in terms of a throbbing organism, a concept that resonated with the increasingly biological European viewpoint of the cosmos. Indeed, Friedrich may well have fallen under the spell of the various oriental religions and philosophies that were beginning to fascinate Germans about that time.

By 1800, Chinese art had worked its way along all the highways of Europe, and it is reasonable to assume that Friedrich had access to some samples of Chinese landscape painting. Chinese art first began to pour into Europe in the seventeenth century. Cardinal Mazarin of France amassed a significant collection of Chinese art and antiques between the 1620's and his death in 1661. These Chinese artifacts remained popular through the reign of Louis XIV. During the Rococo reign of Louis XV, chinoiserie was elevated to the level of a cult.

Landscape motifs appeared prominently on many painted Chinese screens.
Nevertheless, prior to 1800, the cult of chinoiserie did not have a noticeable effect on European landscape art, for at first Europeans almost unanimously disparaged the lack of proper perspective and shading in Chinese painting. Chinese landscape art simply did not conform to the accepted scheme of things.

But, the Romantics grew up in a world where the ancient scheme of things was disintegrating. As a devoted landscape painter, Friedrich was also committed to overturning the established moral hierarchy of art subjects and placing the once lowly landscape at the top of the scale. Compared to other revolutionary changes in attitude, it was a small matter to invert the normal rules of perspective and to blur or even eliminate the once distinct horizon line.

Across the English Channel, Joseph Mallord William Turner was engaged in much the same task and used many of the same tools. Born and raised in London, where de Loutherbourg chained the fury of the elements on stage and Luke Howard found order amidst the chaos of the sky, the young Turner groped his way through the sulphurous fogs of a rapidly industrializing inferno. All the elements of his environment conspired to make him one of the great sky painters.

London's coal thickened fogs had been cloaking the gasping city for a long time. The recorded history of British air pollution goes back to at least 1257, when Queen Eleanor left Nottingham Castle because of the choking air produced by the burning of coal in the town below. The pollution got so bad that by 1661 John Evelyn was commissioned to conduct a study of London's air. In his report, entitled Fumifugium, Evelyn wrote,

The immoderate use of...coal...exposes London to one of the foulest inconveniences and reproaches...While these [smokestacks] are belching [smoke from] their sooty jaws,...London resembles rather the face of Mt Etna...or the suburbs of hell than an assembly of rational creatures...The weary traveller, at many miles distance sooner smells than sees the city to which he repairs. This acrimonious soot...carries away multitudes by languishing and deep consumptions, as the bills of mortality do weekly inform us.

Evelyn was not exaggerating. During the evening of December 4, 1952, a high pressure area with fair skies, light winds and slowly sinking air settled over London. At first, this air was reasonably warm and humid because it had originated over the Atlantic Ocean. But no sooner did it come into contact with the ground than cooling commenced, for under the clear skies the ground rapidly radiates its heat to space. That night, droplets of fog began to condense onto the water-loving, sulphurous soot continuously being pumped into London's atmosphere. By the morning of December 5, Londoners awoke to one more late autumn day of fog. Painfully inhaling the droplets of sulfuric acid, they went to work as usual even though they could scarcely see thirty feet.

Like most autumn and winter fogs this one had a most unfortunate side effect - it was self perpetuating. Fog, like most clouds, reflects a fairly high percentage of the sunlight that strikes it. Beginning on the morning of December 5, 1952, the fog's bright upper surface reflected most of London's weak December sunlight directly back into space, wasting valuable heat that would otherwise have raised the temperature and burned off the fog. Instead, the lack of solar heating depressed the temperature at ground level to 27º F while 1000 feet up it was 40º F! The classical temperature inversion so often associated with severe pollution outbreaks had formed. The cool, heavy air, with its unnatural burden of pollution, was too heavy to rise, so it hugged the ground like a leaden cloak. Friction at ground level then slowed the wind to an almost complete standstill so pollutants could...
not even drift away. Within this stagnant air, the chilled and choking populace stoked their coal burners more vigorously than ever to keep warm, unwittingly stoking the fog as well. At times, visibility fell below ten feet.

Finally, on December 9, brisk winds swept the fog away, but by that time 4000 people had died. As a result of this anthropogenic catastrophe, England finally passed their Clean Air Act in 1956. London now gets 50% more sunshine during the winter, her citizens lead healthier lives, and no longer accidentally walk into the Thames River because poor visibility keeps them from seeing down to their feet.

These noxious fogs were transformed within Turner's soul into things of great beauty, and came to assume a cosmic aspect. No one before Turner ever thought of painting fog the way he did in his Norham Castle, Sunrise (Fig. 9-4).

What may have helped him get it right was a new interest in the sunrise.

In the 1840's, Turner transferred his primary allegiance from sunsets to sunrises. He purchased a number of houses situated so that he could see the sun rise over water, and often woke early to watch the 'yellow morning' sun go to work invading 'gray dawn'.

During the clear night preceding the Norham Castle, Sunrise, the surface had cooled enough to produce an unpolluted veneer of ground fog only a few feet thick. The fog layer is so thin that the grazing animals emerge from it like mountains in Friedrich's and in Chinese fog paintings. Turner's fog partly transmits and partly reflects the vividly colored light of sunrise, forming a diffuse mirror image of the sky above. This transmutes the entire scene into a blaze of light and color in which land can hardly be distinguished from air, and all the elements partially dissolve into one another. This vibrant but placid dissolution of the elements is also quite real, and resembles the magnificent Alaska sunset just of Fig. 9-5, above a fog-drenched forest near Fairbanks.

The immediate inspiration for Norham Castle, Sunrise was one of Turner's many trips to the countryside in the north of England. Turner had first seen the old ruins of the castle in 1797 and the scene remained fixed in his mind's eye for over forty years. On his last trip past it he commented how the subject had taken so much of his time, for he had painted it a number of times before he finally got it right.

Fig. 9-4. J. M. W. Turner. Norham Castle, Sunrise. c. 1840-1845. Tate Gallery, London.

Norham Castle, Sunrise is an organic synthesis of much of Turner's life and art. It integrates Claude's exquisitely illuminated sunsets, the Chinese painters' formless mists, the latest color theories, and Leonardo's dissolution of the elements.

Fig. 9-5. Alaska sunset with fog and crepuscular rays through trees. Takeshi Ohtake, photographer
Almost from the beginning, Turner was destined for landscape but it would be many years before he could say, "indistinctness is my forte." Trained classically to master line and tackle tempestuous subjects in the 'sublime' manner, Turner slowly evolved into the painter of Norham Castle. From his youth in London, he had been strongly attracted to the dramatic effects of the Eidophusikon and this shows up in a number of his early paintings such as the Fifth Plague of Egypt (1800). But these biblical cataclysms were also accompanied by some quieter landscape moments such as the Buttermere Lake (1798, Tate Gallery, London), where a shower from indistinct clouds produces an almost monochromatic rainbow over the misty landscape.

Most of Turner's rainbows are disappointing because their color is so washed out. Surprisingly, Raymond Lee and Alistair Fraser recently performed a color analysis of real rainbows that reveals even the brightest and most striking bows are far from spectrally pure. Still, Turner downplayed the rainbow's colors.

Why did Turner downplay the rainbow's colors? In the Re-Creation of Landscape, James Heffernan has argued that this was a deliberate act of rebellion against Newtonian rationalism. At the time it was standard practice for painters use quotations to accompany their entries in exhibitions. For his Buttermere Lake, Turner chose a selection from James Thomson's revolutionary poem, The Seasons (1726-1730), which included the lines,

Here, awful Newton, the dissolving clouds Form, fronting on the sun, thy showery prism And to the sage-instructed eye unfold The various twine of light, by thee dissolved From the white mingling maze.

Heffernan argued that Turner was out to restore a synthetic approach to nature that he felt Newtonian analysis had ousted.

Recombining the spectrum was the just the first act in a lifelong quest to rescue chaos from the rigid confines of order.

Incipient chaos is one theme of Turner's Snowstorm: Hannibal and His Army Crossing the Alps (Fig. 9-6). Turner had first travelled through the Alps in 1802 and had made many drawings, but the concept of Hannibal took years to ripen. The crucial moment of inspiration was meteorological. During the summer of 1810, while staying in Yorkshire, Turner witnessed a thunderstorm and sketched it as it passed overhead.

One stormy day at Farnley, says Mr [Hawkesworth] Fawkes, Turner called to me loudly from the doorway, 'Hawkey - Hawkey! - come here - come here! Look at this thunderstorm! Isn't it grand? isn't it wonderful? - isn't it sublime?'

All this time he was making notes of its form and colour on the back of a letter. I proposed some better drawing-block, but he said he did it very well. He was absorbed - he was entranced. There was the storm rolling and sweeping and shafting out its lighting over the Yorkshire hills. Presently the storm passed and he finished. 'There,' said he, 'Hawkey; in two years you will see this again and call it Hannibal crossing the Alps'.

The Hannibal is a highly dramatic work showing how unleashed nature completely overwhems and outshines the doings of man. The sun, which brilliantly illuminates the valley in the distance, has been dimmed by the storm's first swirling rainshaft and will soon be blotted out.

Swirling motions occur at the leading edge of many thunderstorms (recall da Vinci's Deluge scenes, Fig. 6-5) where violent updrafts and downdrafts stand side by side. Here, the curvature of the rain shaft helps trace the
vortex at the storm's edge. On the right the air ascends to produce the cloud. High overhead the air spreads out to the left, carrying with it the raindrops that fall out into the clear. The rain streaks then curve back toward the cloud as it falls into the storm's inflow region.

Fig. 9-6. J. M. W. Turner. Snowstorm: Hannibal and His Army Crossing the Alps. 1812. Tate Gallery, London.

A remarkably similar scenario occurs in so-called low precipitation thunderstorms of the Great Plains (Fig. 9-7). Here, the smooth, almost vertical edge of a pedestal cloud or wall cloud traces the updraft of a thin layer of humid air originating just above the ground, while on the left the rain shaft falling from the overhanging cloud base high above reveals the presence of the invisible inflow as it curves toward the pedestal cloud (Fig. 9-8). The pedestal or wall cloud is an appendage commonly affixed to the base of tornadic thunderstorms. The storm’s main shaft sometimes rotates visibly, in which case it is often marked by helical streaks. A tornado may extend down to the ground from the base of the pedestal cloud, as it later did in this storm.

The Hannibal left its imprint in John Martin's Seventh Plague of Egypt (1823, Museum of Fine Arts, Boston), and then, through that and other similar pieces, in Thomas Cole's The Course of Empire IV - Destruction (1835, New York Historical Society). Martin's Seventh Plague simply adds hail and lightning to what is otherwise and obvious graft from the storm in Turner's Hannibal.

Fig. 9-7. Low precipitation cumulonimbus in Limon, Colorado. Susan Henry, Photographer.

Fig. 9-8. Air motions and humidity structure for the thunderstorm of Fig. 9-7.
Now let us flash back to Turner. He first saw a painting by Claude in 1799 and was immediately inspired to reverence. His friend, Farington reported - "he was both pleased and unhappy while he viewed it, it seemed to be beyond the power of imitation." Still, Turner's palette remained rather subdued until sixteen years later. Then, in the spring of 1815 the huge volcanic explosion of Tambora filled the entire stratosphere with micron sized particles that scatter red light more efficiently than blue light. This reddened the entire world's sunrises and sunsets for months and provided Turner with the material and impetus to vie with Claude.

While Turner was working on his Claudian or Tamboran sunsets, he began to show a new interest in clouds. Around 1818, he executed a series of cloud studies and from 1819, the clouds in his paintings reveal greater attention to form. This is particularly true of his altocumulus and cirrocumulus, but applies to the good old cumulus as well. Although there is no documentary evidence, it Turner's interest in cloud forms was probably sparked by Luke Howard's work.

In 1813, the first edition of Thomas Forster's Researches About Atmospheric Phaenomena was published. A good part of the book is devoted to a version of Howard's cloud classification. The modest printing quickly sold out so a revised second edition was given a much larger printing in 1815. It was this edition that brought Howard's work before a wide audience. John Constable owned a copy of this edition, and used it as a source book on clouds, adding many comments in the margins.

Turner's only comments must be judged from changes in his skies. In 1817, Turner was off for his first trip to the continent since 1802. The Napoleonic Wars were finally over and the rivers of Germany beckoned. Two years later he produced one of has best cloudscapes, the Entrance of the Meuse: Orange Merchant on the Bar, Going to Pieces (Fig. 9-9).

The meteorological setting of the Meuse shows the trip certainly had its rough and exciting moments. I will never forget the strong initial impression this painting had on me. I was disturbed by the yellow tone of the towering wall of cumulus, but in a matter of seconds the coloring and shading began to impart an impression of unbounded size to the convoluted clouds.

An advancing squall line of towering cumulus stretches diagonally from the left background across the painting. The cumulus rise from obscurity to achieve great prominence. Their bases are lost in foam and mist but the swelling cauliflower tops gleam proudly in daylight. The entire squall line is crowned by a deck of rippled altocumulus or cirrocumulus rows, possibly due to moisture expelled from the tops of other nearby towering cumulus.

The coloring and illumination of the clouds tells that the sun is near the horizon. Only when the sun is low in the sky are the high clouds brighter than the directly illuminated sides of cumulus. Furthermore, subtle gray shadows, possibly cast by the higher clouds, fall on the cumulus in the foreground. The yellow highlights that even tinge the cumulus also suggest a low sun. Yellow cumulus is certainly not a common sight, but has been photographed (as in R. Greenler, Rainbows, Halos and Glories).

The features of Turner's works that still startle us the most occasionally prompted vicious attacks from some of his offended contemporaries. It was one such attack, directed against Turner's Juliet and Her Nurse (1836) that inspired John Ruskin to champion Turner's cause. The ultimate result was Ruskin's classic, Modern Painters, which appeared in five volumes beginning in 1843. This is the first work after Leonardo's Treatise on Painting to carefully inform painters what to look for when painting the sky.
But Ruskin began with a grudge. He set to work, savagely and methodically tearing apart the skies of most other painters, and then arguing how his hero, Turner, was virtually alone in capturing the essence of nature. Turner apparently did not like Modern Painters, for he was reluctant to attack other artists, and, moreover, greatly admired some of the painters that Ruskin so cavalierly and sarcastically dismissed with lines such as,

Now watch for the next barred sunrise, and take this [work of Turner's] to the window and test it by nature's own clouds. And with whom will you do this except with Turner? Will you do it with Claude, and set that blank square yard of blue, with its round, white, flat fixtures of similar cloud, besides the purple infinity of nature with her countless multitudes of shadowy lines, and flaky waves, and folded veils of variable mist? Will you do it with Poussin, and set those massy steps of unyielding solidity, with the chariot-and-four driving up them, by the side of the delicate forms which terminate in threads too fine for the eye to follow them, and of texture so thinly woven that the earliest stars shine through them? Will you do it with Salvator, and set that volume of violent and restless manufactory smoke beside those calm and quiet bars, which pause in the heavens as if they would never leave it more?

*Modern Painters*. Vol I (1843) p 212

John Ruskin
The fact is that, more often than not, Ruskin was right. Supplementing Howard's scheme with his own acute observations, Ruskin pinpointed the meteorological limitations of even some of the great artists. Ruskin had been born to an age that deified nature. He knew the cloud forms intimately and could neither remember nor tolerate a time when artists had little alternative but to paint the 'effects'. But even in Ruskin's time, many artists still refused to go to the source, and these the young author particularly scathed.

Still, if artists were more in the habit of sketching clouds rapidly, and as accurately as possible in the outline, from nature, instead of daubing down what they call the 'effects' with the brush, they would soon find there is more beauty about their forms than can be arrived at by any random felicity of invention, however, brilliant, and more essential character than can be violated without incurring the charge of falsehood.

ibid. p 206

Despite all of John Ruskin's unmitigated praise, the altocumulus cloud lines of Turner's Meuse are still a bit too sawtoothed. But with time Turner improved even here. Many of his later works such as the Venetian scenes, show the upper clouds subtly, with small patches of delicate ripples of cirrocumulus or shreds of cirrus. Turner's skies tend not to be the ones that meteorologists include in their textbooks because they only hint at the underlying cloud forms. Nevertheless, they are seen far more often than skies covered from end to end with textbook examples of cirrus mare's tails or the well ordered rows and ranks of the cirrocumulus or altocumulus that make a mackerel sky.

Ruskin came back to consider the sky again and again. With time he gained more respect for its possibilities. In Volume I he named a chapter, On the Truth of Skies while by Volume V he had acquired enough humility to call the appropriate entry, On the Beauty of Skies. He was also drawn to the sky because of its ceaseless variability and noted that the sky "is the only part of the picture of which all, if they will, may be competent judges". This is because, as Thomas Forster had noted in the preface to his Researches About Atmospheric Phaenomenae,

The atmosphere and its phaenomenae are everywhere,...and we may view them whether it may be out lot to dwell in the frozen countries of polar ice, in the mild climates of the temperate zone, or in the parched regions which lay more immediately under the paths of the sun.

John Constable never left his native England, but knew that all the sky's infinite moods would eventually visit him. And while Ruskin had little patience for Constable's art, Constable had anticipated Ruskin in establishing the format for meteorological analysis of paintings in his Lectures on Landscape Art, and in realizing that the sky is the "keynote, the standard of scale, and the chief organ of sentiment" of the landscape.

Most of Constable's subjects were taken from East Anglia, the flat countryside of Suffolk and Essex counties along the River Stour in eastern England. In many of his works, as in his homeland, a great expanse of sky holds court above the flat farmland.

More has been written about the meteorology of Constable's art than of any other artist, largely because so many of his meteorological thoughts and notes have been preserved. Constable began a practice of noting the accompanying weather and sky conditions on the back of some studies when visiting the Lake District in northern England in 1806. That practice enabled John Thornes to confirm the dates of many of his cloud studies of 1821 and 1822.
One of Constable's prime goals of the cloud studies was to rectify an early inability to make the sky emphatic but not obtrusive. In this effort he was helped by knowledge of Luke Howard's work, probably acquired through his copy of Forster's *Researches about Atmospheric Phaenomena*. The *Study of Cirrus Clouds* (Fig. 9-10) proves how well Constable knew his cloud forms. There, the unmistakable trails of cirrus slope down across a deep blue sky. His study of cirrocumulus would also win any meteorologist's praise.

But Constable's meteorology went far beyond concern for the static forms of clouds. His notes on the back of the studies include comments on preceding and subsequent weather conditions, for Constable knew well that the sky of any given instant contains evidence of its past and future. As a result, it is not surprising that he greatly admired Jacob van Ruisdael and modeled some of his own skies on Ruisdael's ever changing skies, which, as we have seen in Chapter 7, Constable well understood.

The issue of change may help explain why the meteorological repertoire of Constable's finished works is so limited and why the forms of individual clouds are so downplayed. We are treated time and again to busy fields of cumulus with an occasional rainbow and hints of the higher clouds. Little more can be dredged from his finished skies.

In 1937, the meteorologist, L. C. W. Bonacina, pointed out that Constable's fields of cumulus are indeed quite common in the summer skies over East Anglia. But I have also seen these cloud fields, and I find a bit of subterfuge in Constable's skies. Constable was almost as averse to showing the flat bases of cumulus as were his beloved Dutch. Indeed, following in Dutch footsteps, he sought a variety of devices to hide the flat bases, using trees or cloud fragments of various shades. The mature Constable often used the overall lighting or chiaroscuro of the cloud web to submerge the form of clouds.

The distracting play of light on the cloud field makes it almost impossible to distinguish the individual clouds of the Whitehall Stairs, June 18, 1817 - The Opening of Waterloo Bridge (Fig. 9-11). This, of course, is precisely what Constable aimed at.

Fig. 9-11. John Constable. Whitehall Stairs, June 18, 1817 - The Opening of Waterloo Bridge. John Constable. 1832. Private Collection.

Only near the sun or in a very misty atmosphere can lighting effects mask the individual cloud forms of a field of cumulus (Fig. 9-12). Far from the sun on a day of high visibility, cloud outlines are easily distinguished. Constable, of course, well knew all of this when he painted the Waterloo Bridge, yet even though he looked away from
the sun and kept the visibility high, he still disguised the cloud forms.

Fig. 9-12. Sun-drenched cumulus from Tybee.

Constable began working on Waterloo Bridge in 1819, two years after presumably witnessing the ceremonies. Before he finished it thirteen years later, he had learned about the cloud forms, executed his cloud studies, and studied the rainbow. In 1831, he executed a watercolor, View from Hampstead, with a Double Rainbow (British Museum, London), in which a shaft of sunlight illuminates a small segment of the primary and secondary rainbows. Paul Schweizer has pointed out that Luke Howard illustrated two rays crossing a rainbow in his Climate of London (1818-1820). These are anticrepuscular rays, recorded with scientific precision. They cross the bows at 90ø angles and converge toward the center of the bow's circle.

Anticrepuscular rays appear beneath the clouds in the Waterloo Bridge and properly converge toward a point below the horizon. This is probably the first major painting to represent the phenomenon correctly and may still be the only one. In 1590, Lucas van Valkenborch may have tried to paint anticrepuscular rays in his Winter Games on the Scheldt at Antwerp (Fig. 6-39) but showed them parallel. Several of Frederic Church's rainbows have bright spots, which are actually pieces of anticrepuscular rays, but Church never depicted the rays themselves.

Crepuscular and anticrepuscular rays are both produced the same way. The only difference is that anticrepuscular rays are seen opposite the sun. Their convergence toward the horizon is also entirely a result of perspective. They are far less common than crepuscular rays because aerosols are poor reflectors, scattering very little light more than a few degrees from its initial direction. Anticrepuscular rays can be seen on days when the air is pure and clouds cast very distinct shadows (Fig. 9-13). They are also produced when falling raindrops help illuminate shafts of sunlight.

Fig. 9-13. Anticrepuscular Rays with Glory and Cloudbow. David Lynch Photographer

So, why was Constable willing to divulge with scientific accuracy the precise form of anticrepuscular rays when he routinely masked the form of clouds? Constable may have loved the play of light on the landscape even more than the cloud forms. He annotated several of Forster's statements regarding the lighting of clouds, circling one paragraph in his copy of the Researches about Meteorological Phaenomena and putting a double line under the following statement - "All clouds are capable of becoming brighter and darker, according to their relative position with respect to the sun." To this he added his own comment, "as seen opposite or under the sun".
What is the source of Constable's love of the play of light? Constable wrote that in much of his art he attempted,

to arrest the more abrupt and transient appearances of the CHIAR'OCSURO IN NATURE; to shew its effect in the most striking manner, to give 'to one brief moment caught from fleeting time', a lasting and sober existence, and to render permanent many of those splendid but evanescent Exhibitions, which are ever occurring in the changes of external Nature.

[This artist] seeks perfection at its PRIMITIVE SOURCE, NATURE.

Lectures on Landscape from John Constable's Discourses p 9-10.

The play of light enabled Constable to keep the moment, to arrest the ravages of time, and possibly to revive memories of the freedom of boyhood. The play of light on a field of clouds made each cloud seem indefinite. Coleridge had noted - "The moderns revere the infinite and affect the indefinite as a vehicle of the infinite." A field of indefinite clouds or misty air helped impart an aura of the infinite to the entire scene. And this could release life from its finite bounds.

The lure of the infinite gripped young Samuel Palmer. In 1819, fourteen-year old Palmer had been greatly taken by Turner's Entrance to the Meuse (Fig. 9-9) and had executed some of his own cloud studies. Palmer's most creative and highly visionary period came early in his career, after he had moved from London to the small village of Shoreham in Kent in southeastern England in 1826. There in the peaceful valley, he painted scenes of superabundant nature, often beneath a huge moon whose image had been poetically burned into his mind at the age of four by his nurse. One vision of a growing, mushroom-shaped cumulonimbus briefly attended by pileus drew his attention around 1833 and led to several versions of The Bright Cloud (c. 1834, City of Manchester Art Galleries). But the uncountable flocks of altocumulus and cirrocumulus that frequented the sky day and night and echoed flocks of sheep below impressed Palmer first and left him with a more enduring image. In A Kentish Idyll (Fig. 9-14), Palmer filled the moonlit sky with myriad elements of art's first truly convincing field of cellular altocumulus (Fig. 5-15), properly foreshortened near the horizon. Years later, and long after the visionary quality of his art had been ousted by a more factual sense of sobriety, the altocumulus and cirrocumulus could still stir memories of youthful ardor. In 1845 he dubbed one sighting of a mackerel sky the 'Margate Mottle' and left its traces along with streaks of cirrus in several works.

Fig. 9-14. Samuel Palmer. A Kentish Idyll. 1829-1831.

Palmer, Friedrich, Turner, Constable, and a host of other Romantic painters combined the romance and science of the sky in a new way during the early part of the nineteenth century. Still, as much as these devotees revered the sky they did so because, as Carl Gustav Carus put it, "the sky...is the real image of the infinite." Focusing on the particular aspects of the sky's
countless faces they felt most effectively conveyed a sense of the infinite, they either ignored, downplayed or suppressed the sky's other faces. Thus, the Romantics were early contributors to the progressive intellectualization that has so strongly marked so much of late nineteenth and twentieth century art.

The Romantics were apparently looking as much to confirm and strengthen their concept of the infinite as to discover new worlds in the sky. But they did herald the dawn of an even greater age, for as their vision began to dim, a new, all-seeing eye was finally pointed at the sky. That eye would come to reveal everything the sky had to show.

**Realism: The Camera, A New Eye**

For a generation, France's infatuation with Napoleon blinded her to nature's magnificence. Jacques Louis David portrayed the diminutive Bonaparte Crossing the Alps (1801, Kunsthistorisches Museum, Vienna) as an invincible colossus, bound for victory and glory in Italy. The wind roars through the snowy pass under overcast skies and his steed rears, but Napoleon appears to disdain or even hold sway over the raging elements. He would certainly have taught Hannibal a thing or two!

David's painting is a fantasy from beginning to end. To begin with, Napoleon flatly refused to pose for the artist. So too did the sky. Benign weather accompanied the army when they crossed through the St. Bernard Pass riding on mules. Then, once past the summit, Napoleon used his own rear rather than a rearing steed to slide down the snowfield. His troops and all France joined the joy ride. Those who can create reality make their own facts.

But there was one trouble with the camera obscura. The image disappeared the instant the lens or peephole was covered. Niepce was not the only person who dreamed of fixing that elusive image forever. But to do that he had to become a chemist.

In the previous century the chemists had discovered that various salts of silver are affected by light. Johann Heinrich Schulze began all this work in 1727. He filled a flask with chalk, nitric acid and silver and obtained a
white mixture containing silver nitrate. He then covered the flask with a stencil and exposed it to bright light. Wherever the sunlight shone on the mixture, it chemically separated the silver nitrate. This released tiny flecks of pure silver, turning the illuminated parts of the surface purple while the rest remained white.

As early as 1796-1802, Tom Wedgwood had coated paper and glass with silver salts in an effort to obtain permanent images of objects. But although he was able to produce an image, he could not stop reaction in the presence of light. The coated paper proceeded to turn entirely black and the ephemeral image disappeared. The chemist Sir Humphrey Davy, who communicated Wedgewood's findings wrote,

> Nothing but a method of preventing the unshaded parts of the delineation from being coloured by exposure to the day is wanting, to render the process as useful as it is elegant.

However, neither Wedgwood nor Davy was ever able to carry the work beyond this point. Niepce succeeded where Wedgewood failed. Niepce had also quickly realized that

> I must succeed in fixing the colors; this is what occupies me at the moment, and it is the most difficult.

It was not until 1935 that two musicians turned inventors (Leopold Godowsky and Leopold Mannes) adequately solved the problem of color film, but by 1822, Niepce was able to fix a shaded image. His earliest known print dates from 1826 and contains a faint image with contradictory shadows that resulted from the required exposure time of eight hours. Obviously, Niepce's method still needed a few improvements!

In January, 1826 Louis Jacques Mande Daguerre wrote to Niepce, telling him that he had been working along the same lines and suggesting they collaborate. Daguerre was a landscape painter and designer of the illusionistic theatre, Diorama. Always searching to improve the verisimilitude of his theatre, Daguerre had also thought of fixing the image of the camera obscura. Almost four years later, on December 4, 1829, Daguerre finally convinced the secretive and reluctant Niepce to enter into partnership. Progress was slow so that Niepce, who died only four years later, never did get to see himself in pictures.

By 1837, Daguerre had improved the process to the point where he could announce it. Within a few months of his announcement in January, 1839 the news had spread around the world. Daguerre's process initially required an exposure time of at least five minutes in bright sunlight. Then the mathematicians, engineers and chemists went to work, introducing drastic improvements in lens and camera designs as well as faster chemical reaction rates. Within two years, the necessary exposure time had been reduced to less than a minute and the daguerreotype became a rage.

The atmosphere remained less patient than the typical subject. The clouds could not stand still for even half a minute and Daguerre's chemical processes had a spectral bias which overexposed the sky. Thus, no clouds appear in the smoky skies of the early daguerreotypes. Landscape painters were influenced by these skies for they created very 'artistic' effects, but the daguerreotype was not to be the final word in photography.

A faster process was required to capture the instant and reveal the sky. The wet collodion process, invented by Frederick Scott Archer in 1851, reduced the exposure time to as little as four seconds and made cloud photography a reality. In 1856 Gustave Le Gray used this process to produce the first cloud photographs - some blurred cumulus. By 1858, after several further improvements, photographic exposures had become virtually instantaneous. Artists showed great interest in this new tool and some even began to carry
cameras with them or travel with photographers. Sky painting would never again be the same.

The camera was the chief vehicle that launched France on her greatest century of sky painting but other forces also aimed French eyes skyward. Napoleon had bequeathed to France the ‘Orient’ with all its erotic possibilities. This ‘Orient’ was not China and Japan but rather North Africa and what we now call the Middle East.

The first painters of the Orient, such as the Baron Antoine-Jean Gros, used their baggage of French fog and mists as a European parasol to protect against the searing sun and roasting sands. Some of these early Orientalists, including Gros, never actually saw the lands they painted. Their works were products of second hand information, preconceived notions about the ‘uncivilized’ Turks and Arabs, and strongly romantic imaginations.

Many of the Orientalists, especially after France's successful military foray into Algeria in 1830, finally did, like Muhammad, go to the mountain. There the desert sun burned a new religion into their eyes and dispelled the fanciful, ‘Napoleonic’ clouds. There they learned that fact was often stranger and more fascinating than fiction. The French also recognized the camera's documentary value in the lands of Antiquity. Within months of Daguerre's announcement, Horace Vernet took a camera on his trip to Egypt.

Prosper Marilhat set out for the Orient in 1831 as a member of a scientific expedition, but it was probably the spectre of being outdone by a camera that prompted him to dig out his old drawings of Egypt and transform them to paint. His Ruins of the El Hakem Mosque in Cairo (Fig. 9-15), is based on these Egyptian drawings and is one of the earliest Orientalist works in the documentary tradition.

Fig. 9-15. Prosper Marilhat. Ruins of the El Hakem Mosque in Cairo. 1840. Louvre, Paris.
A few lingering, infertile altocumulus have shown up in the mostly clear desert sky of the Ruins to tease any European hoping for rain. Such altocumulus are surprisingly common in the desert when the sun is low in the sky. The sky is blue above but a thin layer of dust turns the horizon sky golden and reduces visibility. Golden and red tones dominate the entire sun baked setting while the stark contrasts between directly illuminated and shaded parts of the landscape are unforgettable to eyes accustomed to the weaker light north of the Alps.

Jean-Baptiste Camille Corot's vision was also tempered under a more blazing sun than his native France could boast. His father wanted him to join the family business but, like St. Francis of Assisi, Camille had no inclination for such mundane affairs. When Camille's younger sister died in 1821, his parents gave him her small allowance, freeing him to pursue his career as a painter. Right away he began his love affair with the sky and land. The evaporating stratocumulus of northern France, a bit of Richard Bonington, and the indistinct verdure of his earliest works gave a hint of things to come. But Corot was convinced that a landscape painter must learn directly from nature and set off for Italy in September 1825.

Corot's early Italian works show his sensitivity to the Italian landscape and sky. The stark lighting and predominance of tan and both dark and dull green coloring lets you feel the uncompromising sun of the long, hot, dry Mediterranean summer. In most of these Italian works the skies are dry and sparsely populated with small clouds. The Bridge at Narni (1826, Louvre, Paris) has a line of small cumulus over the distant hills that looks as if it had been lifted directly from a painting of Giovanni Bellini. Above the cumulus are some wavy cloud lines that resemble altocumulus; Corot willingly admitted several different cloud types into a single painting.

Northern European clouds blossomed in Corot's skies the moment he returned to France even though for years he retained the dry, Italian palette. In July 1830, while avoiding the Paris Revolution, Corot quietly painted Chartres Cathedral (Fig. 9-16). He designed it with several pairs of objects, perhaps to provide employment for future generations of art historians. In the foreground, there are two people, a man and a woman, who almost seem to grow out of the rocks. These people may have been added in 1872 when Corot retouched the work. The two tall trees on the mound behind the woman are far more conspicuous and almost seem to be nature's symbolic response to the cathedral's unique towers. Then, in the sky above the cathedral there are two types of clouds that convey a more mundane message.

Fig. 9-16. Camille Corot. Chartres Cathedral. 1830 (retouched 1872). Louvre, Paris.

It is mid afternoon, for the sun boldly strikes the western face of the Cathedral yet still casts short shadows. Near the horizon, some small cumulus with smoothed outlines show that convection has been barely able to lift the heated air from the ground to its condensation level. Just above the condensation level, the rising currents
encounter a layer of warmer air that stifles any further ascent. The cumulus are abruptly capped and are forced sideways. As a result, some of the cumulus have spread out into almost pancake-shaped stratocumulus, so often seen on afternoons of suppressed convection. On such days, widely spaced chimneys of cumulus frequently project from lower bases into the stratocumulus deck they have produced (Fig. 9-17), but Corot has not shown this.

![Fig. 9-17. Cumulus projecting into a deck of stratocumulus on a day of suppressed convection.](image)

When the convection is weak, gaps will be left in the stratocumulus deck. But even if the stratocumulus do spread to cover the sky, internal convective circulations, described in Chapter 5, soon fracture the sheet into the classical pattern of narrow-fringed closed cells.

The cumulus beyond the Chartres Cathedral are brighter than the stratocumulus above because the optically thick cumulus reflect more light from their sunlit tops than the flattened stratocumulus can transmit through their bases. Later, the young Monet would take great delight in capturing the small lighting differences between different cloud types - perhaps he first learned to do so from Corot.

After working with a number of skies of varying cloud cover but invariably weak convection, Corot developed the poetic style that brought him wealth and public acclaim. Ville d'Avray (Fig. 9-18) is a classic example of this style. It evokes the feeling of a misty, Elysian landscape but is a seductive sham designed to keep you off balance. The mass of grass, reeds, and foliage appear as indistinct as if seen through frosted glass, but a sprinkling of bright spots (ala Constable) and sharp edged limbs and branches that terminate with a few distinct leaves intercede to provide substance. Not a single ripple can be seen on the water, yet its unpolished surface only permits a delicately blurred reflection of the chateau. It would seem not only to be absolutely calm but also misty, yet if that were the case why are the buildings in the Ville d'Avray so distinct?

![Fig. 9-18. Camille Corot. Ville d'Avray. c. 1867-1870. National Gallery, Washington.](image)

What led Corot to such soul views (Souvenirs)? His vision came at an age that is often critical for men and may have been prodded by the loss of his parents. But Corot was also indebted to Watteau and Fragonard for their gelatinous verdure, to the camera for its various tricks (and shortcomings), and to Charles Daubigny, a painter of the Barbizon school, for his love of mist and light. Even Corot knew the process was complex, noting, "One has to give the mists time to rise."

After the July Revolution of 1830, a number of painters had fled Paris for the peace of the countryside near Fontainebleau and the village of Barbizon, where they learned to revel in nature. The Forest at Fontainebleau
faithfully served several generations of French landscape painters. Photographers were also welcome. From there, troops of painters and photographers set out on forays to France's north coast, another favorite artistic setting.

On one such trip, Corot was taken by Daubigny's overriding concern with the effects of mist and light. There he also succumbed to the spell of the camera's potential charm. (Corot's fascination with the camera was enduring - in later years he frequently visited the studio of the photographer, Gaspard-Felix Tournachon.) Early photographs required such a long exposure time that leaves swaying in the wind would produce frosted images and tiny waves would give water a matte finish. Blurred images could also be produced by changing the focus. The Barbizon painters and photographers found such effects aesthetically appealing and cultivated them further by coating the glass plates with dust films. Corot took all the camera's technical limitations and distortions and transformed them into a new form of poetic art.

In most of the Souvenirs, Corot faded his skies unobtrusively into the background. In the Ville d'Avray, only the tiniest cumulus gives a hint of structure to a sky otherwise filled with an amorphous, translucent cloud layer. But out of the midst of his reveries, Corot would occasionally recall his old cloud friends. In the Souvenir of Lake Nemi (1865, Art Institute of Chicago), a delicate layer of stratocumulus or altocumulus glow white overhead but reflect the pink tones of the horizon sky.

Intoxicating as these impossibly poetic visions are, Corot was never quite satisfied with his own ability to capture the beauty of the sky. As he lay dying, new visions came to him.

You have no idea of all the new possibilities I see - a host of things I never noticed before. It seems to me that I have never been able to do a sky.

Jean-Francois Millet and Jean Desire Gustave Courbet came closer to capturing some of the atmosphere's exquisite possibilities. They were among a host of landscape loving artists brought out of the woodworks by the Revolution of 1848 and stamped by its radical politics. But while the political subjects broadcast from Millet's and Courbet's foregrounds kept them embroiled in dated controversy, the unsurpassing beauty of their background skies will carry them through the ages.

Jean-Francois Millet was born of successful peasant stock in the seaside hamlet of Gruchy in the village of Greville, about ten miles west of Cherbourg. There earth, sea and sky meet. Millet remained a man of the earth, ever sensitive to the vibrancy of the rural sky. As a child he witnessed an intense coastal storm on All Saints' Day (November 1) that may first have tuned him in to the power and majesty of nature. The storm roused the entire congregation from church to the edge of the sea for a rescue effort that proved fruitless. Years later, Millet vividly recalled the storm and its effects.

Though I was quite a child it seemed to me that I was looking on at death playing a ghastly sport with a handful of doomed and helpless creatures, before dashing them upon the rocks and whelming them at last beneath the waves.

An immense billow towering aloft like a mountain enveloped the ship and swept it close to where we were standing, when another wave even bigger than the first hurled it upon a reef just hidden beneath the surface of the waters. Immediately the sea was covered with wreckage of every description....We spent the night trying to protect our own houses. Some covered their roofs with boulders, others brought up ladders and long poles which they made fast to the roof to keep it from
being carried away. Trees, bowed to the very earth, cracked and broke in two.


Millet, who is known primarily for his sympathetic portraits of countryfolk, is actually one of the great and overlooked sky painters. During the last decade of his life, he grew particularly intent on capturing the faces of the sky, observing that, "Art began to decline from the moment that the artist did not lean directly and naively upon nature."

Millet preferred to shelter his peasants under the placid sunset skies of summer, but no mood of nature escaped his eye. He used the cellular altocumulus to broaden his horizon and prove that the world continues beyond the End of the Hamlet of Gruchy (1865-1866, Museum of Fine Arts, Boston). After nightfall he encircled the moon above the Farmyard by Moonlight (1868, Museum of Fine Arts, Boston) with one of painting's few coronas, while in his Starry Night (c. 1855-1867, Yale University Art Gallery, New Haven) there were no city lights to drown out a shooting star flashing across the sky. When the weather turned harsh, Millet was there to show how the wind can sweep across the landscape to make the trees bow before it, and how winter's desolate and snowy grip puts to sleep the land's fertility.

Millet also stayed to greet the king of clouds. Coming Storm (Fig. 9-19) represents an almost literal transcription of the weather at the edge of an approaching severe thunderstorm (Fig. 9-20). The main base of the storm is advancing from the left and has already covered everything but the distant horizon. Below the general base of the storm is a pendant shelf cloud or arcus, and in the darkness below tilted rain streaks pelt the ground.

The painting captures the moments before the deluge. The air in the foreground is still warm and humid, the wind is light, and not a drop of rain has fallen. But the plowman sees what is about to break upon him. He has unhitched his team and is dragging them towards shelter, following the lead of two birds who are fleeing at upper right. In a few moments, violent wind gusts will arrive from the left to whip dust into the air, the temperature will drop abruptly, lightning will flash, and intense rain or possibly hail will pelt the earth.

The curved arcus advancing like a plow from the left marks the leading edge of the cold outflow from the thunderstorm's downburst.
where the cold air turns abruptly upward and then curves back on itself to form a vortex (see Fig. 6-3), much as Leonardo envisioned in his Deluge scenes (see Fig. 6-5). When the downburst is rain soaked, even the small amount of lifting at the front of the vortex cools the air to the point of condensation. Ragged cloud fragments then trace the unforgettable rolling motion at the base of the arc cloud that surely inspired da Vinci in his Deluge scenes and Soga Shohaku in his silkscreen, The Chinese Immortal, Ch`en Nan Causing a Rainstorm (see Fig. 9-37).

The ragged underside of the arc cloud is often the darkest part of the thunderstorm. Much of the illumination then comes from the distant sky and can produce the orange-brown color that Millet has shown. Rayleigh scattering (see chapter 2) has removed the blue light from the distant illuminated horizon, and the earth tones are further enriched by light scattered by dust raised into the air or reflected from the ground.

Millet's stunningly beautiful Spring (Fig. 9-21) acts as a fitting sequel to the Oncoming Storm and is perhaps the final synthesis of his natural vision. Now, the thunderstorm has ended and is retreating in the east although a fine rain may still be falling. The pristine air and glistening vegetation have been cleansed by the rain that now fills the ruts in the path with elongated puddles. The sun has come out once again. It shines intensely on the glorious late springtime landscape and on the retreating veil of rain to produce a double rainbow that stands out against the backdrop of the dark storm cloud. Cloud fragments called scud form in the rain-washed air and race after the parent cloud, as they often do in the wake of thunderstorms. At the extreme upper right, a small patch of blue sky contains some fragments of altocumulus, which reconfirm the rainbow's promise of redemption. The birds, seeing all is safe, once again are soaring joyously. The man, who has miraculously survived the storm beneath the tree without being electrocuted, will soon follow their example and walk freely once again.

Gustav Courbet also saw raging storms and, late in his career, took joy in describing their impact on the sea at the coast of Normandy. Like Millet, Courbet knew as well that no matter how violent the storm, the sea and sky eventually return to their normally quiet summer ways, as he has shown in the Cliffs at Etretat After a Storm (Fig. 9-22).

The scene faces west on the Normandy coast. A bright afternoon sun illuminates the
light green grass, the white sand, the white foam of the breaking waves, and part of the white cliffs. Even the shaded cliff sides share in the luminous quality. But hints of the forces of darkness remain everywhere. A line of overcast darkens the horizon. Short-crested waves, toppled by the wind, still break far from the shore. But the most prominent signpost of recent storminess is the seemingly innocent and innocuous layer of cellular altocumulus, the shredded outpouring of the thunderstorm’s most violent excesses, that brightens and fills the turquoise sky.

Several earlier artists including Altdorfer and Turner had already hinted that some altocumulus and cirrocumulus are the residue of cumulonimbus, which do eject a significant fraction of their water from their spreading tops. Altocumulus may briefly form as the spreading tops and anvils of convective clouds are stretched thin and shredded by strong jet stream winds aloft. The shredded anvils soon evaporate to form invisible, humid layers which continue moving downwind. Then, when evening approaches the humid layers cool to the point of condensation and altocumulus often magically reappear far downwind from the parent thunderstorm and often long after it gave up the ghost. As a result, it is not strange at all to see sheets of altocumulus simultaneously invading all quarters of the sky from late afternoon onward. Similar altocumulus often form at the top and leading edge of thick layers of warm, humid air to herald the onset of warm weather, but then the sky tends to be washed out and hazy, as in Friedrich’s, Wanderer Above the Sea of Mist.

Courbet had first encountered altocumulus many years earlier, on one of his frequent visits to his birthplace, Ornans, in eastern France. *Grape-picking at Ornans* (1849, Winterhur, Oskar Reinhart Collection) displays the edge of an altocumulus deck over the eastern cliffs on a bright afternoon.

*Grape-picking at Ornans* is one of several topographical renditions of the limestone cliffs and Loue River Valley that the nascent realist produced in this landmark year following the uprisings of 1848, and each was done under a different but convincing sky. The Valley of the Loue in Stormy Weather (1849, Strasbourg Museum) shows a broken layer of stratus with scud beneath. The work is so literal it contains a weather forecast. The scene faces almost due south down the Loue Valley from the Roche du Mont. The village of Montgesoya can be seen in the distance. The afternoon sun is striking the western faces of the cliffs. Some of the leaves have already turned color, so that it is probably early fall. The forecast calls for rapid clearing with brisk westerly winds in the wake of a low pressure area. The crucial piece of meteorological evidence is provided by the cloud fragments or scud. These mark the intrusion of cold, dry air into a region of rain, and also tilt upward to the left or east, indicating a drying wind from the west.

The more famous *Funeral at Ornans* (1849, Louvre, Paris) provides a different forecast. Here, Courbet suppressed the sky's vivacity, filling it with a somber but striated deck of altostratus. This he may have done as a gesture of respect for the dearly departed, but it surely suggests a more dismal weather outlook. Rain should soon follow this funeral.

Apart from a funeral and a storm or two, the mid nineteenth century was the grand era of altocumulus. Attention had first been focused on the infinite ranks and rows of altocumulus at the beginning of the century by Luke Howard and the Romantics. By mid-century it had become the time of the masses and the "Communist Manifesto". And what cloud could better represent such times than the assembled, proletarian masses of altocumulus? But perhaps it was the camera's all encompassing eye as much as any inchoate Romantic yearning for the infinite or any communist or democratic sympathy for the rapidly proliferating population that alerted artists to all the potentialities of the altocumulus. For it was not until Courbet's
Cliffs at Etretat After a Storm that a European painting really showed the altocumulus in their full glory and photographic detail. And it is not surprising that Courbet, the `realist', unabashedly used the camera from the time of the Funeral at Ornans.

The close association of the camera and altocumulus was not limited to the European side of the Atlantic. The new worlds of detail so effortlessly revealed by the camera demanded of all artists an unprecedented commitment to close scrutiny of nature and a greater level of awareness to everything in the world around us. This heightened consciousness of nature and new dedication to revealing its faces brings us across the ocean to America.

America's Banner in the Sky

In 1818, America was still a land of unclamed skies when Thomas Cole, enchanted by the image of America's natural scenery touted in travel books, convinced his parents to leave behind the smoky pall of industrial England. Prior to Cole, most American painters had attempted with little success to adapt European themes to the American scene, and would leave for Europe to disappear there forever the moment the opportunity presented itself. British born Cole would help change all that.

At first, Cole earned his bread painting portraits. But in the spring of 1823, he heard the call of America's Wilderness and went out to do studies from nature. Moving to Philadelphia the next year to study the Masters, Cole saw a few of Thomas Doughty's and Thomas Birch's early works of scenic America. This brought his days as a portrait painter to an abrupt end. In 1825 he moved to New York. There he heard about the magnificence and untrammeled beauty of the Catskills, and in the fall set out to paint in the vicinity of the celebrated Catskill Mountain House.

The Catskill Mountain House had opened in 1823 and quickly became one of America's premier resorts. Perched on a high ledge overlooking the Hudson River Valley, the Mountain House served as the gatepost to America's sublime wilderness, then embodied by the Catskills. In the decade before the Mountain House was erected, writers such as Washington Irving, James Fenimore Cooper and William Cullen Bryant helped initiate America's love affair with its natural beauty by praising the sublime qualities of the American wilderness. The east face of the Catskill Mountains around the Mountain House and Palenville, New York served as the focus of their attentions. Years earlier, Rip Van Winkle fell asleep to the tune of a summer thunderstorm in Sleepy Hollow, one and a half miles north of the site of the future Mountain House. Artists were drawn like flies to the site so that an astonishing number of works by Cole and other members of the so-called Hudson River School show topographic or composite views at or within two miles of the Mountain House.

Cole's first landscapes, based on views near the Mountain House immediately struck a responsive chord. At the end of 1825, John Trumbull noticed three of Cole's works in the window of a New York frame shop and remarked, "This young man has done what all my life I have attempted to do in vain." Cole was forthwith adopted by New York's leading cultural and business figures as the champion of a new, American art form. Four years later, Cole's departure for Europe so worried William Cullen Bryant that the poet comsped the following verse as a plea that Cole not succumb to Europe's lure and not defect from the new American cause,

To Cole, the Painter, Departing for Europe

Thine eyes shall see the light of distant skies:
Yet, Cole! Thy heart shall bear to Europe's strand
A living image of our own bright land,
Such as upon thy glorious canvas lies.
Lone lakes - savannahs where the bison roves -
Rocks rich with summer garlands - solemn streams -
Skies where the desert eagle wheels and screams -
Spring bloom and autumn blaze of boundless groves.

Fair scenes shall greet thee where thou goest - fair
But different - everywhere the trace of man.
Paths, homes, graves, ruins, from the lowest glen
To where life shrinks from the fierce Alpine air.
Gaze on them, till the tears shall dim thy sight,
But keep that earlier, wilder image bright.

Bryant had no need to worry. Cole absorbed the lessons of Europe, meeting with Turner, Constable and John Martin among others. Then two years later he returned, with unflagging dedication and better equipped to paint America's land and skies.

The contrast between mature, cultured Europe and coarse, youthful America deeply impressed Cole and provided him with the material for a serial allegory of paintings showing civilization's evolution from its savage beginnings through its zenith to its ultimate demise. About a year after his return he began The Course of Empire (compl. 1836, New York Historical Society).

Cole designed The Course of Empire as a meteorological odyssey that takes place at a particular spot over the course of a single day. The first painting, entitled the Savage State, is set in an almost primeval forest just emerging from the mists and fog of night. The rosy hues of dawn break through an opening in the cloud cover and are splashed all over the canvas. Civilization has arrived by the second scene, the Pastoral State. This is set in mid-morning when the last heated and evaporating remnants of fog are slowly rising up the distant mountainside.

The third scene represents civilization's Consummation. A few small disorganized patches of altocumulus drift across a milky blue summer sky of mid afternoon above a thriving classical port. It appears as if nothing could possibly disturb such a society. But distant, inconspicuous and growing cumulus, almost invisible through the haze and hidden behind the monument in the center, provide a subtly ominous note.

There is nothing subtle about the fourth scene, Destruction. This is a cataclysm lifted directly off the canvases of Turner and Martin, a swirling late afternoon thunderstorm that accompanies destruction and rapine.

The final scene is Desolation, a moonlit view of the crumbled and abandoned city, now being reclaimed by forest and ivy. Above this setting of disintegration and vegetative proliferation, a veneer of stratocumulus or altocumulus clouds is overgrowing the gray-blue moonlit sky of dusk.

The Course of Empire is tinged by Cole's penchant to stress cloud effects at the expense of cloud form. Cole was deeply religious and committed to showing the presence of the divinity in the American wilderness. As a result he included more than a random share of blasted tree trunks, precipitous crags and gorges, stark lighting effects, and hyperbolic storms. But on a few occasions, he made quite literal statements about clouds. He was certainly a critical and astute observer of the sky. In 1841 he wrote for the Northern Lights,

The sky will next demand our attention. The soul of all scenery, in it are the fountains of light and shade and color. Whatever expression the sky takes the features of the landscape are affected in unison, whether it be the serenity of the summer's blue or the dark tumult of the storm....The climate of a great part of the United States is subject to great vicissitudes, and we complain, but nature offers a compensation. These very vicissitudes are the abundant source of beauty - as we have the temperatures of evey clime so we have the skies; we have the blue unsearchable depths of the northern sky; we have the upheaped thunderclouds of the torrid zone; we have the silver haze of England and the golden haze of Italy....For variety and
magnificence American skies are unsurpassed....The American summer never passes without many sunsets that vie with the Italian, and many still more gorgeous, that seem peculiar to this clime. Look at the heavens when the thundershower has passed, and the sun stoops below the western mountains - then the low purple clouds hang in festoons around the steeps - in the higher heaven are crimson bands interwoven with feathers of gold; and still above is spread that interminable field of ether, whose color is too beautiful to have a name.

*Catskill Creek* (Fig. 9-23) is the crystallization of Cole's natural vision of the sunset sky's "crimson bands interwoven with feathers of gold" and Fig. 9-24 confirms the painting as a literal document. The photograph depicts a late winter sunset, fittingly observed along the Hudson River at Palisades, New York. The painting represents an early autumn sunset with a topographic view of the east wall of the Catskill Mountains. It faces southwest to the Mountain House from a point on the creek near the town of Catskill.

These are gentle sunsets, and in *Catskill Creek* Cole also gently pointed out the subtle but unyielding incursion of civilization into the American scene, for the smoke plumes he knew so well as a boy in England are just beginning to taint the distant atmosphere.

*Catskill Creek* is, quite simply, the first photographic rendition of sunset altocumulus cells in the history of art, predating Millet's and Courbet's by two decades. It is also unique in Cole's repertoire and therefore raises an intriguing question. Was Cole aided by the camera? There is no evidence that he worked from a photograph when he created the Catskill Creek and in fact, all evidence indicates the camera was simply not able to capture details of cloud structure until after 1851, when the wet collodion process reduced exposure time to a matter of seconds. Recall that the first known photograph of clouds was taken by Gustave Le Gray in 1856, and the first known photograph of altocumulus was a striking shot taken in 1857 by Frederic Church.

The mere awareness of the camera's ultimate potentiality may have redirected Cole's eyes from the effects to the details of the world of nature. Cole first learned of the camera within days of the time Samuel Morse brought news of it to America in 1840. Cole had himself photographed in 1841, and in 1844 even tried to obtain a photograph of Albany to help in a panorama of the city.

Fig. 9-23. Thomas Cole. Catskill Creek. 1845. New York Historical Society.

Fig. 9-24. Sunset over Palisades, NY.

The spectre of the camera's potential was only one of the forces that brought Cole's
attention to the forms of clouds. From 1841-2 Cole was again in Europe and in 1843 the first volume of Ruskin's Modern Painters, with its call to carefully observe the cloud forms, made its grand appearance. Also, in 1845 Frederic Church was studying with Cole, and Cole may even have created *Catskill Creek* as a primer for his promising student on how to follow nature. Church later used Cole's technique (used even earlier by Claude) of highlighting the bases of the altocumulus cloud elements with short wavering horizontal lines of crimson or gold in many of his own spectacular sunset scenes.

By the time of Cole's sudden illness and death in 1848, America had begun to tire of symbolism in landscape. Thus, Asher B. Durand's testimonial to Cole, *Kindred Spirits* (1849, New York Public Library) represents a transitional piece. The painting shows Cole and Bryant standing on a rocky outcrop in the Catskills during one of the hazy summer afternoons so common in the Eastern United States. The view seems to be facing west up the Kaaterskill Clove, but includes the Kaaterskill Falls, which can only be seen by facing east. Durand freely juxtaposed various separate elements of nature, but joined his contemporaries in insisting that painters begin by studying from their true master, Nature.

Yes! Go first to Nature to learn to paint landscape, and when you shall have learnt to imitate her, you may study the pictures of great artists with benefit....True art teaches the use of the embellishments which Nature herself furnishes, it never creates them.

A pressing concern with the unyielding and rapid westward advance of American civilization gave painters the mission of recording the wilderness's disappearing remnants. Artists replaced sublime `effects' with detailed natural records of exotic places that the public eye quickly learned to admire. Jasper Cropsey, perhaps the premier painter of the fall foliage and an marvelous sky painter as well, put it succinctly -

The axe of our civilization is busy with our old forests.... Yankee enterprise has little sympathy with the picturesque, and it behooves our artists to rescue from its grasp the little that is left before it is ever too late.

Anything that assisted American painters in this noble task was welcome. For two decades, art and science walked hand in hand. When the new, brilliant metallic pigments such as cadmium yellow became available after 1850, painters eagerly used them. Samuel Morse, inventor of the telegraph but an artist by training, immediately recognized the camera's value. American painters, even more than their European colleagues, embraced the camera as an essential tool in their art and welcomed its every improvement. Many eagerly consorted and travelled with, or even served as their own photographers.

The American public was so receptive to the realism of American landscape paintings that they viewed them through optical tubes or opera glasses to minimize distractions and feel as if they were transported into the scenes. Even Mark Twain succumbed to the fad and wrote about the pleasure he experienced in viewing a Church landscape in that manner.

The expectation that paintings be faithful to nature proved to be a boon for the sky, which received an unprecedented degree of attention. And even when American painters traveled to the far ends of the earth in search of new natural wonders, they never forgot Cole's admonition that the sky is "the soul of all scenery".

Fitz Hugh Lane was forced by polio to restrict his travels to the coastal indentations of his native New England. There he focused his attention (and later, his camera as well) on the varied moods of the sea and sky. He produced
storm scenes with raging seas and days with tranquil skies and unlimited visibility. Most of his scenes have very little wind, for the waters below are bright and barely ruffled. As a result, his paintings possess an unmistakable lustre and mood of stillness and silence that have been recognized as hallmarks of the so-called Luminist school. In them, time seems to have been suspended. On several occasions, Lane allowed an oncoming storm to darken the distance but still retained the high visibility and the smooth waters. No one more effectively captured the quiet before the storm.

Lane, like Cole, stressed meteorological effects but sometimes turned his attention to the secrets of cloud form. Salem Harbor (Fig. 9-25) seems at first glance to be just one more tranquil harbor scene. The sky, which occupies 75% of the painting, does not have particularly vivid coloring or stark lighting effects, while the clouds are not the grossly billowing behemoths that overwhelm the scene and imprison the eye. But in its quietly compelling way, *Salem Harbor* is a revolutionary piece of sky painting.

*Fig 9-25. Fitz Hugh Lane. Salem Harbor. 1853. Museum of Fine Arts, Boston.*

Haze and shade partly mask an approaching line of towering cumulus. The cloud line in turn hides the base of an even higher wall of cumulonimbus that will surely bring a raging thunderstorm within an hour. Although the cumulonimbus have not yet come into view, their approach can be inferred from the leading top edge of their anvils, which consist of cirrus. At the upper right we get one of the few indisputable views of cirrus uncinus or mares' tails since Jan van Eyck. But it is the cirrus at the extreme upper left that herald the coming thunderstorm. Such diverging cirrus (also called false cirrus) spread in fanlike form from the evaporating forward edge of some
thunderstorm anvils (Fig. 9-26) but had never before been represented in art.

Fig 9-26. A cirriform anvil diverging from a thunderstorm in Bali.

Lane painted several thunderstorms without ever exposing their full profile. This was no mere Victorian gesture. In the Eastern United States it is unusual to see the full outline of thunderstorms because they are almost always embedded in a thick layer of humid, hazy air. Thus, it is remarkable Lane was able to observe as much of their anvils as he did. For an unexpurgated painted view of the giant thunderstorm, we will have to cross the Mississippi and wait almost another century.

Sanford R. Gifford allowed the summer haze of the Eastern United States to ripen into a rich autumn mist in his Kauterskill Clove (Fig. 9-27). Here is a painting Leonardo or any Chinese master would have admired. The scene faces just north of west up the Clove beyond the distant Haines Falls. The Clove is less than 1000 feet deep at this point but mist so reduces visibility that the scene assumes almost cosmic dimensions.

Despite the mist, Kauterskill Clove remains faithful to the American cause, for innumerable details appear when you look carefully. But the apparently documentary quality is misleading. The sun will soon set to right of center, just north of west. This makes it August, the time Gifford executed several studies. But the trees are draped in the already fading autumnal colors of mid October. Finally, the Clove offers artists no such centrally situated ledge, while no such lake fills the Clove directly below Haines Falls.

Fig. 9-27. Sanford R. Gifford. Kauterskill Clove. 1862. The Metropolitan Museum of Art.

No such mists were allowed to intrude upon Frederic Church's early sunset scenes. Church learned to paint his sunsets from Thomas Cole between 1844 and 1846. Then he set out on his own, making such rapid progress that he assumed the mantle as America's leading landscape painter upon Cole's death. Church based his first scenes on local settings but after reading the Baron Alexander von Humboldt's Cosmos, began his global travels and became the self-appointed painter-companion that Humboldt had long wished for.

Frederic Church was not only the archetype and most successful American landscape painter of the mid-nineteenth century, he was also one of the greatest sky
painters of all time. He was rightly known for the detailed and scientific study he put into all his works. He was an avid collector of photographs, which he used largely to help with the details. He photographed interesting cloud formations, and then colored them and traced their outlines. These remarkable qualities, that first propelled Church to fame and later consigned him to near oblivion when artistic fashions changed, were recalled by one of his first students, William Stillman,

Church in many respects was the most remarkable painter of the phenomena of nature I have ever known....His retention of the minutest details of the generic or specific characteristics of tree, rock or cloud was unsurpassed....His mind seemed a camera obscura in which everything that passed before it was recorded permanently.


Thus, it was neither Titian, nor Rubens, nor Turner, nor Constable, but rather Church who was the first, in his Niagara Falls (1857, Corcoran Gallery of Art, Washington DC), to capture in paint the shimmering spectral translucence of the rainbow. It was Church who in his recently rediscovered Icebergs (1861, Dallas Museum of Art) first froze on canvas the emeralds of the Arctic. And few have ever captured the magnificence of sunrise and sunset as well as Church.

Fig. 9-28. Twilight in the Wilderness. 1860. Frederic Church. Cleveland Museum of Art.

Church began his homage to the sunrise and sunset by 1848 with a dawn scene entitled Morning (1848, Albany Institute of History and Art) that faces eastward into the Hudson
River Valley from the vicinity of the Catskill Mountain House. Later trips to Maine's rocky coastline and Mount Katahdin produced even more spectacular sunrises and sunsets. Most of these featured cellular or banded altocumulus with occasional wisps of cirrus in a supporting role, and all in pristine skies. The archetype of all Church's sunsets was apparently inspired during a trip to the Adirondacks although its precise location, which may be Acadia, Maine, has not been identified. This is the now celebrated *Twilight in the Wilderness* (Fig. 9-28). One year later, with the outbreak of the Civil War, Church transmuted the banded altocumulus sunset into a patriotic work, *Our Banner in the Sky* (1861, New York State Office of Parks, Recreation, and Historic Preservation, Olana State Historic Site, Taconic Region, New York).

*Twilight in the Wilderness* dazzles without relying on hyperbole. Church used a black and white photograph of altocumulus bands to help construct its cloud elements, while many color photographs of flaming sunset altocumulus, such as Fig. 9-29, now attest that Church remained meticulously faithful to nature. The sun has already set on the darkened earth but the day's death still colors the almost bloodied crimson waters of the lake. The spirit of the departed sun also lingers in the sky, for the clouds reflect all its colors and the clear sky grades from pure yellow at the horizon to a deep almost purple blue above. Even the vivid yellow horizon is proper, for it seems to be a product of twilight on dry days when a cloud layer such as altocumulus covers most of the sky but the horizon.

Fig. 9-29. Sunset like Twilight in the Wilderness near Katonah, NY.
Church’s day did not end with twilight. In 1862 he composed a nocturne describing the Meteor of 1860 (private collection) that briefly flashed across the American sky one night.

But in the long polar night there are even more durable lights to relieve the darkness, and these Church saw when he toured the coasts of Labrador and Newfoundland in June 1859. Then, on December 23, 1864, in the waning days of the Civil War, an extraordinary display of the Aurora Borealis was seen in the United States. This was widely interpreted as a favorable omen to the Union Cause and spurred Church to paint the Aurora Borealis (Fig. 9-30). Church transported the auroras he had seen to a sterile arctic landscape described to him by his friend the polar explorer, Dr. Isaac I. Hayes. The symbolic ship of state lies icebound in the frozen sea while the aurora lights up the sky and brings down the curtain on the Civil War. The bursts, spokes, wheels and curtained rays of the aurora may first have been revealed to us by Ezekiel, but it was Church that first let us share the vision. Now, of course, the camera has also immortalized the beauty of aurora (Fig. 9-31).

Fig. 9-30. Frederic Church. The Aurora Borealis. 1865. National Collection of Fine Arts. Smithsonian Institution, Washington.

What causes the aurora? The aurora is parented by outbursts from the sun's corona and by the earth's magnetic field. The sun's corona is so hot that its matter is continuously ejected in a solar wind. The solar wind consists largely of hydrogen that has been ionized or split into protons and electrons by the heat. Every day the solar wind bathes the earth with a constant low level supply of protons and electrons to produce modest auroras. But roughly every eleven years the sun goes through a cycle in which its surface becomes disturbed. Sunspots appear, tied together by giant flares that dwarf the earth, turning the solar wind into a torrent of protons and electrons that hurtle earthward through space.

If Earth did not have a magnetic field these particles would smash directly into the sunlit side and do their work invisibly in broad daylight. But the magnetic field creates a shield called the magnetopause, which diverts these particles and then captures them on the night side of our planet. The particles are then further energized and constrained to spiral like moths around the magnetic field lines, oscillating between the north and south magnetic poles (Fig. 9-32).

Fig. 9-31. The aurora borealis over Alberta, Canada. Paul Neiman photographer.

During most of their transit between the magnetic poles, the protons and electrons are so high above the surface that they travel through a near vacuum and do not collide with any atmospheric particles. But as the charged particles approach the magnetic poles they are
carried down to much lower heights where the atmospheric density is much greater. Then, about 90 to 150 kilometers above the surface they collide with the molecules and atoms of the upper atmosphere. The collisions produce the auroral light by momentarily exciting the upper atmosphere's oxygen and nitrogen atoms. Light is released an instant later when these atoms spontaneously deactivate. The colors of the aurora are determined by the particular atoms involved - for example, auroral green light is characteristic of the deactivation of oxygen atoms.

Fig. 9-32. Extensive auroras form when the Earth’s magnetic field diverts energetic electrons ejected from solar storms toward the magnetic poles. NASA

The region where the aurora is seen most frequently is an oval ring surrounding the magnetic poles. Since the magnetic poles have been closely aligned with the geographic poles throughout historical times, the aurora has been almost exclusively a phenomenon of the high latitudes. Only during times of extremely high solar activity are auroras seen at lower latitudes, where they may stupefy the local residents.

Church may have insisted on limpid clarity for his American sunsets and polar vistas, but he allowed mists and volcanic plumes to spread across a number of his scenes of the `steamy' South American tropics. In Rainy Season in the Tropics (Fig. 9-33), a beautiful double rainbow arches across the rain and mist soaked sky. This double rainbow is a model of scientific accuracy in almost every respect. The bows are translucent, their color sequence is correct and, as Constable and Luke Howard noted earlier, bright spots on the bow are observed at times. The sky is also brightest beneath the primary bow and darkest between the bows. But Church permitted one gross error.

Fig. 9-33. Frederic Church. Rainy Season in the Tropics. 1866. The Fine Arts Museums of San Francisco, Mildred Anna Williams Collection.

Church squeezed the two bows too close together, allowing only half the spacing Nature provides them. Why did he do this? It is certainly not from ignorance. Church had remarkable powers of observation and a visually photographic memory. He was mathematically precise. He even included two properly spaced bows in a study for the Rainy Season! It is, of course, possible that he neglected to leave adequate space for a secondary bow after first painting the primary too large, for a stereoscopic view of his studio shows the work in progress with only a single bow visible and not much room for a second. But this degree of carelessness seems totally out of character. Somehow, the error seems almost deliberate.
If the error was deliberate what was Church's motive? In April of 1865, both his children died of diphtheria. Perhaps the close bows served as a linked cenotaph for his lost babies.

It is also possible that Church was perpetrating a hoax at the expense of the gawking public and carping critics who blindly bleated the rhetoric of realism while seldom, if ever, looking at nature for themselves. In That Wilder Image, James Flexner pointed out that Church was normally quite an exuberant fellow, much given to practical jokes.

If Church did intend a joke, he had a precedent. In 1860, after years of unfulfilled promise, critical acclaim finally came to the epileptic, George Inness, as a result of several bold landscapes. One of these, A Passing Shower (Private Collection), contains a beautiful and convincing double rainbow for which every one of nature's decisions has been inverted. The color sequence of each bow has been reversed and Alexander's dark band has been replaced by a light band. George Siscoe has suggested that this inversion is too perfect to be accidental or random, but rather represents a deliberate practical joke by Inness, who was a notorious trickster and a rather contrary individual. Not surprisingly, critics, who wouldn't have recognized a rainbow if they were sitting on one, praised Inness to the sky for the objectivity of this work.


Unlike some of his more successful contemporaries, Inness preferred the cultivated or civilized landscape to that of the wilderness. This naturally drew him to Europe. In 1852, his first trip abroad ended rather unceremoniously when he was expelled from Rome and Italy for scuffling with soldiers after refusing to take off his hat to the Pope. On his next trip to Europe, in 1854, Inness wisely chose an itinerary that bypassed Italy. This brought him into direct
contact with painters of the Barbizon school, whose works greatly impressed him. He allowed the Barbizon approach to cloud his horizon for six years. It was only in 1860, when he moved to Medfield, Massachusetts (about 15 miles from Boston) that he received the spark that transformed his skies into inspired masterpieces such as *A Passing Shower* and *Clearing Up* (Fig. 9-34).

The cultivated countryside setting of *Clearing Up* faces north along the upper reaches of the Charles River near Medfield. The brightly illuminated tree trunks testify to Inness's Barbizon debt. But the moment the sky was involved the American in Inness took charge. Quite simply, the meteorology of *Clearing Up* is too explicit and too good to have been done by any of the Barbizon painters except Millet. The fisherman’s long shadow and the purple color of the clouds betray an early morning sun low in the eastern sky. A cold front has passed, and through the clearing in the west the lifting and disintegrating edge of a stratiform cloud layer can still be seen. The fleecy stratocumulus cells have been herded into long cloud lines that parallel the west winds in the wake of the cold front, but for some reason Inness showed no signs of wind at the ground. But he made the visibility extremely high, the air pure, and the light as sparkling as in Vermeer’s *View of Delft*.

Scores of other American artists succeeded in capturing on canvas the wilds of their native lands and skies. Martin Johnson Heade tinged his marshy sunsets with the most exquisite dying stratocumulus and in so doing, created aerial poems of unsurpassing beauty. John Kensett’s sunsets vied with Church’s, while his New England coastal scenes were even more luminous than Fitz Hugh Lane’s. Kensett even recorded cirrocumulus, displaying them in the hazy summer sky above Lake George (1869, Metropolitan Museum of Art, New York). Worthington Whittredge’s altocumulus would have made Rubens, Turner or van Eyck stop to admire. Thomas Moran brought the untamed radiance of Yellowstone’s earth and sky back to civilization. All of these and more labored for appreciative audiences until a change in the winds of sentiment cast them down to nearly a century of thankless oblivion. But their works have recently been exhumed and restored to their former and rightful place in the sky.

Canadian sky painters are an even better kept secret than their American brethren. A Dutch immigrant, Cornelius Kriehoff first showed up in New York in 1837 before establishing himself and sky painting in Canada. In New York, Kriehoff may have seen some of Thomas Cole’s paintings, for his works bear traces of Cole’s style. Kriehoff was also influenced strongly by Canada’s weather with its snow-covered ground and smooth edged, broken stratiform cloud sheets.


Even in summer, Canadians do not forget that they live in a land of snow and ice. Lucius R. O’Brien’s monumental *Sunrise on the Saguenay* (Fig. 9-35) makes several meteorological statements. A luminous glow fills the misty air of a summer morning while fog crowns the cliff tops. Flecks and bands of altocumulus in the distance share the sky with shreds of the fog, while both are reddened by the rising sun. Everything seems to herald a warm summer day, but rising vertically from the sun, a sun pillar, one of art’s rare ice crystal
halo phenomena, warns who really rules that wintry land.

**Skies of Other Lands**

By 1800 the entire world had learned to groan under Europe's heavy hand. Sometimes, however, this hand did bring a lighter touch to foreign skies.

In 1549, St. Francis Xavier visited Japan and weighed down their painted skies with Christian gold. But Japan expelled the Jesuits, threw off their golden cloak, and returned to a Chinese landscape style. While in this mode, Soga Shohaku (1730-1781) painted *The Chinese Immortal, Ch`en Nan Causing a Rainstorm* (Fig. 9-36). Here the ancient Chinese vortices are transformed into a surprisingly modern guise. The scene depicts the flow of air just beneath the edge of violent thunderstorm. A gusty wind from beneath the cloud blows down a few helpless mortals trying to stand with Ch`en Nan while a giant vortex, the thunderstorm downburst strikes the ground and curls outward as if it were the tongue of a dragon.

![Fig. 9-36. Soga Shohaku. The Chinese Immortal, Ch'en Nan Causing a Rainstorm. C. 1770. Museum of Fine Arts, Boston, Fenollosia Collection.](image)

Shohaku's downburst shows that even if Japan remained a land closed to greedy European hands the Shoguns were unable to seal off the unruly sky completely. A stream of Western products and ideas were smuggled into Japan through a single port of entry, Nagasaki. There, eager Japanese artists could obtain science books filled with realistic illustrations or Dutch oil paintings that revealed a new way of depicting the landscape.

The marriage of European and Japanese art first reached fruition in the landscapes of Katsushika Hokusai. In a career that spanned seventy years, Hokusai took his time to become a great sky painter. During the first decade after his apprenticeship ended in 1779, he painted mostly actors and dramatic scenes in the Ukiyo - e (floating world) tradition. During the next decade he gradually shifted his emphasis to landscape done in a traditional Japanese style. It was only after about 1800 that his art began to reveal a strong European influence. This shows up in the coloring, perspective, and attention to the details of cloud forms.

Hokusai's sky painting culminates in the series, *Thirty-six Views of Fuji*, done from 1823 to 1828. These prints show the venerated
Japanese volcano from every conceivable viewpoint and in all types of weather. One of the most famous and most often reproduced scenes, The Hollow of the Deep Sea Wave shows a monstrous curling wave about to break on some poor sailors.

*The Fuji in Clear Weather* (Fig. 9-37) may be Hokusai's greatest meteorological statement. The towering volcano pokes up into the domain of the sky. The early morning sunlight highlights the red rocks above the sloped tree line. Ribbons of snow still remain in the eroded gullies near the top where they are most effectively shielded from the sun's merciless rays. The sky, which is deep blue above lightens near the horizon, all the while maintaining infinite visibility and hosting myriad rows of cellular altocumulus.

Fig. 9-37. Hokusai. Fuji in Fine Weather. c. 1825. British Museum, London.

This is surely based on a cloudscape that Hokusai observed. In fact, although the *Fuji in Fine Weather* owes something to European tradition, Hokusai recognized the potential of altocumulus several decades before most of his European and American colleagues. But Hokusai also chose to flaunt the rules of perspective so fundamental in European art. Near the horizon, where the clouds are seen obliquely, the cloud rows should grow progressively narrower and eventually appear to merge (Fig. 9-38). In the *Fuji in Fine Weather*, Hokusai severely understated this natural tendency.

Other Japanese artists rapidly followed Hokusai's lead. Hiroshige (Ando Tokitaro) also produced several series of landscape prints. In these he emphasized atmospheric effects more than Hokusai. The *Cloudburst at Shono* (Fig. 9-39), a scene from the *Fifty-three Stages on the Tokaido* shows how a driving rainstorm sends peasants scurrying in all directions. The
wind-driven rainstreaks, rendered by diagonal lines, have severely reduced atmospheric visibility. Hiroshige used successive rows of trees the same way the Chinese and Japanese had long been using successive rows of mountain ridges to show how rapidly objects fade with distance in the hazy East Asian summer atmosphere.

Fig. 9-38. Oriented altocumulus cells appearing to merge at the horizon over Fort Lauderdale, FL.

Fig. 9-39. Hiroshige. Cloudburst at Shono, from Fifty-three Stages on the Tokaido. 1833-1834. Tokyo, National Museum.

The Japanese landscape artists also gave us a fresh look at snow. Unlike the dreary snow scenes of Europe, with their misty, overcast skies, Japanese scenes often take place under crystalline, deep blue skies with infinite visibility. This difference is due more to meteorology than philosophy since the sky clears so much more quickly after Japanese snowstorms than it does after European snowstorms. Snow scenes with clear skies are
also common in the United States and in Canada, where skies also tend to clear dramatically after snowstorms.

Most of the Japanese landscape prints were simple and refreshing in comparison with European landscape paintings. Around mid century, Japan slowly began to send a trickle of exports to the west. In 1856, a French bookseller brought one of Hokusai's sketchbooks containing some colored prints to the attention of Manet, Degas, Fantin-Latour and Whistler. A year later the 16-year old Monet purchased his first Japanese prints. Japonisme was soon all the rage and Japanese prints directly influenced a number of European painters.

One artist influenced by the Japanese prints was the primitive, `Le Douanier', Henri Rousseau. Rousseau got his nickname from his job as an octroi official who collected the duty imposed on certain items entering at the city gates of Paris. He kept this job in order to support his habit of painting. He apparently was a rather simple soul, often the victim of practical jokes and frauds, but one who was convinced of own his greatness and who very consciously cultivated a `modern' naive style now recognized everywhere.

Rousseau is best known for his dreamlike jungle scenes. The first of these he called *Surprise* (Fig. 9-40). A crashing thunderstorm has invaded a botanical garden jungle to terrorize a tiger. Bolts of lightning strike the ground in several places. A driving downpour, possibly inspired by a Japanese print, indiscriminantly pelts everything in the overcrowded scene.

Despite the overcrowding, Rousseau's jungle scenes represent a return to simplicity and clarity of form that many of his
contemporaries were fleeing. Rousseau made it a point of stressing the outlines of all objects. Most of his leaves are clearly identifiable. So too are his clouds. These appear in his topographical landscapes in parklike settings in and around Paris. In a few of his earliest paintings, Rousseau's clouds resemble the small cumulus of European art prior to 1400. But then, as if telescoping several centuries of northern European cloud painting into a few years, some of Rousseau's clouds spread into decks of almost unbroken stratocumulus.

At Rousseau's post just south of the city, a dark but broken deck of stratus covers the View of the Bievre at Gentilly (Fig. 9-41). The breaks suggest an improvement in the weather as does the lower layer of fractostratus, so often seen near the end of rains in the wake of low pressure areas. Visibility is high, for the air has been swept clean by the departing rain, and drier air is moving in. It is a scene transcribed faithfully from a direct observation. In it Rousseau has succinctly captured the mood of typically overcast northern European skies.

![Fig. 9-41. Henri Rousseau. View of the Bievre at Gentilly. c. 1895. Tate Gallery, London, from a Private Collection.](image)

Far from the imaginary tropical settings of Rousseau's jungles but closer to his dreary French skies, a frigid winter wind blows across the heartland of Russia. Cold has etched its indelible insignia onto almost every great artistic creation in Russia, for bitter winter lies at the heart of the unfathomable Russian soul. In the nineteenth century, Russia attained cultural equality with the rest of Europe. Her novelists, poets, playwrights and composers are beloved by the entire world. But what about her landscape painters? We are finally recalling that Russia had these too; we had simply overlooked them.

Consider The Thaw of Fyodor Vasilyev (Fig. 9-42). Thaws may come at any time during the winter but they are mixed blessings. While they last, the roads turn to mud and the sleds and troikas must be put to rest. In Russia, thaws always mean mud. Every part of The Thaw has been daubed with mud. The melting snow is almost as muddy as the road and even the cloudy sky with its green cast seems muddy. But while mud is a filthy nuisance, in Russia it is also the fertilizer of approaching spring. Learn from the crows and live! These hardy birds find their food softened in the mud. And what may their bonanza consist of? Perhaps it is only horse manure! But manure is far better fare than deep winter's sterile drifting pure white snow that inters everything edible.

![Fig. 9-42. Fyodor Vasilyev. The Thaw. 1871. Tretyakov Gallery, Moscow.](image)

At last spring comes even to Russia. Then the entire countryside acts as if released from a long prison term. The flowers burst into bloom where snows covered everything just a few weeks before. But there is carefully planned purpose in all this exuberance. The flowers
must do their work quickly, for the warm days are numbered. Even in the midst of summer, winter's impending onslaught can be sensed in the air.

During the summer of 1893, Isaak Levitan resided near Lake Udomlya, midway between Moscow and Leningrad, and began painting *Eternal Rest* (Fig. 9-43). It is a dull summer day. The late afternoon sun has tinged a thin mottled altocumulus sheet with yellow highlights but its rays are too feeble to reach the ground. The altocumulus also darkens the shaded side of an advancing line of cumulus congestus. Several signs indicate the line is approaching. The top of the highest cumulus slopes up to the left and toward the viewer, showing that the clouds are moving in that direction. The thin arched cloud veneer midway up the sky on the right also heralds an approaching thunderstorm, for it resembles an arc cloud often produced by the forced uplift of air ahead of active cumulonimbus. The cloud line has not yet begun to produce rain, for we can still see clear to the horizon, but it is only a matter of time.

Fig. 9-43. Isaak Levitan. Eternal Rest. 1893-4. Tretyakov Gallery, Moscow.

There is evidence this will be no ordinary rainstorm. *Eternal Rest* seems to be a transcription of the Biblical Flood to Russian soil. Levitan has succeeded in conveying the spirit of the vast power that water and sky hold over the solid earth in Russia. There, rivers and
lakes, swollen every year by melting winter
snows and stubborn, growling ice jams,
overflow their banks and inundate the land. In
Eternal Rest, the church and its graveyard sit
like Noah's ark on an isolated promontory,
dominating a landscape with no other relief.
The gray river or lake that covers most of the
earth's surface seems poised to overflow its
bounds. The small spitlike island which appears
to be shrinking may have just lost its slender tie
to the mainland. Even the vegetation
contributes to the overall impression of
flatness, for it consists of a smooth, almost
monochrome dull green mat characteristic of a
tidal flat on a cloudy day. When the rain finally
arrives, it will carry all before it.

Levitan labored to achieve the mood of
Eternal Rest. In an earlier study, he placed the
church atop a more elevated and extensive
promontory, while the small island showed
more relief and was still connected to the
mainland. Even the vegetation in the study is
more variegated and possesses some relief.

_Eternal Rest_ is an elegy to nature's
vastness. It is a work of one of society's
geographical frontiers. By 1900, when Isaak
Levitan and Frederic Church died, these
frontiers were in full retreat, forcing artists to
wander ever further in search of the shrinking
wilderness. Other issues were flooding the
mainstreams of artistic ideas in the world's
`cultural' centers. Insulated and protected from
the raw force of nature, urban artists had new
tales to tell, tales that would first raise us to the
verge of divinity and then cast us down into the
dungeons of our own personal hells.
Throughout this journey the sky, which
faithfully reveals the soul of the times, would
become ever more distorted and restricted. The
lessons of the nineteenth century romantics
were then banished to the far corners of the
globe, where they were rudely preserved only
in remote enclaves of Russia, the United States,
Canada and New Zealand. It would take time
for the forces of sanity to demand their recall.