CHAPTER 4
THE EBB AND FLOW OF NATURE'S WIND:
ASIAN SKY PAINTING

China had an ancient civilization a thousand years before Rome was founded as a rude farmers' hamlet. When Rome rose from its humble origins to rule the Mediterranean, China was still a great nation. When Rome finally succumbed to pressures from the sparse plains of Asia and internal dissolution, China had already long since cast aside her problems and returned to greatness.

Chinese landscape art began to soar just as Europe blocked its skies with a gold curtain. Nevertheless, the birth and early development of sky painting in China remains as obscure as the beginning of sky painting in Europe. In both civilizations, ancient literature describes the accomplishments of landscape artists whose works have been long lost or destroyed. But contemporary written descriptions can only testify to an increased concern about representing nature. If, for example, Giotto's work were judged solely by the assessment of his contemporaries, he would be acknowledged as a master of realism, while if we relied on John Ruskin's 19th century testimony, we would compare Giotto's technical abilities to those of a stammering infant.

The sky first appeared in Chinese art centuries after it had in European paintings, and after Rome and China had developed strong economic ties. The art found all along the Silk Road, the caravan routes of Central Asia, suggests that prior to 600 AD, artistic ideas moved predominantly eastward and that sky painting did not blossom in China until she had learned the Hellenistic technique of shading to provide the illusion of depth. It is difficult to tell if the Chinese discovered sky painting independently or if they first learned of it from Europe.

No matter what their initial inspiration, Chinese artists developed landscape and sky painting anew and with a different emphasis than in the West. Chinese sky paintings are basically philosophical poems of the atmosphere. They are distillations of an ancient philosophy of the meaning of nature and man's place in it, and of climate conditions very different from those in Europe. A thousand years ago, Chinese painters saw things in the sky that most Western painters are still unaware of. For centuries while the West slept, patient and sensitive Chinese eyes traced the flow of air and plumbed the depths of aerial effects.

Then in the 13th and 14th centuries, China repaid any possible earlier debt to the West. Mongol conquests linked China with Persia and indirectly with Europe. Chinese experts in every field were transferred all over Asia and brought their culture wherever they went. Suddenly, in the first half of the 14th century artists in Persia were painting the sky gloriously, using Chinese techniques that were merely modified to suit the Persian atmosphere. Not long afterward, stray glimpses of sky began appearing with increasing frequency in European art. Contacts with Persia may have hastened the European Renaissance in sky painting.

The Birth of Chinese Sky Painting

Landscape was a late addition to the Chinese scene even though its roots can be traced back to quite ancient times. By 2255 BC, hieroglyphic motifs for mountains and trees were said to be among the 12 insignia of the legendary Emperor Shun. Other primitive precursors of landscape art such as abstracted
forms for forests and streams as well as the whirling ‘cloud forms’ appear on the ritual bronzes (Fig. 4-1) of the Shang Dynasty (1766 to 1122 BC).

The Chinese ‘cloud forms' exemplify an ancient and seemingly universal human fascination with whirls and spirals. Vortices have appeared repeatedly in the art of widely separated societies. Not all were based on observations of fluid motions. Some were inspired by the spiral or curled patterns of seashells, ram’s horns, leaves, or coiled animal movements. More often than not, the spirals or scrolls were abstracted and divorced from their natural roots. They were seldom incorporated into anything that vaguely resembled a scene. In art of the Shang Dynasty they might well be used to adorn the skin of elephants or the fur of tigers but they never appeared in anything vaguely resembling a scene.

![Ceremonial vessel ho in bronze with fluid motifs in the form of vortices and cloud scrolls. C. 1100 B.C. Freer Gallery of Art, Washington, DC.](image)

Fig. 4-1. Ceremonial vessel ho in bronze with fluid motifs in the form of vortices and cloud scrolls. C. 1100 B.C. Freer Gallery of Art, Washington, DC.

On rare occasion, spirals in ancient art were depicted in their natural setting. An Assyrian wall carving at the Palace at Nimrud celebrating the victory of Ashurnasipal in 878 BC shows enemy warriors attempting to escape certain capture by swimming in the river (Fig. 4-2). The rapidly flowing water is indicated by carved flow lines interlaced with eddies or whorls that were most likely seen by the artists walking along the banks of the swiftly flowing Tigris River in Nimrud.

![The Escape of Enemies Across a River Wall Panel. Ashurnasipal’s Palace at Nimrud 878 BC, British Muesum. Vortices are carved as swirling flow lines in the water at far left and at right below the fortifications.](image)

Fig. 4-2. The Escape of Enemies Across a River Wall Panel. Ashurnasipal’s Palace at Nimrud 878 BC, British Muesum. Vortices are carved as swirling flow lines in the water at far left and at right below the fortifications.

In Western Art, spiral patterns degenerated into decorative dead ends such as the petrified scrolls on Ionic and Aeolian capitals of temples (Fig. 4-3). Only in China was the link between symbol and nature retained and nurtured. The whirling cloud form was associated with the writhing dragon form, which brought or withheld rain and ascended to the clouds in waterspouts and tornadoes. Both forms were considered to symbolize humid elements - the very breath and spirit of life.
The transformation from symbolic to scenic art began during the Han dynasty, which was established in 206 BC and ruled China with only a single interruption for about 400 years. During those creative years paper and the first seismometer were invented, the compass was improved, and commerce helped culture thrive.

As the Chinese learned to distinguish natural phenomena from the supernatural they modified and absorbed the antique forms into a coherent picture of nature. But this took time. At first, heaven and earth were treated as separate domains. A painting from the inside of a bronze toilet box (Fig. 4-4) shows how use of the cloud form had evolved by the time of the Han dynasty. The phoenix in the center seems to fly through empty space but is surrounded by swirling lines that accentuate the turbulence of its flight. The only earthly reference points are the tear-shaped clouds that appear at the fringe of the dish. The stress markings appear to catch the cloud in motion and are, in fact, the ancient cloud forms. The work still belongs to the realms of symbolism and decoration but it constitutes an important step in the direction of naturalism.

Even when heaven and earth were portrayed in a single work, clouds and sky were relegated to ceilings and segregated from mountains and trees on the walls below, somewhat as in Egyptian art. In the Ceiling mural, *Ascending to Heaven* in Dingjiazha Tomb 5 in Jinquan, gansu Province (c. 4th-5th century) various deities fly around a sky full of flowing cloud forms while trees grow atop the airless gumdrop mountains below (Fig. 4-5).

The Chinese have maintained an enduring love affair with their mountains. It was
recorded that one Chinese Emperor was so infatuated with mountains he had some constructed for his pleasure in the palace gardens; the pyramids of Egypt render this story eminently believable. It also makes sense that the Chinese would attempt to paint their mountains. A mural of a mountain scene from the first century AD has been found in a recently opened tomb in Pinglu, near the Sanmen Gorge of the Hwang Ho River (Fig. 4-6).

Like many other peoples, the ancient Chinese wanted to provide their dead with a familiar and beloved environment. A tomb located in the hilly countryside was therefore a natural place to paint a mountain scene. Presumably the departed soul would be able to look on the wall at the manor he had once owned and gaze at the mountains beyond.

Trees grew on those painted slopes, which pile one beyond the other in a seemingly endless series. Above all the mountains there is a space for the sky, but it was left neutral, and even the bird does not venture into it. But the hills do convey a feeling of atmosphere, for their tops are painted darkly and are clearly outlined while the valleys appear washed out as if by haze or fog. Here is a primitive prototype for centuries of later Chinese sky paintings.

The painted cloud forms and early scenes bear a native stamp. But during the Han dynasty, China maintained extensive although indirect relations with the West, largely as a result of her silk. Regular trade along the length of the Silk Road between Rome and China were established before 100 BC. Contact between Rome and China remained indirect for the most part although in 65 AD, a Roman delegation did reach China. Several relay transfers were invariably required to get the silk from its secret source to its ultimate destination.

The typical route (Fig. 4-7) was similar to the one taken much later by Marco Polo, who traversed it from west to east. The silk was carried from the heart of China toward her northwest frontiers and thence across the fringes of the Takla Makan desert north of the Himalayas. After crossing the mountain passes of the Pamir Range, it was carried westward across the plains of Persia, which was then under the control of the Parthians. From there the silk reached the eastern outposts of the Roman Empire, usually in Syria or in Armenia on the Black Sea.
The Parthians choked off the land route by levying an exorbitant (25%) tax on all goods that passed through their lands. This encouraged Roman merchants to seek a cheaper route; they soon learned from Hippalus to sail with Asia’s pulsing winds of the monsoon (Fig. 4-8).

The Youth of Chinese Sky Painting: Marking the Flow of Air

All of Asia pulses to the monsoon’s annual heartbeat, which is powered by the seasonal cycle of the sun's heating. The word, monsoon, derives from the Arabic mausim or season. During the summer months the sun heats the Asian landmass and its hot, light air rises. Cooler winds from the surrounding oceans rush in like a giant sea breeze, bringing great quantities of moisture inland. In most of Asia summer is the rainy season.

When the sun heads south in late summer, the Asian landmass begins to cool and the winds from the sea gradually weaken. In autumn the winds pause briefly before setting in from the opposite direction. Throughout the winter months the cold, dense air from the dry interior of continental Asia drains out to sea, much as a land breeze does along coastal regions at night. This continues until the spring when the land once again begins to heat up and the annual cycle is completed.
Around India these seasonally reversing winds are remarkably regular and reliable, even though precipitation varies widely from year to year. The summer winds over the Indian Ocean originate in the Southern Hemisphere and cross the equator in their northward journey. Once in the North Hemisphere, they are turned somewhat to their right by the rotation of the earth and so, approach the continent from the southwest. During the winter months when the air pours out from India, the earth's rotation also turns it to its right so that the wind arrives over the Indian Ocean blowing from the northeast, like all good trade winds.

Hippalus, a Greek sailor shortly before the time of Christ, is credited with the discovery that these monsoon winds, long known at the shore, also extend far out to sea over the Indian Ocean. This made it possible to sail confidently for days without sight of land. No longer did sailors feel compelled to cling timidly to the southern shore of Asia. In one step, voyages were reduced from months to weeks, and profits soared. In summer, fleets set sail from Egypt via the Red Sea or from Arabia via the Persian Gulf and headed toward India under southwest winds. Then, in winter, the northeast monsoon sent them safely home with their precious cargos.

From India other merchants continued on to China, skirting either side of the Himalayas. The southern route was usually by sea and had to circumvent Southeast Asia. The more common, northern route seems to have been up the Indus River valley, where the Gandharan civilization was centered, and then over the mountain passes of the Hindu Kush to join the Silk Road. In any event, it is along the Silk Road where the transmission of Roman and Hellenistic art is documented on stone! Many paintings have been preserved in the dry caves near these once flourishing trading posts.

If landscape art was inspired in India by these contacts with Rome, it has disappeared without a trace. Not one of the early Indian civilizations showed the least concern for landscape in art. The secular art of India is often frankly sexual, apparently preoccupied with the boundless fertility of that tropical land. But Gandharan India did adopt and transmit the Hellenistic techniques of shading to give figures dimensionality and the diagonal representation of buildings. These reached Miran, near the western outposts of China, before the close of the third century. Their entry into Chinese art seems to have been delayed by the collapse of the Han dynasty around 220 and the subsequent political chaos. In the fourth century, Miran was abandoned but other outposts soon took over, for even at the worst of times traffic continued to trickle along the Silk Road.

The period following the collapse of the Han dynasty is known as the Chinese Middle Ages. A resurgence of religious feeling accompanied the decline of political organization. Buddhism began to filter slowly into China at this time although Taoism remained the dominant religion and philosophy. Taoism contains its share of magical elements but never stressed the otherworldly to the degree that Christianity did. In fact, Taoism, which dates back to about 550 BC urges one to leave the hustle and bustle of society and learn to live in harmony with nature. During times of political turmoil and conflict, a retreat to the peace of the mountainous countryside held considerable allure in Chinese cultural circles.

The Chinese Middle Ages was different than Europe’s Dark Ages. Contact with the outside world temporarily diminished during the fourth century but never entirely ceased. Cultural activities, in fact, were revitalized at this time by the elimination of conservative traditions that had been maintained throughout the Han dynasty. Art in particular benefited because Han artists had been stigmatized as mere artisans. It was during the Middle Ages that Chinese painters were first hailed as poets and geniuses.
Chinese writings made it clear that a deeply rooted love of landscape had become established and that painters at this time were doing something about it. In an essay on landscape painting, Tsung Ping (375-443) wrote that after he had grown too old and feeble to climb the mountains he had scaled in his youth, he reexperienced his former travels by painting the scenes from memory on his walls and then gazing upon them. Nothing remains of his work.

Thus, it was during the Chinese Middle Ages, probably at the end of the fourth century, that landscape art began to blossom in China. Only a few later copies of the early landscape works remain. If they are faithful, they show a new concern for portraying coherent scenes rather than merely rendering individual landscape elements such as clouds, mountains, and trees.

A copy of a scene from the *Admonitions of the Court Instructress*, (Fig. 4-9) attributed to Gu Kaizhi (c. 345-c. 406) indicates the change. In the place of the earlier pile of mountains towers a single, deeply eroded peak. A serpentine path carved into the mountain in the form of a tree-lined ledge is rendered with a fair strong sense of perspective. Bubbly froths of cumulus clouds rest atop and alongside the peak, showing that the artist knew that mountains often make their own clouds. Two other cumulus clouds drift across the sky on either side of the peak. Each of these is composed of the ancient cloud scrolls and supports a venerable figure encircled by a halo studded with tiny circles that might represent sun dogs.

By the fifth century, heavy traffic had resumed on the Silk Road and Buddhism, with its traces of Hellenistic influence, began pouring into China from Gandharan India. At the beginning of the sixth century, Chang Seng-yu is credited with introducing shading to give the illusion of depth into Chinese painting. This technique, with its concern for representation of the third dimension, may have helped stimulate the development of landscape art in China.

If the inspiration for landscape art came from the west, it is fitting that most of the earliest Chinese sky paintings have been found in the caves at Tun-huang, at the western gatepost of China. The caves were hollowed out of solid rock by monks from the time of the founding of the religious retreat by Lo Tsun in 366 AD. The monks prepared and then painted the walls of their caves with a variety of works including many landscape scenes. These generally reflected the dry environment of the Silk Road.

One of the early cave paintings shows a mountain range rising abruptly from a flat, rocky plain (Fig. 4-10). In the sky above the sawtooth peaks, float substantial, almost triangular and flat-based cumulus, vaguely reminiscent of the loaf-shaped clouds in early Christian paintings. In another scene from the same cave rain streaks from similar loaf-shaped clouds fall onto the mountains and ground.
The Chinese long recognized that mountain peaks are often decked in clouds, but they would not often allow such solid looking objects in their skies.

Sky art was also developing to the east in China at the same time. Clouds and a distant sky appear in the *Nelson Stone Sarcophagus*, probably based on a highly regarded painting. A row of small mountains near the top embedded in a series of horizontal lines creates an impression of great distance. The lines seem to represent the sea but they merge with the ancient cloud forms blowing in from the right. At the same time, the clouds seem about to collide with the nearby tree on the right. It seems a convincing sense of perspective had not yet been developed. As Max Loehr noted, Reality in a landscape of this stage, is tied to objects. The objects alone are real. Neither space, as such, nor atmosphere exists as yet. The advance over Han designs consists in the fact that the clouds rather than birds are used to symbolize the air.


Over the next two or three centuries the rendering of perspective improved markedly. A series of poetic ‘desert’ landscapes at Tun-huang show this progress. In *Meditation by the Setting Sun* (Fig. 4-10), the grass-covered earth is depicted as a light blue-green wash, while distant mountains at the horizon are tinted blue. And the red setting sun contemplated by the monk tinges two nearby lines of stratocumulus.

By the eighth century, Chinese painters had learned to represent scenes in a convincing manner. One of the earliest Chinese sky paintings for which there are reliable copies is *The Emperor Hsuan-tsung’s Journey to Ch’eng-tu* (Fig. 4-12).

In 755, the Emperor fled the capital with his favorite mistress in the wake of an armed
rebellion. The original is presumed to date from some time late in the 8th century. The mountains are rendered as precipitous and sometimes unbelievably overhanging crags that bear a remarkable resemblance to the Huang Shan or Yellow Mountains of Southern Anhwei. The Chinese would remain fond of such mountain forms and would, with increasing effectiveness, continue to employ them for centuries.

The painting suggests that knowledge of aerial perspective had not yet reached China. The outlines of the most distant trees and mountains are almost as distinct as those in the immediate foreground. Colors are bright and sharp. The neutral sky has no tonal gradation and can be distinguished from the water only by the waves and by the clouds.

Clouds figure prominently in the Journey. They ooze their way through the mountain passes, like trails of toothpaste. Streak lines within the clouds render the air's normally invisible flow patterns tangible and enable us to see the atmosphere's secret whirling eddies and waves. These streak lines within the clouds are the ancient cloud forms.

Clouds must be perfectly positioned and sized to mark the patterns of airflow. If a cloud line is not located at an interface where waves have formed, no waves will be seen. If the clouds on the interface are too thick or if they cover the sky, the waves will be drowned in a sea of clouds. Most distinct flow patterns are also highly transitory; in just a few minutes, eddies disintegrate or waves break and the patterns dissolve into turbulence. The waves that formed on the line of cumulus in Fig. 4-13 were visible for less than two minutes before they crested, broke and dissipated into chaos.

Fig. 4-13. Waves in a row of cumulus over NYC.

Fig. 4-14. Von Karman vortices form in the wake of Alexander Selkirk Island, 15 September 1999. Landsat, 7 WRS Path 6 Row 83, center: -33.18, -79.99.
The vortices represented by the ancient cloud forms occur in a number of distinct situations. A train of von Karman vortices forms in the wake of any obstacle in the flow, such as an island. Such von Karman vortices are the ones depicted in the Assyrian bas reliefs and are now seen from satellite in disturbed patterns of stratocumulus clouds (Fig. 4-14).

Other vortices form as breaking waves produced by strong wind shear on the interface between two stably stratified layers in the air. These Kelvin-Helmholtz waves are visible only when a thin cloud deck occupies the interface, as in Fig. 4-15.

Vortex pairs form in the wake of airplane wingtips as the plane emerges from a cloud deck, as in Fig. 4-16. In this photo, air in the vortex on the right rotates counterclockwise, air in the vortex on the left circles clockwise, and air sinks in the center of the double vortex, depressing the cloud top. Similar vortex pairs form behind an oar moved through the water.

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**Fig. 4-15.** Breaking Kelvin-Helmholtz waves with air circling clockwise revealed by a cloud layer. Photograph provided by Margaret Lemone

**Fig. 4-16.** Trailing wingtip vortex pair in the wake of a plane emerging from a cloud deck.

**Fig. 4-17.** Mushroom cumulus over Yonkers, NY.

**Fig. 4-18.** Air motions in mushroom cumulus.
Vortex pairs also characterize the motions of rising mushroom-capped cumulus clouds (Fig. 4-17) or any explosive cloud including the pino cloud of Vesuvius. Each such cloud consists of a buoyant stem or core and a growing cap of hot, humid air (Fig. 4-18). The air in the stem of the cloud rises freely but once it reaches the cap its upward motion is slowed by contact with the quiescent surroundings. But the air in the cap is still propelled by the rising column of hot air in the stem below and so, is forced to spread out along the top and curl down the sides. In this way the cap gradually rises and expands. Finally, after entraining some of the air from the immediate surroundings, the air flows inward along the underside of the cap and back toward the stem. This flow pattern, which is easily seen in explosions in movies, can also be seen by patiently observing any mushroom-shaped turret of a cumulus for a minute or so, and is revealed by the strain lines in the mushroom turrets of the clouds in *The Emperor Hsuan-tsung’s Journey to Ch’eng-tu*.

The Chinese penchant to view clouds as flow markers, like their tendency to stress process as a fundamental aspect of nature, may be a natural consequence of living in a land governed by the pulsing flow of the monsoon. The temperature in the traditional art centers of China drops by 45º to 60ºF from summer to winter. Winter sets in and departs with startling abruptness. The stark contrast between the hot, humid, rainy, luxuriant summer with its persistent winds from the south, and the frigid, dry, dusty, sterile winter blast from the north encourages a view that the universe consists of the pull of opposite forces (Yin and Yang).

In Western Europe the temperature difference between winter and summer is less than 30ºF. The seasonal transitions are far gentler and more gradual, and are not marked by a monsoonal wind shift. Europeans have also observed the flow in their clouds - Pliny correctly noted the evolution of the cloud of Vesuvius with its growing trunk (stem) and spreading branches (cap) - but, possibly lulled by more gently changing seasons and less frequent thunderstorms, have apparently not felt such observations to be compelling.

But even though the signs of airflow in real clouds are seldom so obvious, you need only watch growing cumulus carefully for several minutes (or observe their evolution using time lapse photography) as they swell into the sky to see their outlines evolve in the manner of an unfolding mushroom cap or a breaking wave - just as is indicated in *The Emperor Hsuan-tsung’s Journey to Ch’eng-tu*.

The time lapse view of clouds is one of three fundamental modes of representing clouds. Clouds can also be conceived of as formless mists whose chief property is the ability to disguise or hide objects (as in the Sacrifice of Iphigenia) or as solid objects with distinct outlines. Most later Chinese masters would treat clouds as formless mists and carry the execution of this conception to almost unimaginable lengths. The Early Christians, and almost all Europeans since, have viewed clouds as solid objects with distinct outlines and have stressed either their basic form or the play of light on them.

It was the Chinese who discovered that clouds can be viewed as tracers of the flowing winds of time. The deeper significance of the ancient Chinese cloud forms should now be clear. They are the dye markers of the flow in air, signposts of the perpetual flux in all of nature, embodiments of process, evolution, dynamism. Since the Chinese cloud forms existed from very early times, the penchant to view clouds as symbols of the flow in nature has long been part of the Chinese psyche.

What are clouds? Clouds are assemblages of tiny water droplets or ice crystals that block our vision in a region of the atmosphere. The droplets are on average so small that if strung together like beads, 30,000 of them would stretch only a foot and one billion of them weigh less than an ounce. A typical cubic foot of cloud air contains about 300,000 of these
droplets. The droplets are so tiny that they are passively swept along with any gentle air currents. This makes it possible to walk through a cloud or fog without getting wet.

Clouds, like fog, are not solid objects although they may appear solid when viewed from a distance. A feather placed at the top of the densest cloud will fall through it just as it falls through clear air. Many clouds seem solid when viewed from afar because they reflect light as well as or better than most solid objects. The light entering a cloud quickly strikes droplets or crystals and is repeatedly scattered or deviated from its original course. Most of the light soon reemerges in an incoherent fashion from the same side of the cloud it entered without having penetrated so much as 100 feet.

The apparent solidity of a cloud depends critically on the size and concentration of droplets or crystals and on the clarity of the surrounding air. Chinese artists faithfully recorded the differences between the distinct outlines of flowing cumulus and the indistinct edges of valley fog. Rapidly growing clouds such as towering cumulus appear most solid because they have a high concentration of droplets right to the outer edge of their turrets. When such clouds punch up into clean, dry surroundings, the impression of solidity is redoubled. Evaporating or slowly forming clouds and much fog appear amorphous and indistinct because they have fewer and smaller drops at the edges and are often surrounded by humid air filled with vapor-engorged, light scattering aerosols. Ice crystal clouds and rain fallstreaks also tend to appear fuzzy rather than solid because they consist of fewer (though larger) particles than water droplet clouds.

The colors of clouds depend on the light that strikes them. Clouds in direct sunlight appear white because they reflect the sunlight, which is white. They appear golden or red at sunrise because the sunlight that has reached them is itself golden or red. The bases of opaque clouds or cloud fragments shaded by a higher cloud layer appear dark gray because little light has been able to penetrate. Scattering of light by the intervening atmosphere alters the color of distant sunlit clouds, giving them a pink or orange tint.

When clouds, mist or haze are viewed from afar their form is of the essence. When viewed from within, they act in the opposite manner, blurring the outlines of all objects and making their basic form seem to melt away. Most of the light coming from an object within a cloud will strike a droplet or crystal and be diverted before reaching our eyes. In the thickest clouds or fogs, objects only a few yards away can literally vanish from sight. Thick haze can blur objects within a few hundred yards and sometimes make it impossible to see the clouds above. Chinese sky painting began by viewing clouds from afar but eventually came to present the view from within.

It would seem that clouds should fall since they consist of liquid droplets or ice crystals, which are heavier than air. The droplets are so small and light, air resistance ensures that they settle to the ground at about 1/40 mile per hour. This lethargic settling rate is more than offset by the rising of air that produces most clouds in the first place, and even if the air is not rising, even the slightest of wind is sufficient to keep the droplets airborne.

Only larger particles can fall from the clouds. Ice crystals are usually larger and fall faster than cloud droplets. As a result, ice crystals often fall out of the cloud base and trail below. In active clouds some of the droplets and crystals collide and coalesce, eventually growing larger and falling out as precipitation. A typical raindrop has a diameter only about one millimeter, but is as massive as one million cloud droplets and falls 15 miles per hour.

The tiny cloud droplets can be used to trace the atmospheric flow patterns because they move passively with the wind. Naturally, it is not possible to follow the path of any given droplet; for that a microscope would be needed.
Instead, it is necessary to look for protuberances at the edges of the cloud. These localized regions of cloud droplets also move with the wind and trace its flow patterns.

The Emperor Hsuan-tsung’s Journey to Ch'eng-tu represents a turning point in Chinese history and painting. The old, feeble emperor, preoccupied with his favorite mistress, had allowed a squabble between his generals to escalate into a full-scale rebellion. It took two years to restore the throne to its ‘rightful’ heir. But in suppressing the rebellion, the Chinese foolishly requested military assistance from the Hui-heh, nomads living to the northwest, who then ravaged much of the northern part of China for an additional fourteen years. Millions of Chinese lost their lives and glorious period of the T’ang dynasty came to an end.

China did not heal quickly from this wound. Somehow, the T’ang Dynasty managed to linger on for over a century despite a succession of weak Emperors. Power at court gradually slipped from the Emperors and fell into the hands of eunuchs, who raised intrigue to a high level and neglected the needs of the country. China fragmented into several essentially independent, squabbling sub-kingdoms.

All these troubles helped to produce some extremely parochial attitudes toward foreigners and outside influences in general. Xenophobia was raised to such a pitch that in 836, a decree forbade Chinese to have any relations with outsiders. Shortly after that Buddhism, seen as a corrupting foreign influence (and far too rich and powerful), was suppressed. All other foreign religions were banned outright. On several occasions, as in Canton in 878, foreigners were massacred.

The political turmoil and resulting parochialism had a direct effect on fine art. The atmosphere of unlimited visibility, grasped by the swirling cloud forms, continued to remain highly popular in the more decorative arts such as the landscape scenes of porcelains and carved dishes. But some time in the ninth or early tenth centuries the clouds in fine Chinese painting began to dissolve into formless mists that wound through the valleys and rose to envelop the distant peaks in an obscuring atmosphere. Mist and obscuration were the twin legacies these painters bequeathed to the masters who raised Chinese landscape and sky painting to its greatest heights during the Sung dynasty.

The Zenith of Chinese Sky Painting

In 959, a young general named Chao K’uang-yin was appointed Commander of the Imperial Army by the dying Emperor because of a signal action. Chao had been accused of extorting bribes and appropriating large chests of gold and jewels for his personal fortune after a successful military campaign. When the chests were opened, they were found to contain only books - books that the cultured general had rescued from almost certain destruction. Shortly after Chao's appointment, the old Emperor died.

On February 2, 960, while marching to suppress an uprising of the Khitans, a nomadic people from Mongolia, Chao K’uang-yin was presumably awakened by his generals in the middle of the night and proclaimed Emperor. In this way, we are told, the Sung Dynasty was born. The Khitans were soon mollified and political order was finally restored in China.

As Emperor, Chao instituted a policy whereby all government officials were appointed on the basis of intellectual abilities as determined by standard examinations. What followed was a time of unprecedented creativity and great economic expansion. New, more effective strains of rice and techniques of rice growing helped swell the population and allowed increasing urbanization. The manufacture of paper and inks was greatly improved and in 1040, movable type was invented so that the printing industry greatly expanded. Gunpowder was also invented although the Chinese failed to exploit its
military potential. The first documented use of the ancient compass for navigation is credited to Sung mariners in 1119. In time, China donated these gifts to the world.

Artists prospered as well. No longer bound by the Buddhist preoccupation with human and religious themes, they began by stressing the monumentality of the natural world and the relative insignificance of Man, strangely downplaying the greatly increased scale of human inventiveness and prosperity that helped this art to flourish. In these works it is typical to find towering waterfalls cascading from immense, forested mountains. Evidence of human activity is almost always present but it is generally inconspicuous and insignificant in comparison with the scale of the natural features of the landscape.

And what is it that has so greatly enhanced the feeling of epic monumentality in these works? It is the discovery and masterful treatment of aerial perspective! All features in the foreground are rendered in detail with short, sharp brushstrokes while the more distant features are treated lightly with broad, pale washes. (This is one advantage of using inks and watercolors as the Chinese have.) In most Sung landscapes there are no clouds and the sky is simply left blank. Color is deemphasized and many of the paintings are almost monochrome. Time, of course, has added to this character. Fog and mist lacking distinct outlines are quite common, especially at the base of mountains or waterfalls. We notice these mists and fogs in the paintings only when our eyes pass from mountain crest to valley. Then, we suddenly realize we are no longer seeing anything solid.

Most of these features can be seen in the masterpiece of Fan K'uan, Travelling Among Streams and Mountains (Fig. 4-19). Fan K'uan was something of a nonconformist. He was not a member of the Chinese Academy. Instead, he spent much time in the Ts`in-ling Mountains of Shensi near the Hwang Ho River and learned to capture their character.

![Fig. 4-19. Fan K'uan. Traveling Among Streams and Mountains. C. 1000. Palace Museum Collection, Taichung.](image)

In _Traveling Among Streams and Mountains_, one must search for the manor that merges into the hillside or the small mule train wending its way silently along the path. The scene is dominated by the huge mountainous crag with its step canyons and towering ribbon waterfall and the forested foothill in the foreground. Here we are face to face with the immensity of space and time. And where is the
bottom of the valley that the waterfall empties into? We can only surmise, for it is filled with a mist or fog that adds to the sense of mystery and infinity.

Fan K'uan and the other Sung landscape painters were trying to immerse themselves in the soul of nature. Fan stated this clearly.

Those before me made it their rule never to be detached from the things. Rather than learning from other men, therefore, I should learn from the things themselves, or, better still, from their inner nature.

The early works, such as Fan K'uan's, tended to be valley views in which distant features of the landscape are blocked by an imposing nearby mountain. The furthest features of the landscape are then not very distant and so rendition of the effects of aerial perspective had to be subtle. But artists quickly scaled the heights and began to offer more panoramic vistas.

The panoramic view in Li Gongnian’s Landscape (Fig. 4-20) dramatizes the full majesty of mist in the mountains (Compare Fig. 4-21). The nearby wintry trees are rendered in great detail but the mountains fade dramatically in the distance. The furthest peaks are mere silhouettes, barely able to emerge from the mists and general obscuration of the thicker atmosphere below. Eight hundred years later, Caspar David Friedrich would show Europeans the clear air above valley fog (See Fig. 9-2).
Troubles were not long in returning to China. Early in his rule, Chao Kuang-yin had secured the resignation of all his generals. Thereafter, army leaders were chosen on the basis of scholarship rather than martial ability and were frequently transferred to prevent them from establishing any undesirable allegiances. Soldiers were chosen from the poorest and most downtrodden elements of society, and their faces were branded upon enlisting! Military qualities, formerly admired by the Chinese were disparaged, while intellectual refinement became the single most highly valued personality trait. Although the armed forces continued to grow during early Sung times, these steps had the effect of unilaterally disarming China in the presence of her enemies.

Invasion from the north began in 1122 after two decades of unbridled extravagence at court provoked an internal uprising. The weakened Sung were pushed southward to the gates of Hangchow, which became their new capital. The period thereafter, until the conquest by the Mongols, has been termed the Southern Sung. It was marked by continued economic prosperity but a dreamy, introspective passivity that tended to deny the existence of earthly cares.

It is the Southern Sung painters who discovered the ultimate possibilities of mist. In many of their landscapes we see, to a degree far beyond what the Romans were ever able to attain, the visage of a 'floating' world. The mist served to reduce the solid texture of the material world and replace it with the incorporeal spirit of nature. It also helped reduce the scale, replacing the monumentality of earlier Northern Sung works with a more limited vision of a personal universe. No longer was it necessary to convey the impression of 'a hundred peaks and ten thousand trees' - a single tree and lone peak would now suffice. Southern Sung landscapes are maps of the soul. They capture the fleeting impressions of a meteorological moment, at times using little more than a few broad brushstrokes. All the rest is a dream in the great Void.

Fig. 4-22. Boats Returning to the Mist-Shrouded Village. Hsia Kuei. Kansas City, Nelson Gallery and Atkins Museum, Kansas City.

A beautiful example of Southern Sung obscuration is Hsia Kuei's Boats Returning to the Mist-Shrouded Village (Fig. 4-22). Only a few houses of a small fishing village are vaguely visible through dense patches of ground fog. Earth is so tenuous that in the lower right foreground it is not possible to tell where the water ends and the land begins. Trees, which help distinguish the sky from earth, emerge from the fog and also define the limits of visibility. This world appears to end at the further edge of the village until we notice hints of a distant, inaccessible mountain range.

What motivated the Chinese artists to select aerial perspective as a main vehicle for expressing their philosophy? The aerial effects in Chinese paintings are not mere figments of the imagination - they are adopted from the monsoonal nature of China's climate. During the winter, waves of bitterly cold, dry Siberian air surge southward, sweeping relentlessly
across China. Snow often falls along the leading edge of these outbreaks and then remains on the ground as long as the arctic blast continues. Because of this, many Chinese landscape scenes depict snow-covered ground.

Winter and early spring skies in China are often cloudless, but the air is commonly laden with loess, a fine dust picked up in dust storms that form several days a month as the wind whips across the wastes of the Gobi desert. The finest dust particles remain suspended in the air for thousands of miles so that even as far south as Hong Kong, the dust bleaches sky color and visibility is reduced below ten miles 75% of the time from December to May.

As the sun marches northward in spring, the arctic blast begins to yield to the strengthening tropical airmass. During May and June, the meteorological battlefront between tropical and polar airmasses lies right over China. The result is the soaking the Mei-Yu or Plum Rains, which bring dull, dreary days. Finally, by June in the south and July in the north, the oppressively hot, humid southerly winds of summer are well established. The dust of winter is gone but is replaced by a thick layer of humid air and haze.

On such days, it is easy to understand why the Chinese so often left the atmosphere as a neutral wash and why they dispensed with all but the most subtle hints of a horizon line. Haze and mist deemphasize solid forms and make Nature appear continuous and infinite.

China's humid, hot summer air extends from the ground upward to a great height. Lush vegetation exudes its own mix of fragrant hydrocarbons that adds to the general haziness. Under such conditions the blue of the sky is almost washed out and all colors appear subdued (Fig. 4-23). The atmosphere can get so 'thick' that the sun will turn red and disappear in a cloudless sky when it is still as much as 10° above the horizon! Even dark rain clouds become difficult to decipher. Similar skies, now further thickened by air pollution, dominate the Eastern United States during summer and early Autumn.

Finally, in late summer and fall, when the sun weakens but winter's northerly winds have not yet set in, fog is quite common, particularly in the valleys. The fog tends to form at night and usually burns off by afternoon, except in the deeper valleys, where it may persist for days on end.

The Chinese feeling for the monumentality of nature is intimately bound up with the obscuring properties of dust, haze, mist, and fog. About five hundred years ago, Leonardo da Vinci noted in his Treatise on Painting that, objects seen through a fog will appear larger than they are in reality because the aerial perspective does not agree with the linear

On pure, clear days outlines of even the most distant objects are sharp, so even the largest mountains seem closer and modest under the crystalline vault of heaven. On days of reduced visibility even relatively nearby objects appear blurred, and make us assume that they are further away and therefore larger. Chinese artists routinely utilized this magnifying property of obscuration. In so doing, they anticipated Leonardo's great 'discovery' by about 500 years.
Looking Backward

Even as Kua Hsi was painting his Boats Returning to the Mist-Shrouded Village, the Mongol hordes of Genghis Khan were beginning to pour down from the steppes of Asia. After taking Peking in 1215, Genghis turned westward and set out to conquer the rest of the civilized world. By the time his grandson, Kublai, finally obliterated the Sung Dynasty in 1279, the Mongols had linked almost all of Asia.

Painting revived quickly in the early days of the Yuan (Mongol) Dynasty but showed a new face. A generation of patriotic, but often starving painters arose who were not associated with the Academy. They designed their paintings to express disdain for the Mongols and for all spineless countrymen who besmirched their nation's honor by cooperating with the Mongols. It was, of course, wise to express this disdain subtly. The upstart painters began by spurning the accomplishments of their immediate predecessors in the Academy. In landscape they did this by clearing the air and restoring some color and substance to matter. Overnight, as if by magic, all the dreamy and poetic vistas evaporated and the distant mountains appeared in all their glory. But the new landscapes were not really new. Instead, the early Yuan painters consciously sought to recapture the lost glory of the past by imitating the approach of ancient masters.

Events over the next several centuries helped perpetuate the glorification of the past practiced by the early Yuan landscape painters. The Mongols drained the wealth and destroyed the initiative of the country, deliberately excluding the Chinese from important business and government positions, and ruthlessly suppressing their intellectuals. Irregularities of the monsoon compounded the problem. An alternating series of excessively rainy and dry years culminating in the floods of 1332 either drowned or starved millions and set loose an outbreak of bubonic plague that may have reached Europe as the Black Death sixteen years later. These natural disasters precipitated the fall of the Yuan Dynasty and served to increase China's inward and backward looking tendencies.

Early in the fifteenth century, great maritime expeditions of the Ming Dynasty sailed on monsoon winds across the Indian Ocean. Ironically, these only proved to be a prelude for a closed door policy. China's fleet was dismantled and her coasts fell prey to pirates. Troubles from nomads in the north led to the reconstruction of the Great Wall. China, ever suspicious of outsiders, grew positively isolationist and reactionary. A country that had for long remained at the innovative forefront of civilization folded in upon itself and allowed time and progress to flow from it and pass it by. In such an environment it is no wonder her artists consigned themselves to adulating the past and repeating the themes of their hallowed ancestors.

Recap of Chinese Sky Painting

The magic and limitations of Chinese landscapes are bound inextricably. Chinese landscapes transport us to fairy tale worlds that one gladly enters and sadly leaves. The paintings shield us from a nature `red in tooth and claw' and give us one that has been carefully prepared for our material comfort and spiritual enjoyment. What a pleasure it is to trace a path through mountains and forest from one rural manor or small village to another. As long as we wish, we are welcome guests in these sparsely populated worlds. We are free to stop at any point in order to reflect, rest or drink from a clear stream. Here, all urban cares have been left behind and, as the long scrolls are slowly unrolled, time goes on without end.

The charm of Chinese landscapes is so intoxicating that it takes a conscious effort to realize the artists employed a severely restricted view of reality. There are no cities to crowd the land and no substantial clouds to
clutter the sky. Who would ever guess from the largely vacant landscapes that by 1100 AD, the population of Sung China reached 150 million! Perhaps we should not expect to see many urban scenes; landscape painting has always offered harried city dwellers a pastoral respite from chronic crowding. But what could be the reason for purging solid-looking clouds from the sky? The sky over even the most mist-shrouded Chinese valley exhibited far more variability than her artists ever allowed.

Only certain kinds of skies could properly limit the dosage of reality to fit the dream worlds of the Chinese fairy-tale landscapes. Haze or mist blurred the sharp distinctions and softened the harsh substance of the real world. Now, if even solid objects were dissolved, how could anyone attribute a variety of chiseled forms to the fleeting clouds? So when clouds were painted, their solid outlines had to be eliminated, either by melting them so they would flow, or reducing them to amorphous mists.

Civilizations reveal their souls in their sky paintings. Interestingly, Chinese and Roman (or Hellenistic) sky paintings were marked by similar biases and restrictions. Roman painted skies were typically bluer, but both stressed exaggerated obscuration effects and both proscribed the use of solidly chiseled clouds. Advances in sky painting came during the more vibrant periods in each of these civilizations - times of unprecedented advances in commerce and technology and times of great political ferment when new governments or dynasties were still consolidating their power. But the ascending phases of these societies were rather brief and the notion of progress never fully took root. Probably because both societies were amply populated they avoided labor-saving devices and found a way of relegating important inventions as toys. The almost unbelievable history of a clock designed to provide a Sung Emperor with astrological forecasts but maintained in the strictest secrecy from the rest of Chinese society is the paradigm of how the scope of technological and scientific developments was constricted in Rome and China.

In China, these tendencies were compounded by the fact that the artists formed a class unto themselves. They were the poets and philosophers, often in government service, and usually did not rely on commissions from worldly people. One of the great common threads running through Chinese painting was the tendency to be antimaterialistic. The practical concerns and enterprises of businessmen were scornfully disparaged. As a result, landscape art in China remained perpetually severed from the mainstream of its society. It suffered from too much idealism, too much sophistication, too much philosophy and, as time went on, too much tradition.

**Sky Painting Reaches Persia**

Although China's painters doomed themselves to repeating the atmospheric discoveries of their honored ancestors, information about Chinese sky painting crossed Asia and even may have sparked the awakening painters in Europe.

The Mongol conquests reopened China, bringing traffic along the Silk Road to flood stage. The Mongols favored Persian merchants so that Persian became the business language all along the route from Peking to Tabriz. The Chinese, largely bypassed in business, were used by the Mongols for their technical expertise in a variety of fields, and sent to work on projects throughout the Middle East.

Shortly after Ghazan became ruler in Persia, he instructed his vizier, Rashid al-Din to compile and illuminate a Chronology of Ancient Nations. Around 1300, Chinese artists arrived in Tabriz to help in the task. And it is through these artists that sky painting reached Persia.
In *Muhammad Investing `Ali* (Fig. 4-24), the sky makes a grand debut in Persian art, tapering from a deep blue above to a lighter shade near the horizon. Persians occasionally experienced blinding dust and sand storms but they apparently had little use for the routine obscuration of the Chinese atmosphere in their art. Visibility is therefore unimpeded although there is little depth. Two trees frame the sky and mark the horizon line while the mostly bare ground befits the dry Persian plateau - isolated tufts of grass and flowers are spotted across the sandy surface. Where then is visible proof of the Chinese influence?

The color-graded sky could have come from China, for the Chinese did occasionally represent the phenomenon as early as the 11th century. But the sky in Chinese art was usually executed in the monochrome style and left as a neutral wash. Visibility in Chinese paintings did increase during the Yuan Dynasty, but the scenes still possessed a sense of monumentality and distance that most Persian miniatures lacked. Persian settings are dry with only scruffy vegetation or prominently isolated trees. These features bespeak familiarity with the Persian environment and do not seem to suggest a strong Chinese influence.

It is the clouds that most brashly betray the Chinese origin of many Persian miniatures. The large mushroom-shaped cumulus of *Muhammad Investing `Ali* has the unmistakable flow lines of Chinese clouds and is correctly oriented in an upright position. In some later Persian works the clouds and flow lines became highly stylized. Some of the whirls come from cloud turrets that are either sideways or up-side-down and descending. Since air in cumulus clouds is usually warm and buoyant this is generally not the case. The degree of stylization suggests that later Persian artists adopted the convention as if it were a decorative feature and lacked a full appreciation of its underlying physical significance.

For several centuries flowing clouds continued to make occasional appearances in Persian art, vestiges of the fading Chinese influence. Persian artists developed their own unique worlds of charm and beauty. They made no new meteorological discoveries but remained true to their dry surroundings. Visibility was high at all times while the sky was often a clear deep blue. On occasion, the Persians even took pleasure in painting their sky golden, for they also maintained links with
Europe and apparently were impressed by some of the Gothic and Byzantine paintings.

An awakening Europe was also growing more receptive to ideas from the East that accompanied the goods along the trade routes. The Persians and Arabs, living in an arid land, bore a special love for their gardens and may have imparted this love to their Medieval European brethren. It is also possible that the Persians passed along to Europe some fragment of what they had learned about the sky from China. If they did so, Persia and China can claim an essential role in sparking the European Renaissance in sky painting.