

Eclipses in Siam (now Thailand)

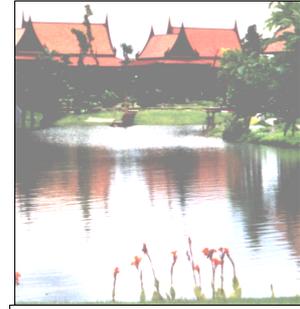
History and Legends

Astronomy and cosmological ideas in Siam (now Thailand) were greatly influenced by Indian religious beliefs and ideology but many local traditions have survived. For example the constellation of Ursa Major, which at 15 degrees north, dips partly below the horizon, is the Crocodile.

The Thais established their country in the valley of the Chao Phraya river in the 13th century - about the same time of the Mongol expansion across Asia. The first capital was Sukhothai. A century later the kingdom had expanded further south to include Ayutthaya.

By the 16th century when many Europeans followed the trade routes here, the capital city had moved down river to Ayutthaya (called Siam). The Chao Phraya valley is a fertile plain, but hot and steamy, and flooded in the rainy season. The traditional teak houses were built on platforms which kept them out of the floods and airy in the sticky heat.

Both men and women kept their hair cropped short and wore the wrap-round sarong with a long scarf or jacket. Women sometimes wore both, or just the scarf draped to cover



traditional Thai houses

the bust. Men had a rather unusual decoration mentioned by Ralph Fitch, a merchant from London who was there in 1583: they inserted little gold (or brass or silver) bells in a certain part of their body. "The King sometimes taketh his out and giveth them to his noblemen as a great gift; and because he hath used them they esteem them greatly." According to Fitch: "...the women do desire them. They were invented because they should not abuse the male sex." Both men and women were addicted to betel chewing, which gave them gory red mouths and red spit everywhere.

Gold, silver, gems and spices were amongst the treasures for which merchants braved the dangers of long sea voyages to reach the Kingdom of Siam. The mines of gold and silver are part of a Thai story (mentioned by Frederick Arthur Neale, in Siam in the 1840s).

Many years ago the Sun was much nearer the Earth than it is now, and watched over the Earth all the time. This began to annoy the Stars who had no chance to shine. They decided to watch the Sun and see if they could overthrow him.

One day the Sun was watching the Earth when he noticed the Princess "Rosy Morn" bathing in a stream, then going to rest out the midday Sun in a cave. Smitten by desire, the Sun drove his chariot down to Earth and followed her into the cave. This turned into a regular date. Every day at midday the Sun met Rosy Morn in the cave.

This was noticed by the Stars, and they formed a plan for revenge against the Sun. One afternoon while the Sun was with Rosy Morn in the cave, the Stars came down and took away the Sun's chariot parked outside. The Stars declared they had overthrown the Sun, as he was no longer fit to rule the heavens because of his disgusting behaviour.

Full of remorse, the Sun shed golden tears. The mountains felt sympathetic and opened up their caverns into a tunnel through which the Sun could take a short cut back to the sky every day. This took as long as it did for the Sun to cross the sky. The tears shed by the Sun turned into the gold mines of Siam, the tears of Rosy Morn became the silver mines.

Finally the Sun and Stars reached a compromise. The Sun was allowed to shine for half the day, but for the other half "Rosy Morn" was to stay with the Stars. The Sun was only allowed to meet Rosy Morn for part of a month and they could not be seen kissing in public. However sometimes they break this rule and the result is a lunar or solar eclipse.

When this happens, people make a big noise and racket with fireworks, bells etc. to stop such a breach of etiquette. (Kissing in public was not approved). This works as the bodies move apart again.



Another reason for the fireworks and noise during an eclipse was to ward off the God of Darkness - Phra Rahu, who is the God of Darkness. Worshippers also offer Him black food, and offer black flowers, black joss sticks, black candles and so on. His symbol is the number 8. He is also prayed to at other times, to ward off bad luck.

Neale mentions the story in connection with an annual ritual in which he took part in 1840, when the King (then Rama III, the elder half-brother and predecessor of King Mongkut – who became Rama IV) led a procession on a pilgrimage to make offerings at the original stream and cave in the legend.

This site was further up the Chao Phraya River near the earlier capital city of Ayutthaya. Only ruins (which can be seen today) were left of the old capital. In 1767, the city was trashed in the wars with Burma, and the capital city of Siam was to be re-established at the port of Bangkok, which was the



ruins at Ayutthaya

farthest up the Chao Phraya that ocean going ships could reach. From there transport had been by the traditional gondoliers up to Ayutthaya, which was surrounded by water.

In 1680, when King Narai started sending lavishly equipped embassies to foreign powers in Europe, Ayutthaya (then also called Siam) the capital city and Lopburi (then called Louvo), where the King built his new palace and preferred to live, were cosmopolitan towns, populated by expat communities of Portuguese, Japanese, Dutch (who minted the Siamese silver coinage), French, English and also Bengali, Golcondaese (from South India), Mogul (from North India), Turkish, Javanese, Malay, Persians, Chinese and Armenians.



map of Siam 1685

Constantine Phaulkon

At the King's side was Constantine Phaulkon - a remarkable British man, then in his thirties, whose life was like an adventure novel. He was born in 1647, on the Ionian island of Cephalonia where his parents had a taverna. Cephalonia now part of Greece has changed nationality several times in its long history and was then under Venetian rule, so Constantine was brought up as a Catholic.

When Constantine was 12 and old enough in those days to leave home for an apprenticeship, his mother signed him up on a British East India Company ship that was docked at the international port on the island. She wrote to her son often, sending him gifts of the local wine.

Years later, a British citizen, helped by his many contacts and his skill in languages, he embarked into trading with his own merchant ship in Siam. This enterprise almost met with disaster, but he had the opportunity of helping some important Thai officials, and of exposing corruption in the government.

By 1683, he was in charge of the King's Treasury, had learned to speak Thai, and had married a beautiful Japanese girl, Maria Piña de Guima. Her grandparents had been exiled when from 1636 Japan began isolating itself from the world, expelling all foreign influences - expats were executed if they returned. Japan had been a powerful rival in South East Asia trade and politics but now thanks to the isolationist policies of the Tokugawa Shogunate, it was going to find it had been left behind in the world. Exiled Japanese Catholics joined the Portuguese Catholic community in Siam hence Maria's Portuguese name.

The Dutch had been extremely aggressive in the 17th century spice trade in South East Asia to the point of imprisoning and massacring their rivals. It had brought British and Japanese together, but now the Japanese were out of international trading except via the Dutch, the only foreign traders allowed in Japan and they were limited to Nagasaki.

To counter the Dutch, Phaulkon (now Phra Khlang –and in charge of foreign affairs), had suggested bringing in their enemies, the French, with which the Protestant Dutch were at war. This should help protect British interests. Although officially a Protestant country, the King of England, Charles II and his brother and heir, James Duke of York, had been brought up in France. James was openly Catholic and had led attacks on Dutch trading posts and overseas fortresses. (*One of them was renamed New York after him*).

Siamese Embassy to France

In December 1680, King Narai saw off the ship – "Soleil d'Orient" containing his impressive state embassy to the French King Louis XIV.

Two years later, having had no news (the fate of the ship which had run aground and sunk with no survivors after stopping at Madagascar was not known for four years), the anxious King dispatched two envoys, - Pichai Warit and Pichit Maitri, with a French missionary, Bénigne Vachet (1641-1720) to France (via England) to find out what had happened to his embassy - and at the same time shop for floor to ceiling mirrors and fountains like the ones at Versailles.




**Phaulkon's
signature
and seal
with
falcon**

And a modern astronomical observatory like the one in Beijing - which he heard about from Jesuit astronomers who had stopped off in Siam on their way home from Beijing, where they had modernized the observatory with new equipment, for the Manchu Emperor Kangxi. They offered to build an observatory for King Narai just as good as those in Beijing and Paris.

Astronomical equipment was on the shopping list, along with French hats, crystal decorations for elephants, mirrors, and other things. In exchange, King Narai had sent many gifts to King Louis XIV and his family not forgetting his new grandson. Along with the envoys and their entourage, King Narai also sent four boys to become students in France. Vachet complained that these were "very uncomely" and could have been better chosen "the temples are crammed with very pretty boys."

King Narai's expensive and risky ambassadorial expeditions, were to be followed by others. There were more shipwrecks though with survivors – it was shipping elephants along with other gifts that had probably caused the wrecking of his first embassy ship. His ambassadors had been primed to visit the French arsenals, and bring back not only astronomers and hydraulic engineers, but military engineers and commanders.

Vachet who had been a missionary in Siam since 1671 was to have been assisted as interpreter and guide by another, younger missionary, but he disappeared as soon as he was back on home shores. They went to England first as they were on a British ship.

On the 26th September 1684, Vachet was in the apartment of King Charles II's French mistress, Louise de Keroualle, being introduced by the French Ambassador. The King and Louise seemed to have confused Siam with China. Vachet's main concern was that when they disembarked at Margate, customs had impounded all their things brought from Siam and were searching them for the payment of duty.

Charles II sent a note to Samuel Pepys to take the Siamese ambassadors and their things to Calais on the royal yacht, the Charlotte. The King also arranged that a letter be sent to the Treasurer-General to release their things immediately so they could continue their journey to France.

Here Vachet and the envoys, saw the difference between the King of England and the Kings of France and Siam. The people of England had rebelled against Charles II's father and executed him. Although the English monarchy was now restored – its autocratic powers were not – when Vachet handed the King's letter to the Treasurer-General he was informed that first he had to have a meeting about the issue in Parliament. And would let him have his decision tomorrow. Vachet and the envoys dashed back to Windsor arriving at 10 pm when the King was still having dinner. The King dashed off a note himself to the Treasurer asking him if he could take the letter direct to the Customs office and have all the Siamese ambassadors' things taken onto the royal yacht Charlotte without imposing any charges.

The next morning Vachet and the envoys were back in London to see the Treasurer – who had already left for the meeting in Parliament. They went there – and on receiving the note from the King, the Treasurer left his meeting, and took the envoys and Vachet down to the Customs house at Margate in his coach drawn by six horses. There he arranged for the envoys and Vachet to check all the items before transferring them to the yacht. Before leaving them, he invited them all to have a drink with him in an inn where he ordered Spanish wine. They finally left England in early October, impressed by their friendly reception and efforts to help them (despite no one apparently knowing where exactly Siam was).

Their arrival in France was much grander. Every effort had been made to make this an impressive state occasion. Their journey to Paris was a succession of processions, grand receptions, speeches and presentations. They were given luxury accommodation. Crowds gathered to wave and see the exotic ambassadors from Siam.

In Paris they were accommodated in the Hotel de Taranne, a residence of the Marquis of Seignelay, President of the state run Compagnie des Indes Orientales and Secretary of State for the Navy.

Vachet was impressed. But he was dismayed by the reactions of the Siamese. They were in culture shock. Nothing had prepared them for the total difference in language, customs and climate. Climate above all. They had never known it so cold. In fact it was to be the coldest winter in living memory – the coldest for centuries in fact. So cold that in London the Thames froze over all winter and the ice was strong enough for a fair to be held on it. Astronomers at the time noted that few if any sunspots were to be seen on the Sun.

We now know this means the Sun was actually less active than it is now. The weather all over the world was colder. The Siamese in Paris had never experienced any sort of winter weather. They huddled by the fireplaces which were kept going day and night. They had to be supplied with warm, unfamiliar clothes and were carried in warm luxury coaches or sedan chairs when they ventured outside. They kept out of sight of the crowds who wanted to see the "mandarins in their pointy hats". And refused to meet people wanting to see them. And Vachet (who found compensation in Seignelay's wine cellar) hadn't a clue how to get them presented to the King.



New Opportunity for the Abbé de Choisy

On his arrival in Paris, Vachet had been welcomed by the Head of the Mission Etrangères. It was he who suggested that Vachet speak to the Abbé de Choisy who, was by lucky chance staying in the Mission Etrangères at this time. He knew everyone of consequence, including the King, to whom he had served as chaplain. For Choisy this could not have come at a better time.

François-Timoléon de Choisy (1644-1724) had two great passions in life, gambling and dressing up as a woman. Debts from the former meant he usually had to make do with fake jewellery, but he liked to keep up his luxurious and frequently scandalous life-style at Louis XIV's court, where he was friends with the King's brother, Monsieur, Philippe duc d'Orleans who also liked to dress up in drag.

His gambling debts even led him to resort for the first and only time to the Abbey of Saint Seine from which he had his living, - after which they petitioned for his replacement.

Choisy had been useful to Louis XIV, had served as chaplain in his campaigns in 1672, and travelled to England and Italy, so spoke English and Italian. - He had accompanied his friend Cardinal de Bouillon to the papal conclave of 1676 where he had been useful writing letters and passing them round behind scenes in the campaign to have a French pope elected.



The year before he met Vachet, Choisy had fallen seriously ill. This, plus greying hair, approaching 40th birthday, his daughter's wedding, and the company of a pious friend, the Abbé de Dangeaux with whom he wrote a religious book, had made him determine on a life change. And Vachet had presented the opportunity. It is not Choisy's religious works that have remained in print to this day, it is his Memoirs of his unusual sex life, and the account of his voyage to Siam.



Choisy arranged a meeting on 27th November, for Vachet and the envoys with the Marquis of Seignelay, who although hosting the Siamese embassy in his town house, had little idea of why they were in Paris.

Thanks to Choisy, later that day the two Thai envoys were presented to Louis XIV in the Hall of Mirrors, Versailles. With Vachet standing next to them as interpreter, they prostrated themselves Thai style on all fours - knees and elbows to the French King.

They were shown around the palace and to watch the King dine. They were shown round the famous gardens and to Vachet's dismay were unimpressed and bored. The King had invited them to an opera by his favourite composer Lully – but they walked out before it was over. Thanks again to Choisy, Vachet met the King's brother, famously dissolute but with a better perception of the cultural problems, and a rather more successful visit to his residences, from then on things improved.

Louis XIV had seen himself as the re-incarnation of the pagan Sun God and had his portrait dressed as the Sun God. He was known as the "The Sun King". But with age and the influence of his second wife Madame de Maintenon, he now saw himself as the Catholic Monarch. The former Sun King was now in the process of repealing the Edict of Nantes which had allowed freedom of worship in France and had prevented religious persecution. To Louis XIV the interest King Narai had shown in France must mean he wanted to convert to their religion. The significance of the refusal of the Siamese to attend a special mass at Notre Dame on All Saints Day escaped him.

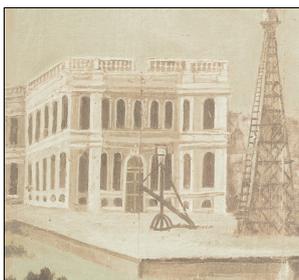
For Choisy, the opportunity to travel to Siam, to convert the King of Siam, was, as his friends pointed out to him, the opportunity for Choisy to turn his life. And leave his debts behind. Choisy applied to be the ambassador to Siam, but the Chevalier Alexander de Chaumont, a Naval Commander, from a Huguenot family which had now strategically converted, was chosen to head the expedition. Choisy remained hopeful, Chaumont might fall ill or overboard. Choisy had to pay for his journey himself which meant more debts.

Académie des Sciences interested

For the Académie des Sciences, founded not long before, in 1666, the voyage to Siam was a great opportunity to collect information on this part of the world, and also to make astronomical observations which would determine the position in latitude and longitude of places on the route - essential for navigation and maps. The scientists were also aware that the Observatory in Beijing which was rebuilt by Jesuit astronomers, needed new staff. And they wanted these to be French scientists.

The Académie des Sciences had been founded by Jean-Baptiste Colbert. He was at that time Controller General of Finance in France and his programme of economic reconstruction was largely responsible for making France the leading power in Europe. Colbert was in a position to give the new Academy the support it needed and he arranged for its members to meet in the Royal Library.

The Paris Observatory – Jean Picard (1620-1682)



Jean Picard introduced the concept of using telescopic sights with micrometer as an essential part of all observing equipment. It was Picard who suggested to King Louis XIV that Italian astronomer Giovanni Domenico Cassini (1625-1712), who was Professor of Astronomy at the University of Bologna, be invited to Paris as Director of the new Paris Observatory, which was completed in 1671.

Picard's main concern was the practical one of measuring the Earth, and the length of a meridian – which was essential for accurate mapping and navigation.

and Olé (Olaus) Christensen Römer (1644-1710)

To determine the meridian of the new Paris Observatory, Picard travelled to Denmark, Tycho Brahe's old Observatory on the island of Hveen. Determining its exact position and meridian would give a reference for the Paris Observatory. This brought him into contact with Danish astronomer Olé Römer, whom he invited to Paris. Römer was born at Århus, and educated in Copenhagen where he married the daughter of his professor Erasmus Bartholin.

Römer was invited to work at the Paris Observatory. One of the main methods to determine the Paris meridian of longitude was by the observation of the eclipses of Jupiter's satellites, as suggested by Galileo, who was awarded a gold chain as a prize. As a method for finding longitude at sea it turned out to be useless (*see John Harrison and the Problem of Longitude for a full description of the methods used*), but it was very useful on dry land.

When they started mapping France using the new data, it turned out to be much smaller than on earlier maps – causing King Louis XIV to complain that his astronomers had lost him more territory than his generals.

Römer's study of the movements of the moons of Jupiter led to his discovery of the speed of light. He noticed that when Jupiter was nearest the Earth on its orbit, the interval between the eclipses of the moons was less, than when Jupiter was further from the Earth on its orbit. In September 1679 he predicted that the eclipse of Io on 9th November would occur 20 minutes later than calculated. His explanation of the result, was that light was not instantaneous – according to established belief – but travelled at a certain speed. From this he estimated the speed of light – only slightly less than the modern mean value.

Römer designed many instruments to aid observation – one of this was a transit circle with telescopic sights. With the increasing religious intolerance in France, he returned to Denmark in 1681 and became Astronomer Royal to King Christian V.

The Pendulum, telescopes and other instruments

Another invention which with the telescope was to revolutionize astronomy, was the pendulum. A means of precise timing is essential. New work on the pendulum and the mathematics of its movement in the 17th century, had many applications. The most famous, is the use of the pendulum to regulate the clock movement. Christaan Huygens inventor of the pendulum clock, was one of the founder members of the Académie des Sciences, granted a large pension and an apartment in its building. But he had to return home to Holland permanently after the Revocation of the Treaty of Nantes in 1688.

Observatories used regulators based on the pendulum until the 1960s when atomic clocks replaced them.

A pendulum was useless at sea, though. Astronomers on scientific voyages had to assemble their clocks in an observatory on shore. Pendulums had a number of scientific applications on their own and were used for timing in astronomy too. The Abbé de Choisy was called upon by the astronomers to call out numbers for the moves of the pendulum for timing as we shall see, on the voyage to Siam.

The telescopes which were supplied for the expedition, were measured by length - 12, 15, 18, 25, 50 and 80 foot - some of these were intended for the Beijing Observatory. (None of those telescopes seem to have survived.)

Other instruments that were made specially for the expedition included

- two quadrants of 90 degrees - one was 18 inches radius, the other 26 inches
- three pendulum clocks with seconds hands
- an instrument for finding out both right ascension and the declination of stars
- an equinoctial dial that marked hours and minutes, with a compass under it - this was to find the compass declination at different times of the day
- Also three half circles with divisions, one donated, one with sights, one with lenses

They also had two pendulums (for timing), two burning glasses 12 inches and 20 inches diameter, lodestones (to magnetize compasses), microscopes, thermometers and barometers, and equipment for testing air and other things.

- Also "A Dial upon an inclining plane" which seems like Congreve's still popular (as fascinating to watch it), clock or similar.
- "The two machines of Römer" (Olé Römer) - One of which represents the motion of the planets the other the eclipses of the Sun and Moon."

The astronomers were equipped with the latest tables from the Paris observatory of the satellites of Jupiter.

And also with scientific reference books, navigational charts and instructions on what to look for and collect. The scientists were not just to make astronomical observations, but also observe the natural history, arts, architecture, culture etc.

There were also military officers and men, and engineers. Many of these were to remain in Siam.

Among the gifts to King Narai was a device for observing eclipses that he had requested. Vachet commented on its design. "As to the machine which is demanded to observe eclipses, it will be assumed that they only want to see the sun at the longitude and latitude of Siam, as then fewer adjustments have to be made. This machine is not universal; it is necessary to construct it following the elevation of Siam, and it is most important that it is easy to understand."

The expedition astronomers:

Six Jesuit astronomers were appointed to go to Siam and then on to Beijing. They were

-Jean **de Fontenay** 1643-1710 - leader of the scientific part of the expedition who eventually worked in China 1688-1703

-Jean-Francois **Gerbillon** 1654 - 1707, also arrived in China in 1688 and was to be Ferdinand Verbiest's successor as Director of the Beijing Observatory

-Louis **le Comte** 1655-1729 - in China 1688-1694, and wrote a book on China.

-Claude **de Visdelon** 1656-1739, a teacher, in China 1688 - 1709, then on to Pondichery in India. He was one of the first European scientists to take the trouble of studying the Chinese books.

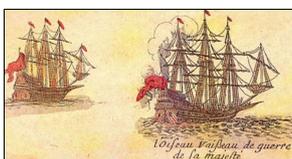
-Joachim **Bouvet** 1656-1730 - in China twice 1688 to 1693 and returned 1698.



-Guy **Tachard** 1648-1712. Eldest of eight children of apothecary Leonard Tachard and his wife Françoise. Many younger sisters. He had spent four years in America and was to go to Siam three times - his book about the 1685 voyage has more information about the astronomical observations than Choisy's book. Tachard had his own agenda in Siam and was to take over the negotiations. He returned from the 1685 voyage with secret instructions from Phaulkon to negotiate with Louis XIV's Jesuit Confessor, de la Chaize - which is why Tachard received gold crosses one for himself and one for de la Chaize, instead of Choisy. Tachard was to accompany the 1688 Siamese embassy to the Pope – more on this later.

Another missionary from the Missions Etrangères, was independent of the other Jesuits and had to pay his own passage- François de Langlade, Abbé de Chayla. He was one of a number of tourists and others wanting to go to Siam and paying their own passage.

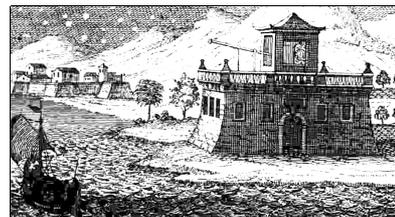
Not all the scientists were Jesuits and missionaries, there were engineers and craftsmen equipped to build the observatory and also hydraulic engineers to make drains and fountains for King Narai.



The Voyage to Siam

Two ships were provided, The Oiseau, a warship with 46 guns, and the Maligne, a frigate with 24 guns.

Their route took them around the Cape of South Africa into the Indian Ocean. They stopped at Capetown. This was in Dutch territory, but they were welcomed. The Dutch had made extensive gardens, which enabled ships to restock on fresh fruit and vegetables. In these gardens the Jesuits were provided with an observatory. Here they set up their telescopes and equipment to calculate the longitude by the position of Jupiter's moons, using the tables from the Paris Observatory.



De Fontenay manned the telescope, the other astronomers watched the clocks, and de Choisy called out the seconds from a pendulum. In his journal "Journal du Voyage de Siam fait en 1685 et 1686 - OUP 1993" he points out the importance of having the correct longitude. At the latitude of the Cape, "three degrees longitude means 48 leagues and that is most important when sailing." As Tachard commented "The occultation of the moon occurred on the 4th June at 10 hours 40 minutes in the evening, and in consequence 74 minutes later than in Paris. During the 74 minutes the moon only moved $18 \frac{1}{2}$ degrees; consequently the Cape is only $18 \frac{1}{2}$ degrees further east than Paris, whereas the maps usually place it three degrees further east. This single observation justifies all the instruments which the King has caused to have made."

Two weeks later they observed an eclipse of the moon at sea. It was 16th June, the penumbra began at 6.15 in the evening, the eclipse at 6.43 and 26 seconds. The eclipses was total for one hour ten minutes, when the moon appeared red. It was an eclipse invisible to Cassini in Paris but this satisfaction was marred by the difficulties of making observations on the tossing deck of the ship. The blood red moon upset the Thai envoys. Choisy wrote: "Our poor mandarins, who make much ado about the moon, came out of their lair (from which they never emerge) and came to see the piteous state it was in. They could not bear the sight of it and went back to bed."

The Siamese revived when the ships reached Java and the Dutch port of Batavia (now Jakarta). They could get betel-nut chews again. This addiction looked revolting to Europeans, who could not understand the attractions of gory mouths and constant gobbing. Everyone carried their betel sets - frequently ornate gifts.

At Batavia, the Jesuits set up their observational instruments in the garden of the Governor-General. They were able to give the Governor and his family and friends, the thrill of looking at Jupiter and other fascinating celestial objects through the telescope. Their real reason for observing Jupiter was to find the correct longitude of Batavia by observation of the eclipses of its moons. It can be seen why the Jesuit astronomers were welcomed by the Protestant Dutch. Unfortunately the skies clouded over and they could not finish.



Arrival at Siam

Soon they arrived at the mouth of the Chao Phraya river. Chaumont's second in command, the Chevalier Claude de Forbin (1656-1739) was not impressed. The first officials that they met "were sitting on the bare ground, chewing betel, without shoes, stockings, hat, or anything at all to cover their body but a piece of cloth to hide their nakedness. Their house too looked as poor as the inhabitants, for I saw no chairs in it, nor any manner of furniture; upon which I inquired where the governor was, and one of the company said "I am he"."



They sailed up to Bangkok. This was the furthest that ocean going ships could reach. Here the governor was a Turk and Muslim, and "cut a better figure than he at the bar". From there they were travel by the traditional ornate Thai gondoliers. It took five days to reach Ayutthaya. Phaulkon had arranged temporary overnight accommodation en route.

The Siamese were nervous. Court etiquette was very strict. If they had made some error in the ceremonial conveyance of the King of France's letter to the King of Siam, they could get their heads slashed. (And this did happen).

King Narai and his daughter

King Narai, was 53, and his heir and joint ruler was his daughter, the Princess-Queen, Yothathep, then aged 27. She held her own court, but only women were admitted into her presence. No one else saw her. Although she was present at the meetings and dinners, she was concealed behind a screen. Even when she rode past on her elephant, she was hidden from view as in this picture of her.



King Narai was protected by about 500 handpicked burly body-guards with heavily tattooed arms and bodies, responsible for administering punishments at the King's command. These were frequent and at least as bad and inventive as the horrors of Louis XIV's France. For even apparently slight offences, they cut off men's legs, burnt their arms with a red hot iron, hit them with a sabre over their heads, or pulled their teeth out. Even royal princes and princesses were not immune to terrible punishments.

Chaumont was aghast when Phaulkon told him the etiquette for presenting Louis XIV's letter to King Narai. Chaumont would not, and would not allow his entourage, to remove shoes and crawl on all fours to greet the King. Phaulkon had to try and arrange a form of audience acceptable to all parties, and the astrological predictions.

King Narai asked Phaulkon if the French were clean. Did they clean their teeth, use mouthwash, wash their bodies. De Choisy was amused to hear this, he commented that the Siamese were "the cleanest people in the world, in their eating, in their dress, in everything, including their discourse. Serious punishments are meted out to those who sing rude songs".

In 17th century France, the Sun King Louis XIV's new palace at Versailles had magnificent furnishings, floor to ceiling mirrors, and outside the gardens featured magnificent fountains. However none of that architectural expertise and hydraulic engineering skill, had been applied to providing bathrooms, and toilets for the thousands who were compelled by the King to attend court and crowded into the palace daily.

Another 17th century account of Siam comments: "The lavatories are also notable for their extreme cleanliness. It is considered by the people to be an act of merit to make them as attractive as possible. They are situated in a spot far removed from the pagoda (wat), built on piles like dwelling houses and disposed in such a way that the excrement is discharged into a trench with running water, which carries it away leaving no stench."

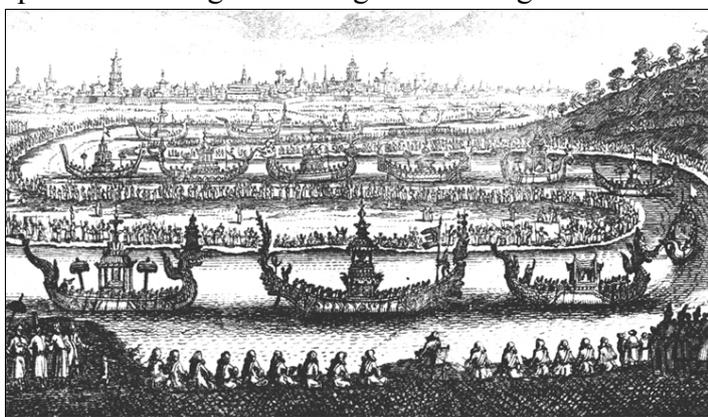
To an Audience with the King

The French embassy found they immediately followed a spectacularly impressive embassy from Persia who were actively supporting an ongoing move to convert King Narai and his kingdom to Islam. And King Narai was now wearing new Persian style clothes. If they were to convert the King to their own religion they had to impress and be seen in desirable fashions.

Choisy had little choice as he had to look respectable enough to supervise the King's conversion if it happened. He chose his favourite black satin but kept to ecclesiastical style rather than padded bodice, hooped petticoats etc. The others wore the latest fashions in French court dress complete with big wigs (luckily they had arrived at the slightly less hot and sticky time of the year). Chaumont's outfit was particularly flamboyant.

They were taken in a procession to the palace up the river in gondoliers and introduced first to the White Elephant with his gold feeding bowls and gilded litter.

The French King's letter had been placed in a gold box on top of a gold plate on a long pole, for the ambassador to present to Narai since he always appeared separately in a window higher than anyone else. Chaumont was disgusted – he said to Choisy "I'm not going to present the King's letter on a stick!"

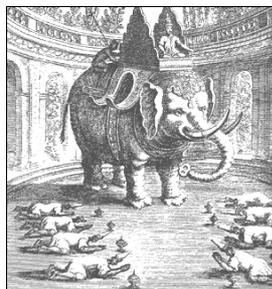
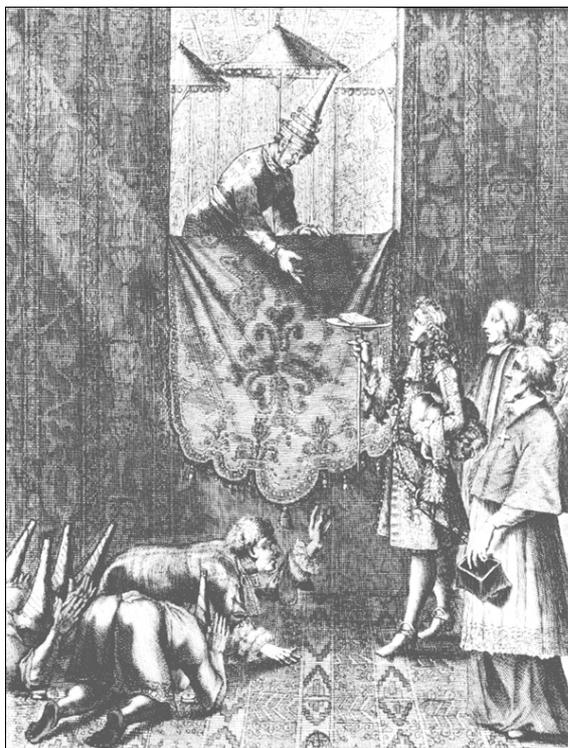


In the picture showing the presentation of Louis XIV's letter to King Narai, Phaulkon is in his stockings, and on hands and knees, saying "lift it up! lift it up!" to Chaumont who stubbornly waited for King Narai to reach down instead to get the letter. Choisy is directly behind Chaumont and behind him is Forbin and La Mare.

In the foreground is the Abbé Artus de Lionne, (1655-1713), son of the French Secretary of State, a missionary in Siam since 1681.

Choisy, who had passed the voyage, taking lessons in Thai, noticed that Phaulkon's interpretation was much shorter than Chaumont's speech - he had edited out all the bits referring to King Narai's religious conversion.

Choisy, who could also speak in English and Italian, acted as interpreter between Phaulkon and Chaumont. Speaking to Phaulkon and to de Lionne, Choisy realised that the Sun King had mistaken religious tolerance for a desire for conversion.



Watching the King and Princess-Queen passing in glittering procession on their lavishly caparisoned elephants (a sight forbidden to their subjects who were beaten up if caught looking), on their way to great glittering Wats filled with huge gold Buddhas, Choisy saw there was no advantage for the Siamese King and his subjects to change their religion.



To gain respect, the French missionaries, Tachard told Choisy, lived and dressed like the local Buddhist holy men, wearing only a simple muslin robe, going about without shoes and hats, unprotected from the burning sun and rough ground, caring for the poor and sick.

Perhaps Tachard told Choisy this to put him off staying. This humble lifestyle certainly did not appeal to Tachard. Tachard had his own agenda which did not include tending the poor and sick or converting the heathen – he had a few commercial enterprises going which was to include diamond smuggling and he expected a new Western style observatory with comfortable accommodation for the Jesuit mathematicians which included himself.

Tachard feared that Choisy might ruin Jesuit plans to get for the French the fortress and port of Bangkok. When Phaulkon tried to talk them into having the southern port of Songkhla (famous for bird's nests for the soup but on the wrong, east side of the Malay peninsular for the spice trade), de Lionne stamped on Choisy's foot to stop him agreeing. The British trading centre was at Mergui (now in Burma), on the west coast which was on the spice route. (The same side as Junk-Ceylon, now called Phuket). The new maps showed a narrow strip of land which La Mare thought could be easily crossed by canal. In reality the terrain was inaccessible enough to be inhabited by isolated stone age tribes.

Choisy had expressed a wish during the voyage, to become ordained. At the time he believed he was remaining in Siam to convert the King. The Jesuits used this to get Choisy out of their way. On the 7th December Choisy was hustled into the Seminary, "into retreat" for an intensive ordination, during which time he was a virtual prisoner, while Tachard (who spoke English) took over the negotiations.

The Eclipse

When Choisy emerged on the 10th December, a fully ordained priest, it was just in time to help choose suitable gifts for the French royal family and watch the eclipse of the moon. He was to return home, but some of his entourage and others were to stay. The engineer La Mare, to design new fortifications at Bangkok, and Chaumont's second in command, the Chevalier Claude de Forbin (1656-1733), also other military men such as Lt. Beauregard.

The eclipse of the Moon on 11th December 1685 would provide an interesting celestial spectacle for a demonstration to King Narai. They needed a suitable place to set up their telescopes. They had arrived at the time when the climate is at its best. The monsoon over, the skies now clear and temperatures not as hot as it will get. But the ground was still wet and flooded, and the traditional wooden buildings on pillars far too unsteady for telescopes.

On the 5th December, the King's astrologer came to look at the Jesuit telescopes and discussed arrangements for the forthcoming eclipse. King Narai planned a modern purpose built observatory at Lopburi, not far from his palace buildings surrounded by great fortified walls.



The French were housed in a palatial extension to the Wichayen Palace, residence of Phaulkon. A canal side terrace at King Narai's palace was to be used as the observatory for the eclipse.

At nine in the evening of 10th December Phaulkon collected the astronomers in one of the King's gondoliers along the canal - lit up by rows of bonfires. Coming close to the King's palace, the rowers worked silently. The soldiers and officials who met them at the landing stage were also silent as they were near the presence of the King.



The astronomers lifted their telescopes onto the stands and adjusted them. When ready they walked back to the Wichayen Palace - a hazardous walk in the dark as the ground around the King's palace was covered by calliopes - spiky balls - for security.

At 3 am, they returned to King Narai's palace to watch the eclipse. They had shown King Narai, with Phaulkon's help, diagrams to show what to expect. The King was to sit at a window, as he had to be apart and above everyone else. A 5-foot long telescope was set up for him to look through.

When the penumbra was advanced and the eclipse was becoming visible, the King was notified and appeared at the window. Below him, on the terrace by the canal, the astronomers sat cross-legged on Persian carpets. Some at the telescopes, others at the pendulum for timing, and others were making notes. They bowed to the King, then got on with their work.

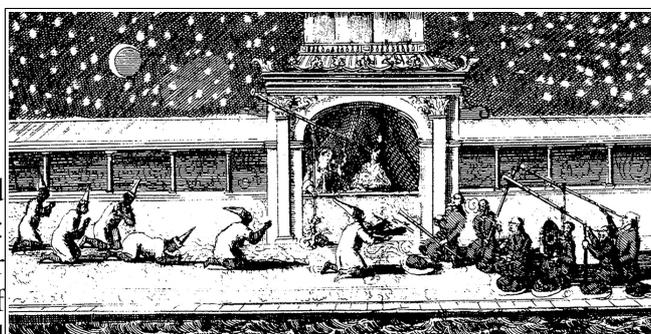
Finding the Longitude by an Eclipse of the Moon

The astronomers were taking advantage of the eclipse to find the longitude, and thus make their maps more accurate for future French expeditions to Siam. Longitude could be calculated by comparing the times of the beginning or ending of an eclipse of the Moon, and then comparing this data with the times recorded by observations made on the same eclipse at different places on the Earth. One disadvantage of this method was that eclipses of the Moon can only be seen once or twice a year, although the date and time of eclipses could be predicted fairly accurately by the 17th century. Another problem was that the Moon had to be adequately mapped, so the position of the shadow could be measured accurately.

This method of finding longitude only became possible after the invention of the telescope, when it was possible to make maps of the Moon so the exact position of the Moon's shadow at a given time could be observed in two or more positions on the Earth - in this case the eclipse was also being observed in Paris. There were obvious difficulties when it was tried using small telescopes on the deck of a boat at sea as we have seen.

King Narai Observes the Moon

All this had been explained to the King. Tachard reported: "The King expressed a particular satisfaction seeing all the Spots of the Moon in the Telescope, and



especially perceiving that the Type or Map that was made at the Observatory of Paris agreed so well with it. He put several Questions to us during the eclipse; as for instance, Why did the Moon appear revers'd in the Telescope? Why was part of the Moon eclipsed, still to be seen? What o'clock was it at Paris? For what could Observations made by concert in remote Countries be useful etc."

The astronomers were presented with silver bowls containing gifts of silk clothes. (You can see them in the picture). King Narai insisted on looking through the larger 12 foot telescope, which Fontenay was using. It had to be carried to the King. This caused a breakdown in traditional protocol. They had to set it up for the King first of course, which meant the King had to allow them to stand in his presence and wait for them to look in the telescope before he got a look.

King Narai asked the Jesuits to take care of the three ambassadors he was sending with them back to France. And presented Tachard with two large gold crucifixes, one for him, one for his superior, De La Chaize. (Choisy was furious as he had expected to get one, not Tachard). After two hours, King Narai left, leaving Phaulkon with the astronomers to get on with their work. "So many favours to which it behoved us to answer upon the spot, hindered us from observing the immersion of several spots."

After totality had passed, they returned to Phaulkon's house and continued observing the Moon until the shadow had passed completely and had timed it to 6 hours, one minute and 11 seconds, but eventually settled for a time of 6 hours 9 minutes, as by then the Moon was near the horizon and shrouded in fog. There was some dispute about the setting of the pendulums, which made the timings out. Tachard gives the results in his book which he had published in English.

The next morning they were taken on an elephant hunt. Then it was time to leave taking the Siamese ambassadors back to France. There had been complaints and riots involving the crew of the ships, enjoying shore leave after months trapped with so many priests who entertained them with sermons. The Jesuits had even tracked down two Huguenots in the crew and converted them. Choisy, now ordained could take turn giving sermons - his were more popular than the others. He also ran a book, betting on the ship's position the next day.



The three Siamese ambassadors and their entourage had been carefully chosen by King Narai. The chief ambassador was Ok-Khun Wisut Sunthon, known as Kosa Pan. He was an experienced diplomat, and had been brought up with King Narai – and was brother to the man Phaulkon replaced.

This Siamese embassy arrived in France in summer. But it was not just the weather that made the difference. The leaders of the embassy were all experienced diplomats. They made good use of the long voyage to be briefed by Chaumont and de Choisy on French customs and court etiquette, and to learn the French language. They kept copious and detailed notes on black paper with white ink. They noted every detail. Kosa Pan had no problems talking with the French people, including the many ladies (amongst them Tachard's sisters) who came to see him.



Louis XIV receives the Siamese embassy 1686

King Narai's letter to Louis XIV was written on gold leaf and carried in a shrine-like container which had to be higher than anyone. So it was kept in a place above the ambassadors lodging until presented to the French King.

The Sun King was as Choisy put it not so sunny – Louis XIV had a painful fistula in his bum which was not getting better even after surgery. Louis XIV and his family were already swamped with priceless works of art, and the costly and beautiful gifts sent by King Narai and his daughter the Princess-Queen, were not fully appreciated by them. Amongst those listed and consigned to a storeroom were "Two pieces of cast iron cannon six foot long, hammered cold, set out with silver, mounted on their carriages, garnished also with silver, made at Siam." On 13th July 1789, these two cannons were used to storm the Bastille.

While the Siamese ambassadors and their entourage were visiting ship yards and armouries and making careful notes of all they saw, preparations were being made for the return journey in October.

Uniforms for 500 soldiers were provided, and 1800 pairs of shoes for them. The number of troops was 600, with 160 cannon – including those requested by King Narai plus more cannon used as ballast on the ships, together with 2,000 cannon balls, 2,000 grenades, gunpowder for cannons and for 300 muskets, and this was only part of the armaments sent with the ships. The expedition was led by Simon de la Loubère a diplomat and Claude Céberet du Boullay a director of the Compagnie des Indes Orientales (CIO). Tachard was going back carrying out instructions from Phaulkon.

The ships were also laden with gifts for King Narai, including carpets, elephant harnesses and decorations, a celestial and a terrestrial globe both specially printed in Siamese, telescopes and other scientific instruments and 4,264 mirrors. Phaulkon was to be made a French Count and given the Order of St. Michel. His wife was to receive a harpsichord and three musicians – equipped with the scores of Lully, Louis XIV's favourite composer.

1,361 passengers in addition to crews and soldiers were loaded onto the Oiseau, Maligne, Gallard and Normande, Loire and Dromadaire, plus three store ships. Including General Desfarges, his two sons, his officers and his bombardiers.

They finally left France in March 1687. On the 11th May there was an eclipse of the sun, observed by the Siamese and the Jesuits, and they passed the Tropic of Capricorn. The voyage did not go well. Because of the Revocation of the Edict of Nantes the French were not welcome at the Dutch ports on which they depended for stop-overs, and there was a lot of sickness on board the overcrowded ships. The Maligne was sent back from the Cape and the other five ships went on to Siam, arriving late September.

Return to Siam

Meanwhile those left behind under Forbin by the previous expedition had built a fort at Bangkok. Just in time. In 1686 there was an armed uprising against King Narai. This was led by Muslim Macassar refugees under Prince Dai who had left their home – the Indonesian island of Sulawesi, then Celebes, which had been taken over by the Dutch. The Macassars, noted for their seamanship and boats, and also as fierce warriors, were granted asylum in Siam by King Narai. Now they attacked the King's forces. They also surrounded and attacked the French fortress at Bangkok. This was followed soon after by a massacre by Siamese insurgents of the British at Mergui. Lt. Beauregard who had survived being seriously wounded in Bangkok thanks to Forbin stuffing his intestines back and sewing up his slashed belly, was sent to Mergui as governor. With the British driven out of Siam, Phaulkon was isolated from his old friends and dependant on building a new relationship with the French.

King Narai is remembered for his cultured interests. He had been an accomplished poet and specialized in lullabies for elephants, which he loved to hunt. He was also an avid reader and took a keen interest in the world about him. Under his rule, Siam was becoming a notable country with embassies to important countries in the world.

Now his health was declining, he suffered from asthma and his kidneys were failing. And he was estranged from his daughter who remained in Ayutthaya while her father was in Lopburi.

Prince Petracha and his 17-year old son Sorasak – called: "Tiger" were behind the attacks on the British and French. Their xenophobia may have been inspired by the expulsion of foreigners and foreign influences in Japan. But was also a way of attacking King Narai and his policies. As far as they could see, he had allowed the French to build a military fort and import missionaries - clearly with the aim of taking over the country for France. And his chief minister, Phaulkon was a foreigner.

Sorasak was an expert in martial arts, including Thai boxing. On one occasion he punched Phaulkon in the face, breaking two of his teeth. Only the intervention of his grandmother, Dusit, saved Sorasak from execution.

French ships leave

The French ships left Siam at the end of 1687. Forbin and Ceberet left, and many others of the French expedition. The Oiseau and the Gaillard were the last ships to leave on 3rd January 1688.

Tachard and La Loubere were on board the Gaillard – and both ships were laden with Jesuits, and a Siamese embassy from King Narai to the Vatican – led by Tachard. The chief of the Thai envoys, Chamnan, had been on a previous embassy to Portugal, on that journey he had been shipwrecked in South Africa, and had an arduous trek to reach safety. They carried letters written on gold from King Narai to both Louis XIV and to the Pope, and also letters from Phaulkon to the Pope. Tachard also carried another long shopping list from King Narai which included requests for 4,000 mirrors, and about 40,000 glass and crystals dangles for elephants and 54 hats of all different colours, sizes and materials.

After seeing off the last of the French ships, Phaulkon returned to Lopburi. He was at the height of his career. And a French Count with the Order of St. Michel. More ships from France were on their way to Siam.

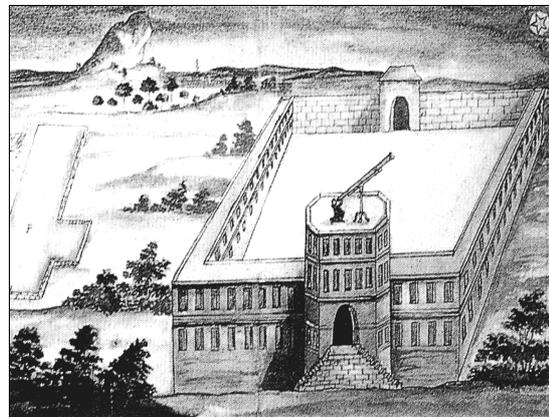
Then on the 11th January 1688, his youngest son John died. He had a foreboding he told his chaplain, that this death meant even more than the loss of a dearly loved child, it was a warning from Heaven of even greater misfortune ahead.

The fort at Bangkok was now under General Desfarges. He came up to Lopburi to warn Phaulkon about an impending revolt against the King, arriving late on 15th April. He found Phaulkon and his wife at the new observatory, watching a eclipse of the moon at midnight.

Phaulkon was persuaded to entrust some of his valuables to Desfarges for safekeeping but refused Desfarges' offer to escort Phaulkon, his wife and child to safety in Bangkok.

The observatory at Lopburi

King Narai's observatory at Lopburi was now complete. In this contemporary illustration, the main octagonal observatory can be seen with the viewing platform. The rooms for accommodation formed a quadrangle with the observatory in the middle of the front.



The telescope is pointing north. To the side can be seen the foundations for a church which was never to be finished. This photo taken in 2005, shows part of the remains of Narai's observatory.

Petracha had been told by an astrologer, that there would be a celestial sign that the French would be driven out of the kingdom.

On the morning of 30th April, 1688, Phaulkon and Petracha were observing an eclipse of the sun at the new observatory with King Narai, and those few Jesuit astronomers remaining in Siam. Some of the astronomers had left to staff the observatory at Beijing.



In this contemporary picture by one of the French missionaries, King Narai is in a small pavilion on the observatory roof – so he is higher than the other observers, who have to crouch down on the Persian carpet provided. The King is looking at a device demonstrated to him by one of the Jesuits. Phaulkon can be seen seated in the centre on the floor. The Jesuits are also sitting on the floor. Petracha, on his knees and elbows like the other Thais – is looking at the image of the sun projected through the telescope. This was attached to a clockwork mounting so it followed the movement of the sun. We are looking across the roof towards the south, and the colonnade linking the quadrangle of rooms can be seen – just the red brick foundations and bits of the walls remain today. This eclipse may have been the sign Petracha was looking for.



On the 10th May King Narai called a council with Phaulkon included, to decide on his successor. He had left it too late. On the 18th May – the uprising planned by Petracha began.

Phaulkon, and his wife and son were captured. His wife Maria spat at him as her husband was carried away to be imprisoned, tied up and mutilated. And finally on the 5th June, cut in two and his remains fed to dogs.

Maria was beaten with canes to force her to reveal any caches of treasure Phaulkon may have hidden. They were to be disappointed. Phaulkon had invested his substantial spare savings in the modern way with shares in the *Campagnie des Indes Orientales* and given other money and valuables to Desfarges for safe-keeping

Kosa Pan former ambassador to France replaced Phaulkon as Phra Khleng, Petracha's chief minister. Narai, in declining health, was made a prisoner in his bedroom, and little Mon Pi (aged 22) remained by his side until on the 20th May he was murdered.

On the 9th of July, Sorasak organised the killing of King Narai's brothers who were tied up in sacks and beaten to death – so as not to spill royal blood – all according to the regulations for murdering royal relatives. The following day Narai died – a sad end for the monarch who had hoped to make his country a world power. Petracha gave him a state funeral, and this was followed by his own coronation and wedding on the 1st August to his niece, the Princess-Queen, who was to give him a son, who King Petracha named as his heir. In October, Maria and her son George managed to escape with the help of a French officer, to Bangkok. But Desfarges handed her back to Petracha. Desfarges kept the valuables and money that Maria's husband had given him for safe-keeping and presumably had intended for his widow.

Maria had to work in the palace kitchens together with her mother, aunts, and grandmother. Prince Sorasak and his father, now the King, admired the beautiful young widow not - as French missionaries thought, for her body (the French missionaries were trying, fortunately without success, to persuade expat foreign girls they should mutilate their faces and beg rather than be protected by Siamese friends) - but for her reknown baking skills, especially her cakes, sweets and desserts. She had collected and adapted a number of delicious receipes, both from her French chef, and from her mother and other female relatives and ex-pats. In fact some of her desserts are still known today.

Desfarges was more interested in getting himself and his two sons out alive with all their loot loaded onto the waiting "Oriflamme" which had arrived just a few weeks earlier – having left France in February. He expected to return to his waiting wife a very rich man.

The voyage was to be slow and troubled. Since the persecution of Huguenots had restarted, the French were not welcome on Dutch territory. So they could not stop at the Cape they had to cross the Atlantic. Many of the passengers and crew fell ill. Desfarges was one of those who became very ill and he died before the ship reached their stop-over at Martinique. His two sons did not waste too much time mourning their father, they enjoyed a wild fling with their inheritance in Martinique before re-boarding the ship. In sight of home just off the coast of Brittany on 27th February, 1691, the Oriflamme floundered in a terrible storm and sunk with no survivors.

On the 23rd December 1688, Britain's last Catholic monarch, King James II with wife, baby son and son's wet nurse, fled to exile in France. His daughter Mary and son-in-law William had been invited by the British government to come over from Holland to be King and Queen of England. That was the end of France's hope that Britain would be a Catholic ally. It was now ruled by a Dutch king and remained a refuge for the French fleeing religious persecution.

At the same time, Tachard and the Siamese delegation had an audience with the Pope, who gave them many expensive gifts plus letters for King Narai and Phaulkon. Then news reached the Vatican of King Narai's death and the murder of Phaulkon. The Pope wanted his gifts back but Tachard and his charges had scarpered as soon as they found a ship heading in the right direction. They had to change ships a few times, and Tachard was left in Pondichéry in India, where he supported himself with his diamond smuggling and other commercial enterprises. When it was taken by the Dutch in 1693, he was deported to Holland, eventually finding his way to the Far East again.

A Dutch botanist, Engelbert Kaempfer was in Siam in 1690. He was presented to and impressed by Kosa Pan. But found him in reduced straits: "...the hall of his House, where we had a private audience of him, was hung with the pictures of the Royal family of France, and European Maps, the rest of his furniture being nothing but Dust and Cobwebs."

Things got worse for Kosa Pan as Petracha became increasingly tyrannical. In 1696 he slashed off Kosa Pan's nose in a fit of temper, with his sword. Kosa Pan's eldest daughter, two sons, his wives and concubines were arrested and tortured. His possessions were seized. In 1700, just as 48 officials were to be imprisoned, fed on their own flesh and impaled and disembowelled, he killed himself.

In 1695, when Forbin was in Cephalaria, he traced Phaulkon's brother and told him there were considerable sums in Paris which Phaulkon had sent by Tachard, when he returned with Chaumont. Forbin took him to France to claim this money and complained he got no thanks for it.

Tachard managed to return to Siam in 1699, armed with the out of date letters from the Pope for King Narai and Phaulkon to get himself into the Palace, but no papal gifts – they had all “disappeared” by then. He looked for Maria Phaulkon, and found her supervising the making of cakes, desserts and sweets in the palace kitchens for the Queen, along with her female relatives. Tachard gave her some money. In the end she and her son had been fortunate that they did not escape in the "Oriflamme".

Phaulkon's son was educated in the (Portuguese) Jesuit Seminary, married Luisa Passana, and had three children. His son Constantine is later heard of at court in the mid 18th century. There may still be descendants of Phaulkon in Thailand.

King Petracha died in 1703, naming his teenage son by King Narai's daughter his heir. Sorasak took over regardless, and his younger brother did not survive. Known as "the Tiger King", King Sorasak, died in 1709, aged 44, – after a troubled reign. His sons had good reason to fear him and had to be protected by their great-grandmother Dusit. Sorasak's two sons were much respected as joint Kings.

In 1715, after her son George died, Maria and her daughter-in-law claimed the money that Phaulkon had invested in the CIO. After a long legal battle, on the 26th June 1717, Maria was finally paid back the money she was owed and both widows received a pension. In 1718, a British visitor in Ayutthaya described Maria Phaulkon as being "the Superintendent of His Majesty's Confectionery". She was much respected in the court and in the city for her "prudence and humanity to nations and strangers when they came into difficulties or under the weight of oppression from the officers of the court or city".

More Eclipses

In 1729, the court at Ayutthaya ordered half a dozen green spectacles from the Dutch, to watch a solar eclipse safely. But they would only have seen a partial eclipse, early morning on July 26th – and it was the rainy season. It shows how important any eclipses were.

On 16th March 1737, members of the Dutch East India Company were invited by an astrologer priest to observe a partial eclipse of the Moon with him at midnight. The astrologer asked the Dutch merchants what they thought caused an eclipse. They told him that it was caused by the world standing more or less perpendicular between the sun and the moon, ...and thereby deprived the Moon, which is a dark body and which received all its light from the sun, of that sunlight and kept it from shining. "Well" he then asked, "and what about the sun when it eclipses?" They answered that then the Moon stood between the world and the Sun in such a manner as when the world stood between the Sun and Moon, and that this furnished definitively strong evidence that the Moon was a dark body and that nothing was accidental in this eclipse."

In 1765 the Burmese invaded Siam, and in 1767 looted and trashed Ayutthaya, which means the loss of records as well as treasures from the past. The Thais fought back under Taksin – he was overthrown in 1782 by the founder of the current Chakri dynasty – descended from Kosa Pan. Known as King Rama I he established Bangkok as the capital city. The story continues with his grandsons.

King Mongkut and the Solar Eclipse of 1868.

King Mongkut, known as King Rama IV, was the King of Siam (now Thailand) in the popular musical "The King and I" and the films. He did not at all resemble the way he was portrayed. And the film was banned in Thailand.

Mongkut was twenty and his younger brother sixteen, when their father (known as King Rama II) died. As the sons of the Queen, they were direct heirs to the throne. However, their elder half-brother, already well experienced in government, was preferred as the next king, to be known as Rama III.

Mongkut, renounced the lifestyle of a royal prince and became a monk although this meant abandoning his wife and their two sons (and ten children by other consorts). He spoke English and a number of other languages and studied not only the ancient religious traditions but the latest in science. He instituted a number of religious reforms – founding a new Order.

Mongkut's younger brother, spoke English fluently, and mixed socially with British and American diplomats and merchants. He collected a vast library of scientific books and English literature, and scientific instruments, including many telescopes, ordered from Dollonds in London. Each morning he drilled his troops, inspected his armoury, then disappeared into his workshop which had a sign over the door saying in gold letters "Clocks and Watches Mended Here."

In 1851, on the death of his half-brother, Rama III, Mongkut succeeded the throne as Rama IV. His younger brother was made the Second King. The Second King found many responsibilities in the north of the country, and married the daughter of the King of Chiang Mai. (*See notes*).

By the time he ascended the throne, King Mongkut was 47, and not in good health. A stroke had left him slightly disabled down the right side. He had lost his teeth and wore dentures.

After spending 27 years as a monk only allowed to eat food that had been given to him, and not even allowed to touch or speak to a woman, he now lived in a palace with a harem of some 9,000 women. This was like a walled city of women who were kept in order by a women's army and a women's prison.

With each succeeding generation royalty dropped a rank down the 5 levels of the aristocracy. It was the duty of the King to repopulate the upper classes, and families were accustomed to presenting their teenage daughters, hoping they would become one of the King's consorts, and have a child by the King. Some 600 young consorts of varying ranks were scheduled on a rota organised by his chief wife, the Queen, to attend the King at bedtime. To get through the list, the King had two bedtimes a day, from 3 am. to 5 am. and from 11 am. to 1 pm., each with a different detail of women.

Since it was forbidden for a man to touch any of the royal princesses or consorts, they led (as Anna Leonowens was to put it) rather spinsterish lives. Most of them ran business enterprises, and wanted to benefit from a modern education.

King Mongkut asked one of his friends, Dr. Bradley, to find a lady teacher to give classes at the palace for his harem. Dr. Bradley was an American missionary and editor of the English language newspaper, the Bangkok Recorder which made better use of the press sent from the USA to print bibles. King Mongkut was a frequent contributor, sending articles on astronomy, history and other topics.

Bradley sent his own wife and the two wives of other American missionaries, Mrs. Matton and Mrs. Jones.

Thailand's first school for girls opened in the palace on 11th August 1851. But after three years, the students rebelled. The teachers preached their religion, and offered only boring religious texts to read. They were all sacked.

In 1855, Sir John Bowring the British Ambassador arrived to negotiate a treaty, and found the King playing with his youngest children. King Mongkut's second chief wife the Queen (and one of his half-sisters) had died after giving birth to her fourth child, and Mongkut was caring for his little daughter (Fa-Ying) himself. The King's private apartments were ornamented with clocks, watches, barometer, thermometers and other English scientific instruments. Shelves were filled with new books.

The photograph shows King Mongkut with his third wife, who is wearing the traditional Thai dress and short hairstyle. (The daughter of King Narai was similarly dressed in the 17th century.)



King Mongkut asked Bowring about the discovery of Neptune and they discussed astronomy. He was interested in the astronomical slides viewed through his magic lantern."

King Mongkut asked Bowring to send from England astronomical and philosophical (scientific) instruments, models of engines, a good telescope, an armillary sphere, the model of a screw-steamer, a ventometer (to measure wind) and "specimens of the most approved instruments of war." A telescope had been put together for him by the engineer on the ship (the Rattler) which brought the British envoys to Bangkok.

Bowring found the apartments of the Second King filled with a "well-selected library of English books, a considerable museum of mechanical instruments, with models of late improvements in many of the departments of science, excellent sextants and quadrants, miniature screw-steamers, and modern weapons." Little Princess Pia - one of the youngest of the Second King's "about twenty" children was there - covered with gold and jewels and painted all over with yellow turmeric (as they did to small children). And which stained the white trousers of the English diplomats. The next time, little Pia appeared in European dress. Both Kings found it useful to have their play time with their youngest children overlapping their audiences. It helped diffuse cultural problems by making the occasion less formal.

King Mongkut corresponded with Queen Victoria, and with British and French scientists. In 1856, Queen Victoria sent a large number of gifts, most of which perished on the way, especially the scientific diagrams and the "charts of the Indian and Chinese seas". Some of the gifts which arrived safely can be seen in the National Museum. They include a pair of globes on showing the Earth the other the night Sky, a camera and photographic apparatus, and models of a steam-ship and a train. These can now be seen in the National Museum in Bangkok.

In 1857 King Mongkut sent an Embassy to London. They got on very well at the usual official functions and parties, but their national dress was inadequate for a British winter - so they became ill with colds and chest infections, and the doctor who looked after their health recommended that they be sent home.



King Mongkut had not abandoned his scheme to provide a Western education for his children and younger wives, but he could not find a suitable lady teacher. He wrote to his Consul in Singapore, Tan Kim Ching, and the Manager of the Borneo Company's Singapore branch, William Adamson pointing out *"It is not pleasant to us if the school mistress much morely endeavour to convert the scholars to Christianity than teaching language literature etc. like the American missionaries here."*

They were able to recommend a suitable teacher in Singapore. Anna Harriet Leonowens, a young widow, who had started a small school, to support herself and two children. In February 1862 the King wrote to Anna *"You will do your best endeavour for knowledge of English language, science and literature, and not for conversion to Christianity."*

King Mongkut had at last found an ideal English teacher for his school. Anglo-Indian, born and brought up in Bombay, in an army barracks, however she concealed much of her real background later and allowed inventions.



With her husband Tom Leonowens, she had 4 children. But after the death of their first daughter they moved from Bombay to Western Australia. Having lost another child, they took a ship from Perth to Penang. Here Tom worked as a hotel manager, while Anna had two more children. Then Tom died and was buried in the Protestant cemetery in Penang. Left with two small children, daughter, Avis then 4, and son Louis, then 2, to care for as a single mother, Anna moved to Singapore and opened a small school.

With her mixed race Bombay background, she was not the blinkered missionary type, King Mongkut feared. Brought up surrounded by different beliefs she was not a church goer, however, as King Mongkut was to discover, she was a keen advocate of women's rights and against slavery. She did not bring a bible but "Uncle Tom's Cabin". And insisted on being accommodated outside the palace in her own home.

In 1862, Anna arrived in Bangkok, with her son Louis (her daughter Avis was sent to Miss King's small boarding school in Britain with a British friend whose daughter was to go to this school), a Moslem married couple she refers to in her book, as Moonshee (*Teacher*) and Beebee (*Wife*), who helped look after her household, and Bessy, their big Newfoundland dog. When Anna was finally, after much persistence, given her own house, Mrs. Hunter helped her clean, decorate and furnish it.

Anna's secretarial skills were also in demand by King Mongkut. English was essential for diplomacy.

At this time, during the nineteenth century, Siam's traditional enemies, the states which surrounded it, Laos, Cambodia, Burma, Malaya, were falling under occupation of either the French to the East - (Cambodia, and by 1893, Laos, and Vietnam) - or the British - Pegu - (South Burma) and later Burma to the West, and Malaya, and Singapore to the South. So Siam was turning into the centre of a British-French sandwich. If the country was to remain independent, it had to appear as modern and technically up to date as the occupying powers around it.

Conventional efforts at diplomacy had sometimes met with culture clashes. But now a great opportunity presented itself. King Mongkut was an astronomer. He had studied traditional astrology when a monk and backed that up with modern science books, telescopes and other equipment ordered from London. He knew that a total solar eclipse would soon be visible from his country.

King Mongkut's own calculations, and reference to the Greenwich astronomical tables, showed that on 18th August 1868, the path of a total eclipse of the sun, would cross the southernmost part of Siam. In fact the best place would be longitude 100 degrees to 102 degrees east of Greenwich - at just after noon local time (between 05.04.39 and 05.11.14 Greenwich time) where totality would last the longest - 6 minutes 47 seconds. But this would be in the Gulf of Siam and Mongkut knew that a boat at sea would be an unstable platform for astronomers. The best place on land would be on the east coast of the south part of Siam on the Malay peninsular. It was a great opportunity for organizing a modern scientific international eclipse party.

Most of the eclipse path crossed through British controlled territory. British astronomers were setting up stations in Aden, and in India and Malaya. The French territories were outside the eclipse path, and a party under French astronomer Pierre-Jules-César Janssen had joined the British expedition at Guntur.

King Mongkut had been in correspondence with French astronomers earlier, about the discovery of Neptune. He now wrote to Edouard Stephan, Director of the Observatory of Marseilles to invite him to bring a team of scientists to view the eclipse in Siam.

"The astronomical statement of the King of Siam.

I beg to state truly that my knowledge of astronomical science was very less, almost inconsiderable. I have studied this science firstly in Siamese and Peguan astronomy, which had been adopted and somewhat translated from the ancient book of Hindu, intitled Suruyasiddhant, Varoha-Mihirate, Kaju-Mutant, etc. - I have afterwards only tested certain european books of astronomy and astronomical navigation, geometry, and so I have understood better manner of calculation in use of logarithm, of secant, cosecant, sine, cosine, tangent, cotangent, logarithm of number, etc. Became acquainted with various astronomical terms in latin and english on certain way. But my knowledge of algebra etc. is not sufficient for accurate calculation. I have compared with some knowledge of geographical observation and apprehended the place of the central eclipse which we may be able to stand and see the present solar total eclipse in duration as great as obtainable on land, but I observed that more duration than that which will be here, will be fallen at about the middle of the Gulf of Siam towards east most inclined towards south-east, where there is no land, to be standing steadily and see, while duration of the total darkness may be more than here about only 2 or 3 seconds of minute. But to point directly the place of most durable point on land, my knowledge is not sufficient. I do not understand of using various instruments which were not in my possession.

I have only a few telescopes large and small: they in comparison with those newly invented and improved must be considered very common.

*The knowledge of Siamese and Peguan astronomers are thus:
The total eclipse of the sun may take place for the following points of astronomical occurrence*

- 1. The node, either ascending or descending, comes near to the sun's apogy, (apogee) either before or behind, at a distance at least of 60 degrees in the ecliptic course.*
- 2. The moon's peregy (perigee) comes near to the place of syzygy, or strait between the centres of the sun and moon and the earth, or near to the said position.*
- 3. The sun comes as near to the said nodal position as 720 miles, or 12 degrees in ecliptic.*

They said also that whenever the interior planets, Mercury or Venus, and Moon, come below the sun directly to any latitude or place on the surface of the earth, the extractive power of those said bodies attracts the surface of the earth and

produces great wind and clouds more than usual on that point for several days. It is evident that the like or similar occurrence can be compared with attraction of the sun and moon, and produce high water on the surface of the earth in the days of new moon and full moon always, and lowest water appears in the first and last quarter of the lunar month, for the sun and the moon are in a very different position toward the earth.

*But the wider knowledge was not to me more than is before said
S.P.P.M.Mongkut,K.S."*

King Mongkut had an observatory built at his palace of Chao Wang, south of Phetchaburi (Town of Diamonds), on the west side of the Gulf of Siam. The palace had been built in 1858 as a holiday retreat in a mixture of traditional Thai and Western styles. When the King came to stay here, he lodged in the summer house (now a museum) and spent many nights star-gazing from his nearby observatory. Queen Victoria had sent him a telescope and he ordered others from London.

The best view of the eclipse would be south of here, in the marshlands of Khao Sam Roi Yot. Now a National Park it is described in a guide book as "A most impressive, desolate moonscape over flooded paddies, with the mountains clearly visible. Birds and monkeys abound on all sides." Unfortunately that is not the only wild-life - the place is still infested with malaria-carrying mosquitoes.

King Mongkut invited Sir Harry Ord, the Governor of Singapore to his eclipse party. He told him to come to Prachuap Khiri Khan (*a seaside town with harbour so the ships could dock there*), where the eclipse would be full, and where he had put up a palace for the observation and for the reception of the guests. He directed him precisely to "East Greenwich longitude 99 degrees 42 minutes and latitude North 11 degrees 39 minutes". (*Greenwich was not fixed until 1884 as the universal prime meridian, which is why the meridian had to be specified.*)

Other guests invited to these co-ordinates, included: Mr. Alabaster the Acting British Consul in Bangkok. (*Mr. Alabaster and Sir Harry Ord both wrote full accounts of the viewing of the eclipse – see notes*). Dr. Bradley was invited, Mongkut's American missionary friend, who published The Bangkok Recorder, the English language newspaper to which King Mongkut frequently contributed articles. The French scientists. And of course Thai princes and officials and their entourages as well as Mongkut's court, his Queen, consorts and children. But many that would have been there were missing.

King Mongkut's two eldest sons had recently died. His eldest son and heir, had died only the previous year at age 44. Now King Mongkut's heir was Prince Chulalongkorn – eldest son by his second wife, nearly fifteen, and one of Anna's prize pupils. King Mongkut's brother, the Second King, had died in December 1865. Mongkut took his collection of telescopes for the eclipse party. (*See notes*).

Also missing from the eclipse party, was Anna Leonowens - the teacher who had made it possible for King Mongkut's consorts and children to mingle easily with the guests and speak to them in English. She had been popular with the Queen and many of the other women at court. An advocate of women's rights she was sympathetic to their problems and did her best to help their cause with the King. But this also made her enemies. She had been injured by a rock thrown at her head. Her servant Moonshree had been badly beaten up and had returned home. Her dog was poisoned. Then she fell ill with cholera. Above all, she missed her daughter Avis who had now grown up isolated from her family in England, and having to spend her holidays as well as term time in Miss King's school. And at 14 she was ready to leave.

Anna left Siam on what was supposed to be six months leave, in July 1867. She placed her son Louis in a boarding school in Ireland, near relatives of her late husband. Instead of travelling back immediately to Siam with her daughter, they boarded a ship heading west and went to stay with friends in America, in Boston (the ones who had given her "Uncle Tom's Cabin").

The Eclipse

The party of French scientists who had received and responded to King Mongkut's letter of invitation to view the eclipse with his estimates of the timing and position were:

Edouard Stephan, to whom the invitation was written who led the team. (He was to become famous later as in 1877 he discovered the interesting cluster of galaxies - although then only known as nebulae, which is called Stephan's Quintet after him.)

Georges Rayet (1839-1906), who with Charles Wolf had in 1866 discovered the spectrum of the large bright stars called Wolf-Rayet stars after them. He was in charge of the spectroscopic work and also had an interest in photographing the corona. His observations of the solar prominences and on the bright lines in the spectrum of the sun's corona at this eclipse and in the two following years were written up as a doctoral thesis in 1871.

Francois-Felix Tisserand (1845-1896), had just completed his doctoral thesis at the Ecole-Normale on the three-body problem with regard to the Moon's orbit. He was to be Director of the Toulouse Observatory in 1873. A crater on the Moon is named after him.

Also: **Chabirand** (from Marseilles Observatory), **Hatt, Olry, Letourneur, Pierre, Garnault** (who was the pharmacist at the military hospital in Saigon). And officers of the "Sarthe" and the "Frelon".

Here is part of Edouard Stephan's report (translated from French) describing the scene:

"This point, usually so solitary, was full of animation. The King of Siam with all court, part of his army and a number of Europeans established in Bangkok, were arriving by sea in a convoy of a dozen steam ships, after which, by land came groups of buffalo, elephants and horses.

The purpose of the trip of his Siamese Majesty was to observe the eclipse, and for this, he had installed a certain number of glasses for better seeing from his brother, dead for some years.

This late prince possessed scientific learning - which is exceptional in this land; the King himself is passionately interested in astronomy."

The French scientists set up their temporary observatory in the place provided by King Mongkut who came to see them. One of the modern technological innovations that impressed the King was the telegraph equipment. They had set things up so that the observations from their 40cm. telescope could be transmitted electrically the second they happened.

Another modern technological innovation that was used for the 1868 eclipse was spectroscopy. Earlier in the century Fraunhofer had discovered lines in the spectrum of light. Further work and analysis, identified these dark or bright lines as signatures of different elements, and those so far recognised were published by Kirchhof in 1862. One of the scientific projects for the 1868 eclipse was to use spectroscopy to analyse the sun's corona and prominences which the total eclipse

would make visible. The spectroscopic work on this 1868 eclipse was to result in the discovery of an unknown element - helium.

The other new technology available in 1868 was photography. This enabled the scientists to observe and also record the appearance of the eclipsed sun for further study of the appearance of the corona and prominences. The results of observations of this eclipse were the discovery of the formation of the sun's prominences, and were to lead to new work on the sun.

The guests at the eclipse party were accommodated in palatial buildings specially constructed for the occasion. Catering was in the charge of a French chef and an Italian maitre d'hotel.

Mr. Alabaster's report gives some idea of the immense effort and organisation of the event: "...the Prime Minister (Kalahome) and his lieutenants erected quite a town in the distant jungle to which we were about to resort and, in order that the King's guests might lack nothing, a French cook with about forty European and Chinese assistants was sent to organise a kitchen. A steamer was kept running for some weeks conveying stores; and the mail steamer diverted from its course in order to bring luxuries from Singapore."

"Fearing that the desertion of the capital by the majority of the officials, the removal of all the gunboats, etc. might tempt disorderly Chinese to make a riot – I suggested an increase of the Police. My suggestion was adopted, the force doubled and police stationed throughout the part of Bangkok which may be called the Foreign Settlement."

"On the 12th instant I left in the finest gunboat in the Siamese navy, the "Impregnable" of Captain Walrond. The French Consul, not being prepared to go on that date, did not go at all though two other vessels were subsequently offered to him. With me were my wife, Mrs. Campbell, Mrs. Kennedy (*who sketched the temporary town built for the occasion*) and Gould of the Consulate, and two British merchants. A large party of Europeans and Americans including the United States Acting Consul were allowed passage in the same vessel."

"On arrival on the morning of the 14th I received a message from the Prime Minister requesting me to remain on board until every one else had landed as the King wished to give me an official reception. I did so, and, on landing, was received at the end of the pier by the second Foreign Minister and other officers and forthwith conducted to the outer gate of the Palace where the King, surrounded by his family and ministers cordially welcomed me and proceeded to fire a salute of seven guns with his own hand – an extraordinary honour – His Majesty stood to the guns, watch in hand, and fired with the most perfect precision, saying he would show his officers how to keep time. His Majesty then led me across the courtyard of the Palace to a spacious Audience Hall, and, while refreshments were served, conversed for sometime about the eclipse, showing a knowledge of the subject I was unprepared to expect. After the audience the Prime Minister led me to his house and thence to that erected for me close beside his own."

"It is remarkable and yet only consistent with the whole course of hospitality shown by the Siamese government on this occasion that the Siamese ministers did not provide for themselves the comfortable accommodation provided for their guests. The Prime Minister himself rather than allow any beyond my own Party to take up rooms in my house gave up room after room his house – until it became a hive of European and American ladies and gentlemen; his reception room became a club and he had only a bedroom to himself. When I brought away some of his too numerous guests he

fetched them back and it was only after some resistance he agreed that they should take their meals with us."

"Knowing His Excellency well I know what an effort it must have cost him to show such nobleness to the foreign ladies who had uninvited and unexpected come down upon him in such numbers. His Excellency's attention continued and time after time he called to learn whether anything was desired. Other Siamese officers vied in offering facilities. Such hospitality, such attention as was shown to us I have never seen anywhere before, never expect to see again."

"But all this time there were two sources of uneasiness; first, the weather had been for some time stormy and the sky overcast, and, though it improved on the 15th there was general expectation that we should not see that which we had come to see; second, the French were complaining and dissatisfied and said the Siamese were so suspicious of them that they would give them no assistance. (This was unfair; the Siamese, if I was not misinformed, wanted to do everything for them even to feeding them).

On the 15th the Emperor Napoleon's fete day was celebrated, all the ships dressed gaily and many salutes were fired. The Chief of the French expedition and the French Consul had not been able to agree as to their respective positions in regulating the ceremonials of this day, which was one of the reasons that the French Consul remained at Bangkok.

"On the 16th the Governor of Singapore arrived in his yacht the "Peiho" but as it was Sunday deferred landing until the morrow. Early on the morning of the 17th HMS "Satellite" Captain Edge arrived and at 11 o'clock Colonel Ord, Captain Edge and their suites landed under a solute of seventeen guns from the shoe battery, and were at once conducted to the Prime Minister, where HRH the Foreign Minister also awaited them. In the meantime the King conceived that it would be well to establish a second observatory some miles distant and himself started off to select the spot. We waited nearly three hours until His Majesty return and invited our attendance.

"Colonel Ord was received with as much pomp as the situation admitted of. A line of soldiers presented arms on his approach and the King received him seated on a temporary throne with about two hundred princes and officers in brilliant silk and gold jackets kneeling around him. I presented His Excellency, Caption Edge and their officers and the King then introduced them to the chief princes and nobles.



"The conversation was limited to formal civilities and expressions of the satisfaction the visit gave His Majesty. As soon as the ceremony was over the King willingly submitted to have some photographs taken of himself surround by his guests."

In this photograph shown here, the King is in the centre, raised up on a platform, as the king had to be higher than anyone else. (*Rule still applies*). Around him stand the European male guests in their best tropical uniforms or suits. Thai princes, government ministers, despite their high rank are all crouched heads down, on knees and elbows without shoes, as Thai custom dictated they be (still - at present time) in the presence of the king. Europeans refused to conform to this.

Alabaster continues:-"This ended, Colonel Ord was conducted to the residence built for him and a very excellent tiffin served up. Colonel Ord's house was next in size to the King's Palace and I think the supply of provisions and wines etc. was not



inferior to any I have seen or heard of on Colonial Governor's tables. The wines indeed were the best procurable."

"In the evening Colonel and Lady Ord, Captain Edge, I and my wife, etc. and in all a party of eight were entertained in the interior of the Palace and introduced to His Majesty's children and nine of the favourite ladies of the Palace, and, next morning, the unprecedented intimacy allowed us with the Royal Family so increased that they threw off all customary reserve and while the King and several of His Majesty's wives were conversing with Colonel and Lady Ord in one room in the adjoining audience hall I and other gentlemen were talking for full three quarters of an hour with the princesses – several of the latter young ladies of 15 to 18" (*Anna Leonowens' pupils*).

"The pleasant manners of these young princesses and the frankness and intelligence of their conversation exceeded my anticipations. They spoke the simplest language but sifted of the rough and coarse expressions which are so general as to be almost a feature of the Siamese language. To those with me who could not speak Siamese they spoke a few words of English. His Majesty, once of the kindest of fathers heard the run of conversation and the frequent ringing peals of laughter and accepted it with perfect good humour, smiling, as he said on his return, "What a noise you have been making."

"The whole time was as it were spent on a picnic. For once the Siamese laid down the screen they ever hold at Bangkok between foreigners and themselves and I hope that their doing so has given them more confidence in foreigners as it has given foreigners a much increased esteem for them. In the afternoon the King's eldest son rode out with a large party of foreigners including several of the younger of the "Satellite"; and another party of foreigners were delighted with an elephant ride."

The only worry was the weather. August is coming up to the rainiest time of the year. When the big day dawned, the sky was covered with black clouds. It was raining hard. (This happened to us 151 years later, at the Millennium eclipse on 11th August 1999, which for us, in the Salzkammergut in Austria, also took place at midday. So we can guess how the astronomers and guests would have felt).

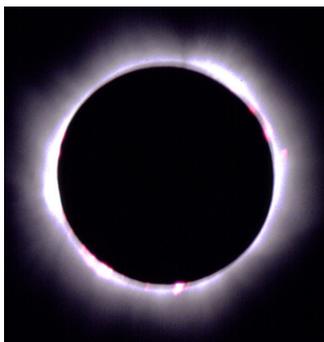
Alabaster said:"As soon as day broke a busy crowd might be seen mounting their telescopes in front of the houses, and, as the clouds chased across the sky, thickening every hour, the excitement became intense. A gun announced the commencement of the eclipse, but the earlier stages were but imperfectly seen."

Tension must have been terrible, as some guests sheltered from the rain while others were trying to protect their telescopes, cameras, and other equipment and despairing. Mongkut nearly had a major fiasco on his hands instead of a historic event. Would the skies clear by midday.

Their luck was in. Just as the eclipse was starting the clouds began to break up. (We were just as lucky in August 1999). *According to Alabaster:* "A roar of wonder and delight rose from the whole colony." The astronomers were ready with their telescopes, and cameras ready on the tripods, manual shutters poised.

The electric telegraph hummed transmitting details from the French observatory where the scientists were busy. The guests put on the dark glasses provided and watched the sky. The King and his Prime Minister ran round from telescope to telescope and reporting events excitedly to their respectfully crouching ladies. The Prime Minister called to his wives "now will you believe in what foreigners tell you."





As the sky darkened, showing stars, eerie lavender and green shadows settled and the sun blacked out, looking like a glowing coal, there was an awed hush. Then suddenly a tremendous racket broke out from the local people who were letting off fireworks and banging drums and gongs. (The picture shows 1999 eclipse of sun photographed by Mervyn Hobden at Weyregg, Austria.)

Alabaster reported: "My party all felt subdued and somewhat hysterical; a party of missionaries a short way off cheered violently. The Siamese after their first roar of wonder sat silent, the women half-frightened; some native women ran into their houses. The Prime Minister ran about like a younger man and was running with me to my observatory when the sun burst forth again. He took me in at once to the King and I sat down with the rest of the council who had already assembled. Again the screen was dropped; the King and his ministers sat round smiling, talking and even joking, phrases of ceremony were cut down to the shortest, freedom of speech allowed to the utmost. The King gave a full and clear account of the causes of the eclipse showing how thoroughly he had read up the subject. He finally presented me with a gold coin (a custom of Siam on remarkable occasions) and the interesting meeting broke."

Soon after the eclipse, the Prime Minister presented himself to Colonel Ord and announced that the King was on his way. *Ord reported:* "Immediately afterwards His Majesty arrived in considerable state with a Guard of Honour, hand and field pieces, but was accompanied by several of his children and all the principal members of the Court and seemed in excellent spirits, it having proved, as he informed, me, that his calculation of the time of the occurrence of the eclipse was more accurate than that given by the French astronomers. "

The eclipse was celebrated by a champagne dinner (*which we did also in 1999*). They had ice with the champagne which in that hot country at that time was a fabulous luxury. In the evening, the guests were entertained by a performance of classical Thai dance.

The astrologers had prophesied that the eclipse was an evil omen of disease and death but that evening, King Mongkut had every reason to consider the event a success.

The 1868 eclipse marked a watershed in astronomy. The use of spectroscopy and photography had been invaluable. The results immediately were to lead to further development of equipment to improved studies of the sun and its corona without waiting for nature to provide a suitable eclipse.

It also marked a breakthrough in diplomatic relations and Siam's position in the changing world. *Ord reported:* "I believe that much benefit will result from this visit – it will tend to strengthen the good feeling existing between Siam and Her Majesty's government and will render easier the settlement of those questions to which our position on the peninsula must from time to time give rise.

It has had the effect of calling forth an exhibition of regard for our nation on the part of the King such as was hitherto unknown in the annals of Siam. This Court has been heretofore notorious one in which the observances of etiquette have been carried to the most extreme length and the accounts of Mr. Crawford's and Sir John Bowring's Missions exhibit clearly the inconvenience and difficulties to which they were subjected from it. In the present instance all the traditions and customs of the kingdom seem to have broken through by the mere will of the King, and in order to testify his regard for our nation....."

Unfortunately the astrologers had been right, if for the wrong reasons. Everyone, workers, guests, scientists, had been bitten by the mosquitoes which plagued the area. Many of them were stricken with malaria, including King Mongkut and his son Prince Chulalongkorn and ten of the French astronomers party.

King Mongkut died on the 1st October, his 64th birthday. 15 year old Prince Chulalongkorn was now the King and his 27 year old cousin Prince George Washington, was Second King.

How the story changed

Anna Leonowens was now living in America with her daughter Avis, working as a teacher, and giving talks and writing about her travels. Her book: "The English Governess at the Siamese Court" published in 1870, followed by "The Romance of the Harem" - have similar sounding titles to the works – "The English Governess in Egypt", "Nights in the Harem", and so on, published by Emmeline Lott from 1865, after the end of her employment teaching the children of the son of the Khedive. So it is certain that Anna had to fulfil the demands of the publisher and readers.

In reality, Anna was Anglo-Indian, born in Bombay (now Mumbai), India not England, and at the time she worked in Bangkok, she had never even visited England, although she had lived in Western Australia, Malaysia and Singapore. She let people in her new home in the USA, think her dark complexion was "sun-damaged", and her accent was "Welsh". A concession to the racist attitudes of the time, especially in the USA, to which she never normally subscribed.

When Avis married, Anna moved with her and her son-in-law, to Halifax in Canada. She was an active campaigner for women's rights. Her globetrotting had not ended, she went to Russia, and to England and Germany many times and remained in contact with her Thai friends and now grown-up pupils including King Chulalongkorn. Her son Louis escaped from school early, working on ships, until he was back in Siam for the rest of his life. Anna ended up taking care of her eight grandchildren (6 Canadian, 2 Thai) with the early deaths of her daughter and daughter in law. She died in 1915.

In 1944, a fiction writer and missionary, Margaret Landon used Anna's books and some material given to her by one of Anna's grand-daughters, as inspiration for a romantic novel. In 1951 this fictional novel only, was used as the basis for the musical by Rodgers and Hammerstein, which was turned into a film. Banned in Thailand, as was the 1999 film which despite its claims, was still very low on historical accuracy. Neither had anything about the eclipse.

Later eclipses in Thailand:

April 6th, 1875, total solar eclipse. A Royal Society expedition travelled to Siam to see this eclipse. This was led by Arthur Schuster, already noted for his work in spectroscopy.

May 9th 1929. 20th June, 1955, 24 October, 1995. More information is on the NARIT (National Astronomical Research Institute of Thailand) website.

Notes and References:

Acknowledgements

The author is grateful to the considerable help, references and primary material and advice, given by authorities in Thailand.

Places to visit in Thailand

Information on King Mongkut's eclipse can be seen in the Planetarium and Science Museum in Bangkok. A booklet is available in Thai only. Further information on traditional Thai numbers, calendars etc. in the science museum. Much of the Royal Palace has been restored showing how it was in the late 19th century. The National Museum in Bangkok has displays on the 17th century French astronomers, as well as some of the gifts sent to King Mongkut by Queen Victoria. Ayutthaya and Lopburi now are heritage centres easily visited from Bangkok on a day trip. The remains of King Narai's palace, Phaulkon's house and the observatory can be seen in Lopburi.

Legends and traditions

Legend of the eclipse (and information on Mongkut and his brother as princes in the reign of Rama III) from Narrative of a Residence in Siam, by Frederick Arthur Neale, 1852 (reprinted) ISBN 9248495094.

17th century

Journal of a Voyage to Siam 1685-1686, Abbé de Choisy, reprint: edited and translated by Michael Smithies, Oxford University Press, 1993, ISBN 9676530263

A Relation of the Voyage to Siam, by Guy Tachard, 1688, reprint: ISBN 9748304302

Aspects of the Embassy to Siam 1685

by the Chevalier de Chaumont and the Abbé de Choisy edited by Michael Smithies, 1997, ISBN 9747100517

The Siamese Memoirs of Count Claude de Forbin 1688-1688, reprinted 1996 ISBN 9747100304

Nicolas Gervaise: The Natural and Political History of The Kingdom of Siam 1688 Paris. Reprint 1998, ISBN 9748496619. Gervaise was a young French missionary.

Siam and the West 1500-1700 by Dirk van der Cruysse. ISBN 974 7551 57 8.

History of Anglo-Thai Relations by M.L. Manich Jumsai. ISBN 974 7390 19 1.

Siam and the Vatican in the seventeenth century by Michael Smithies and Luigi Bressan, ISBN 974 8225 68 2.

The English Factory in Siam, 1612-1685 (2 vols), ISBN 978 07123 4928 4

Websites

<http://www.mfa.go.th/web/117.php>
<http://mapage.noos.fr/memoires-de-siam/index.html> (This excellent site has full information on the 1685 - 1688 French embassies to Siam). In French.
<http://www.geocities.com/CapitolHill/Congress/7905/ayuthis1.htm> - Ayutia
<http://www.geocities.com/RainForest/7153/ayut.htm> - Thai history:
<http://www.sala.net/Thailand/history.html>
<http://www.thaimain.org/eng/monarchy/ayutthaya/narai.html>
<http://www.thaimain.org/eng/monarchy/sukothai.html>
<http://mapage.noos.fr/memoires-de-siam/choisy0.html>
<http://www.guidetothailand.com/thailand-history/phaulkon.htm>
<http://welcome-to.chiangmai-chiangrai.com/ayutthaya9.htm>
<http://www.myanmar.gov.mm/Article/Article2002/july/july1b.htm>
 1737 eclipse by T.J.van der Heuvel: <http://instruct1.cit.cornell.edu/courses/hist244/>
<http://www.asiatour.com/thailand/e-01land/et-lan71.htm>
<http://www.vocsite.nl/geschiedenis/handelsposten/siam.html>: Dutch site on the VOC

1868 Eclipse

Anna Leonowens' book "The English Governess at the Siamese Court" is still available. Paperback reprint. ISBN 0195888979. Oxford University Press 1988. She describes the eclipse party although she must have been sent the details in letters by her friends at the Thai court as she was in America at the time. She also published "The Romance of Siamese Harem Life", 1873.

More on Anna Leonowens:

Anna Leonowens: A Life Beyond The King and I, by Leslie Smith Dow, 1991, ISBN 091900001696

Bombay Anna: The Real Story and Remarkable Adventures of the King and I Governess, by Susan Morgan, 2008, ISBN 9780520252264. Anna's real background. And how her story was changed by others to eventually become the tacky musical etc.

John Bowring: "The Kingdom and People of Siam. Published in 1857, soon after his return from Siam. Paperback reprint: ISBN 9780543953117.

King Mongkut and the British by M.L.Manich Jumsai, 2000, ISBN 9748591344, has a number of Mongkut's letters to Queen Victoria and details of the gifts of scientific instruments.

Rapport sur l'Observation de l'Eclipse de Soleil du 18 Août 1868 par H.Stephan: (to whom Mongkut wrote with his estimates of the eclipse timing and position).

King Mala Mongkut of Siam by John Blofield, 1987, ISBN 9748298159.

Note: The Princess of Chiangmai Chao Ubo Wanna, was a daughter of King Kawilorot. Chiang Mai was then a tributary state of Siam – with its own government. On his brother's death, the harem ladies who supervised his kitchens were accused of poisoning him and condemned to death. King Mongkut moved into his brother's palace for some weeks and took several of his brother's wives into his own harem, but the Princess of Chiang Mai refused – she preferred to live in Chiang Mai where she actively supported industry and commerce, founding industries in weaving, silver work, wood carving and whisky distilleries. She also supported the missionaries not for their religious preaching but for the knowledge of the Western World which they also brought with them.

websites:

http://www.wangdermpalace.com/kingpinklao/eng_pinklao.html – the second king.
<http://sunearth.gsfc.nasa.gov/eclipse/SEhistory/SEpath/SE1868Aug18T.html>
<http://sunearth.gsfc.nasa.gov/eclipse/TSE2002/TSE2002txt/T02animate.html>
<http://sunearth.gsfc.nasa.gov/eclipse/SEhistory/SEpath/SE1868Aug18T.html>
<http://www.thaistudents.com/kingandi/owens.html>
http://www.escati.com/architecture_of_old_bangkok.htm
 Georges Rayet: <http://www.observ.u-bOrdaux.fr/public/administration/rayet.html>
<http://www.royalty.nu/Asia/Thailand/Mongkut.html>
<http://www.mahidol.ac.th/Thailand/monarchy/rama4.html>
<http://library.usask.ca/herstory/leonow.html>
<http://www.thaistudents.com/kingandi/index.html>
 Toulouse Observatory: http://webast.ast.obs-mip.fr/patrimoine/jolim_e.html
<http://cfa-www.harvard.edu/~pberlind/atlas/htmls/wrstars.html>
<http://thaiastro.nectec.or.th/eng/index.html>
 Sir John Bowring's journal 1855: <http://instruct2.cit.cornell.edu/courses/hist244/Bowring.html>

data on 4,000 years of eclipses of the sun and moon on this website:
<http://sunearth.gsfc.nasa.gov/eclipse/eclipse.html>

The continuing story of astronomy in Thailand is on the NARIT website.

This work was sourced from material available in Thailand, and/or from Thailand, and checked in Thailand. Any problems will be instantly corrected as soon as made known.

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