

CHAPTER 4

ECLIPSE POLITICS IN FRANCE AND THAILAND, 1868

David Aubin

Everywhere in the East Indies it is believed that the
when the Sun and the Moon eclipse one another, it is
because some dragon, with very dark claws,
stretches towards both stars wishing to grasp them.
On those occasions you can see rivers covered with
the heads of Indians in water up to their necks, a
most devout position well adapted to defend
themselves against the dragon.

— Bernard Le Bovier de Fontenelle (1686).¹

On croit les Asiatiques plus naïfs qu'ils ne le sont.

— Prosper Mérimée.²

On 18 August 1868, that is on Tuesday, the first day of the waxing moon in the tenth month
of the year of the Dragon, year 2,411 of the Buddha Era, an unusual crowd gathered on the

¹ Fontenelle, *Entretiens sur la pluralité des mondes* (1686), second soir. My translation.

² “Asians are taken for more naive than they are.” Mérimée to Jenny Dacquín (29 June 1861)
commenting on the Siamese ambassadors’ visit to Napoleon III; repr. in Mérimée,
Correspondance générale, 10:315.

desolate beaches of the Wako district in southern Thailand (then Siam). Dozens of Europeans and Americans—or *farangs* [foreigners] as the Siamese called them—diplomats, traders, navy officers, and ship crew, anxiously stared at an overcast sky. There also was a handful of scientists expressly dispatched from faraway France, lead by Édouard Stéphan, director of the Marseilles Observatory. At ten o'clock in the morning, the King of Siam, Mongkut (later known as Rama IV) went out on the terrace of his three-storied wooden palace built for the occasion and peered through his telescope. More than a thousand Siamese from his court, including many of his wives and children, the heir apparent, as well as countless horses, cattle and fifty elephants, had journeyed here from Bangkok 140 miles away (**fig. 04-01**). Then, to everyone's great relief, the clouds opened and the sun shone, though not as brightly as it should have at this time of the day (**fig. 04-02**).

It could be seen that the eclipse had already started. The fanfare therefore started the music, and the King took his bath of purification. . . . At exactly thirty-six minutes and twenty seconds after eleven o'clock, the sun was in total eclipse. At that moment, it was dark as if it were nighttime, around the twilight time. Those sitting close to each other could not see nor could they recognize each other's faces.³

<< Insert figure 04-01 here. >>

At the king's signal, a cannon shot was fired. According to Buddhist mythology, an angry creature named Rahu had swallowed—or grasped, no one knew for sure—the sun, but luckily, the roar of drums and trumpets from a nearby village no doubt helped to scare him away, so

³ Thiphakorawong, *Dynastic Chronicles*, 2:538.

that some six minutes forty seconds later he let it go free again. Everyone rejoiced and the king gave out gifts of money to his entourage.⁴

With its long totality, the eclipse of 1868 drew the attention of European astronomers as well. For historians of astronomy, the eclipse is most significant for the discoveries made using the spectroscope.⁵ Less than a decade after Robert Bunsen and Gustav Kirchhoff set the foundation of spectrum analysis and showed how to use it to determine the chemical constitution of the sun, this was the first opportunity for spectroscopes to be directed at the limb of the eclipsed sun. Several European parties dispatched to distant lands, from Aden to Indonesia, were then able to shed lingering doubts about the nature of prominences—those pinkish flames around the dark disk of the moon only visible during eclipses. They were neither effects of the earth's atmosphere nor Olympian mountains on the moon; they definitely belonged to the sun. Observing the flames through their spectroscopes, astronomers saw the emission lines rather than the dark Fraunhofer lines typical of the sun's spectrum and inferred that prominences were gigantic outbursts of incandescent gases, mainly consisting of

⁴ Olga Lingberg, "King's Mongkut's Solar Eclipse," *Astronomy* 13(1) (1985), 24–6; and Yvon Georgelin and Simone Arzano, "L'Éclipse de soleil du 18 août 1868: Stéphan et Rayet, hôtes du roi de Siam à Wha-Tonne," *Astronomie* 113 (1999), 12–7. On Rahu, Alabaster, *Wheel of the Law*, 217–8.

⁵ Among other works, see Auguste Laugel, "Découvertes récentes dans le soleil," *Revue des deux mondes* (1869), 585–602; Ferdinand Hofer, *Histoire de l'astronomie depuis ses origines jusqu'à nos jours* (Paris: Hachette, 1873), 544–5; Ernest Lebon, *Histoire abrégée de l'astronomie* (Paris: Gauthier-Vilars, 1899), 141–3; Clerke, *A Popular History of Astronomy*, 4th ed., 167–70; Mitchell, *Eclipses of the Sun*, 136–9; and Mark Littman and Ken Wilcox, *Totality: Eclipses of the Sun* (Honolulu: University of Hawaii Press, 1991), 66–74.

hydrogen. After this single observation, no one would have any doubt about the possibility of analyzing spectroscopically the chemical constitution of celestial bodies. Not long after, when a certain spectral line was studied more carefully and found not to correspond to any known substance on earth, some felt so confident in the spectroscopic method that they attributed the unknown line to a new element unknown on earth, which they named *helium*.⁶ Above all, historians of astronomy have remembered this eclipse as the occasion in which the spectroscopic method for studying prominences was discovered by Jules Janssen, sent to India by the French government. (The discovery of the method was also attributed to the Englishman J. Norman Lockyer whose observations, independent from Janssen's, relied on early reports from these eclipse expeditions).⁷

<< Insert figure 04-02 here. >>

What historians have failed to emphasize however is the regime change signaled by the 1868 eclipse with respect to the organization of expeditions as far as the antipode for just a few minutes of observation time—all for nothing in case of bad weather! If they occur rarely at any given spot on the surface of the earth, solar eclipses are not all that uncommon. From 1800 to 1868, only a handful of the 41 such events that took place on earth gave rise to witness reports, much less to precise observations by professional astronomers. A common misconception was that the 1868 eclipse was, as Janssen himself wrote, “of such duration that

⁶ Lockyer, “The Story of Helium,” *Nature* 53 (1896), 319-322, 342-346; W. H. Keesom, *Helium* (Amsterdam: Elsevier, 1942); Clifford W. Seibel, *Helium: Child of the Sun* (Lawrence: Univ. Press of Kansas, 1968); and Schaffer, “Where Experiments End.”

⁷ Besides references cited above, see Seymour L. Chapin, “P. J. C. Janssen and the Advent of the Spectroscope into Astronomical Prominence,” *Griffith Observer* 48 (July 1984), 2-15; and Aubin, “La métamorphose des éclipses de soleil.”

one must go back to the time of Ancient Greece to find something similar.”⁸ In fact, the longest eclipse of the century had occurred barely 18 years before, on 7 August 1850. Visible in Hawaii, it has, as far as I know, given rise to no memorable description. Up until then only three times (in 1842, 1851 and 1860) were several concurrent major expeditions undertaken. These three eclipses were all visible from Europe. Whenever eclipses took place in other parts of the world, their observation apparently did not warrant the risk of long seafaring: reports provided by navy astronomers and officers whose duties led them close enough to the penumbra usually sufficed. After 1868, on the other hand, it henceforth became almost unthinkable for an eclipse to go unobserved by trained specialists from Europe or America. A “competitive bounding ritual” propitious to the striking of friendships, eclipse expeditions tightened the bonds of an emerging international solar physics community.⁹

For different reasons, historians of Thailand have also emphasized the importance of the eclipse of 1868. Although King Mongkut died later that year from a fever contracted during his journey, this event has become a building block of Thailand’s national identity. During the reign of his successor and son, Chulalongkorn, the walls of the Ratchapradit Temple were decorated with depictions of the king observing the eclipse. On the hundredth anniversary of the eclipse, Mongkut was granted the posthumous title of “Father of Thai Science,” and in 1982, Bangkok’s bicentennial year, 18 August was branded National Science Day. The population was encouraged to pay tribute to King Mongkut each year on this day. Today in Thailand, the king’s eclipse expedition now stands for the establishment of modern

⁸ Janssen to the Minister of Public Instruction (15 Feb.1869). AN F¹⁷ 2977. Partially repr. in *Archives de missions scientifiques et littéraires*, 2nd ser., vol. 5 (1868), 615. Eclipse predictions by Fred Espenak, NASA/GSFC.

⁹ Hufbauer, *Exploring the Sun*, 65. See also Pang, *Empire and the Sun*.

science, which, by and large, followed Western norms, applied Western technology, but remained respectful towards traditional belief systems. Traditionally, Thai historians have regarded this process of “modernization,” begun in the mid-nineteenth century, as a necessary measure taken by Mongkut and his court in order to save the country from being colonized by either France or Britain.¹⁰ Viewed from Siam, the 1868 eclipse expedition was—and remains—one of the king’s shrewdest political acts.

Historians of Thai science have recently paid renewed attention to the social meaning of the solar eclipse of 1868. Thongchai Winichakul has argued that the acclimation in Thailand, not only of the technology of production, trade, and war, but also of certain elements of western science, such as geography and astronomy, played a role in showing the West that Siam would join the imperial world-system without having to be colonized. Concomitantly, it helped to redefine the notion of “Thainess.” While Thongchai has emphasized is that for Mongkut this event was an occasion to show his court astrologers that Western practices were superior to theirs, Nerida Cook has explained that the king’s interest in astronomy could hardly be divorced from his very real belief in astrology—or at least from his need to exert some astrological control over the various ceremonials associated with monarchy.¹¹ Power in Thailand was traditionally legitimized by association with the supreme sources of power, and a good way to do this was through religious ideology, by which the monarch could claim privileged access to Buddhist theology and Hindu gods. In the second half of the nineteenth century, Siam therefore had to reconceptualize itself in relation to a new

¹⁰ On Thailand’s intellectual response to western challenges, see Bhumichitr, *Phra Chomklao*.

¹¹ Thongchai, *Siam Mapped* and Cook, “A Tale of Two City Pillars.” See also David Turnbull, “Travelling Knowledge: Narratives, Assemblage, and Encounters,” in *Instruments, Travel and Science*, ed. Bourguet et al., 273-294.

source of supreme power, which had shifted away from defeated China and India to Europe whose ethos no longer lay in the “cosmic” spheres, but in “civilization.”¹² In the following, I claim, however, that supreme power in Europe was also cosmic, hence the crucial status held in both societies by the body of knowledge that was both cosmic and civilized—astronomy.

The Global Politics of Solar Eclipses

But what do both views of the eclipse, the French and the Thai, have to do with one another? While insisting on the European construction of “otherness” in non-Western societies, postcolonial studies have often preserved a measure of incommensurability in the descriptions they provide for the kind of “modernity” experienced in both societies. Science posed a challenge to traditions (especially religious ones) and therefore became a bone of contention over which local elites fought and sought to extend their control. None of this is very surprising. But the fact that similar processes took place concurrently in France as well as in Thailand is rarely addressed. My aim in this paper is to use the eclipse as a revelator for the several, overlapping power struggles in which astronomy played a role: the cosmic clash between the West and the Far East, and within society on both sides, fights over the right to speak for the heavens and the epistemological, religious, and political consequences of exerting this right.

Solar (and lunar) eclipses indeed provided dramatic stages for the display of knowledge and power. Like cannons, steamships, and colonial bureaucracies, European countries mobilized eclipse expeditions into the service of their imperial ambitions.¹³ In

¹² Wilson, “State and Society in the Reign of Mongkut,” 144–5; Thongchai, “The Quest for ‘Siwilai’,” 533–4.

¹³ See Pyenson, *Civilizing Mission*.

Thailand, the sudden disappearance of the God-Sun from the tropical sky was, no doubt, a terrifying sight for those the event took by surprise. Tales about ignorant populations frightened by the unexpected, eerie nightfall were used to draw the line between rationality and superstition. In Europe, the fight against unfounded fears seemed to have been won. As the *encyclopédistes* triumphantly wrote: “Today, everybody, philosophers as well as common people, know what cause eclipses.” Almost a century later, the director of the Paris Observatory, François Arago proudly reported that the solar eclipse on 8 July 1842 had been observed in Southern France by “twenty thousands improvised astronomers.”¹⁴ In contrast, erasing their material dependence on local knowledge, nineteenth century European witnesses of such phenomena often felt that accounts of overseas expeditions were an appropriate place to emphasize the constructed demarcation between them and the “others,” between the civilized West and the savage Orient. The mastery of rational and scientific narratives both reinforced and legitimized imperial ambitions. “Civilization,” an American magazine emphasized, hinged on knowledge: a citizen who did not know his rights and duties was little better than a “Feejee Islander” unable “to manage an eclipse of the sun without burning his fingers.”¹⁵ The “management” of eclipses—accurately predicting their occurrence long before and making a display of rational, professional coolness amidst chaos —superbly showed European (and American) superiority.

As rhetorical strategies of European control over local populations, these simplistic accounts prove to be, unsurprisingly, much too monolithic. In the second half of the

¹⁴ “Eclipse,” s.v. in *L’Encyclopédie*, ed. d’Alembert et Diderot (1755) 5:293–8; F. Arago, *Astronomie populaire* 3:583. About the 1842 eclipse, see also Theresa Levitt’s contribution to this volume.

¹⁵ Anonymous, “Civilization,” *Manufacturer and Builder* 1 (1869), 277.

nineteenth century, learned segments of non-western populations had a wide arsenal at their disposal to try and exploit solar eclipses to their own advantage. In the face of a European menace to their sovereignty, local elites thus adopted a strategy similar their aggressors. To show the value and richness of their own knowledge traditions, they attempted to channel the symbolic power of eclipses in a manner more flexible than that of Westerners. In a syncretistic fashion, they mustered the respective strength of both endogenous and occidental knowledge traditions. In their view, solar eclipses were ideal terrains for mounting seduction operations aimed at demonstrating to the Europeans *both* their ability to adapt to modern science *and* the value of traditional knowledge. Such demonstrations played a key role in the defense of Thailand's political independence.

The symbolic power of eclipses was not only at stake in the imperialistic collision between Europe and Asia, but also within these respective societies. Among Europeans, nationalistic concerns vis-à-vis their neighbors sometimes seemed to take precedence over scientific results when planning of expeditions. In France, a deeply divided astronomical community haggled bitterly over who would be in charge of the 1868 eclipse expedition, while a small minority around the King of Siam recklessly tried to navigate between modernizers in favor of acculturation and imitation and traditionalists clinging to the past. When focusing on fights about who would be allowed to claim scientific mastery over eclipses, striking parallels emerge between East and West. In both cases, educated elites exploited epistemological, cosmological, and religious debates as a way to appeal to and increase their constituencies. In this view, institutional brawls in France, nationalistic contests between European states, and court intrigues in Bangkok all seem to have been geared towards claiming symbolic capital from the eclipse—to be able to speak about science and

modernity increased one's legitimacy.¹⁶ Although these debates took place in vastly different contexts characterized by huge imbalances of power and resources, the processes by which French and Thai societies were "scientized" in the last part of the nineteenth century followed similar paths.

That the European modernization of society through greater reliance on science and technology provide a useful lens through which one may examine similar processes in Thailand will come as no surprise. But, as I will suggest, the confrontation of French and Siamese discrepant experiences can also help scholars read French archival sources in a different light that will reveal some of the dynamics at play in the European metropolis.¹⁷ The dichotomy between West and East, between the metropolis and the empire henceforth appears less significant. In their own ways, Siam and France followed similar paths towards political prestige, strengthened central power, rationalized administration, and state-controlled science. Ultimately, it is the meaning of "modernization" that is questioned here.

The Beaches of Wako

As historians know well, no event can be dated more accurately than astronomical ones. Despite the variety of sources available, there is a wide consensus concerning what happened on the beaches of Wako on the morning of 18 August 1868. Viewed from Southeast Asia, there was no question about what the main purpose of astronomy was. European navigators and Thai officials were not the least bit troubled by the contemporary emergence of

¹⁶ On symbolic capital, see Pierre Bourdieu, *Distinction: A Social Critique of the Judgment of Taste*, trans. Richard Nice (Cambridge, Mass.: Harvard University Press, 1984).

¹⁷ On the juxtaposition of European and non-western sources and "discrepant experiences," see Said, *Culture and Imperialism*, esp. 37-40; and Dening, *The Death of William Gooch*.

astrophysics. They all agreed that the principal task of astronomy was to provide accurate measurements of position and time. So, it is highly significant that, while most accounts of the expedition, whether Thai or European, agree on many points, they markedly differed on two counts: who was responsible for choosing the observation site and who produced a better prediction of the time of the eclipse.

Some historians—and several modern guidebooks—prefer to locate the royal camp in the luscious Khao Sam Roi Yot (“Three Hundred Peaks”) National Park, but most observers gathered 50 to 60 km south of there on the barren beaches of Wako. In the invitation he sent Governor Harry St. George Ord of Singapore, King Mongkut had been quite precise: they were to convene at East Greenwich 99 degrees 42' and latitude North 11 degrees 39'.¹⁸ According to the *Dynastic Chronicles*, the King himself had “calculated on charts that the actual point of the eclipse would be at eleven degrees, forty-one minutes, forty seconds north latitude, at a spot only fifty-one geographical minutes west of Bangkok, and where the time differential would only be three minutes and thirty seconds from Bangkok time.” With respect to Greenwich, this translates (taking 100° 30' for Bangkok) to 99° 41'. When they reached the spot on 25 July, the first task that the French astronomers set out to do was to measure their position. They quickly disposed of the latitude by determining it “very exactly” as 11° 42' 35" N. As for the longitude, lack of time forced them to leave a residual error of about 5 seconds and they adopted the average of 6^h 29^m 50^s, East of the Paris meridian, which (taking 2° 20' 14" as the longitude of Paris) is equivalent to 99° 47' 44" E. According to Governor

¹⁸ Mongkut to Ord, signed by Henry Allabaster, dated 8 July 1868, repr. in Smith, *A Physician at the Court of Siam*, 47–8.

Ord, the meeting took place “in Lat: 11° 38' N. and Long: 99° 39' East, almost at the foot of the Mountain Kow Luan 4,236 feet high.”¹⁹

The agreement is not bad indeed. But who had chosen to establish a camp there? In his official chronicle of Mongkut's reign, Prince Thiphakorawong was explicit. Two years earlier the king “himself had personally calculated the coming of the eclipse. He insisted that that eclipse would definitely take place.”²⁰ A proclamation was issued. This was a serious matter: two hundred years earlier, King Narai had been ridiculed by French Jesuits' prediction of the solar eclipse of 11 November 1659 in Bangkok. Now Mongkut would outdo the French savants, who, having independently “discovered” that an eclipse could be witnessed in Siam, were allowed to come and observe it from his territory.

The French scientists came and searched about many districts, . . . but they were unable to locate the precise venue of the sun's path. It was after the Chief Minister of Military Affairs had started the construction work for the King's temporary quarters . . . that the French scientists asked if they, too, might erect their own quarters there in order to witness the eclipse. Their quarters were constructed at a point eighteen *sên* south of the King's own pavilion.²¹

The French, however, were just as explicit in denying any responsibility to the Thai for the choice. In a letter addressed to the French Minister of Navy sent from Saigon on 29 May,

¹⁹ Thiphakorawong, *Dynastic Chronicles* 2:532; Stéphan, “Voyage de la commission française;” Chabirand, “Étude sur l'éclipse totale,” on 378 and 381-382; Ord, “An Account of the Visit to the Late King of Siam,” 118.

²⁰ Thiphakorawong, *Dynastic Chronicles* 2, 532.

²¹ Thiphakorawong, *Dynastic Chronicles* 2, 533. Stéphan wrote that both camps were about one mile apart. Stéphan, “Voyage,” 124.

Governor Ohier of Cochin China reported that the gunboat *Frelon* had been sent to inspect the western coast of the Gulf of Siam to determine the best spot for observation. Criteria the captain was ordered to take into account included the possibility of building a temporary wharf on the coast, harboring several ships and probable weather conditions. Jean-Jacques Hatt, an engineer-hydrographer, selected a spot along the coast at a latitude first evaluated at 11° 36' and later corrected with data sent from France to 11° 42'. In his letter, Ohier added: "the King of Siam is apparently intent to come with his whole court in August to the spot we have chosen [*le lieu choisi par nous*]." ²²

The contradiction highlights the political tension in which this all took place. The station was located on an almost deserted sand beach, bordered by a jungle infested with mosquitoes and tigers. Mongkut had gone to great effort and expense to assert his dominion on this beach: "Out of the barren sands, almost overnight, sprang a noisy encampment, a straggling line of huts and buildings, spreading along the shore for a couple of miles." But pointing out that his control over this territory was but nominal, Stéphan's reports typically mentioned the possible commercial exploitation of the region, singling out its mineral riches, were it to fall into "more resolute hands." ²³

<< Insert figure 04-03 here. >>

The Eclipse in Franco-Siamese Context

When Lieutenant Hatt was received by Mongkut in the spring of 1868, he was greeted with suspicion. The king said he could not understand why the French would not observe the

²² Ohier to the Minister of Navy (29 May 1868). Copy in AN F¹⁷ 3008, folder "Stéphan et Rayet (éclipse de 1868)," file "Ministère de la Marine."

²³ Smith, *A Physician at the Court*, 46; Stéphan, "Voyage," 123-125.

eclipse from their own, newly acquired territory, on the southernmost tip of modern Vietnam, a territory Hatt himself had just surveyed.²⁴ The eastern shore of the Malacca peninsula had been singled out by director of the Paris Observatory, Urbain Le Verrier, some fifteen months earlier, because of the protection offered by the mountains against dominant westward winds and, during the monsoon, better guarantees of good weather conditions.

At the time, Mongkut could not see, without considerable worry, French warships crisscrossing the gulf and surveying the coasts of his kingdom.²⁵ On 11 August 1863, less than five years before Hatt's visit, in a move that humiliated and angered the Siamese court, Cambodia had been forced to accept French "protection." Culturally close to Thailand, Cambodia was traditionally a vassal State placed under the personal protection of the King of Siam who appointed its kings among the Khmer princes educated in Bangkok. Thus, any foreign intervention in Cambodia was perceived as a direct aggression on Siam. Consequently, the government in Bangkok started to worry. "Since we are now being constantly abused by the French because we will not allow ourselves to be placed under their domination like the Cambodian," Mongkut wrote, "it is for us to decide what we are going to do; whether to swim up-river to make friends with the crocodile or to swim out to sea and

²⁴ Ohier to Ministre de la Marine (May 29, 1868). See also *Cosmos*, 3rd ser., 3 (1868), 169-170.

²⁵ Cf. Wilson, "State and Society," 497ff.; and Bhumichitr, *Phra Chomklao*, 280ff. See also R. Stanley Thomson, "Siam and France 1863-1870," *The Far Eastern Review* 5 (1945), 28-46; Lawrence Palmer Briggs, "Aubaret and the Treaty of July 15 1867 Between France and Siam," *The Far Eastern Quarterly* 6 (1947), 122-138, and "The Aubaret Versus Bradley Case at Bangkok 1866-67," *ibid.*, 262-282; and Wasana, "L'Emprise thaïe sur le Cambodge."

hang on to the whale...”²⁶ The whale was Britain, which Mongkut saw as the less of two evils. If a British protectorate were necessary for the defense of Siam’s interests against the French, then he would accept it.²⁷ In 1865, *Kalahom* Sisuriyawong, asked D. K. Mason, the Thai consul in London, whether “the European powers, say France and England—have a mutual understanding or secret treaty as to interfering or non-interference with each other in the event of either desiring to conquer or have political influence over any native states in the East.”²⁸ He went on:

For centuries the English have been quietly exerting their power in the East, from Ceylon to Singapore. The Dutch can act as they please in Sumatra, the Spaniards in the Philippines, and the French in Cochin China. The latter appears to have been by mutual pre-arrangement set apart for French accession. Now in the case of Siam should the French desire to acquire political influence or be inclined to take possession of it, would the British Government interpose in the matter? . . . I have reasons to think that this Kingdom, like Cochin China, has been set apart for French ambition.

Writing to his ambassador in Paris, Mongkut confirmed his fear: “As regards the French, they are distinguished for their vainglorious disposition. Their Emperor, famed for his descent from a line of tigers and cobras, would, after his ascent to the Throne, seek colonies that are rich and vast. . . . These lands between Annam and Burma must appear to him to be ownerless

²⁶ Quoted in Moffat, *Mongkut*, 124.

²⁷ Mongkut to his consul in Britain (18 December 1866); Bhumichitr, *Phra Chomklao*, 348.

²⁸ Both the previous and following quotes are Wilson, “State and Society,” 392. Often translated as Prime Minister, the *Kalahom* was the most important post in the Siamese government.

and therefore desirable.”²⁹ Even the French sometimes agreed with him. In 1869, Count de Beauvoir thought that the old Siamese kingdom was a very “tempting *gateau*” served between France and England.³⁰

A few years before Hatt’s visit, the French consul Gabriel Aubaret, who had gone to negotiate a treaty with Siam, noted: “The sight of a warship always confer great weight to the words of an agent.”³¹ In 1868, Mongkut once again bowed to the power of gunboat diplomacy and declared himself enthusiastic about the French expedition. He would provide them with temporary observatories and lodging at a total cost estimated at \$100,000. But he made sure that British men-of-war would be present too. According to Constance Wilson, the Foreign Office archives show that it was at the suggestion of the British consul in Bangkok that Mongkut mounted his own show at Wako, “ostensibly to view the eclipse.” Having invited Sir Harry Ord to join him, Mongkut hoped that “the presence of Thai and British warships [would] show their unity in the face of possible French intrigue.”³² Altogether, eighteen steamships were anchored close to Wako in August 1868, between which elaborate gun salutes were exchanged. Stéphan was properly aware of the political nature of Mongkut’s voyage, if not of his own: “the king . . . wanted to see by himself our true intentions and avoid

²⁹ Translation of letter to Phraya Suriyawongse Vayavadhana, Siamese ambassador to Paris, 4 March 1867, quoted in Moffat, *Mongkut*, 122.

³⁰ Beauvoir, *Java, Siam, Canton*, 306 and 336.

³¹ Aubaret to Drouyn de Lhuys, Minister of Foreign Affairs (15 April 1865); quoted in Wasana, “L’Emprise thaïe,” 71.

³² Wilson, “State and Society,” 497.

the surprise of a devious seizure of his land.” But he granted that the king’s love for astronomy was reason enough to explain his trip.³³

Mongkut knew he could hardly count on British protection alone to safeguard Siam’s autonomy. But direct confrontation with the French was no more viable an option. Even if the country could afford one hundred warships, Mongkut wrote in 1866, “we would still be unable to fight against them, because we would have to buy those very same warships and all the armaments from their countries. . . . The only weapons that will be of real use to us in the future will be our mouths and our hearts.”³⁴ According to conventional historiography, the Siamese responded to the western threat with anxiety. But, as Thongchai has argued, Thai “desire” also played an important part. A portion of the Siamese elite was truly attracted by the *farangs’* culture and sought to incorporate many of its aspects into their own: they became “*siwilai*” (civilized).³⁵

But seduction, the flipside of desire, was present, too. While the Thai were no doubt fascinated by western technology, Mongkut sought to reverse the flow in this politics of seduction. On a diplomatic level, he increased contacts with European and American heads of states and saw to it that Siam played a conspicuous part in the Paris Exhibition of 1867. There was a more personal touch to this policy however. The king, according to an anonymous foreign observer, longed “to be esteemed by foreigners abroad as one of the best men that ever drew the breath of life.” The writings of Anna Leonowens, the Englishwoman who

³³ Stéphan, “Voyage,” 125.

³⁴ Translation of a letter to Phraya Suriyawongse Vayavadhana, Siamese ambassador to Paris, 4 March 1867, quoted in Moffat, *Mongkut*, 24; Wilson, “State and Society,” 394.

³⁵ Thongchai, “The Quest for ‘*Siwilai*,’” 532.

famously told her experience as his children's governess in the royal palace in Bangkok, belabored Mongkut's lust for flattery.³⁶

<< Insert figure 04-04 here. >>

For seducing the West, king Mongkut was an unlikely candidate (**fig. 04-04**). Meeting him in 1867, Count de Beauvoir found that “His Siamese Majesty . . . is perfectly ugly and looks like a monkey [*tient beaucoup du singe*].”³⁷ Having suffered partial facial paralysis in his late twenties or early thirties, he grinned constantly. His lower teeth had been replaced by a set made of deep-red Sapan wood. In the words of an American delegate, the king was, in the spring of 1868, “about as unprepossessing in appearance as can be imagined. His eyes were nearly closed, and he had a sort of sleepy look and drawling voice, which did not at all accord with the words he uttered. He was constantly chewing betel, . . . and the juice ran down his chin, rendering his whole appearance almost repulsive.”³⁸ Nonetheless, Mongkut inspired many novels, musicals, and movies,—and, one must admit was particularly

³⁶ Leonowens, *The English Governess at the Siamese Court* (1870) and *The Romance of the Siamese Harem Life* (1873). The anonymous quote is from Wilson, “State and Society,” 730. On seduction, see Bhumichitr, *Phra Chomklao*, 285–90. About the ambiguity of Siam's involvement in World's Fairs, see Thongchai, “The Quest for ‘Siwilai’,” 540-542; Pierre Aymar-Bression, *Histoire générale de l'Exposition universelle de 1867: les puissances étrangères* (Paris: J. Claye, 1868), 403–12; and Étienne Gallois, *Le Royaume de Siam au Champ de Mars en 1878 et à la Cour de Versailles en 1686: deux rois de Siam* (Paris: Challamel aîné, 1878-1879).

³⁷ Beauvoir, *Java, Siam, Canton*, 303–4.

³⁸ Allen D. Brown, “A Visit to Bangkok,” *Harper's New Monthly Magazine*, 41 (1870), 359-368, on 365.

successful in captivating imaginations in the West. Likewise, one can mention the way in which American periodicals fought tongue in cheek for his readership after his death: “His late highness was a regular reader of the SCIENTIFIC AMERICAN, and it seems to us very likely that he learned more from its columns about forts, steamboats, railways, canals, and photography, than from the [*Evening*] *Post*.”³⁹

In the politics of seduction, science, as one of the two supreme value systems—the other being the Christian faith—of the West, was the only one that the Siamese could accept wholeheartedly. Mongkut organized exchanges of animals between Siam and France. The steamship *Gironde*, which the Siamese Ambassador took to France also brought animals for “French Zoographers.”⁴⁰ The arrival of a lion-skin and a stuffed-lion from France mentioned in the *Dynastic Chronicles* shows the importance attributed to the gift. The “conquest” of the West was vital for the survival of Siam.⁴¹ In this war of seduction, Mongkut found a way to use his pet science—astronomy—as a weapon against the West.

The Many Uses of Astronomy

In 1851, Mongkut was crowned at forty-seven, after having spent more than twenty years in a Buddhist monastery. The oldest son of King Rama II, he had been passed over when his

³⁹ *Scientific American* 20 (1870), 10. Margaret Landon, *Anna and the King of Siam* (New York: The John Day Company 1944). The book was turned into the musical *The King and I* by Oscar Hammerstein (1951) and several subsequent movies. On Leonowens, see Susan Brown, “Alternatives to the Missionary Position: Anna Leonowens as Victorian Travel Writer,” *Feminist Studies* 21 (1995), 587-614.

⁴⁰ As Mongkut called them. Quoted in Moffat, *Mongkut*, 103.

⁴¹ Thiphakorawong, *Dynastic Chronicles* 2, 309-310; Bhumichitr, *Phra Chomklao*, 399.

father died and, “preferring a crownless head to a headless body,” had retired from the court.⁴² Isolated from his princely milieu, he learned English and befriended French Catholic and American Protestant missionaries, who, Leonowens wrote, “helped to unlock to him the secrets of European vigor and advancement.”⁴³ His eagerness to learn endeared him to foreigners. This much-praised receptivity, as Wilson has written, should be interpreted “as evidence of Thai initiative in seeking the information they wanted. They were eager to learn about mechanics, science, and medicine, the benefits of which were immediately observable, but they ignored or rejected those things for which they felt no need.”⁴⁴ The Siamese elite were extremely discriminate in what they sought from western values. If they showed great interest in science and technology, they were much more reluctant towards religion, politics, art, and social mores. In 1857, the British hosts of a Siamese delegation noted that “they seemed to have no taste for architecture, paintings, or sculpture but they . . . took great interest in scientific instruments of all kinds making many purchases of chronometers and scientific instruments and arms from the best makers and of the latest improvements.”⁴⁵ As for religion, some missionaries had hoped that science could draw the Siamese to the gospel: “[u]nder the starry mantle of astronomy, our holy religion is easily introduced among princes and province governors.”⁴⁶ Others, however, recognized that while Mongkut welcomed their company, he

⁴² Feudge, “An Oriental Monarchy,” 798.

⁴³ Leonowens, *The English Governess*, 56.

⁴⁴ Wilson, “State and Society,” 21–2.

⁴⁵ Quoted in Aasen, *Architecture of Siam*, 147n31.

⁴⁶ P. H. Josson and L. Willaert, eds., *Correspondance de Ferdinand Verbiest* (Brussels: Palais des Académies, 1938), 237; quoted by Bhumichitr, *Phra Chomklao*, 69.

had “no other object as he says than to acquire the English language and get hold of foreign science.”⁴⁷

Why did Mongkut, then, show so much interest in a hobby such as astronomy? There are three parts to the answer. First, astronomy actually was, on a practical level, useful, especially as far as geodesy and mapping were concerned. When the French started to map the Mekong region, for example, it seemed unwise not to do the same. The Thai government hired an Englishman to do the job, Mr. “*doojchók*.”⁴⁸ On several other occasions, while visiting various parts of his country, Mongkut measured their longitude and latitude himself. During those trips, one reads again and again in the *Chronicles* that “the king made scientific measurements of the sun” and “of the stars.” With geodesy, he wished to keep control over Siam’s inscription on European maps.⁴⁹ Fortifying the capital city on the sea side, Mongkut had his “Holy Fortress of the Hill”—whose eclectic architecture encapsulated his policies mixing Thai, western and Chinese influences—built overlooking the town of Petchaburi and the mouth of the Chao Phraya River. From there, he could observe the stars from his observatory tower while his ministers kept an eye on the naval traffic in the gulf.⁵⁰ Telescopes have many uses.

⁴⁷ Reverend Bradley, quoted in Moffat, *Mongkut*, 156.

⁴⁸ Thiphakorawong, *Dynastic Chronicles 2*, 308. This man may have been a Dutchman named Duisart. On this, see Thongchai, *Siam Mapped*, 116-117, 193n20.

⁴⁹ Thiphakorawong, *Dynastic Chronicles 2*, 338-341; Wilson, “State and Society,” 496; Cook, “A Tale of Two City Pillars,” 287.

⁵⁰ Bhumichitr, *Phra Chomklao*, 224; Henri Mouhot, *Travels in the Central Parts of Indo-China (Siam), Cambodia and Laos, during the Years 1858, 1859, and 1860*, 2 vols. (London : J. Murray, 1864), 2:50–7; and Aasen, *Architecture of Siam*, 135–6. For a picture and plan see

But Mongkut always had more success convincing the British than the French. If his goal in showcasing the eclipse had solely been to make a strong impression on the French scientists, one can only say that he failed miserably. For Stéphan, this encounter on the beach of the gulf of Siam symbolized the clash of two worlds. A Navy officer from the *École polytechnique* in his party, Lieutenant Chabirand wrote “the king’s visit was one of the most curious events of our station on the west coast of the gulf of Siam.” Going about their serious business, installing and calibrating their delicate equipment and measuring their position, the French impatiently listened while the king, with a touching naïveté, displayed his astronomic erudition. After this meeting, Mongkut seemed displeased with the impression he had given the Frenchmen and sent a handwritten “astronomical statement” for clarification.⁵¹ In an embarrassing confession, he explained that he had acquired his astronomical knowledge first, from Siamese sources and the Hindu treatise *Sûrya-Siddhânta*, before he “tested certain european books of astronomy and astronomical navigation geometry, and so I have understand better manner of astronomical calculation [sic].” But the *Sûrya-Siddhânta*, according to French eyes, was “not aimed at intelligence.

It is a collection of numerical rules, true codes indeed, that the disciple will have to learn by heart, verse after verse, and unperturbedly fix in his memory, so has to recite all the words in order, without letting any pass by. Then, by executing the arithmetic operations prescribed by each verse, he will mechanically, without mental work, be

136-137; for a description of the palace see Apinan Poshyananda, *Modern Art in Thailand: Nineteenth and Twentieth Centuries* (Singapore: Oxford University Press, 1992), 5.

⁵¹ Chabirand, “Étude,” 380. Mongkut’s letter was reproduced *in extenso* by Stéphan. After the eclipse, the king again tried to explain his astronomical knowledge to Stéphan who found him “incomprehensible.” Stéphan, “Voyage,” 146.

able to determine for any given time the apparent positions of the moon, the sun, and the five planets, to predict the moments of lunar and solar eclipses.

Even so, the astronomer Jean-Baptiste Biot added, computing solar eclipses with the methods of the *Surya-Siddhanta* led to erroneous results. “As a scientific work, it is an incoherent assemblage of true or false, exact or inexact astronomic data, combined through generally imprecise numerical rules” in which observation played no part.⁵²

Mongkut had no need to worry, however: his personal competence as an astronomer was, as far as the French were concerned, beside the point. Even if unimpressed by the king’s actual knowledge of astronomy, Westerners could not help but be struck by the interest an Asian despot showed toward the most advanced of their sciences. To take part in the “scientific movement” was bound to attract attention. And eclipse expeditions had traditionally been a good way for monarchs to give the impression of contributing to western science. In 1858, for example, the Emperor of Brazil, Don Pedro II, himself fond of astronomy, made sure that several parties were sent to observe an eclipse traversing the northern part of his country. Two years later, while most European astronomers converged in Spain, the Viceroy of Egypt mandated his own astronomer, Mahmoud-Bey, who had been trained in Paris, to observe the eclipse in Nubia. Even if no scientific data from the expedition was ever to be used in Europe, Egypt’s participation in the “European scientific concert” was applauded by everyone, from the Academy of Sciences in Paris to trade journalists in the United States:

by European influences, the Khedive of Egypt, the King of Siam, and other semi-barbarous potentates have been induced to erect astronomical observatories and

⁵² All quotes here are from J.-B. Biot, *Études sur l’astronomie indienne et sur l’astronomie chinoise* (Paris: A. Blanchard, 1869), 177, 187–8, 196–7.

appoint salaried astronomers, among whom are many natives. . . . It is indeed a cheering sight to see the beginning of the *conquest*, which peaceful science is bound to make over the whole world, independent of nationalities, creeds, or races.⁵³

“Conquest” was precisely what Mongkut sought to avert even while he recognized the need to adapt to Western science. But how was he to do this without selling out completely?

The third use Mongkut assigned to astronomy was thus ideological. After the eclipse, the king was, by all accounts, ecstatic. To his guests he said that the great noise made during the eclipse, the frantic beating of drums and firing of guns, was not an attempt to frighten the dragon Rahu, but rather an expression of joy caused by their king’s ability to predict the exact time of the event (**fig. 04-05**). The court astrologers were the main losers in this event. They thought it impossible that the sun could be eclipsed by the moon and barely refrained from expressing their skepticism in the face of Mongkut’s conviction. Returning to Bangkok after the trip, the king justifiably, humiliated and punished them.⁵⁴

<< Insert figure 04-05 here >>

According to many people present at Wako, the king boasted that his calculations were more precise than the French astronomers’ by 2 seconds. As indicated above, Mongkut’s more accurate prediction was a second, important discrepancy between the Siamese and

⁵³ Anonymous, “Progress of Astronomy Among the Modern Barbarians—Paying Our Debt to the Arabs,” *Manufacturer and Builder* 7 (1875), 58. My emphasis. About the Egyptian expedition, see Mahmoud-Bey, *Repport à son altesse Mahammed Saïd, vice-roi d’Égypte sur l’éclipse totale de soleil observée à Dongalah (Nubie) le 18 juillet 1860* (Paris: Mallet-Bachelier, 1861), 19.

⁵⁴ Cook, “A Tale of Two City Pillars,” 296-297; Allabaster, *The Modern Buddhist*, 12; and Thiphakorawong, *Dynastic Chronicles* 2:540-541.

French accounts of the events of Wako. For French astronomers, however, a two-second difference would have fallen within an acceptable margin of error since they had lacked the time to properly ascertain their longitude. As Chabirand wrote, to determine the longitude within a precision of one second was a very delicate operation which took time: it required at least forty meridian observations of the moon, that would be, in the most favorable conditions, roughly three months.⁵⁵

Be that as it may, the fact that this king's feat was widely reported is significant. While this extraordinary precision was sure to strike amateurs, like Sir Harry who commented on it, Mongkut himself probably knew that this could be exploited on the domestic front. Indeed, the audience he first had in mind when staging the expedition was most likely, not the *farangs* but his own subjects. During the eclipse the Prime Minister "left his long telescope swinging on its axis and walked into the pavilion and addressed several of his wives, saying 'Will you now believe the foreigners?'"⁵⁶ As this remark shows, the eclipse was part of the king's efforts to make his people embrace western science. In the Bowonniwet temple in Bangkok, murals from this time commemorate the king's friendly relations with Westerners.⁵⁷

⁵⁵ Chabirand, "Étude," 383. See also Emmanuel Liais, *Traité d'astronomie appliquée à la géographie et à la navigation suivies de la géodésie pratique* (Paris: Garnier, 1867). On longitude determination, see Guy Boistel's contribution to this volume.

⁵⁶ Feltus, *Abstract of the Journal of Bradley*, 278; and William L. Bradley, *Siam Then: The Foreign Colony in Bangkok Before and After Anna* (Pasadena: William Carey, 1981), 149.

⁵⁷ Englishmen at a horse race, American ships bringing missionaries, German geologists searching for minerals, etc.; see Aasen, *Architecture of Siam*, plate 35 with a modern color photo of the Wat, facing p. 188.

But Mongkut's attitude toward western science was hardly one of unproblematic, pragmatic acceptance. His emphasis on his having to rely on both Western and Asian astronomy books to compute the path of the eclipse is significant. His astronomical syncretism was not aimed at showing the West that traditional knowledge could compare to modern science as much as it was intended to convince his countrymen that they could use, in Wilson's words, Siam's "pre-modern social and political order as a weapon against the intrusion of the West." Mongkut's political struggle with his court was directed both against the excessive "occidentalophobia" (Bhumichitr) of his astrologers and the modernists' acceptance of the pure and simple domination of foreign values over those of Siamese culture. In her fascinating article, Cook has emphasized the "paradox" in which the monarch can be celebrated today both as the founder of Thai science and a reformer of Thai astrology. She has argued that Mongkut's experience with astronomy provided "justifications . . . both for the emergence of Siam into the modern world, and the retention of Siamese tradition without ceding defeat to competitive and hostile traditions."⁵⁸ To emphasize this point, one may turn to Mongkut's younger brother 'Itsaret, who held the honorific but powerless title of "second king of Siam." Indeed, the fascination Mongkut exerted on Westerners often paled in comparison to the success enjoyed by 'Itsaret. By the time of the eclipse in 1868, he had been dead for two years, but his reputation reached Stéphan, who believed that he had devoted his life to the study of the heavens. But what foreigners admired most about the second king was his pragmatic take on science and technology. In their view, his conversation had none of Mongkut's quaintness: he "would chat with you (if you knew enough to keep up your end of the conversation) about the latest improvements in firearms or the most recent scientific

⁵⁸ Wilson, "State and Society," 739; Bhumichitr, *Phra Chomklao*, 179; and Cook, "A Tale of Two Pillars," 302.

discovery.”⁵⁹ Moreover, he put his knowledge to good use. On 4 July 1848, for example, Dan Bradley noted in his diary that:

This A.M., we saw something new on the river—a little model steamboat, not twenty feet long, with smoke-pipe, paddlewheel, all complete, steaming bravely against the tide with H.R.H. Chao Fa Noi [Prince ‘Itsaret] sitting at the helm. It was the first native steamer on the Meinam [Chao Phraya River], entirely his own construction.⁶⁰

‘Itsaret’s palace, “rebuilt after the model of an English nobleman’s residence,” held a library “more judiciously selected than that of his brother, [which] abounds in works of science, embracing the latest discoveries.” He had a little cottage with glass windows and English furniture. Above the entry hung a sign stating “Watches and Clocks Made and Repaired Here.”⁶¹ He even named his second son George Washington.

Western science and technology had many faces. The two royal brothers acquired their familiarity with it through rather different channels. While Mongkut was still in the monastery, ‘Itsaret was put in charge of rebuilding ancient fortifications. Through a crew of European engineers and artisans he had hired, he became acquainted with navigation, naval construction and armament, coast and inland defense, engineering, transportation, and telegraphy, the working and casting of iron, etc. Working with engineers, ‘Itsaret was exposed to a different kind of science from the one Mongkut discovered while debating cosmologies and moralities with missionaries. Even while adopting western ways of measuring time and

⁵⁹ Geo B. Bacon, “In and Around Bangkok,” *Scribner’s Monthly* 5 (1873), 421-432, on 426.

See Stéphan, “Voyage,” 125.

⁶⁰ Feltus, *Abstract*, 60-61; quoted in Wilson, “State and Society,” 229.

⁶¹ Leonowens, *The English Governess*, 224-231; Moffat, *Mongkut*, 50; and Feudge, “An Oriental Monarchy.”

space, Mongkut understood the ideological use of science and of astronomy especially. In 1867, an essential book that endorsed western science and technology was published in Bangkok. It was called *Nagsu sadaeng kitchnanukit* [*A Book on Diverse Matters*] and its author, a former Minister of Foreign Affairs, was Prince Thiphakorawong, half-brother to the Prime Minister Sisuriyawong and a close associate of King Mongkut's. This major text, the first ever published by the Siamese without foreign assistance, used the observatory sciences (astronomy, geography and meteorology) as linchpins for displacing traditional cosmological beliefs, which were cast off as mere superstition. In this hybrid text, modern (western) astronomy became a way to reaffirm Buddhism. Western science and technology could be interwoven with old mental structures, in order to salvage their essential core.⁶²

To achieve this, a reinvention of tradition was required. As a monk, Mongkut had reformed Siamese Buddhism and founded a new sect, the *Thammayut*, which means "those who follow the law."⁶³ A Pali and Sanskrit scholar, Mongkut wished to rid Buddhism of Brahmanistic superstitions by recovering ancient texts and rituals. Recently, this move has been interpreted either as a reaction to Christian attacks on Buddhism or as a way to explain clearly the nature of Buddhism to critical *farangs*.⁶⁴ Buttressing local religious traditions was

⁶² The *Kitchnanukit* is the basis for the first part of Allabaster, *The Wheels of the Law*; on this, see Craig J. Reynolds, "Buddhist Cosmography in Thai History, with Special Reference to Nineteenth-Century Culture Change," *Journal of Asian Studies* 35 (1976), 203-220; Wilson, "State and Society," 32-33, and 226; and Thongchai, *Siam Mapped*, chapter 2..

⁶³ Alexander B. Griswold, "King Mongkut in Perspective," *Journal of the Siam Society* 45 (1957), 1-47.

⁶⁴ Bhumichitr, *Phra Chomklao*, 96-98; and Arom Prapandah, "Le contact missionnaire au XIX^e siècle: Mgr. Pallegoix et le Prince Mongkut (Rama IV)," in *Études indo-chinoises*.

for Mongkut just as important for the survival of his nation as was the embracing of western technology. He made use of western technology—the printing press—and of the ideological appeal to reason to do this. While Wilson has argued that Mongkut found in tradition a resource to help his country resist the West, Bhumichitr has followed the Thai art historian Piriya Kairiksh's suggestion, that the Buddhist monk actually *invented* parts of the very tradition upon which he leaned. For example, with his emphasis on free trade, Mongkut constructed an idealized past that bore close resemblance to the nineteenth century Occident. In a way thereby directly inspired by European nationalism, he became one of the first theoreticians of Siamese nationalist ideology.⁶⁵

In this light, the eclipse was indeed “an event symbolic of [an] epistemological struggle.”⁶⁶ But it also played an important role in the more straightforward power clashes. What was the nature of the tensions gripping the oligarchy at the time of the eclipse? Suspicion and jealousy had already soured relations between Mongkut and his younger brother, the second king.⁶⁷ But following ‘Itsaret’s death in 1866, a realignment in the power structure took place. In opposition to the *Kalahom* Sisuriyawong, Mongkut, whose health appears to have been frail even before he left for Wako, wished for his older son to succeed

Frontières et contacts dans la péninsule indochinoise (XVI^e–XIX^e siècles) (Aix en Provence: IHPOM, Etudes et documents 13, 1981), 23–47, 28.

⁶⁵ Wilson, “State and Society,” 732-739; Bhumichitr, *Phra Chomklao*, 102-105. Recall also Eric Hobsbawm and Terence Ranger, eds., *The Invention of Tradition* (Cambridge: Cambridge University Press, 1983).

⁶⁶ Thongchai, *Siam Mapped*, 42.

⁶⁷ Prince Chunla Chakkraphong, *Lords of Life: A History of the Kings of Thailand* (London: Redman, 1967), 201; Smith, *A Physician at the Court*, 158-159.

him, but he was merely 14 years old. During the journey, the etiquette of the Court slackened: “On no previous occasion had the Court been so completely revolutionized; the royal apartments were thrown open, and the ladies of the household brought prominently forward, whilst the younger members of the royal family were allowed to mix with their English visitors in the most friendly and sociable manner.”⁶⁸ In this way, Mongkut took the opportunity to allow Chulalongkorn to meet foreigners, to participate in the workings of government, and to visit French ships.

The king died on 1 October from a fever he contracted in Wako where “myriads of insect [had begun] to *zizzee*, as the Siamese anomatopoeically [sic] express it.”⁶⁹ Although seriously ill himself, the young Chulalongkorn was appointed King, with Sisuriyawong and Thiphakorawong as his closest advisors. During his forty-two year reign, he vigorously pursued his father’s policy of “modernization.” His main rival, the older George Washington, the son of the late second king, had to be content with assuming his father’s position as second king. Often taken as a sign that astrologers were right after all in seeing the eclipse as a bad omen, the trip to Wako, by securing his son’s appointment, was indeed Mongkut’s last political victory of enduring consequence.

Mongkut’s eclipse expedition therefore has to be read as part of several overlapping political conflicts. Inside the Bangkok court, the epistemological and religious implications of the eclipse were turned into crucial chips in more mundane power struggles. In the cosmic confrontation between Southeast Asia and Western Europe, the eclipse functioned as test case for precise mastery over astronomy. From East to West, exhibiting one’s control over the

⁶⁸ Ord, “An Account,” 129.

⁶⁹ Garnier d’Abain, “An Elephant Hunt in Siam,” *Scribner’s Monthly* 8 (1874), 223–8, on 224.

event determined who was allowed to speak for the heavens, and ultimately for science, civilization, and modernity.

The Reasons of the Eclipse

“Transition periods offer a curious spectacle: . . . all is mingled, the fantastic and the real, the positive mind and supernaturalism, skepticism and superstition, imagination breeding chimeras and reason destroying them.”⁷⁰ This comment was not directed at Prince Thiphakorawong’s *Kitchnanukit*, where modern observatory sciences sided with superstition to uphold Buddhism and polygamy, but at Camille Flammarion’s *Pluralité des mondes habités* [The Plurality of Inhabited Worlds], first published in 1862. To outline the French cultural and political landscape that made the 1868 expedition possible, our detour through Siam will prove instructive. For the French also, the eclipse provided a major stake in various fights about science and modernity that involved epistemology, religion, and politics.

In 1868, it was by no means preordained that France should send astronomers on a twenty thousand kilometer journey just to observe an eclipse of six-minute duration. The Minister of Education Victor Duruy had already petitioned Emperor Napoléon III for funding, but the director of the Paris Observatory Urbain Le Verrier started to fear that no one among the astronomers would agree to go to Siam. As late as 14 March 1868, naval officer Ernest Fauque de Jonquières wrote:

⁷⁰ G. Vapereau, “La confusion des idées et des langues. Philosophie, science, fantaisie, rêve et orthodoxie tout ensemble. M. C. Flammarion,” *L’Année littéraire et dramatique, ou Revue annuelle des principales productions de la littérature française et des traductions des œuvres les plus importantes des littératures étrangères, classées et étudiées par genre* 8 (1866), 383–90, on 383–4.

I still believe that M. Hatt, the engineer who is the head of the astronomical and hydrographic service in Cochin China, can make useful observations of the eclipse . . . especially if a pocket or portable spectroscope were made available to him. To make good astronomical determinations, he already has the necessary instruments in his possession and the experience of this kind of observation. . . . Due to a lack of suitable instruments, he will admittedly not be able to . . . make photographic reproductions; but if he is, as I imagine, gifted in drawing, he will be able to supply images almost as good and exact [as them].⁷¹

At first, Le Verrier had had no firmer conviction as to who should be sent to observe the phenomenon: “either we decide especially to send some professional astronomer, or the Navy would consent to ask some able officers from the station in Saigon to take charge of this work.” Similarly, the astronomers Hervé Faye and Ernest Laugier, of the Bureau of Longitude, issued eight pages of instructions for naval officers who might be in the region at the time of the eclipse.⁷² They detailed procedures to be respected: circles to be drawn in advance on cardboards around which the position of the main prominences would be sketched; each time, the observer’s name, his geographic position, the instrument used, the mean time of the observation and above all, the zenith of the disk should be noted on the

⁷¹ Note that, for lack of time to prepare carefully, photography was excluded from the expedition. Jonquières to the Minister of public instruction (14 March 1868). AN F¹⁷ 3008, folder “Stéphan et Rayet (éclipse de 1868),” file “Renseignements sur les localités.”

⁷² Le Verrier to Minister of Public Instruction (15 March 1867). AN F¹⁷ 3008. E. Laugier and H. Faye, *Instructions sommaires du Bureau des Longitudes sur l’observation en mer de l’éclipse totale du 18 août prochain (Connaissance des temps pour 1868)* (Paris: Lemerrier, 1867).

sketch, as a composite painting could be drawn afterwards. Lastly, the astronomers mentioned that a hand-spectroscope could be used to observe the areole around the dark lunar disk.

One will observe one of the three following phenomena: Either the spectrum of the areole will remain identical, except for its intensity, to the spectrum of the corresponding region of the sky before the eclipses, that is, to the ordinary spectrum of the Sun; either to that spectrum another spectrum composed of a few bright and colored lines will be superposed; or the ordinary spectrum will be totally inverted, bright lines taking the place of the black lines of solar origin.

Captain Rapatel and M. de Créty, both from the *Messageries impériales* Company, dutifully gave picturesque descriptions of the eclipse—which were never used by astronomers.⁷³ In Britain, similar instructions, as well as pocket spectroscopes, were sent to the managing directors of the Peninsular and Oriental Steam Navigation Company who dispatched them abroad—to little avail: Captain Rennoldson's comment, "I return the spectroscope, and am only sorry I could not make more use of it," being a rather typical response.⁷⁴ As Faye and Laugier themselves noted, the correct use of such an instrument was far from obvious: "To take advantage of this small instrument, one must familiarize oneself with the details of the spectrum that it produces when turned toward different regions of the sky during the day."⁷⁵

⁷³ Flammarion, *Études et lectures sur l'astronomie* (Paris: Gauthier-Villars, 1872), 3:97-98.

⁷⁴ "Proceedings of the Council of the Royal Society with Reference to the Undertaking of Certain Physical Observations in India," *Proceedings of the Royal Society in London* 16 (1867-1868), 283-294; Capt Charles G. Perrins, Captain D. Rennoldson, Captain Summerville Murray, and Captain Henry Welchman King, "Observations of the Total Solar Eclipse of August 18, 1868," *ibid.* 17 (1868-1869), 125-127, quote on 126.

⁷⁵ Aubin, "Orchestrating Observatory, Laboratory, and Field."

By the start of 1868, the political situation in the astronomical community was explosive: acrimonious debates had erupted about whether the Paris Observatory should be moved to the suburbs, about the place of meteorology in the institution, about Le Verrier's management of the Observatory, about Charles-Eugène Delaunay's lunar theory, about the relative roles of the Observatory and the Bureau des Longitudes, etc.⁷⁶ On February 3 1868, putting aside all his concerns about the future of the Observatory, Le Verrier exposed his views concerning the coming eclipse to the Academy of Sciences. Nothing had been decided upon, he said, which is why he brought the issue to the table. One rather suspects that he was by then well aware of the Bureau des Longitudes's rival plans to send Janssen to India with the British and that Le Verrier's intervention was aimed at opening up a new front in the debate. What better way to deflect the attacks of the committee that at the time working on reforming the Observatory's administrative structure? In this context, the eclipse became, in Paris as much as in Bangkok, a prized trophy with which no one could dispense. While Faye argued that the mere hope of seeing a reverse spectrum in the prominences was ground enough to legitimate all the efforts, Le Verrier injected practical and political issues into the debate. The expedition he wished to organize should duplicate Janssen's physical mission to "enjoy the benefit of controlled observations" by multiplying observers and stations.⁷⁷ That

⁷⁶ Aubin, "The Fading Star of the Paris Observatory." On meteorology at the Paris Observatory, see Fabien Locher, "Le Nombre et le temps."

⁷⁷ Quoted in Stanislas Meunier, "Académie des Sciences. Séance du 3 février 1869," *Cosmos* (8 Feb. 1868) 2, 24–5; cf. Le Verrier, "Éclipse totale du soleil, le 18 août 1868," *CRAS* 66 (1868), 220–3, and 226–7; and Faye, "Sur les mesures prises par le Bureau des Longitudes pour l'observation physique de l'éclipse prochaine, aux Indes orientales," *ibid.*, 223–6.

the shadow path should cross a French territory was reason enough, Le Verrier said, to go and observe the phenomenon in a neighboring country.

In the 1860s, “science” was a force everyone was trying to co-opt. Although he never traveled to see any solar eclipses, Napoléon III, for one, made sure to pay formal visits to the laboratories of some of the most prestigious savants in the capital. No one could afford to be seen as neglecting it. In February 1868, an Italian daily noted:

You will see that they will not reach the eclipse of 17 August [local European time].

The Bureau des Longitudes is sending M^r Jansen in Cochin China with a letter of recommendation for the authorities. What a difference with the magnificent expedition organized by England. And it is from a French territory that one will be better able to observe this phenomenon without precedent. That’s the state of science in France under Napoleon III.⁷⁸

When Minister Duruy read the article, he penciled in red that however strained his budget might be, Janssen’s mission had to take place. On 13 April 1868, at the Academy of Sciences, Le Verrier argued that sending Janssen to observe the phenomenon in a place where so many more British were was a waste of precious resources. But the Minister had already decided to grant Janssen the mission.⁷⁹ Meanwhile, the Observatory had been reorganized, and Le Verrier’s position bolstered. So, he decided on his own to send an official Observatory mission to Siam: it would be composed of three astronomers and as many trained naval officers and would be allotted twice as much as Janssen’s. Altogether France would spend

⁷⁸ *Riforma*, Florence (12 Feb. 1868). French translation in AN F¹⁷ 2977, Janssen file “4ème mission: Mission scientifique dans les Indes Anglaises (Eclipse du 18 août 1868)”.

⁷⁹ Stanislas Meunier, “Académie des sciences. Séance du 13 avril 1868,” *Cosmos* (18 Apr. 1868), 2:24.

more than 75,000 francs for these two expeditions (that is, about half the annual budget of the Observatory), without taking into account the 30 percent discount offered by the Messageries impériales and the considerable expense of the Navy and the colonial authorities in Saigon.

Engaged in a “scientific struggle” against other European nations, France, however, never felt it was competing with Siam on this level.⁸⁰ Nationalism and colonialism played a large part in mounting the expeditions, but it was the infighting among French astronomers that insured that both expeditions were manned by top-notch, if still junior, astronomers. Despite French fears, British expeditions were on the contrary staffed by officers from the Navy or the Geodetic Survey, most notably Lieutenant John Herschell, who had little spare time to prepare for the special operations required for the spectroscopic observation of the eclipse. While the Dutch and the Papal States canceled their planned expeditions at the last minute, and the Germans and British mounted only half-hearted enterprises, France sent its best trained scientists in astrospectroscopy—who performed in accordance with expectations.

The 1868 eclipse was a key episode in the rise of direct state sponsorship of science. The French government later funded many new astronomical institutions at home. Expedition leaders in 1868 played a large part in overseeing the reorganization of metropolitan science: Stéphan’s Observatory in Marseilles soon became autonomous from Paris, while an Observatory for Physical Astronomy was created for Janssen in Meudon. After the Franco-Prussian war of 1870-1871, the reorganization of astronomy was central to transforming the institutional landscape of French science.⁸¹ Surrounding the power struggles about who could

⁸⁰ Janssen, “Conférence faite à la Sorbonne sur l’éclipse totale du 18 août 1868,” *Lectures académiques, discours* (Paris: Hachette, 1903), 299.

⁸¹ On new astronomical institutions, see Maison, “La Fondation et les premiers travaux de l’observatoire astronomique de Bordeaux.”

speak for astronomy, institutional reforms and the image of science were debated. But these considerations alone cannot fully account for the fact that the Emperor's Council, the Legislative Chamber and the Senate deemed eclipse expeditions important enough to be richly endowed.

The Eclipse of Reason?

“The State must support science just as [it supports] religion,” stated Ernest Renan, for science, like religion, ultimately dealt with human nature.⁸² But in the case of astronomy, science and religion intermingled just as tightly in the French political and cultural landscape as they did in Thailand. In the 1860s, the cultural signification of astronomy has important religious and cosmographic implications in both places. Religion was serious business in Napoléon III's France. Following the coup d'État in 1851 the Church had been one of the strongest supporters of the Imperial Regime. Throughout the 1860s, only the French contingent in Rome allowed the Pope to resist Italian unification. Then, in 1858, the Virgin Mary appeared to a young shepherdess named Bernadette Soubirou in Lourdes, an event that transformed the town into a national shrine and ushered French Catholicism into a thoroughly modern enterprise.⁸³ The fight against superstition was not over even in “our luminous Europe,” as Flammarion reported. For example, during the partial solar eclipse of 6 March 1867, nuns in charge of a girl's school made them fall on their knees and pray hoping to forestall the malediction of the “*Très-Haut*.”⁸⁴ From this context, considerable interest for religious matters—and debates about them—ensued. As had become customary since the

⁸² Renan, *L'Avenir de la science*, 253.

⁸³ Ruth Harris, *Lourdes: Body and Spirit in the Secular Age* (London: Penguin, 1999).

⁸⁴ Flammarion, *Astronomie populaire*, 259.

beginning of the century, science was one of the main tools used by liberal opponents of the French Catholic Church. But while acknowledging nineteenth century fascination with religion, historians have traditionally “minimize[d] the relevance of an obsessive religious quest;” by and large, historians of nineteenth century French science have been blinded by the later success of Comte’s positivism.⁸⁵

The relationship between science and religion has often been tackled from the point of view of what Geoffroy Cantor has called the “conflict thesis.”⁸⁶ As was the case in Britain, the “warfare” between science and religion was portrayed in France as a clash between two systems: “Jesuit system: the authority, the director, the Pope substituted to reason, to God” versus “progress and unity.”⁸⁷ This perception is historically situated, but not generally tenable. Instead, complex and subtle interactions have been exhibited. For Faraday, “the absolute authority of the Bible could not be undermined by science, but science, if practiced

⁸⁵ Eugen Weber, “Religion and Superstition in Nineteenth-Century France,” *Historical Journal* 31 (1988), 399-423, on 399. See however Harry W. Paul, *The Edge of Contingency: French Catholic Reaction to Scientific Change from Darwin to Duhem* (Gainesville: Univ. Presses of Florida, 1979); *Christianisme et science*, ed. Association française d’histoire religieuse contemporaine (Paris: Vrin, 1989); and *La Science catholique. L’“Encyclopédie théologique” de Migne (1844-1873) entre apologétique et vulgarisation*, ed. Claude Langlois and François Laplanche (Paris: Editions du Cerf, 1992).

⁸⁶ Cantor, *Michael Faraday*, 289–95; and J. H. Brooke, “Science and Religion,” *Companion to the History of Modern Science*, ed. R. C. Olby, G. N. Cantor, J. R. R. Christie, and M. J. S. Hodge (London: Routledge, 1990), 763–82.

⁸⁷ Renan, *L’Avenir de la science*, 63.

in a truly Christian way, can illuminate God's other book [Nature]."⁸⁸ Likewise, major astronomers did not hide their belief in God. On 5 June 1876, Le Verrier presented his completed tables for Jupiter, the result of 35 years of work, to the Academy. At the same time he declared that he had relied on the spectacle of the greatest works of Creation and the thought that it reaffirmed the truths of spiritualist philosophy. In his major review of Western cosmogonies, Faye was at pains to warn against the danger of seeing "the ancient demonstration of God's existence sink under the daring scaffoldings of our cosmogonic attempts."⁸⁹ As for Janssen, his private correspondence plainly shows that although he might have sometimes mistrusted the Catholic hierarchy, he was nevertheless a devout believer.

Under the autocratic Second Empire, some French liberal journalists saw the popularization of science as a way to circumvent censorship.⁹⁰ As the regime liberalized in the 1860s, religion would become one of many topics in which its consequences could be more or less freely debated.⁹¹ Catholics themselves were bitterly divided between "Gallicans" partisans of a greater autonomy vis-à-vis Rome and "ultramontains," for the Pope's authority was supreme. In 1863, Ernest Renan published his notorious *Vie de Jésus* [Life of Jesus] who

⁸⁸ Cantor, *Faraday*; see also Susan Fay Cannon, *Science in Culture*.

⁸⁹ Le Verrier, "Recherches astronomiques," *CRAS* 82 (1876), 1280–1, on 1280; cf. Adolph Müller, "Le Verrier," *s.v. Catholic Encyclopedia* (New York: Robert Appleton Co., 1910), vol. 9. H. Faye, *Sur l'origine du monde: théories cosmogoniques des anciens et des modernes* (Paris : Gauthier-Villars, 1884), 8.

⁹⁰ Cf., e.g., Victor Meunier, *Science et démocratie*, 2 vols. (Paris: G. Baillières, 1865-1866).

⁹¹ Ludovic Vitet, "La science et la foi," *Revue des deux mondes* 57 (1865), 680-706, on 681.

submitted the existence of Christ to historical, archeological, and philological scrutiny.⁹² Already, in his *The Future of Science*, written in 1848, he explained that his love of science had destroyed his faith in revelation. Whereas in Britain the issues focused on technical innovation, natural history, and economics, the French debated cultural studies, mathematics, physical sciences, and astronomy. Debates raged for example in the *Revue des deux mondes*, one of the main cultural journals of the Empire, which published over the decade dozens of articles written by the most influential intellectuals (Renan, Edgar Quinet, François Guizot, Paul Janet, Étienne Vacherot, Joseph Gratry, etc.). An accumulation of scientific topics rushed in to question the foundations of the Christian faith: Darwinism, spontaneous generation, geology, the discovery of prehistoric human fossils—and, I would like to emphasize here—spectrum analysis.⁹³

Around 1862, Flammarion, still employed as computer by the Paris Observatory, made the first use of spectrum analysis in discussing metaphysical issues. Constituted of the same elements as the earth, the Sun and the stars possessed “elements that have given birth to organized beings.”⁹⁴ From there, his assertion that they actually existed was a step merrily taken by Flammarion. He wished astronomy to become “philosophy’s compass,” nay the basis for a new “religion through science.” Enthusiastic or downright hostile, the reception of the book was tremendous and launched its author’s long career as one of the most successful

⁹² Allan Pitt, “The Cultural Impact of Science in France: Ernest Renan and the *Vie de Jésus*,” *Historical Journal* 43 (2000), 79-101.

⁹³ Petit, “L’esprit de la science anglaise et les Français;” John Farley and Gerald L. Geison, “Science, Politics, and Spontaneous Generation in Nineteenth-Century France: The Pasteur-Pouchet Debate,” *Bulletin of the History of Medicine* 48 (1974), 161-198.

⁹⁴ Flammarion, *Pluralité*, 125.

writers to popularize astronomy. Another famous science advocate, Louis Figuier, also relied on spectrum analysis to conjecture that the sun's continuous outpouring of energy was due to the constant inflow of human souls. While in prison, the revolutionary activist Auguste Blanqui also used spectrum analysis to argue that all possible fates actually happen—somewhere.⁹⁵

In 1896, was not the resolution of decades of cosmic debate about the relationship between science and religion the following? “Scientific and philosophical knowledge being always bounded, there is always beyond it a sphere open to all beliefs . . . which is the foundation of religious faith. . . . But faith must never rebel against science or put itself in contradiction with it.”⁹⁶ Under the assault of scientific modernity, religion refrained some of its ambition, but preserved its autonomy. Similarly, in the Franco-Siamese conflict of 1893, whereby France took possession of Laos, King Chulalongkorn was forced to recognize the limits of his country's independence in order to preserve it.⁹⁷ Meanwhile, speculation about life on other planets has remained—to this very day—one of the strongest incentives to promote astrophysical research lavishly sponsored by governments.

⁹⁵ Louis Figuier, *Le Lendemain de la mort, ou la vie future selon la science*, 11th ed. (Paris: Hachette, 1904; first ed. 1871); Louis-Auguste Blanqui, *L'Éternité par les astres* (Geneva: Slatkine, 1996). On plurality of words, see Crowe, *Extraterrestrial Life Debate*.

⁹⁶ Alfred Fouillée, *Le Mouvement idéaliste et la réaction contre la science positive* (Paris: Félix Alcan, 1896), lvi and lx.

⁹⁷ Patrick Tuck, *The French Wolf and the Siamese Lamb: The French Threat to Siamese Independence, 1858-1907* (Bangkok: White Lotus, 1995).