

# How Scientific Instruments Have Changed Hands

*Edited by*

A. D. Morrison-Low, Sara J. Schechner & Paolo Brenni



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## European Pocket Sundials for Colonial Use in American Territories

*Sara J. Schechner\**

### Introduction

The first portable sundials brought to the Americas by European explorers and settlers were not made explicitly for use in those vast and wild lands, but were adapted for the purpose. What kinds were these, and when did types designed especially for use in America come to exist? Who needed or desired them? Where were they produced? What was their geographical range? To answer these questions, this paper will analyze archaeological evidence, household and business inventories, and most importantly, the very rare extant pocket sundials strongly linked to remote forts, tribal lands, battlefields, slave plantations, and colonial administrative seats. By means of close looking and critically thinking about this material culture, we can shed light on the relationship of time to imperialism and the transmission of cartographic and ethnographic knowledge during the colonial period.

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## Seventeenth Century Stories

"Plantations in their beginnings have worke ynough, & find difficulties sufficient to settle a comfortable way of subsistence," Governor John Winthrop, Jr. wrote from Connecticut in 1668. No one had time or supplies to make pocket sundials when there were "buildings, fencings, clearing, & breaking up of ground to be attended, Orchards to be planted, High waies, bridges & fortifications to be made, & all thinges to doe, as in ye beginning of ye world".<sup>1</sup> A public sundial might be erected on a building, as shown by the Habitation of Quebec constructed by Samuel de Champlain in 1608 (*Fig. 7.1*) or by the crude slate dials unearthed at the site of Avalon, an English colony established in Newfoundland in 1621.<sup>2</sup> But pocket sundials? These were an indulgence brought to the New World by the colonists themselves in the first settlements and later by merchants in growing towns. The types transported to America's shores during the seventeenth century were those beloved in the Old World, and they fit their owners like a well-worn shoe. Three brief accounts of sundials in seventeenth century colonial America show this and establish a baseline from which sundial use diverged in the eighteenth century.

We begin with the most famous sundial: the one that brought Captain John Smith into contact with the Indian princess, Pocahontas, in 1607. It was an unusual, spherical, ivory compass sundial, and the dashing captain boasted that it had saved his life by fascinating his Indian captors in Virginia.<sup>3</sup> Smith's spherical sundial does not survive, but archaeological excavations of the James Fort site have yielded examples of rectangular, ivory diptych sundials made in Nuremberg (*Fig. 7.2*).<sup>4</sup> This more common form was apparently preferred

1 John Winthrop, Jr. to Henry Oldenburg, Secretary of the Royal Society, 12 November 1668, in A. Rupert Hall and Marie Boas Hall (eds.), *The Correspondence of Henry Oldenburg*, Madison WI, 1965–1986, 13 vols.; v. 5, p. 153.

2 Samuel de Champlain, *Les Voyages... de la Nouvelle France*, Paris, 1613, p. 187; and Sara J. Schechner, "Sundials of Newfoundland," unpublished paper presented at the annual meeting of the North American Sundial Society, Tenafly, New Jersey, August 19–22, 2004.

3 John Smith, *A True Relation of such occurrences and accidents of noate as hath hapned in Virginia*, London, 1608, p. B4r; J. Smith, *The Generall Historie of Virginia, New-England, and the Summer Isles*, London, 1624, sig. 47; S. J. Schechner, "The Adventures of Captain John Smith Among the Mathematical Practitioners: Cosmology, Mathematics, and Power at the Time of Jamestown," *Rittenhouse* 21, no. 2 (2009), pp. 126–144; S. J. Schechner, "The Adventures of Captain John Smith, Pocahontas, and a Sundial," *The Compendium* 14, no. 1 (2007), pp. 19–24.

4 Ivory diptych sundial, Hans Miller, Nuremberg, early seventeenth century, for latitude 53°, found in 2012 and discussed in Jamestown Rediscovery, Historic Jamestowne, Dig Updates, May 2012, <http://historicjamestowne.org/may-2012-2/> (accessed 3 March 2016). Another

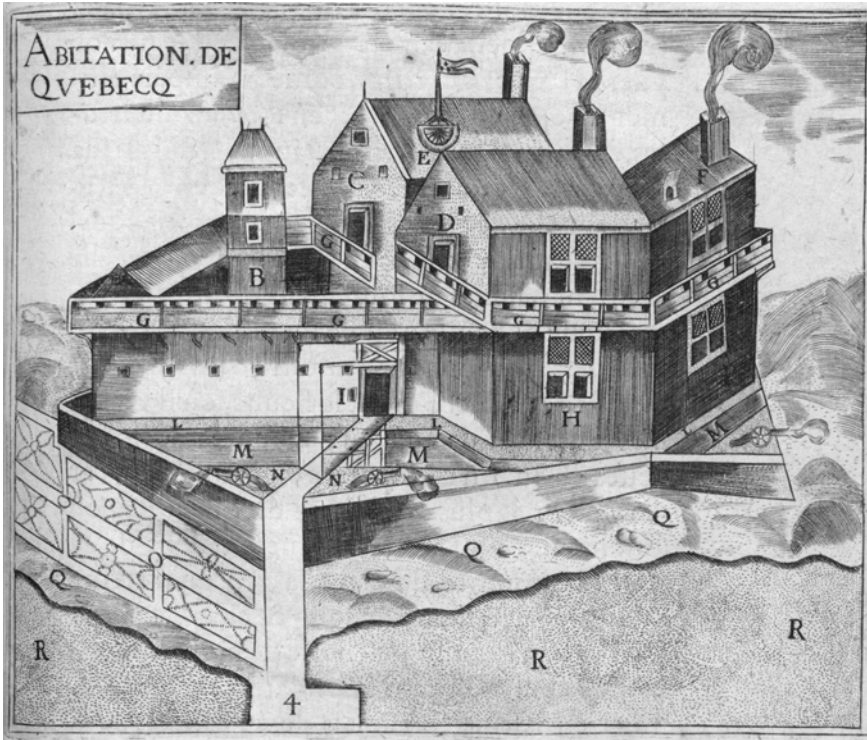


FIGURE 7.1 Samuel de Champlain placed a public sundial beneath the flag on the roof of the fortified habitation he constructed at Quebec in 1608. Plate from Champlain, *Les Voyages . . . de la Nouvelle France*, Paris, 1613.

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by the English gentlemen who accompanied Smith to Jamestown in 1607. The gnomonic projections on their sundials appear to be for latitudes more than  $10^{\circ}$  north of Jamestown ( $37^{\circ} 12'$ ), but accuracy in time finding was not critical in a wilderness fort. More important was the magnetic compass embedded in

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ivory diptych sundial recovered since 1998, is described in Nicholas Lucchetti and Beverly Straube, 1998 *Interim Report on the APVA Excavations at Jamestown, Virginia*, Richmond, 1999, pp. 23–25; and Robert D. Hicks, “Instruments of Science and Technology in Early Virginia,” *Rittenhouse* 21 (2007), pp. 65–81: 72–73. A brass compass box possibly part of an ivory sundial by Hans Ducher (1549–1632) or Hans Christoph Ducher (1584–1656), was excavated from a c. 1617–1624 context at the Governor’s Land site adjoining Jamestown; see Alain Outlaw, *Governor’s Land*, Charlottesville, VA, 1990, item 219. These publications include photos of the sundial fragments.

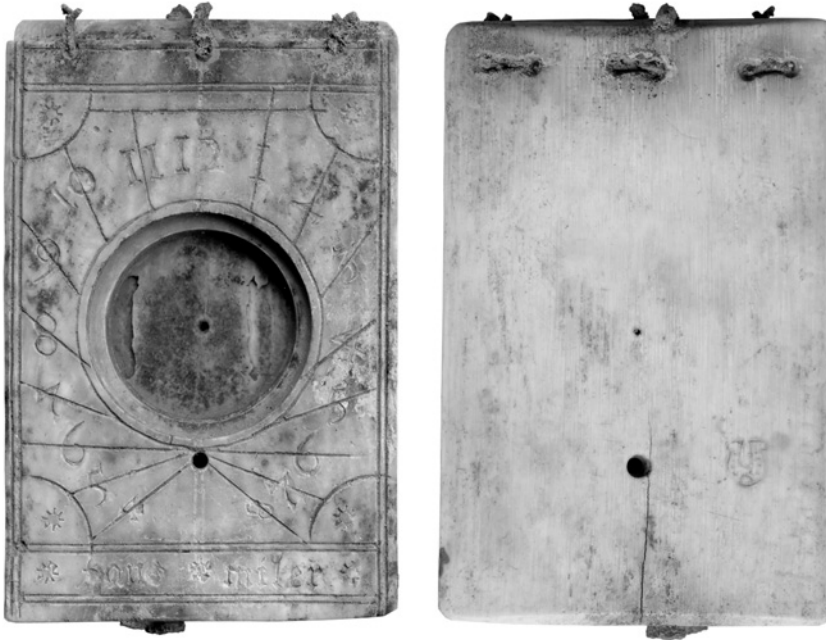


FIGURE 7.2 In 2012, archaeologists in Jamestown, Virginia unearthed this ivory diptych from soil above a cellar dated to 1607–1610. It likely belonged to an English gentleman living in the early James Fort. The diptych is signed “Hans Miler” of Nuremberg and was designed for a latitude of  $53^{\circ}$ .

COURTESY OF PRESERVATION VIRGINIA; HISTORIC JAMESTOWNE.

each diptych, which gave direction, and perhaps the fact that these ivory tools still had the capacity to impress other settlers of a lower status.

Our second example takes us north to New France. It is an oval ivory diptych unearthed from an Indian cemetery near the Jesuit House in Sillery, Quebec.<sup>5</sup> Aside from being ivory, it is simple and demure in design, and of a type commonly made in France in the mid-seventeenth century. What is its story? In 1637, Jesuit missionaries established a settlement in Sillery for indigenous peoples. Known as a ‘reduction’, the village was designed to Christianize and Europeanize its Montagnais and Algonquian residents through economic incentives like shelter, food, trade opportunities, and the use of a hospital staffed by nuns. But Jesuit efforts to turn hunters into farmers and impose

5 André E. Bouchard, “The Grand French Tradition in Gnomonics: The Presence in French America of a Scientific Tradition in the Art of Sundials,” *The Compendium* 13, no. 2 (2006), pp. 3–11: 9.

European social values on Native Americans did not meet with success. By 1663 most Indians had left, and the village land was occupied by French settlers.<sup>6</sup> The discovery of the French oval ivory diptych in the Indian cemetery is fitting, but raises profound questions. Was it a gift to a native resident to encourage Western time discipline, or a timepiece lost by a missionary during a burial?

The last sundial story I wish to tell is that of Roger Williams, founder of the Providence Plantations that became Rhode Island. In Puritan New England, Williams advocated religious freedom, the separation of church and state, and the purchase, not confiscation, of land from Native Americans. These ideas—labeled as ‘dangerous’ by his Puritan neighbors—led to his banishment from the Massachusetts Bay Colony in 1636. Legend claims that Williams found his way to Providence with the help of his large brass compass sundial.<sup>7</sup> Made in England, the brass sundial was sturdy and economical. It was not extravagant in the way an ivory timepiece would have been in Puritan hands. The sundial also had a spooky *memento mori* in the center of a paper wind rose pasted inside the case lid. It featured a skull on top of a winged sand glass sitting on an urn (Fig. 7.3). This same motif is found in George Wither’s *Collection of Emblemes, ancient and modern* (1635) with this motto: “Live, ever mindfull of thy dying; For, Time is always from thee flying”.<sup>8</sup> How apt a sentiment this was for settlers who came to New England on an “errand into the wilderness”—their cause, the building of a model society by the elect on uncorrupted American soil.<sup>9</sup> The skull and winged sand glass served as a constant reminder not to waste time in vain pursuits, but to work hard to leave a positive mark on the world.

6 James P. Ronda, “The Sillery Experiment: A Jesuit-Indian Village in New France, 1637–1663,” *American Indian Culture and Research Journal* 3, no. 1 (1979), pp. 1–18.

7 Compass sundial, English, owned by Roger Williams, c. 1630, brass, Rhode Island Historical Society, RHi X17 1147, Navigational Equipment, Museum 1902.3.1. It may date from the time of his later trips to England in 1643 and 1651–1654. Two similar compass dials signed I. R. are owned by the Collection of Historical Scientific Instruments, Harvard University, 7244 and 7253.

8 George Wither, *A Collection of Emblemes, ancient and moderne: Quickened with metracial illustrations, both morall and divine*, London, 1635, book 4, illustration 27.

9 “Errand into the wilderness” is a phrase taken from the title of a sermon preached in 1670 by Samuel Danforth, a Roxbury pastor, to delegates assembled for the election of officers to the General Court of Massachusetts. It expressed the notion that the Puritans had come on a religious mission to establish a pure reformed church in North America. See Samuel Danforth, *A Brief Recognition of New-Englands Errand into the Wilderness; Made in the Audience of the General Assembly of the Massachusetts Colony, at Boston in N. E. on the nth of the third Moneth, 1670. Being the Day of Election there*, Cambridge, 1671; and Perry Miller, *Errand into the Wilderness*, Cambridge, MA, 1956.





FIGURE 7.3 *Roger Williams, the founder of Rhode Island, owned this English brass compass sundial, c. 1630. The image of a skull on top of a winged sand glass reminded him to spend his time wisely.*

COURTESY THE RHODE ISLAND HISTORICAL SOCIETY, RHI X17 1147.

The three examples show the role of pocket sundials as expressions of social status and religious sentiment, and as tools for missionary work, colonization, direction finding, and, of course, time finding. None of the principals in these three stories expected to travel very far once they arrived in their settlements. They had little need for a sundial adjustable for diverse latitudes. But with the growth of the American colonies came the diversification of purpose and justifications for the settlements. There arose new contracts with Europe and relationships among colonial societies. Up grew towns and ports where trade took place and people traveled. Therefore, by the eighteenth century we find portable sundials not only adapted to, but also designed for use in particular colonial marketplaces and locations. The remainder of this paper is concerned with these.

### A Method of Latitude Analysis

One method for the discovery of sundials destined for use in colonial American territories is the examination of the latitudes for which they were made,

particularly if those latitudes do not match the country of origin. Possible destinations are identified by means of the gnomonic projections on so-called 'particular' sundials designed for a fixed location, and by tables of latitude, known as gazetteers, associated with universal sundials. Such handy geographic directories were frequently engraved right on the surface of the sundial itself or on a metal disk mounted inside the lid of the sundial's case. Sometimes the directory was printed on a broadsheet, which was a sundial accessory.<sup>10</sup>

The variety of gazetteers has long interested me but been little studied. Very few are identical—even from the same workshop—and a comparison tells us something about production practices and the anticipated needs of owners.<sup>11</sup> In general, European makers listed cities in the regions where they made and sold the sundials, or they listed popular destinations throughout Europe where merchants might do business. A typical example is a silver sundial by Pierre le Maire II manufactured in Paris circa 1730–1760, and presently in the Collection of Historical Scientific Instruments at Harvard.<sup>12</sup> *Table 7.1* lists the cities on its gazetteer in the order that they appear on the underside of the sundial. The focus is on locations of great interest to French politics and trade. Out of twenty-six cities, only three were not under Bourbon rule sometime during the eighteenth century (i.e., Rome, Vienna, and London).

Pocket sundials for European use, such as the le Maire example, are common. Much more rare are sundials designed for use in colonial territories in North and South America. Some care, however, must be taken in the interpretation of their gazetteers.

10 Types of sundials with gazetteers include universal equatorial dials, diptychs, universal ring dials, Augsburg-type dials, Butterfield-type dials, and inclining dials.

11 The collections of the Adler Planetarium in Chicago (hereafter, AP), the Collection of Historical Scientific Instruments, Harvard University (hereafter, CHSI), and the National Maritime Museum (hereafter, NMM), Greenwich, and those of many other museums, offer numerous examples of sundials of the same type and quality produced in the same workshop with different geographical listings piece by piece. The gazetteers are transcribed and photographed in S. J. Schechner, *Sundials and Time-Finding Instruments of the Adler Planetarium* (forthcoming); Steven A. Lloyd, *Ivory Diptych Sundials, 1570–1750*, Cambridge MA, 1992; *Waywiser*, the online catalogue of the Collection of Historical Scientific Instruments, <http://waywiser.rc.fas.harvard.edu/> (accessed 3 March 2015); and Hester Higton, *Sundials at Greenwich*, Oxford, 2002.

12 Butterfield-type sundial, Pierre le Maire II, Paris, c. 1730–1760, CHSI inv. 7028. The Roman numeral 'II' is not formally part of le Maire's name, but used by historians to distinguish him from his father, also a mathematical instrument maker.

TABLE 7.1 *Gazetteer on a silver Butterfield-type sundial by Pierre le Maire II, Paris, c. 1730–1760*

Underside of compass box	Left column	Right column
Londres 51	Paris 48. 51	Lion 45. 45
Bruxelles 50. 51	Brest 48. 23	Turin 44. 50
Lisle 50. 40	Rennes 48	Milan 45. 20
Calais 50. 57	Basle 47. 40	Pau 43. 12
Liege 50. 36	Strasbourg 48. 35	Bayonne 43. 30
Nantes 47. 13	Vienne 48. 24	Montpellier 43. 37
	Roüen 49. 27	Perpignan 42. 44
	Bordeaux 44. 50	Madrit 40. 26
	Poitiers 46. 34	Naples 41. 5
	Dijon 47. 20	Rome 41. 54

### Sundials for a Trip Around the World

One class of pocket sundials that may include American place names is the group whose gazetteers list cities and countries from all over the globe. These sundials are of universal or semi-universal functionality, which enables their use for most of the northern hemisphere. The examples discussed here are preserved at Harvard, the National Maritime Museum at Greenwich, and the Adler Planetarium in Chicago.

The first is a silver inclining dial by Delure, Paris, circa 1695–1736. Its forty-three-city gazetteer starts off with Paris, Brest, Dublin, Vienna, Cracow, and other major European destinations, but before it reaches Rome, it has also recorded: *Candie 34 40* (Crete), *Alep 36 15* (Aleppo, Syria), *Le Caire 30* (Cairo), *Ispaham 36 14* (Isfahan, Iran), *Siracuze 34 4* (Syracuse, Italy), *Pequin 40* (Beijing), *Smirne 38 22* (Smyrna, today Izmir, Turkey), *Feéz 33* (Fez, Morocco), and *Goa 15* (in India).<sup>13</sup> The second example is a silver Augsburg-type sundial by Michael Butterfield, Paris, circa 1675–1715. Among thirty-three places on its geographical directory are the following surprises: *Agra 20. 30* (in India), *Cape de Bonne Esperance 34. 15* (Cape of Good Hope), and seven places spread out in the Ottoman Empire, such as *Constantinople 41. 6*, *Babilonne 33. 40* (Babylon,

13 Delure, Paris, ca. 1695–1736, CHSI inv. 7356.

Mesopotamia); *Ierusalem* 31. 50 (Jerusalem); *Alexandrie* 31. 11 (Alexandria, Egypt), *Algere* 36. 38 (Algiers), *Malte* 35. 53 (Malta), and *Candie* 35. 19 (Crete).<sup>14</sup>

Although these two objects do not include any American locations, similar sundials do. A brass Augsburg-type sundial by Delure includes *Kebec* 47 (Quebec) along with outliers *Macao* 40 (Macau), *Pequin* 40 (Beijing), and *Cap. de. B. Esperance* 34 15' (the Cape of Good Hope) among thirty-eight cities that are otherwise in Europe or around the Mediterranean.<sup>15</sup> A Claude Langlois, silvered-brass, Augsburg-type dial, dating from the second quarter of the eighteenth century, not only lists many Mediterranean ports—including the uncommon *Detroit de Gibraltar* 35.30' (Strait of Gibraltar)—but also records five New France and New Spain possessions: *Kebec* 47 (Quebec), *St Domingue* 17. 38' (Saint Domingue, now Haiti), *Lima* 12. 20', *Mexique* 20 (Mexico City), and *Quito* 00. 18' (in Ecuador).<sup>16</sup>

The arbitrariness of the geographical directories is evident in the foregoing examples, and this point is underscored by several universal sundials constructed at the workshop of Nicolas Bion between 1685 and 1715 and presently owned by the National Maritime Museum. One is a brass Augsburg-type dial that catalogues locales in this order: *Paris* 49, *Vienne* 48, *Dantzic* 54 (Gdansk), *Varsovie* 52 (Warsaw), *Naples* 41, *Madrid* 40, *Rig* 57 (Riga), *Londres* 52 (London), *Lima* 12, *Cadis* 36 (Cadiz), *Lahauane* 23 (Havana), *Berlin* 52, *Pequin* 40 (Beijing), *Siam* 14 (Thailand), *Cracovie* 50 (Cracow), *La Martinique* 15, *Ponticheri* 15 (Pondicherry, now Puducherry), *Goa* 15, *S<sup>t</sup> Domingue* 18, *Strasbourg* 49, *Amsterdam* 52, *Ausbourg* 48 (Augsburg), *Petersbourg* 60 (St. Petersburg), *Hambourg* 54, and *Copenhague* 56.<sup>17</sup> Two of Bion's universal ring dials likewise include cities stretching from Asia to South America. One of these—a large brass example at Greenwich—intersperses *Lima* 12, *Canada* 55, *Pekim* 40 (Beijing), *Moskou* 55 (Moscow) and *Siam* 18 (Thailand) among over forty European cities.<sup>18</sup> A smaller brass dial adds *Cayenne* 6 (in French Guiana), *Martinique* 18, *Panama* 10, *Canada* 49, *Quebec* 48, *S<sup>t</sup> Dominique* 20

14 Augsburg-type dial, Michael Butterfield, Paris, ca. 1675–1715, NMM inv. AST0524; Higton, op. cit. (n. 11), pp. 164–165.

15 Augsburg-type dial, Delure, Paris, ca. 1700–1736, AP inv. L-3.

16 Augsburg-type dial, Langlois, Paris, second quarter of the eighteenth century, NMM inv. AST0518; Higton, op. cit. (n. 11), pp. 168–169.

17 Augsburg-type dial, Nicolas Bion, Paris, ca. 1685–1715, NMM inv. AST0285; Higton, op. cit. (n. 11), pp. 165–166.

18 Universal ring dial, Nicolas Bion, Paris, ca. 1685–1715, NMM inv. AST0311; Higton, op. cit. (n. 11), pp. 202–203.

(Saint Domingue), as well as *Bornes 3* (Borneo), *Camboie 10* (Cambodia), *Goa 15*, and *Macao 22*.<sup>19</sup>

There are several points to be made. 1: Rarely when places are south of the equator are they marked as such, and some of the sundials that include them cannot operate in the southern hemisphere because they lack the counterclockwise hour scale required for use with a south-pole-aligned gnomon. 2: Cities and countries are given equal weight in gazetteers, although a single latitude cannot adequately inform a user of the geographical range covered by an entire people or country. 3: The examples noted above are all French, because English and German makers in the seventeenth and eighteenth centuries rarely produced universal sundials that recorded sites all over the globe. 4: French workshops, however, did not confine the exotic destinations to places of particular French interest. Although Quebec, Saint Domingue, and Pondicherry were French colonial possessions, Goa and Macau were under Portuguese influence; Peru and Mexico were Spanish colonies; and Isfahan and Algiers were part of the Ottoman Empire. 5: New England colonies, it seems, were altogether snubbed unless they were in territories contested by France and England. I have yet to see a French sundial from the seventeenth or eighteenth century that includes Boston, New York, or Philadelphia. These cities did not appear on European-made sundials until about 1800, when they were printed on the paper gazetteers glued to cheap wooden diptychs manufactured in Bavaria for export.<sup>20</sup>

Only an owner engaged in one of the East or West India trading companies would find practical use in a timepiece that included not only northern Europe but also the tip of southern Africa, Asia, and the Americas. Even so, it is implausible that any single individual would be traveling between Moscow, Lima, Quebec, Agra, and Dublin. Moreover, too many of these trip-around-the-world sundials survive for global trade to be an adequate reason to explain their existence. So why do these instruments list such widespread cities? What would be the attraction for buyers? The reasons to own such a sundial may be similar to those for owning a world atlas: the pleasure might come from possessing the world from the comfort of one's library or from nonchalantly displaying one's worldly awareness to associates. These cosmopolitan directories

19 Universal ring dial, Nicolas Bion, Paris, ca. 1685–1715, NMM inv. AST0296; Higton, op. cit. (n. 11), p. 202.

20 See diptych examples by David Beringer, Nuremberg, 1777–1821, AP inv. N-16; Stockert, Fürth, Bavaria, ca. 1800–1820, AP inv. N-17; Negelein, Nuremberg, ca. 1825–1850, AP inv. N-15; Würsching, Fürth, Bavaria, ca. 1825–1850, AP inv. A-150; and J. G. Kleininger, Nuremberg, ca. 1825, AP inv. W-202 and W-71.

likely spoke to their owners' fascination in exotic locales and peoples, just as pictures of Native Americans and Ottoman Turks symbolically did a century earlier on ivory diptych sundials (*Pl. 8*).<sup>21</sup>

We must assume, therefore, that few trip-around-the-world sundials ever saw American shores. We now turn our attention to more specialized sundials that clearly did.

### Sundials for Sugar Plantations in the Antilles

Knowledge of sundials made explicitly for use in the Americas comes from extremely rare, extant objects found in institutional and private collections. The first group to be discussed tells a story about French colonial life in the West Indies.

We begin with an object at the Adler Planetarium in Chicago. It is an elegant, octagonal, silver Butterfield-type sundial signed *Baradelle AParis* (*Fig. 7.4*).<sup>22</sup> It has only two hour scales—one for 20° and another for 25°—and they are divided into quarter-hour intervals and labeled in Arabic and Roman numerals respectively. Adjacent to the inner scale, the maker has inscribed a single geographic name: *S<sup>t</sup>. Domingue. 18<sup>d</sup>*. The folding gnomon is partly missing, but what remains proves that it was adjustable for latitude. It could have once had a cute bird whose beak pointed to the latitude scale. There is no gazetteer on the underside of the sundial, but the maker has richly engraved a flower and acanthus leaves on the bottom of the compass box and the gnomon spring. The sundial has no records associated with its early history, but we can learn a lot by close looking and critically thinking.

The Baradelles were a distinguished family of mathematical instrument makers in Paris. Nicolas-Jacques Baradelle (1701–after 1772) was the senior member. He apprenticed with N. la Butte (in 1717), Jacques le Maire (also in 1717), and Nicolas Bion (from 1719 to 1725), and lived and worked at Bion's address on the Quai de l'Horloge in Paris. By 1752, he was operating down the street under the sign *à l'Observatoire* in homage to his godfather, Jacques Cassini, director of the Paris Observatory between 1712 and 1756. Baradelle also had close connections at the Académie des Sciences, and employed members' data in some of his instruments. His grandsons included the instrument makers

21 Two ivory diptych sundials, Thomas Ducher, Nuremberg, 1620–1645, CHSI inv. 7579 and 7573.

22 Silver Butterfield-type sundial, Baradelle, Paris, mid-to-late eighteenth century, AP inv. W-67.



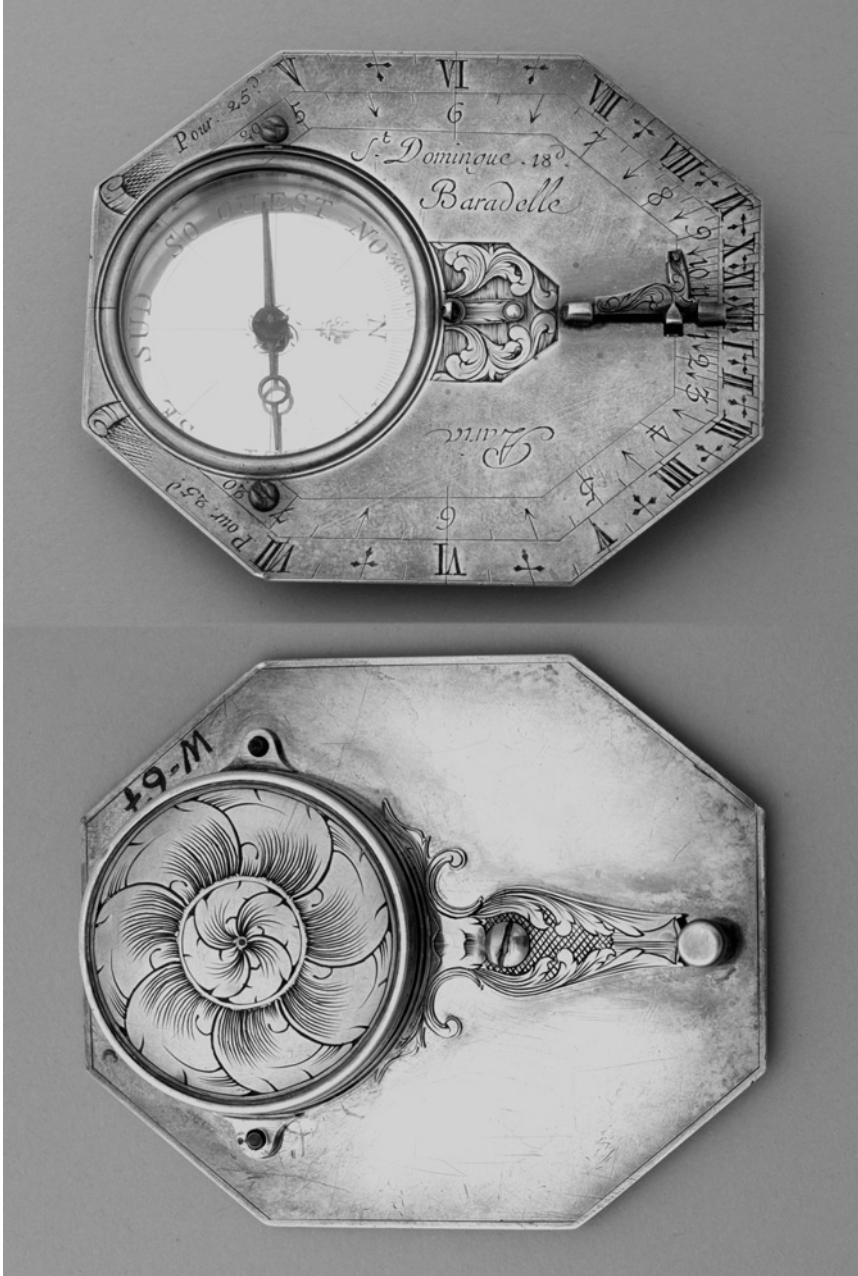


FIGURE 7.4 Designed for use in the French colony of Saint Domingue (today Haiti), this silver Butterfield-type sundial was made in Paris by the Baradelle workshop in the mid-to-late eighteenth century.

PHOTOGRAPHY BY STEVE PITKIN, PITKIN STUDIO. COURTESY OF THE ADLER PLANETARIUM, CHICAGO, ILLINOIS, W-67.

Nicolas-Alexandre Baradelle (ca. 1740–post 1791), Nicolas-Elois Baradelle (1749–1814), and Jean-Louis-Jacques Baradelle (1752–1794), all of whom were in the Founders' Company.<sup>23</sup> Any one of them could have made this sundial, but the best bet would be Nicolas-Jacques or Nicolas-Alexandre Baradelle, who were notable for their high-quality sundials. We therefore conclude that the Adler Planetarium's sundial dates from the mid-to-late eighteenth century.

The sundial's inscription, *S<sup>t</sup>. Domingue. 18<sup>d</sup>*, is another clue. Between 1659 and 1804, Saint Domingue was a significant French colony on the western side of the island of Hispaniola. It is now part of Haiti. The sundial's hour scale for 20° is a good match for Saint Domingue's first capital on Tortuga, an island just off the northwest coast of Hispaniola at latitude 20°, as well as its second capital, Cap-Français at 19° 45' on the mainland's northern shore (today Cap-Haïtien). In 1770, the colony shifted its government further south to Port-au-Prince (18° 32'), which may be the place referenced by the sundial's inscription, *S<sup>t</sup>. Domingue. 18<sup>d</sup>*. A brief look at the colony's history suggests the type of individual who might have owned and used this sundial.

In the first half of the seventeenth century, Tortuga traded hands many times between the Spanish, who claimed it, and French and English settlers who occupied it without permission. It was a notorious haven for renegades and runaways who used the island as a base for plaguing Spanish ships and a source of wild cattle, hogs, timber, and fresh water. From their practice of grilling meat on a *boucan* in the style of the island's indigenous Taíno people, these settlers came to be called buccaneers. Their first livelihood was trade in hides and cured meat, tobacco and crude sugar with anyone willing to buy outside of the law; their second and more notorious business was piracy.<sup>24</sup> In 1640, the French built Fort de Rocher in a harbor on Tortuga. In 1654, the Spanish recaptured the island, but by 1655 the English and French settlers were back, with the English claiming it as their own. In 1659, the English-appointed governor, a Frenchman, Jeremie Deschamps, claimed Tortuga for France.

In 1665, the French West India Company established a permanent settlement on the mainland of Hispaniola and set up a plantation-based economy in

23 Jean-Dominique Augarde, "La Fabrication des instruments scientifiques au XVIII<sup>e</sup> siècle et la corporation des fondeurs", in Christine Blondel et al. (eds.), *Studies in the History of Scientific Instruments*, London, 1989, pp. 52–72; Denis Beaudouin, Paolo Brenni and Anthony J. Turner, *A Bio-bibliographical Dictionary of Precision Instrument-makers and Related Craftsmen in France, 1430–1960* (in preparation).

24 Kris E. Lane, *Pillaging the Empire: Piracy in the Americas, 1500–1750*, Armonk, NY, 1998, pp. 97–101; Jan Rogoziński, *A Brief History of the Caribbean from the Arawak and Carib to the Present*, rev. ed., New York, 1999, pp. 85–86, 92–94 and 99–100.





FIGURE 7.5 *Slaves at work on an indigo plantation in Saint-Domingue, 1667, under the watchful eye of their master. Plate from Jean Baptiste Du Tertre, Histoire Générale des Antilles Habitées par les François, Paris, 1667, and was reproduced three times in publications in the eighteenth century.*  
JOHN CARTER BROWN LIBRARY.

which tobacco and indigo were raised. In 1697, Spain formally ceded the western third of Hispaniola to France in the Treaty of Ryswick. The capital of the French colony was moved to Cap-Français on the mainland's northern coast in 1711. It would become a city of wealth and sophistication in a colony nicknamed "the pearl of the Antilles".<sup>25</sup> Sugar cane and coffee joined indigo, cacao, and cotton as the colony's chief exports (Fig. 7.5). By the 1780s, Saint Domingue produced 40% of the sugar and 60% of the coffee consumed in Europe.<sup>26</sup> But this wealth was founded on an ugly fact: with large scale production came the need for increased labor—a need met by the colonists importing over 800,000

25 Ménéric-Louis-Elie Moreau de Saint-Méry, *A Civilization that Perished: The Last Years of White Colonial Rule in Haiti*, translation and abridgement of *A Topographical, Physical, Civil, Political and Historical Description of the French Part of the Island of Santo Domingo, with General Observations on its Population, on the Character and Customs of Its Diverse Inhabitants, on its Climate, Culture, Production, Administration, Etc.*, by Ivor D. Spencer, Lanham, MD, 1985, pt. 3, pp. 93–158.

26 Rogoziński, op. cit. (n. 24), pp. 108, 116 and 118.

African slaves since 1680, many of whom died within a few years of reaching Saint Domingue. A slave rebellion in 1791 culminated in the establishment of the independent country of Haiti in 1804.<sup>27</sup>

With one in eight people in France earning a living touched by the country's trade with Saint Domingue, it is surprising that Saint Domingue is not found on more French sundials than it is.<sup>28</sup> The Baradelle sundial is therefore noteworthy. With hour scales for 20° and 25°, the silver sundial was perfectly suited to a wealthy, white, French merchant, colonial administrator, or plantation owner, living in or near Cap-Français, which was the chief port and *de facto* capital throughout the colonial period. The owner may also have been among the *affranchis* (freed black slaves) or *gens de couleur libres* (free people of mixed French and African race, such as mulattoes). Although the political rights of free blacks and people of color were limited, they could own property, shops, plantations, and slaves. Many were educated, and some were quite prosperous. Emulating the styles of their white French neighbors, wealthy free blacks and people of color, both men and women, would have found this silver sundial a desirable possession (*Fig. 7.6*). The biggest mystery of the sundial is not the wealthy status of possible owners, but the business that could take him or her as far north as 25°. That is the latitude of Nassau in the British colony of the Bahamas. Perhaps the owner was a French officer fighting the British in the Caribbean during the Seven Years' War (1756–1763).

The Baradelle sundial is a rare but not unique product made in Paris for use in the French West Indies. Recently, I learned of another portable sundial made explicitly for the latitude of 18° (*Fig. 7.7*). This window-sill sundial is made of brass and has a rectangular base. It is inscribed *Lenoir AParis* and *18<sup>d</sup> latitude*.<sup>29</sup> Although it has a single hour scale marked in Roman numerals and divided into quarter hours, its gnomon is adjustable between 16° and 20° with subdivisions every 15 minutes. The magnetic compass has an eight-point wind rose labeled in French, a circle divided 0°–90°–0°–90° every 1°, and

27 Kona Shen, "History of Haiti, 1492–1805," timeline sponsored by the Brown University Department of Africana Studies, 2008, <http://library.brown.edu/haitihistory/1sr.html> (accessed 07 March 2016). M.-L.-E. Moreau de Saint-Méry, *Description topographique, physique, civile, politique et historique de la partie française de l'Isle Saint-Domingue*, Philadelphia, 1797–1798, 2 vols.; *Le code noir ou Edit du roy*, Paris, 1685, and later editions, issued by Louis XIV for regulation of slavery in Saint Domingue; Rogoziński, *op. cit.* (n. 24), pp. 127–142.

28 John Carter Brown Library, "Remember Haiti: Economy", [www.brown.edu/Facilities/John\\_Carter\\_Brown\\_Library/remember\\_haiti/economy.php](http://www.brown.edu/Facilities/John_Carter_Brown_Library/remember_haiti/economy.php) (accessed 07 March 2016).

29 Brass, rectangular portable sundial, 16.5 × 17.8 cm, Lenoir, Paris, ca. 1800–1825, private collection of Dolph Druckman, Baltimore, Maryland.



FIGURE 7.6 *The owner of a French silver sundial in Saint Domingue between 1750 and 1800 may have been a prosperous freed black slave or person of color, such as those depicted by Nicolas Ponce, Recueil de vues des lieux principaux de la colonie française de Saint-Domingue, Paris, 1791 (two details).*

a brake that lifts the diamond-shaped needle off its pivot when transported (a feature more typical of surveying compasses than sundials). The top and bottom of the sundial are plain with no adornments in open spaces. Whereas the silver Baradelle sundial has the air of luxury and refinement, this brass Lenoir instrument is very work-a-day, being more suited to a military encampment, a wharf, or a sugar mill. Etienne Lenoir (1744–1832) or his son Paul-Étienne Lenoir (1776–1827) probably supplied this utilitarian instrument in the first quarter of the nineteenth century to a business in Haiti. It is the only known sundial by Lenoir.<sup>30</sup>

Also known are two pocket sundials designed for use in Martinique, a French possession since 1658 and another center for the production of sugar.<sup>31</sup> One held by the National Maritime Museum in Greenwich is a finely-engraved, brass, Augsburg-type dial made by Claude Langlois, in the second quarter of

30 A. J. Turner, *From Pleasure and Profit to Science and Security: Etienne Lenoir and the Transformation of Precision Instrument-Making in France, 1760–1830*, Cambridge, UK, 1989.

31 Robert Cornevin, “Martinique”, in *Encyclopaedia Britannica Online*, [www.britannica.com/EBchecked/topic/367084/Martinique/54686/French-rule](http://www.britannica.com/EBchecked/topic/367084/Martinique/54686/French-rule) (accessed 9 March 2016).



FIGURE 7.7 A sundial for Haiti made by the Lenoir workshop in Paris in the early nineteenth century.

COLLECTION OF DOLPH DRUCKMAN, BALTIMORE, MARYLAND.

the eighteenth century. On its long list of European cities, there is an interloper: *La Martinique* 14. 43'.<sup>32</sup> The single colonial destination on the sundial suggests that its owner had business that took him from France to the sugar plantations in Martinique. Perhaps he was a merchant or soldier. A private collection holds the second example, which was made in 1764 by Jacques Canivet (fl. 1743–1774), the successor to Langlois as chief engineer to the Académie des Sciences in Paris. This is an octagonal silver sundial for exclusive use at the latitude of

32 Brass Augsburg-type dial, Langlois, Paris, second quarter of the eighteenth century, NMM inv. ASTo260; Higton, op. cit. (n. 11), pp. 169–170.

14° 45', which is the location of Martinique.<sup>33</sup> Its possessor may have been a French officer or administrator stationed on the island after the Seven Years' War, or a prosperous plantation owner or merchant, who was likely white but may have been a freed black or person of color.

### Sundials for the Administration of New Spain along the South Sea

The Harvard Collection of Historical Scientific Instruments owns a mid-eighteenth century sundial designed to be used along the Spanish frontier in colonial Chile.<sup>34</sup> Most likely made in Spain, this rare, brass, universal ring dial has its gnomonic projections flipped correctly for the southern hemisphere (Pl. 9). Both sides of the meridian ring are engraved with sixteen place names between the latitudes of 25° S and 41° S. Nearly all the locations are along the Pacific coastline (then known as the South Sea), but several are in the interior, including Santiago, Maule, and Chillán. The gazetteer also lists Mendoza and San Juan de la Frontera, which were at the time in Paraguay and today are in Argentina. Before 1776, all of the sundial's locations were under the jurisdiction of the Viceroyalty of Peru, and through it, the kingdom of Spain. Santiago was the capital city of Chile and the seat of a royal *audiencia* from 1609 until the country's independence (Table 7.2 and Fig. 7.8).<sup>35</sup>

Chile was an agricultural colony, but had one of the largest standing armies in the Americas. It was heavily militarized in order to protect the natural resources from Spain's European enemies and to fend off the indigenous Araucanian people in the south, who fiercely resisted the Spanish settlers.<sup>36</sup> As we saw in the French West Indies, the population of Chile was divided along ethnic, racial, and class lines. At the top were European-born Spaniards (*peninsulares*) living in the colony as royal administrators and Chilean-born Spaniards (*criollos*), who were landowners. At the bottom were Native

33 Silver, octagonal, pocket sundial for Martinique, 14° 45', signed "Canivet à la Sphère à Paris / 1764," pictured in Mike Cowham, *A Dial in Your Poke*, Cambridge, UK, 2004, p. 68; Franck Marcelin, *Dictionnaire des fabricants français d'instruments de mesure du XV<sup>e</sup> au XIX<sup>e</sup> siècle*, Aix-en-Provence, 2004, s.v. "Canivet, Jacques."

34 Universal ring dial, Spanish, 1725–1775, CHSI inv. 7904.

35 Emanuel Bowen, *A New and Accurate Map of Chili, Terra Magellanica, Terra del Fuego &c. Laid down according to the latest Improvements and Regulated by Astron. l Observat. ns*, London, 1747; David Rumsey Historical Map Collection, 3733.053.

36 Rex A. Hudson (ed.), *Chile: A Country Study*, Washington, DC, 1994: "Conquest and Colonization, 1535–1810," <http://countrystudies.us/chile/> (accessed 07 March 2016).



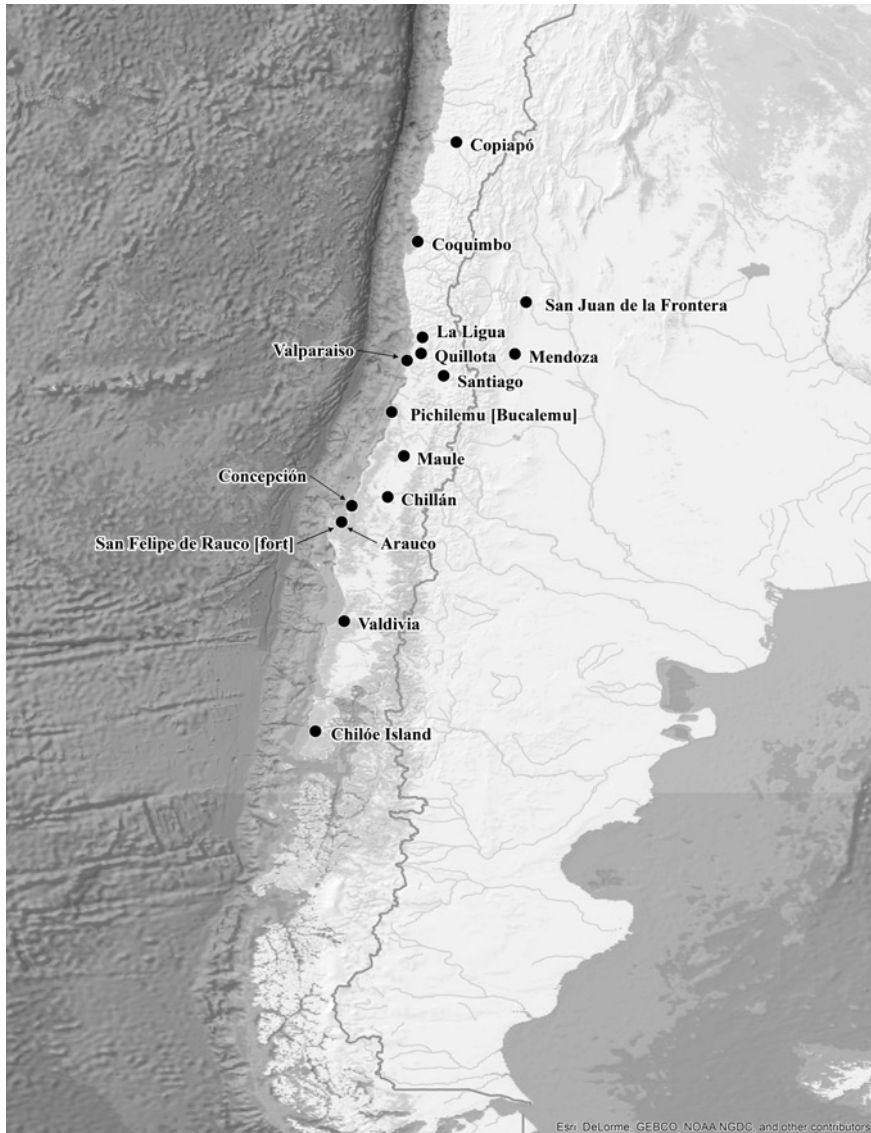


FIGURE 7.8 *Map showing the locations in South America listed on the universal ring dial made for Chile, ca. 1725–1775.*

CREATED WITH THE HELP OF FEI CARNES, CENTER FOR GEOGRAPHIC ANALYSIS, HARVARD UNIVERSITY.

Americans and a few African slaves. In between were those of mixed race. The suitability of this universal ring dial for time finding at so many locations in Chile would have recommended it to an individual of some wealth who had a need to travel—i.e., a royal administrator, a military or naval officer, possibly a merchant, or a missionary.

The most likely user would have been a Jesuit missionary. All of the places listed on the sundial, even the smallest like Bucalemu, have an association with a Jesuit school, *hacienda*, or community. Moreover, the Jesuit theologian, Karl von Haimhausen, the rector of the college in Santiago and confessor to Spanish bishops and the viceroy, was instrumental in establishing in 1748 a significant arts-and-crafts school at Calera de Tango near Santiago. Its workshops were staffed by some fifty German brothers, including a bell-founder, watchmaker, goldsmith, furniture maker, organ builder, painter, sculptor, architect, and printer.<sup>37</sup> Although the universal ring dial was likely made in Spain, it could have been made at this major craft center.

TABLE 7.2 *Gazetteer on a brass universal ring dial designed for use in the Spanish colony of Chile, circa 1750*

Locations on the sundial	Modern place names in Chile, except as noted
Copiapó 25	Copiapó 27° 21' S
Coquimbo 30	Coquimbo 30° S
Ligua 31	La Ligua 32° 27' S
Quillota [32]	Quillota 32° 52' S
S <sup>n</sup> Juan 32	San Juan de la Frontera [San Juan, Argentina] 31° 32' S
Valparyso [33]	Valparaiso 33° 3' S
Stiago 33.	Santiago 33° 27' S
Maule [34]	Maule 35° 22' S

37 Anthony Huonder, "Karl von Haimhausen," in Charles G. Herbermann et al. (eds.), *The Catholic Encyclopedia*, New York, 1913–1950, 18 vols.; v. 7, pp. 112–113; and Biblioteca Nacional de Chile, *Arte en Chile durante la Colonia. Memoria Chilena*, "Carlos Haimhausen (1692–1767)", [www.memoriachilena.cl/602/w3-article-92343.html](http://www.memoriachilena.cl/602/w3-article-92343.html) (accessed 07 March 2016). His name is also spelled Haimbhausen. The author wants to thank her student, Rosario Willumsen of Santiago, for this lead.

Locations on the sundial	Modern place names in Chile, except as noted
Buc <sup>mu</sup> [34]	Bucalemu [Pichilemu] 34° 23' S
Mend <sup>za</sup> 34	Mendoza [Argentina] 32° 53' S
Conception <sup>n</sup> [36]	Concepción 36° 49' S
Chillán 36	Chillán 36° 36' S
S <sup>a</sup> Fee [37]	San Felipe de Rauco [a fort at Old Arauco], 37° 15' S
Arauco 37	Arauco 37° 15' S
Valdiuia 40	Valdivia 39° 48' S
Chiloe 41	Isla Chiloe 42° 41' S

A second extraordinary sundial for use in New Spain was made by Juan Andres in La Paz in 1699. Now part of the collection of the Adler Planetarium, this silver, universal equatorial sundial has eighteen South American places on its gazetteer (*Table 7.3*).<sup>38</sup> These were locations in the northern part of the Viceroyalty of Peru. The sundial does not distinguish between latitudes north or south of the equator, but lists the places in the order of the absolute value of their latitudes (with a few exceptions). The locations include Potosí, known for its great silver lodes and having a population of 160,000 in 1650, making it one of the largest cities in its day in the Western Hemisphere. Lima, the capital of the viceroyalty, was the longtime hub for the export of silver and the import of manufactured goods. Cusco and Quito produced coarse cotton and woolen textiles, while Arequipa and Nazca produced wine.<sup>39</sup> The only ornamentation on this sundial is a simple *globus cruciger* (cross-on-orb), symbolizing the dominion of Christianity over the globe. The decoration suggests that this sundial was made for missionaries, but the locations were also mining, textile, and agricultural centers with European- and colonial-born Spanish administrators and landowners, who oversaw a labor force of enslaved Indians and some Africans.

38 Universal equatorial sundial, Juan Andres, La Paz, 1699, silver, AP inv. A-263.

39 Federal Research Division, Library of Congress, *Peru: A Country Study*, Area Handbook Series, Washington, DC, 1992, pp. 17–24.



TABLE 7.3 *Gazetteer on a silver universal equatorial dial by Juan Andres, La Paz, 1699*

	Locations on sundial	Modern place names
Left column	Quito 0	Quito, Ecuador
	S. Fee 2	[unknown]
	Popaïan 3	Popayán, Columbia
	Paita 5	Paita, Peru
	Zaña 6	Zaña, Peru
	Trugillo 7	Trujillo, Peru
	Panama 9	Panama City, Panama
	Puertobelo 10	Portobelo, Panama
	Cartagena 10	Cartagena, Columbia
	Lima 12	Lima, Peru
Right column	Nasca 15	Nazca, Peru
	Arequipa 16	Arequipa, Peru
	Guamanga 13	Huamanga [Ayacucho], Peru
	Cusco 14	Cusco, Peru
	La Paz 17	Nuestra Señora de La Paz, Bolivia
	Horuro 18	Oruro, Bolivia
	Plata 19	La Plata [Sucre], Bolivia
	Potosì 20	Potosí, Bolivia

### Sundials for Soldiers in North America

The provenances of the Caribbean and South American sundials discussed in the last two sections are lacking for the eighteenth century, leaving us no choice but to make educated guesses about the original users based on the materials, styles, and mathematical projections of the physical objects. By contrast, the pocket sundials considered in this section have better supporting information. These were discovered in archaeological sites at battlefields and forts or have known associations with famous soldiers.

The management of extensive tracts of land in New France and English North America (after 1707, British North America) required the parent nations to build numerous forts to defend their settlements and trading posts. The first fortifications offered protection against Native Americans on whose land the settlers had trespassed. They also prevented European rivals from having access to trading posts, harbors and navigable waterways, and commodities such as fish, timber, and furs. Over the course of the seventeenth and early

eighteenth centuries, the British colonies grew in population until British settlers exceeded the French by twenty to thirty times. Less concerned with settlement than trade, the French explored the interior westward from the St. Lawrence River to the Great Lakes and Plains, and southward down the Mississippi to the Gulf Coast. They made alliances with many native groups and their rate of intermarriage was much higher than that of the British.

The animosities between the French and the British culminated in the eighteenth century in a global war fought over colonial supremacy. Known as the Seven Years' War in Europe, the battles started two years earlier in North America, where the war came to be known as the French and Indian War (1754–1763), in recognition that the French were allied with indigenous groups such as the Abenaki, Micmac, Potawatomi, Ojibwa, Ottawa, Shawnee, and Delaware.<sup>40</sup> The Iroquois, who had been traditional enemies of these tribes before European contact, associated themselves with the British.<sup>41</sup> When the war was settled by the Treaty of Paris in 1763, France relinquished control of Canada and its lands east of the Mississippi to Britain in exchange for keeping its sugar-producing colonies in the West Indies. Spain traded Florida to Britain in exchange for Cuba, and received Louisiana from France.

Sundials carried by French officers during the French and Indian War have been recovered near the sites of military campaigns and garrisons during that war. These instruments list the locations of forts and Native American peoples on their gazetteers. Moreover, in keeping with contemporary fashion trends in Paris, the sundials for latitudes north of 40° are found to be the Butterfield-type, complete with the delightful bird-gnomon. One extant sundial intended for use from the Canadian subarctic to Lima (Peru), is an inclining sundial, another common form of the period. A significant group of such sundials made by Pierre le Maire II will be discussed below.

English military officers, on the other hand, preferred more utilitarian compass dials. Like the sundial belonging to Roger Williams, they consisted of a small, shallow, brass box in which a bare magnetic needle rotated on a pivot in the center of a paper wind rose glued to the bottom of the box. The needle and card were protected by glazing held down with a brass frame, which was

40 Alan Gevinson, "Which Native American Tribes Allied Themselves with the French?", <http://teachinghistory.org/history-content/ask-a-historian/22245>, posted under "Ask a Historian", National History Education Clearinghouse, [www.teachinghistory.org](http://www.teachinghistory.org) (accessed 7 March 2016).

41 According to Irene Castle McLaughlin, Curator of North American Ethnography at the Peabody Museum of Archaeology and Ethnology, Harvard University, the French and Indian War can be seen as a conflict of proxies, with Europeans fighting each other through their Indian allies. Personal communication, 11 April 2015.



FIGURE 7.9 *English compass sundial recovered from the site of a British encampment on Rogers Island, adjacent to Fort Edward on the Hudson River, during the French and Indian War.*

FORT TICONDEROGA MUSEUM.

inscribed with an hour scale and supported a gnomon. The gnomon folded flat when the sundial's brass lid was attached. Most compass dials were pocket-sized and barely 4.5 to 5.5 cm in diameter. Each was designed for a particular latitude, but their precision was not high. If a user relocated a couple of degrees north or south, the small size of the sundial kept reading errors in the same limits.

In 1965, an amateur historical archaeologist recovered such a compass sundial (*Fig. 7.9*) in excavations of the former site of an officer's hut on Rogers Island opposite Fort Edward along the Hudson River in New York. This sundial is about 4.5 cm in diameter and has a gnomon for  $41^{\circ}$  even though the military spot is at a  $43^{\circ}$  latitude. The compass box of a larger, 7.6 cm-diameter, portable sundial was excavated across the river but nearby at the mainland site of Fort Edward.<sup>42</sup> And just thirty miles away from Fort Edward near Rupert, Vermont, a third English compass sundial was discovered in a buckskin pouch.<sup>43</sup> The district was well-traveled by the British military. Situated at a strategic spot

42 David R. Starbuck, *Excavating the Sutlers' House: Artifacts of the British Armies in Fort Edward and Lake George*, Lebanon, NH, 2010, pp. 38–39 and 41. The partial compass dial is part of the McDougall Collection, owned by the Fort Edward Historical Association. Matthew Keagle, Curator, Fort Ticonderoga, email to author, 29 January 2015.

43 The compass dial in its leather pouch was buried 15 feet below the surface, and discovered during the digging of a building foundation. Ogilvie H. Davis, "Directional Time Tellers of the French and Indian Wars", *Muzzle Blasts* (October 1969), pp. 4–6.

known to Native Americans as the “Great Carrying Place”, Fort Edward marked the point on the Hudson River where it became unnavigable going north and travelers had to portage their canoes to Lake George, from where they could access Lake Champlain and continue by water to Canada.<sup>44</sup> Built in 1755, Fort Edward became home to the largest encampment of soldiers—some fifteen to sixteen thousand—during the French and Indian War, and was a staging ground for British campaigns into the Lake George and Champlain valleys in the late 1750s. The Rogers Island compass dial is now on display in the Fort Ticonderoga Museum, and the incomplete dial is held by the Fort Edward Historical Association. The present whereabouts of the sundial discovered near Rupert is unknown.

Archaeologists have also found two gnomons from English compass dials in digs at the Cape Breton site of the Fortress of Louisbourg. Founded by the French in 1713, Louisbourg was a fortified fishing and trading settlement that became home to one of North America’s largest fortresses by the mid-1740s. In 1745, British and colonial New England forces captured the fortress during King George’s War, but it was returned to France by a peace treaty in 1748. During the French and Indian War, the British regained the Fortress of Louisbourg after a siege in 1758, and its engineers methodically razed it. The British had a garrison there until 1768.<sup>45</sup> The fortress has been reconstructed in modern times, and archaeological excavations done. During the digs, two gnomons from English compass sundials were recovered—one from the site of a storehouse of military and domestic goods and building hardware occupied alternately by French and British forces between 1724 and 1768; the other in a layer of mixed domestic artifacts in a yard similarly occupied between 1727 and 1758.<sup>46</sup> Although Louisbourg is at 45° 54’, the first gnomon is from a compass

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44 René Chartrand, *The Forts of Colonial North America: British, Dutch, and Swedish Colonies*, Oxford, 2011, pp. 33–35. See the maps: Thomas Jefferys, *The Provinces of New York, and New Jersey; with part of Pensilvania, and the Province of Quebec. Drawn by Major Holland, Engraved by Thomas Jefferys, Geographer to His Majesty. Corrected and Improved, from the Original Materials, By Governr. Pownall, Member of Parliament 1776*, London, 1776; David Rumsey Historical Map Collection, 0346.020; and Claude Joseph Sauthier, *A Map of the Province of New-York, Reduced from the large Drawing of that Province, Compiled from Actual Surveys by Orders of His Excellency William Tryon Esqr. Captain General & Governor of the fame, By Claude Joseph Sauthier; to which is added New-Jersey from the Topographical Observations of C. J. Sauthier & B. Ratzer. Engraved by William Faden, (Successor to the late Mr. Thos Jefferys) 1776*, [n.p.], 1776; David Rumsey Historical Map Collection, 5298.000.

45 René Chartrand, *The Forts of New France in Northeast America, 1600–1763*, Oxford, 2008, pp. 15–16 and 58–59.

46 Gnomon of English compass sundial for latitude 52°, 16L90B5–36, recovered from Archaeological Event 16D19: use of the second storehouse located at the northeast corner

dial made for  $52^\circ$ . This being the typical London product, its owner was probably a British soldier newly transferred to Louisbourg from southern England near the end of the French and Indian War. The second gnomon has an angle of  $45^\circ$ , which indicates that it was made for British forces in North America. It was suitable for use at the garrison at Annapolis Royal, Nova Scotia ( $44^\circ 50'$ ), which the British seized from the French in 1710, and equally good for use at the nearby Fortress of Louisbourg. It may have been carried from Annapolis Royal to Louisbourg during the British occupation in the 1740s or 1758.

Information about soldiers and their pocket sundials also comes from recollections and estate records. General Edward Braddock, the British commander-in-chief at the start of the French and Indian War, supposedly gave a French silver pocket dial as a sign of friendship to his aide-de-camp, George Washington. At the time a colonel in the Virginia militia, Washington had volunteered his service to Braddock for the ill-fated 1755 expedition to remove French forces from the Ohio territory. When British troops were ambushed and decimated at the Battle of Monongahela, Braddock ordered retreat before being struck by a bullet. With every other officer injured or killed, Washington stepped up to carry out the orders, rallying the forces and employing Braddock's officer's sash as a litter to remove him from the battlefield. As the general lay dying, he gave the sash to Washington.<sup>47</sup> The sash survives, but the story of the pocket sundial is unconfirmed. Another tradition comes from the Revolutionary War period and claims that the Marquis de Lafayette presented a silver pocket sundial to Washington, then commander-in-chief of the Continental Army.<sup>48</sup> As a major general, Lafayette fought in many battles, and Washington treated him as close friend and confident. Whether there is truth in either sundial gift, it is certain that George Washington, like many soldiers, carried pocket sundials

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of Lot D (>1724–1768); and gnomon of English compass sundial for latitude  $45^\circ$ , 2L8oG12–3, recovered from Archaeological Event 2E23: accumulation of occupation material in the yard of Lot E (1727–1758). These sites existed during the first French period–New England occupation, second French period, and final British occupation of the fortress. Fortress of Louisbourg N.H.S.C., Archaeology Collections. Maura McKeough, Cultural Resource Manager, Cape Breton Field Unit, Parks Canada, email to author, 8 April 2015; and Heidi Moses, Archaeology Collections Manager, Fortress of Louisbourg, email to author, 10 April 2015. The latitude measurements are the author's.

47 Matthew A. Byron, "Battle of the Monongahela," in Joseph F. Stoltz III (ed.), *George Washington Digital Encyclopedia*, Mount Vernon Estate, 2012–, [www.mountvernon.org/digital-encyclopedia/article/battle-of-the-monongahela/](http://www.mountvernon.org/digital-encyclopedia/article/battle-of-the-monongahela/) (accessed 20 March 2016). Edward Braddock's sprang silk sash, English, c. 1709, Mount Vernon, W-86. On the sundial gift, see Silvio Bedini, *Thinkers and Tinkers: Early American Men of Science*, New York, 1975, p. 264.

48 Alice Morse Earle, *Sun Dials and Roses of Yesterday*, New York, 1902, p. 143.

throughout his military career. Most were of the English compass-dial form. At his death in 1799, an inventory of Washington's possessions at Mount Vernon listed in his study, "1 Pocket Compass" valued at 50 cents, and with valuables in an iron chest, "1 Compass in Brass Case" and "1 Pocket Compass," valued respectively at 50 cents and \$ 5.00.<sup>49</sup> Perhaps one of these was the treasured silver pocket sundial allegedly given to him by Braddock or Lafayette.

General Philip Schuyler of Albany fought with the British forces in the French and Indian War and against them in the Revolutionary War. He had a fine brass universal ring dial inscribed with his name. It can be seen at the New York Historical Society.<sup>50</sup> General Jean Baptiste Donatien de Vimeur, comte de Rochambeau, commander of the French troops sent by Louis XVI to aid the American rebels, also carried a pocket sundial.<sup>51</sup> Like Lafayette's sundial, Rochambeau's was undoubtedly an elegant product of a fine Parisian workshop. Its present whereabouts is unknown, but such a silver sundial carried by a French officer in the Revolutionary War survives at the Morristown, New Jersey site of Washington's headquarters and the winter encampment of the Continental Army in 1779–1780, now a National Historical Park. Made in 1673 by Roch Blondeau, Paris, the pocket dial is oval and has hour scales for 40°, 45°, and 50° latitude.<sup>52</sup>

Other sundials recovered from Revolutionary War sites illustrate the preferences of the British forces. A brass compass dial was discovered by archaeologists in 2001 at the Lake George Battlefield Park. The Roman numeral *XXIX* scratched into its case has been interpreted as proof of it being the property of the British 29th Regiment of Foot, which fought at the Battle of Saratoga in 1777. That instrument is now curated by the New York State Museum in Albany.<sup>53</sup> Another compass dial fragment was recovered from a 'dump heap' at

49 Benson J. Lossing, *The Home of Washington; or Mount Vernon and Its Associations, Historical, Biographical, and Pictorial*, Hartford, Conn., 1870, pp. 407 and 409; Bedini, op. cit. (n. 47), p. 264.

50 English universal ring dial, 1750–1780, brass, with a diameter of 11.4 cm, is engraved "Gen. Philip Schuyler" on the equatorial ring. It is in the New York Historical Society, inv. 1941.303, where it is listed wrongly as an "astrolabe"; [www.nyhistory.org/exhibit/astrolabe](http://www.nyhistory.org/exhibit/astrolabe) (accessed 8 March 2016). Cf. Bedini, op. cit. (n. 47), p. 264.

51 Earle, op. cit. (n. 48), p. 143.

52 Jude M. Pfister, Chief of Cultural Resources, Morristown National Historical Park, email exchanges with the author, 26 January–3 February, 2015.

53 Starbuck, op. cit. (n. 42), pp. 15–16 and 45–46. The notion that the Roman numerals indicate a connection with a particular regiment deserves further research. Many brass compass dials have Roman numerals scratched on their parts, and these have been presumed to be match marks used in the manufacturing process. See "Compass Dials" in Schechner, *Sundials and Time-Finding Instruments*, op. cit. (n. 11).



Fort Ticonderoga during its reconstruction in the twentieth century. Located at the strategic portage between Lakes George and Champlain, the star-shaped fort was begun in 1755 by the French. Captured by the British in 1759, the stronghold's name was changed from Fort Carillon to Ticonderoga.<sup>54</sup> In 1775, it was the scene of 'America's first victory' in the Revolution, when Ethan Allen, Benedict Arnold, and the Green Mountain Boys captured the fort from the British.<sup>55</sup> The compass dial fragment could have been used by either British or American soldiers (*Fig. 7.10*), whereas a wooden diptych sundial purported to have been carried by Ethan Allen and currently on display at the fort is too late.<sup>56</sup>

Despite wide use of the various forms of pocket sundials by military officers, the historian Silvio Bedini thought none were manufactured in the colonies for this purpose. It is true that surviving examples, inventories, and contemporary records routinely list London and Paris makers.<sup>57</sup> So what do we make of the advertisements of Anthony Lamb in New York City? In 1757, he announced that he made and sold "BATTALIONS of box-wood, according to the new scheme of his royal highness the *Duke of Cumberland*, for distributing the officers proportionably to the several parts of a regiment [...]. Likewise large pocket compasses suitable for the gentlemen of the army".<sup>58</sup> A year later, he advertised "LARGE POCKET COMPASSES, with DIALS, that will serve from 35 to 50 Degrees of Latitude, with the Latitudes of most principal Places in North-America, laid down, suitable for Gentlemen of the Army. Those that have occasion, are desired to apply in Time, lest they be disappointed".<sup>59</sup>

54 Chartrand, *The Forts of New France in Northeast America...*, op. cit. (n. 45), pp. 33–37, 57 and 59; Sauthier, op. cit. (n. 44); and Rigobert Bonne, *L'Isle de Terre Neuve, l'Acadie, ou la Nouvelle Ecosse, l'Isle St. Jean et la Partie Orientale du Canada. Par M. Bonne, Ingr. Hydrogr[aphe] de la Marine*, Geneva, 1780; bound into the atlas accompanying Guillaume-Thomas Raynal, *Histoire Philosophique et Politique des Établissements et du Commerce des Européens dans les deux Indes*, 4 vols., Geneva, 1780; David Rumsey Historical Map Collection, 3083.060.

55 Matthew Keagle, Curator, Fort Ticonderoga, email to author, 29 January 2015. Fort Ticonderoga, *Timeline*, [www.fortticonderoga.org/history-and-collections/timeline](http://www.fortticonderoga.org/history-and-collections/timeline) (accessed 08 March 2016).

56 Thanks to a photo supplied by the Fort Ticonderoga curator, Matthew Keagle, 29 January 2015, I am able to identify the sundial as made by Kleininger in the early 19th century—i.e., after the war and Ethan Allen's death in 1789.

57 Bedini, op. cit. (n. 47), p. 264.

58 Anthony Lamb, advertisement in *The New-York Mercury*, 28 March 1757, issue 242, p. [3], and successive weeks until 25 April 1757.

59 A. Lamb, advertisement in *The New-York Mercury*, 10 April 1758, issue 294, p. [3]; and every week until 19 June 1758.



FIGURE 7.10 *The diversity of soldiers serving in the Continental Army during the Yorktown campaign, 1781, appears in a watercolor sketch made by Jean Baptiste Antoine de Verger, a French sub-lieutenant serving under the Comte de Rochambeau. From left to right, de Verger depicted a black soldier of the First Rhode Island Regiment, a New England militiaman, a frontier rifleman, and a French officer. The American patriots favored compass sundials; the French, Butterfield-type or inclining dials.*

ANNE S. K. BROWN MILITARY COLLECTION, BROWN UNIVERSITY LIBRARY.

And in 1760 he announced that his establishment on Hunter's Quay was the place "where Gentlemen of the Army may be supply'd with large Pocket Compasses, with or without Dials, Mahogany, Japann'd and Shagreen Case Telescopes; with all Kinds of Mathematical Instruments in the neatest and best Manner".<sup>60</sup> These advertisements show us that Lamb was savvy enough to take advantage of the business opportunities associated with the French and Indian War. His customers were officers, and they wanted compass sundials that gave both the time and cardinal directions. The sundials Lamb sold that were adjustable for latitude and had gazetteers were probably inclining or Augsburg-type sundials, which contained large central compasses. His customers were likely the same people who would have bought the *New-York Pocket Almanack for the Year, 1757*:

60 A. Lamb, "Suitable for Gentlemen of the Army," *The New-York Mercury*, 7 April 1760, issue 399, p. [1]; S. A. Bedini, *At the Sign of the Compass and Quadrant: The Life and Times of Anthony Lamb*, "Transactions of the American Philosophical Society 74", pt. 1, Philadelphia, 1984.



Containing, (besides what is usual in other Almanacks) . . . a List of his *Britannick* Majesty's Land Forces, with the Names of the Field Officers now in *America*, and to what Regiment they belong; the daily Pay of his Majesty's Foot and Marines; a Table shewing how to find the Hour of the Night, by the Shade of the Moon, on a Sun Dial, very convenient for the Gentlemen of the Army.<sup>61</sup>

So why do we not find any extant sundials signed by Lamb? It could be that his sundials were wood and did not endure, that they were unsigned brass instruments and have been mistaken for English products, or that he imported this stock from England. The last option is the most likely when we consider the wide range of goods that he sold, and the regulatory laws that forbade Americans from manufacturing finished goods in British colonies.

The only maker for which there is concrete evidence of his workshop supplying the troops in North America was not American at all. He was Pierre le Maire II of Paris.

### Pierre le Maire II, Outfitter of French Officers

Known as Le Maire fils, Pierre le Maire II worked between 1730 and 1760 in Paris at the sign *au Nouveau Quartier Anglais* on the Quai de l'Horloge, Île de la Cité. He was the son and nephew of scientific instrument makers. His father was Pierre le Maire I (b. 1672, fl. 1698–1750), also a maker of sundials but a specialist in mounting lodestones, a point he advertised by working under the sign *à la Pierre d'Aimant*. His uncle was Jacques le Maire (fl. 1714–1762), another sundial maker and member of the Société des Arts. Working under the sign *au Génie*, Jacques had many addresses, but by 1730, father, son, and uncle were all established on the Quai de l'Horloge. Pierre le Maire II worked with his uncle, Jacques, for a time. He was the first maker in France of Hadley's quadrant, which gave meaning to his shop sign, *au Nouveau Quartier Anglais*. He also made sundials, surveying instruments, mathematical instruments, and drawing instruments. Like his father, le Maire was in the Founders' Company, and he served as a juror of masters in 1751–1753. An *ingénieur du Roy*, le Maire made instruments for members of the Académie des Sciences, and was called upon to verify standard measures, like the ell for the city of Paris made by Guibout.<sup>62</sup>

61 *New-York Mercury*, 29 November 1756, issue 225, p. [3].

62 Augarde, op. cit. (n. 23), pp. 54, 62, 67, 71–72; Marcelin, op. cit. (n. 33), s.v. "Lemaire, Jacques", "Lemaire, Pierre Ier", and "Lemaire, Pierre II"; Maurice Daumas, *Scientific Instruments of*

Le Maire's reputation and connections may have led the French government to commission him to supply sundials "to the Officers of their Armies in North America from 1756 to 1759: to assist in guiding them thro[ugh] the Forrests and Wastes of that Country", as a manuscript found in a le Maire sundial case aptly notes (*Pl.* 7.10).<sup>63</sup> Six of these sundials have been located by the author (*Pls.* 10–11; *Figs.* 7.11–13). Details of their construction and inscriptions are included in *Table 4*. Two of the sundials are in the collection of the Adler Planetarium in Chicago.<sup>64</sup> A third is held by the Musée Stewart in Montreal.<sup>65</sup> The fourth is part of the Peter Winkworth Collection of Canadiana at the Canadian War Museum in Ottawa, which is overseen by the Canadian Museum of History.<sup>66</sup> The fifth is located in Green Bay, Wisconsin at the Neville Public Museum of Brown County.<sup>67</sup> The sixth, and last of the known examples, was in the private collection of Dr. C. H. Lewis of Toronto in the 1960s.<sup>68</sup> Its current location is unknown.

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*the Seventeenth and Eighteenth Centuries and Their Makers* (trans. by Mary Holbrook), London, 1972, pp. 182 and 259.

- 63 Butterfield-type sundial, Pierre le Maire 11, Paris, 1730–1750, brass: Musée Stewart, Montréal, inv. 1988.51. The first date has been read both as 1751 and 1756.
- 64 Butterfield-type sundial and inclining sundial, Pierre le Maire 11, Paris, 1730–1760, brass: AP, inv. T-58 and W-57. S. J. Schechner, "The Material Culture of Astronomy in Daily Life", *Journal for the History of Astronomy* 32 (2001), pp. 189–222.
- 65 Butterfield-type sundial, Pierre le Maire 11, Paris, 1730–1750, brass: Musée Stewart, Montréal, inv. 1988.51. A. E. Bouchard, "La collection des cadrans solaires du Musée Stewart de Montréal", *Le Gnomoniste* 8, no. 3 (September 2001), pp. 9–13; A. E. Bouchard, "Les cadrans solaires en Nouvelle-France", *Cap-aux-Diamants: La revue d'histoire du Québec* 60 (2000), pp. 18–22, [www.erudit.org/culture/cd1035538/cd1044716/7665ac.pdf](http://www.erudit.org/culture/cd1035538/cd1044716/7665ac.pdf) (accessed 08 March 2016).
- 66 Butterfield-type sundial, Pierre le Maire 11, Paris, 1745–1755, brass: Peter Winkworth Collection of Canadiana, Canadian War Museum, Ottawa, inv. CWM 20080079-011.
- 67 Butterfield-type sundial, Pierre le Maire 11, Paris, 1730–1760, brass: Neville Public Museum of Brown County, Green Bay, Wisconsin, inv. 9184. This sundial was found in 1902 on the eastern shore of Green Bay by a collector, Frank Duchateau, and is sometimes referred to as the Duchateau sundial. It was first published in the *Collections of the State Historical Society of Wisconsin* 16 (1902), opposite p. 64. Brendon Baillod, "New France Sundials from Wisconsin", *Le Gnomoniste* 18, no. 3 (September 2011), pp. 6–7; B. Baillod, "The Mystery of the French Sundials", unpublished MS in the accession records of the Neville Public Museum.
- 68 Butterfield-type sundial, Pierre le Maire 11, Paris, 1730–1755, silver, owned by Daniel-Hyacinthe-Marie Liénard de Beaujeu (1711–1755), whose name is inscribed on the sundial. In the private collection of Dr. C. H. Lewis of Toronto, who purchased it in a London shop in 1960. C. H. Lewis, "Liénard de Beaujeu's compass-sundial", *Antiques* 87, no. 3 (March 1965), "Collectors' Notes", pp. 336–337; Bedini, *Thinkers and Tinkers*, op. cit. (n. 47), figs. 22–23.



FIGURE 7.11 *A rugged wooden case protected this brass sundial as it traveled across the Great Lakes and Plains in New France. Butterfield-type sundial by Pierre le Maire II, Paris, 1730–1760.*

PHOTOGRAPHY BY STEVE PITKIN, PITKIN STUDIO. IMAGE COURTESY OF ADLER PLANETARIUM, CHICAGO, ILLINOIS, T-58.

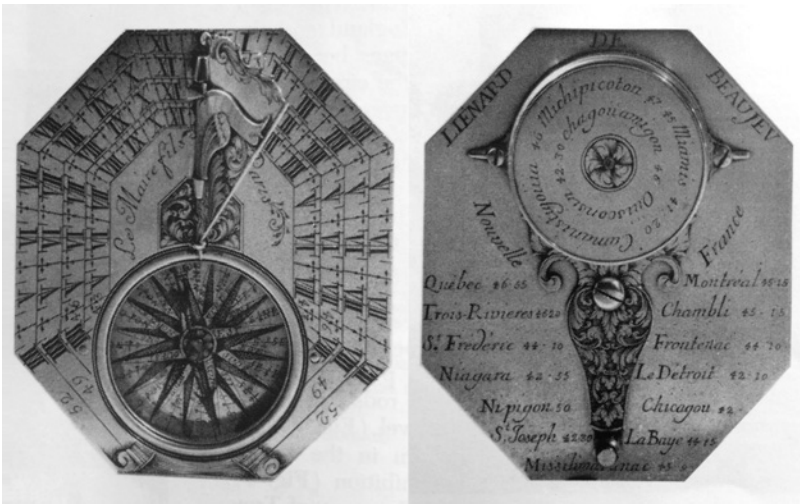


FIGURE 7.12 *A silver pocket sundial fit for a commander of French forces in Canada, this le Maire Fils sundial, 1730–1750, belonged to Daniel Liénard de Beaujeu. Private collection of Dr. C. H. Lewis, Toronto, 1960s.*

REPRODUCED FROM ANTIQUES 85, MARCH 1965.



FIGURE 7.13 Undersides of four le Maire sundials for use in New France. Adler Planetarium T-58, Stewart Museum 1988.5.1, Neville Public Museum 9184, and Adler Planetarium W-57.

IMAGES COURTESY OF ADLER PLANETARIUM, CHICAGO, ILLINOIS; PHOTOGRAPHY BY STEVE PITKIN, PITKIN STUDIO; STEWART MUSEUM, MONTREAL, CANADA; AND THE NEVILLE PUBLIC MUSEUM OF BROWN COUNTY, WISCONSIN.

TABLE 7.4 Comparison of le Maire sundials employed in New France

	Adler T-58	Stewart 1988.5.1	CWM 20080079-011	Neville 9184	Lewis PC	Adler W-57 inclining
Compass box outer ring	Maisons De la Trinité 51. 5'	Maisons De la Trinité 51. 5'	Maisons De la Trinité 51. 5'	Maisons de la Trinité 51. 5' les piche bourouni 49.	Michipicoton 47. 45 Miami 41. 20 Camanistigouia 46	
Compass box inner ring	les piche Bourouni 49	Les piche Bourouni 49	Les piche Bourouni 49	fort S' anne 50. 15' Michipicoton 41. 45'	Chagotiamigon 46 Oüisconsin 42. 30	
Left column	qué bec 45. 55 Montréal 45. 15 port Royale 44. 10 lac Mistassin 52 les jrocois 45 Abnakis 45. 50'	québec 46. 45' Montréal 45. 15' Louis bourg 45. 40' fort S' anne 52. 15' Abnakis 45. 50' les jrocois 45.	québec 46. 45' Montréal 45. 15' Louis bourg 45. 40' fort S' anne 52. 15' Abnakis 46. 50' les jrocois 45.	Montréal 45. 15' lac S' jean 49. port royale 44. 10' abnakis 45. 50' fort Louis 51. 50' lac Mistassin 52.	Québec 46. 55 Trois-Rivieres 46. 20 S'. Frédéric 44. 10 Niagara 42. 55 Nipigon 50 S'. Joseph 42. 30 Missilimakinac 45. 9	Ouabaches . 40. Missouris . 39. AKansas . 34. Natchéz 32. 1/2. N. Orleans . 30. Lima au Perou . M. 12.

	Adler T-58	Stewart 1988,51	CWM 20080079-011	Neville 9184	Lewis PC	Adler W-57 inclining
Right column	lac S'jean 49 Louis bourg 45. 40' Michipicoton 41. 45' fort S'anne 52. 15' fort Louis 51. 50' la baye 44. 15'	lac S'jean 49. lac Mistassin 52. Michipicoton 41. 45' fort Louis 51. 50' port Royale 44. 10' la baye 44. 15'	lac S'jean 49. lac Mistassin 52. Michipicoton 41. 45' fort Louis 51. 50' port Royale 44. 10' la baye 44. 15'	québec 46. 45' les jrocois 45. Louis bourg 45. 40' l'isle Auticosti 50. la baye 44. 15'	Montréal 45. 15 Chambli 45. 15 Frontenac 44. 10 Le Détroit 42. 10 Chicagou 42. La Baye 44. 15 Nouvelle	Illinois . 38. Fort . Louis . 31 . . . Thoméz. . 32. Pensacole . 30. 20' Isl. dauphine 30 La Rochelle 46
Left side compass box						
Right side of compass box					France	Paris 49.
Signature	Pre . le Maire AParis	Pre . le Maire AParis	Pre . le Maire AParis	Pre . le Maire AParis	Le Maire fils AParis	P. Le Maire / AParis
Hour scales	43. 46, 49, 52	43, 46, 49, 52	43, 46, 49, 52	43, 46, 49, 52	43, 46, 49, 52	Inclining
Material	Brass	Brass	Brass	Brass	Silver	Brass
Other	Rugged wooden field case	Original Paris case with manuscript label			<i>Inscribed around compass box:</i> LIENARD DE BEAUJEU	

Five are octagonal, Butterfield-type dials, complete with the adorable bird on the gnomon for setting the latitude of the sundial between  $40^{\circ}$  N and  $60^{\circ}$  N. Four of these are made of brass; one of silver. Each sundial has four hour scales, and every scale is divided from 4 am to 8 pm, with quarter-hour subdivisions. The innermost hour scale is for  $43^{\circ}$  N latitude, and successive scales are for  $46^{\circ}$ ,  $49^{\circ}$ , and  $52^{\circ}$ . On the brass sundials, the hours alternate between Roman and Arabic numerals:  $43^{\circ}$  is marked V-XII-VII;  $46^{\circ}$ , 4-12-8;  $49^{\circ}$ , IIII-XII-VIII, and  $52^{\circ}$ , 4-12-8. On the silver sundial, all hour scales are marked in Roman numerals. Each sundial has an inset magnetic compass with a wind rose labeled in French and a fleur-de-lys at north. On the brass sundials, the wind rose has sixteen simple points identified by initials, whereas the silver sundial has thirty-two points, sixteen of which are split triangles in the nautical style. Its cardinal and intercardinal points are engraved with their full French names; the remaining points are labeled by French initials. When the compass needle is present on the brass dials, it is a blued-steel rod intersected by a circle near the northern end. The silver sundial, however, has a blued needle shaped as an arrow with a feathered tail (*Fig. 7.12*).<sup>69</sup> The compass boxes are offset about  $14^{\circ}$ – $15^{\circ}$  W, which matches the magnetic declination in Paris around 1730–1740 as well as a swathe through Nova Scotia and Canada. Additional ornamentation includes acanthus leaves on the hour plate at the toe of the gnomon and alongside the bird index on the gnomon, and a hint of an architectural scroll supporting the hour scales. The ornamentation is more artfully engraved and refined, of course, on the silver sundial. The brass sundials are signed *Pre. le Maire AParis*. The silver example is signed, *Le Maire fils AParis*. The silver sundial is also distinguished by being inscribed *Nouvelle France* (New France) and *LIENARD DE BEAUJEU* (the name of its famous owner, Daniel-Hyacinthe-Marie Liénard de Beaujeu).

The sixth sundial (*Pl. n*) in this special group is a brass inclining dial signed underneath the hour plate *P. Le Maire / AParis*. Its magnetic compass is similar to those of the brass Butterfield-type dials already described, except that it is offset for a magnetic declination of about  $16^{\circ}$   $45'$ – $17^{\circ}$  W, which was appropriate for Paris circa 1750. The single hour scale is likewise marked IIII-XII-VIII and divided into quarter hours. The folding latitude arm is divided  $50^{\circ}$  N– $0^{\circ}$ – $40^{\circ}$  S, every  $1^{\circ}$  and inscribed *Partie Septentrionale* (northern part) and *Partie Meridionale* (southern part).

The top sides of these six sundials are constructed and ornamented in the style typical of many other mid-eighteenth century French sundials in general,

69 Compass Needle Register, types 10 and 66, respectively, prepared by the author for the forthcoming sundial and time finding instrument catalogue of the Adler Planetarium.



and those of Pierre le Maire in particular. It is only when they are turned over that we see how unusual they are. Instead of the usual gazetteer of French towns and major European cities, we discover a list of sites in North America (Fig 7.13, Table 7.3).

The sundial currently at the Neville Public Museum was unearthed in 1902 from a newly plowed field on the eastern shore of Green Bay, Wisconsin, an arm of Lake Michigan. The field was near Red Banks, the site of a large palisaded village of the Winnebago in 1634 when the French explorer, Jean Nicolet, arrived by canoe in search of resources and a shortcut to China. Nicolet set up a trading post there and called the place *La Baye des Puants* (the bay of the stinking). The *puants* referenced were the Sioux-speaking people that he found living in the village, whose Algonquian-speaking neighbors called *winpyeko* (Anglicized to Winnebago), meaning ‘people of the dirty water’. This referred to the muddy water of the lower course of the Fox River (linking Lake Winnebago to Lake Michigan at Green Bay), which became clogged every summer with rotting fish.<sup>70</sup> *La Baye des Puants* appears on early maps of New France, such as that drawn by Louis Joliet in 1673–1674, but was frequently shortened to *Puans* or *La Baye*.<sup>71</sup> In 1669 a Jesuit father arrived in *La Baye* and established a mission. A fortified trading post followed in 1684, and was rebuilt in 1717, when a garrison was stationed there. Fort *La Baye* remained in French hands until the British captured it in 1761 during the French and Indian War (Fig. 7.14).<sup>72</sup> The sundial was probably lost by one of the last French officers to occupy the post between 1756 and 1758, but it may also have belonged to a missionary.<sup>73</sup>

70 Nancy Oestreich Lurie, “Winnebago,” in William C. Sturtevant et al. (eds.), *Handbook of North American Indians*, Washington, DC, 1978–2008, 20 vols.; v. 15, pp. 690–707; Charles M. Rousseaux, “Winnebago,” in Sharon Malinowski and Anna Sheets (eds.), *The Gale Encyclopedia of Native American Tribes*, Detroit, 1998, 4 vols.; v. 3, pp. 330–335.

71 Louis Joliet, *Nouvelle Decouverte de Plusieurs Nations Dans la Nouvelle France, En L'année 1673 et 1674*, MS map: John Carter Brown Library, Providence, RI, Map Collection, Cabinet B674 / 1 Ms.

72 Jacques Nicolas Bellin, the royal hydrographer, shows the fort and mission clearly on the site in his 1764 map, *La Nouvelle France où Canada*, Paris, 1764: David Rumsey Historical Map Collection, 6903.012. On Fort Labaye, see R. Chartrand, *The Forts of New France: The Great Lakes, the Plains, and the Gulf Coast, 1600–1763*, Oxford, 2010, pp. 28–29.

73 Baillod, “The Mystery . . .”, op. cit. (n. 67). A reference to a Jesuit father having a sundial is found in a letter from La Ronde, commandant at Fort Chequemagon, to Beauharnois, 22 July 1738, in which the writer confirms a report that Sioux had killed twenty-two Frenchmen, saying that it “was quite true, for we have had Sun-dials and several other things belonging to the Jesuit Father”. See *Collections of the State Historical Society of*





FIGURE 7.14 Jacques Nicolas Bellin, the royal hydrographer, clearly shows La Baye des Puans with its mission and fortified trading post in the lower left of this detail of his 1764 map. The map also shows forts and Indians around the Great Lakes that were listed on the le Maire sundials, including Kaministiquia, Michipicoten, Michilimackinac, Frontenac, the Iroquois, Niagara, Detroit, Miamis, and Chicago.

BELLIN, LA NOUVELLE FRANCE OU CANADA, PARIS, 1764; DAVID RUMSEY HISTORICAL MAP COLLECTION, 6903.012.

Fort La Baye (*La Baye* 44. 15) appears on every one of the le Maire Butterfield-type sundials. Other sites listed on the gazetteers were significant outposts in New France. *Québec* 45. 55 referred to Quebec City, established by Samuel de Champlain in 1608. On the St. Lawrence River, it became the main trading port and the administrative capital of New France. Montreal (*Montréal* 45. 15'), the principal interior city in the province of Quebec was established in 1642 as a colonial mission, but quickly became a major fur trading post. Its early years were marked by a series of conflicts with the Iroquois Confederacy, known as

Wisconsin 17 (1906), pp. 277–278, along with a photo of a bronze garden sundial recovered near Portage, Wisconsin in 1903.

the Iroquois Wars or the Beaver Wars.<sup>74</sup> On the northwestern coast of what is today Nova Scotia, Port Royal (*port Royale* 44. 10) was the capital of the French colony of Acadia from 1605 until 1710, when the British seized it and renamed it Annapolis Royal.<sup>75</sup> Notice that the sundials did not concede the defeat. French and Acadian forces, allied with the Micmac, attempted to recapture the town four times during King George's War (1744–1748). In 1755 the British began deporting the Acadian people from Annapolis Royal because they wanted to cut off their support to the nearby Fortress of Louisbourg (listed on the sundials as *Louis bourg* 45. 40').

Other forts on these eighteenth century French sundials also show the tug-of-war between France and Britain in North America. *Fort St Anne* 52. 15' was first known as Fort Albany in the 1670s when the Hudson's Bay Company had established it as a fur trading post and a defense on James Bay at the mouth of the Albany River. The French captured the post in 1686 and renamed it Fort Sainte Anne. The English recaptured it in 1693 and reverted the name. Today it is the home of the Fort Albany First Nation and is accessible only by air or ice roads. *Fort Louis* 51. 50' was another fur trading post established in 1671 by the Hudson's Bay Company as a stockade under the name of Moose Fort. In 1686, the French captured Moose Fort and renamed it Fort Louis. Ten years later in 1696, the English retaliated and burned it to the ground. In 1730 the Hudson's Bay Company set up a new fort a mile upstream. Today the site is called Moose

74 Paul-André Linteau, "Montréal" and "Iroquois Wars," *The Canadian Encyclopedia*, Toronto, 2009, [www.thecanadianencyclopedia.ca/en/article/montreal/](http://www.thecanadianencyclopedia.ca/en/article/montreal/), and Anonym, [www.thecanadianencyclopedia.ca/en/article/iroquois-wars/](http://www.thecanadianencyclopedia.ca/en/article/iroquois-wars/) (accessed 9 March 2016).

75 Nicolas Landry and Anselme Chiasson, "History of Acadia," *ibid.*, [www.thecanadianencyclopedia.ca/en/article/history-of-acadia/](http://www.thecanadianencyclopedia.ca/en/article/history-of-acadia/) (accessed 9 March 2016); Chartrand, *The Forts of New France in Northeast America . . .*, op. cit. (n. 45), pp. 12–16. Compare names on French and British maps: it is Port Royal on Guillaume de Lisle, *Carte du Canada ou de la Nouvelle France et des Decouvertes qui y ont été faites. Dressée sur plusieurs Observations et sur un grand nombre de Relations imprimées ou manuscrites. Par Guillaume De l'Isle, Geographe de l'Academie Royale des Sciences*, Paris, 1703 [between 1708 and 1712?]; David Rumsey Historical Map Collection, 4764.097; and it is Annapolis Royal on Herman Moll, *New Found Land, St. Laurence Bay, the fishing banks, Acadia, and part of New Scotland*, London, 1736; David Rumsey Historical Map Collection, 5580.047. Both names are given together on Didier and Gilles Robert de Vaugondy, *Partie de l'Amérique Septent[riale] qui comprend la Nouvelle France ou le Canada, par le Sr. Robert de Vaugondy Géog[raphe] Ordinaire du Roy*, Paris, 1755; David Rumsey Historical Map Collection, 3353.099; and Bonne, op. cit. (n. 54).

Factory, Ontario. Maps of the eighteenth century give both English and French names for each of these sites.<sup>76</sup>

Since 1714, Michipicoten (*Michipicoton* 41. 45') was the site of a fur trading post on the northeastern shore of Lake Superior at the mouth of the Michipicoten River. The post was at the junction of the two main trade routes—one westward from Montreal and the other north to James Bay. The name is Ojibwa for 'big bluffs'. It also refers to the Michipicoten people whose traditional summer grounds were at the mouth of the river.<sup>77</sup> The French first visited the area between 1617 and 1622, and Michipicoten appeared on Samuel de Champlain's map of 1632 and other later maps.<sup>78</sup>

*Maisons de la Trinité* 51. 5' may have been settlements near the Monts de la Trinité, a mountain range just north of the Manicouagan River. In 1664, Henri Nouvel was the first Jesuit missionary to travel upstream on the river to Manicouagan Lake, which was formed from an impact crater. Along the way, he celebrated mass on the festival of the Most Holy Trinity within sight of a great mountain. This being the "first sacrifice ever offered in this country, where no European had been before", he named the peak Mont de la Trinité.<sup>79</sup> Although *Mont de la Trinité* is found on contemporary maps, as well as a plural form (*Mts de la Trinité*) applied to a range of mountains, no site identified as *Maisons de la Trinité* has been found on maps or in the *Jesuit Relations*.<sup>80</sup> The label on the sundial may be a corruption of *Monts de la Trinité*. There is also another possibility: in France, *Maisons de la Trinité* (Trinity Houses) were relief organizations for sailors and their widows in the mid-eighteenth century, and this listing on the sundials' gazetteers may have referred to such establishments

76 Chartrand, *The Forts of New France in Northeast America...*, op. cit. (n. 45), pp. 54–55; Bellin, op. cit. (n. 72).

77 Michipicoten First Nation, "Who We Are", [www.michipicoten.com/who-we-are/](http://www.michipicoten.com/who-we-are/) (accessed 09 March 2015).

78 Samuel de Champlain, *Carte de la nouvelle France, augmentée depuis la dernière, servant a la navigation faite en son vray Meridien, par le Sr. de Champlain Capitaine pour le Roy en la Marine; lequel depuis l'an 1603 jusques en l'année 1629*, in S. de Champlain, *Les Voyages de la Nouvelle France occidentale, dicte Canada*, Paris, 1632: Bibliothèque Nationale de France, Département Cartes et Plans, GE C-6108 (RES). See also de Lisle, *Carte du Canada...*, op. cit. (n. 75); Bellin, op. cit. (n. 72); and H. Moll, *A New Map of ye North Parts of America claimed by France under ye Names of Louisiana, Mississippi, Canada & New France. with the Adjoyning Territories of England & Spain*, London, 1736: David Rumsey Historical Map Collection, 5580.046.

79 Reuben Gold Thwaites (ed.), *The Jesuit Relations and Allied Documents: Travels and Explorations of the Jesuit Missionaries in New France, 1610–1791*, Cleveland, 1896–1901, 73 vols.; v. 49, pp. 46–47 (1664).

80 For the plural form, see for example, Bonne, op. cit. (n. 54).

along the St. Lawrence River. We must remember that the sundials reflect the decisions of administrators in Paris about what was important in New France, whether or not this was the case on the ground in Canada. Bigger forts and fur trading posts such as Michilimackinac were overlooked on the sundials, and smaller ones such as La Baye and Michipicoten were included.<sup>81</sup>

By the latitude given on the sundials, *Lac Mistassin 52* would appear to be now known as Mistassin Lake, Ontario. However, the largest freshwater lake in Quebec and a degree further south, Lake Mistassini, was frequently identified in seventeenth- and eighteenth-century French accounts and maps as Lac Mistassin and other variations of the Cree word for 'large rock'. It was an important waypoint for traders traveling up the Saguenay and Rupert Rivers to James Bay.<sup>82</sup>

Along the same trading route was *Lac St Jean 49*, which also had a French settlement and fur trading post. The local people, the Kakouchak Innu, called it *Piekouagami*, or 'flat lake'. Some French maps denote a people by the name *Piekouagamiens* near the lake, and it at first seems that the sundial's *Les piche Bourouni 49* may be a much altered spelling given the latitude assigned on the sundials.<sup>83</sup> However, other maps show a people called the *Pitchibourouni* living further north on the eastern coast of Hudson Bay (*Fig. 7.15*).<sup>84</sup> The name refers to a native band living in what is now East Main Cree territory. In the *Jesuit Relations*, they were variously called the Kilistinons Nisibourounik, the Pishhapocanoes "near akin to the Eskeimoes", the Pitchibourenik, and Pitchibourouni.<sup>85</sup> The sundial maker's source has conflated the two.

Anticosti Island (*l'île Auticosti 50*), is strategically situated where the Saint Lawrence River enters the gulf. Originally a hunting ground for native peoples, Louis XIV presented the island to Louis Joliet in 1680. He built a fort and lived with his family there. Only one of the sundials includes this destination.<sup>86</sup>

The remaining geographic locations on the brass Butterfield-type sundials are references to territories inhabited by two native tribal groups: the Abenaki (*Abnakis 45. 50'*) and the Iroquois (*les irocois 45*). The Abenaki were Algonquian

81 Chartrand, *Forts of... the Great Lakes...*, op. cit. (n. 72), p. 5; Baillod, "The Mystery...", op. cit. (n. 67).

82 De Lisle, *Carte du Canada...*, op. cit. (n. 75); Bellin, op. cit. (n. 72); Bonne, op. cit. (n. 54).

83 The Native American name for the lake (Piekouagami) is given alongside the French name (Lac St. Jean) on the maps by de Vaugondy, op. cit. (n. 75), and Bonne, op. cit. (n. 54). Bellin, op. cit. (n. 72) shows the people (Piekouagamiens) as well.

84 De Lisle, *Carte du Canada...*, op. cit. (n. 75).

85 Thwaites (ed.), op. cit. (n. 79), v. 44, p. 248 (1658); v. 45, p. 228 (1660); v. 56, p. 202 (1672); Richard J. Preston, "East Main Cree", in Sturtevant et al. (eds.), op. cit. (n. 70), v. 6, pp. 196–205, esp. p. 205.

86 Neville Public Museum inv. no. 9184.







FIGURE 7.16 *Abenaki couple, eighteenth century watercolor.*  
COURTESY OF THE CITY OF MONTREAL RECORDS MANAGEMENT &  
ARCHIVES, MONTREAL, CANADA.

language family and whose territories were located in upstate New York and Canada. The tribes included the Mohawk, Oneida, Onondaga, Cayuga, and Seneca. A sixth tribe, the Tuscarora, joined the Iroquois confederacy in 1722. The Iroquois called themselves *Haudenosaunee* (People of the Long House) in reference to the construction of their homes. It was the French who labeled them *Iroquois*, deriving it from a pejorative Algonquian name meaning 'real adders'. French alliances with the Abenaki strengthened their animosity with the Iroquois. The British invested in the Iroquois, and used them as proxies to



fight native groups allied with France during the French and Indian War.<sup>88</sup> The sundials, thus, informed users of the locations of friends and foes, but made these Indian nations seem smaller by confining them to very specific latitudes.

Exceptional among these Butterfield-type sundials is the elegant silver one owned by Daniel-Hyacinthe-Marie Liénard de Beaujeu (1711–1755) (*Fig. 7.17*).<sup>89</sup> Born in Montreal, Liénard de Beaujeu was an officer in the French colonial troops like his father, Louis Liénard de Beaujeu. One of the posts where his father served was Fort Michilimackinac, a regional command center and a key trading post on the Straits of Mackinac, the waterway that connects Lake Huron and Lake Michigan.<sup>90</sup> As a lieutenant, Liénard de Beaujeu was among the troops that tried to recapture Louisbourg and Port Royal from the British in 1746. In 1749, he became commanding officer at Fort Niagara, located at the mouth of the Niagara River on Lake Ontario. It had a sizeable stone edifice intended to withstand British artillery.<sup>91</sup> In 1755, Liénard de Beaujeu was sent to command the newly built Fort Duquesne, situated at the meeting point of the Allegheny and Monongahela rivers (in present day Pittsburgh, Pennsylvania). He and his men set out from Lachine near Montreal on the 500 mile journey. En route he stopped at Fort Frontenac, Fort Niagara, Fort de la Presqu'île, Fort de la Rivière au Bœuf, and so forth, building a supply line until he reached Fort Duquesne.<sup>92</sup> Warned of the approach of General Braddock's troops, Liénard de Beaujeu organized a band of French and Indian fighters (Ottawa, Delaware, Huron, and Abenaki) to ambush the British troops. The maneuver was successful, but he died at the start of the battle.

His sundial (*Fig. 7.15*) tells the story of his life, listing the significant French forts of *Montréal* 45. 15, *Missilimackinac* 45. 9, *Niagara* 42. 55, and *Frontenac* 44. 10. It also included Quebec (*Québec* 46. 55) and Trois-Rivières (*Trois-Rivières* 46. 20), the first and second permanent settlements in New France, established in 1608 and 1634 respectively. Of further interest to a soldier like Liénard de Beaujeu were Fort Detroit (*Le Détroit* 42. 10), established in 1701; Fort Saint-Frédéric

88 William N. Fenton, "Northern Iroquoian Culture Patterns", in Sturtevant et al. (eds.), op. cit. (n. 70), v. 15, pp. 296–297; Loretta Hall, "Iroquois", in Malinowski and Sheets (eds.), op. cit. (n. 70), v. 1, pp. 75–84; Correspondence between the author and Irene Castle McLaughlin, Curator of North American Ethnography at the Peabody Museum of Archaeology and Ethnology, Harvard University, April 2015.

89 Malcolm MacLeod, "Liénard de Beaujeu, Daniel-Hyacinthe-Marie", in *Dictionary of Canadian Biography*, Toronto, 2003–2016, v. 3 (1741–1770), [www.biographi.ca/en/bio/lienard\\_de\\_beaujeu\\_daniel\\_hyacinthe\\_marie\\_3E.html](http://www.biographi.ca/en/bio/lienard_de_beaujeu_daniel_hyacinthe_marie_3E.html) (accessed 9 March 2016).

90 Chartrand, *Forts of... the Great Lakes...*, op. cit. (n. 72), pp. 4–5 and 27–31.

91 Ibid., pp. 4–6 and 18–22.

92 On these significant military posts, see *ibid.*, pp. 4–8, 15–21, 25.



FIGURE 7.17 *Chevalier Liénard de Beaujeu (1711–1755), owner of the silver Le Maire sundial. From Benjamin Sulte, Histoire des Canadiens-français, 1608–1880, Montreal, 1882–1884, v. 5, 6th illustration preceding the title page.*  
COURTESY OF THE BIBLIOTHÈQUE ET ARCHIVES NATIONALES DU QUÉBEC, 52327/1956461.

(*St. Frédéric* 44. 10), established in 1734 on Lake Champlain; Fort Kaministiquia (*Camanistigouia* 46), rebuilt in 1717 on Lake Superior at Thunder Bay, Ontario, and its northern dependency, Fort Nipigon (*Nipigon* 50), a fur trading post; Fort Saint Joseph (*St. Joseph* 42. 30), a fur trading post set up in 1691 on the St. Joseph River at Niles, Michigan; Fort Chambly (*Chambli* 45. 15) established in 1711 on the Richelieu River in Quebec, Canada; and Fort Chequamegon (*Chagoüamigon* 46), a stockaded trading post since 1661 on a small bay off Lake Superior, and home to fur traders, copper miners, and garrisons since 1692.<sup>93</sup> His sundial also drew his attention to the southern end of the Wisconsin River from the point where it joined the Mississippi and continued eastward for about a hundred miles (*Oüisconsin* 42. 30). At this eastern point, travelers could portage their canoes to the Upper Fox River and head downstream to Lake Winnebago and the Lower Fox River, which emptied into Green Bay. This was part of an important waterway that linked the Mississippi to the Great Lakes.<sup>94</sup> Another strategic landmark was Chicago (*Chicagou* 42.), which gave southern Lake Michigan access to the Gulf of Mexico via the Chicago River and a portage to the Des Plaines River, which joined the Illinois River going downstream to the Mississippi.<sup>95</sup> Chicago was also a trading center for the Potawatomi, Miami, and Illinois. The Miami, an Algonquian-language people living in what is now Indiana, southwest Michigan, and western Ohio, may have earned their own spot on the sundial (*Miamis* 41. 20), but this inscription, being so specific in latitude, more likely refers to Fort Saint-Philippe des Miamis. Built in 1715 where the St. Mary's River and St. Joseph River joined to form the Maumee River and near a large Miami town, the fort defended trade routes, but was attacked several times by hostile native groups. A British garrison took charge in 1760, and today it is Fort Wayne, Indiana.<sup>96</sup>

93 Ibid., pp. 4–8, 15–34. These forts are shown on maps such as de Lisle, *Carte du Canada . . .*, op. cit. (n. 75); de Vaugondy, op. cit. (n. 75), and Bellin, op. cit. (n. 72).

94 The waterway and portage is clearly noted on the map of Nicolas de Fer, *Le Cours du Missisipi, ou de St. Louis: Fameuse Riviere de l'Amerique Septentrionale aux Environs de laquelle se trouve le Païs appellee Louisiane*, Paris, 1718; David Rumsey Historical Map Collection, 10022.100; and G. de Lisle, *Carte de la Louisiane et du Cours du Mississipi. Dressée sur un grand nombre de Memoires entr'autres sur ceux de Mr. le Maire. Par Guillme. de l'Isle de l'Academie Rle. des Sciences*, Amsterdam, 1742; David Rumsey Historical Map Collection, 4638.095.

95 De Lisle, *Carte de la Louisiane . . .*, op. cit. (n. 94); de Vaugondy, op. cit. (n. 75).

96 Charles Callender, "Miami", in Sturtevant et al. (eds.), op. cit. (n. 70), v. 15, p. 681. The Miami people are featured on many maps of the period, such as de Fer, op. cit. (n. 94); Bellin, op. cit. (n. 72); de Lisle, *Carte de la Louisiane . . .*, op. cit. (n. 94); de Vaugondy, op. cit. (n. 75). Chartrand, *Forts of . . . the Great Lakes . . .*, op. cit. (n. 72), pp. 25–26.

While these Butterfield-type dials took their owners across French Canada, the inclining sundial by le Maire took its owner down the Mississippi and its tributaries to the Gulf of Mexico (*Fig. 7.18*). Most of the listings on its gazetteer referred to native peoples, rather than the French forts near them. Starting in the north, the sundial called attention to the Wabash Confederacy (*Ouabaches* . 40.), Native Americans of different tribes who lived along the Wabash River in present-day Illinois, Indiana, and Ohio. Their designation came from a Miami name for the river, *Wah-bah-shi-ki* (meaning pure white, bright), which referred to the water flowing over the river's limestone bed. French Jesuits shortened the name.<sup>97</sup> The Missouri (*Missouris* . 39.) were a Southern Sioux nation encountered by Jacques Marquette and Louis Joliet in 1673 and noted on their map as *Oumessourit*. They lived along the Missouri River and were known as 'people of the dugout canoes', a name given them by the Illinois nation in their Algonquian language.<sup>98</sup> The Illinois appeared on the sundial (*Illinois* . 38.) as well. Comprised of many related tribes (*Pl. 12*), this large nation historically occupied the central Mississippi River valley (running through the states of Illinois, Iowa, Missouri, and Arkansas).<sup>99</sup> The Akansa (*AKansas* . 34.) referred to the Quapaw tribe who lived where the Arkansas River met the Mississippi. The group was part of the Dhegiha Sioux, which split into several tribes that left the Ohio valley. In moving down the Mississippi River, the Quapaw became known as the *Ogaxpa*, or 'downstream people'. Marquette, the French explorer, first made contact with them in 1673. His Illinois guides, however, called the Quapaw the 'people of the south wind', or the Akansa. They were on friendly terms with the French.<sup>100</sup> Natchez (*Natchéz* 32. 1/2.) was the location of the primary ceremonial mounds and Grand Village

97 Thwaites (ed.), op. cit. (n. 79), v. 59, p. 145 (1673–1675); U.S. Geological Survey Geographic Names Information System, [http://geonames.usgs.gov/apex/f?p=gnispq:3:0::NO::P3\\_FID:449850](http://geonames.usgs.gov/apex/f?p=gnispq:3:0::NO::P3_FID:449850) (accessed 9 March 2016).

98 K. Michelle Moran, "Missouri," in Malinowski and Sheets (eds.), op. cit. (n. 70), v. 3, pp. 302–306. The Missouri are shown on N. de Fer, *Partie Meridionale de la Riviere de Missisipi, et ses environs, dans l'Amerique Septentrionale. Mis au jour par N. de Fer, Geographe de sa Majesté Catolique*, Paris, 1718: David Rumsey Historical Map Collection, 10022.099.

99 Charles Callender, "Illinois," in Sturtevant et al. (eds.), op. cit. (n. 70), v. 15, pp. 673–680; Greg Mazurkiewicz, "Illinois," in Malinowski and Sheets (eds.), op. cit. (n. 70), v. 1, pp. 69–74. See also Illinois State Museum, "The Illinois Indians", [www.museum.state.il.us/muslink/nat\\_amer/post/htmls/il.html](http://www.museum.state.il.us/muslink/nat_amer/post/htmls/il.html) (accessed 9 March 2016). The Illinois appear prominently on maps such as de Fer, *Partie Meridionale de la Riviere de Missisipi*, op. cit. (n. 98).

100 Thwaites (ed.), op. cit. (n. 79), v. 65, pp. 113–125 (1700); v. 69, p. 217 (1750); de Fer, *Partie Meridionale de la Riviere de Missisipi*, op. cit. (n. 98); Candace LaBalle, "Quapaw",





FIGURE 7.18 *Map showing the locations in North America listed on the sundials made by Pierre le Maire II for use in New France, 1730–1760.*

CREATED WITH THE HELP OF FEI CARNES, CENTER FOR GEOGRAPHIC ANALYSIS, HARVARD UNIVERSITY.

of the Natchez tribe along the Mississippi River. The French established a trading post there in 1713, built Fort Rosalie in 1716, and created a colony in 1718. When a despotic commander at the fort demanded in 1729 that the Natchez people leave their sacred Grand Village to make way for his plantation, the people rebelled. The retaliation was harsh. In 1731, the French soldiers forced about four hundred Natchez to surrender, burned some in a public spectacle, and sold the rest into slavery in Saint Domingue.<sup>101</sup> Lastly the sundial identified the city of New Orleans (*N. Orleans* . 30.) at the mouth of the Mississippi. Founded in 1718 by the French Mississippi Company, New Orleans became the capital of Louisiana in 1722 (*Fig. 7.19*).

Further east along the gulf, the Pensacola tribe (*Pensacole* . 30. 20') lived near modern-day Pensacola, Florida. The Spanish established a garrison there in 1698. In 1719, the French took charge, but surrendered to the Spanish in 1722. The Pensacola were at war with the indigenous people living along the Mobile River to the west. These included the Mobila and Tohomé. The Tohomé were also listed on the sundial (*Thomé* . 32.), and were allied with the French colonists settled on the Mobile River at La Mobile (today Le Moyne, Alabama).<sup>102</sup> La Mobile was the capital of French Louisiana from 1702 to 1711. It was guarded by Fort Louis (*Fort-Louis* . 31.) on Mobile Bay. In 1699, the French explorer Pierre Le Moyne d'Iberville had visited Mobile Bay and established a colony on 'Massacre Island', which was renamed Dauphin Island (*Isl. Dauphine* 30) in 1707.<sup>103</sup>

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in Malinowski and Sheets (eds.), op. cit. (n. 70), v. 3, pp. 350–355. The official website for the tribe today is [www.quapawtribe.com](http://www.quapawtribe.com) (accessed 9 March 2016).

- 101 De Fer, *Partie Meridionale de la Riviere de Missisipi*, op. cit. (n. 98); Patricia Galloway and Jason Baird Jackson, "Natchez and Neighboring Groups", in Sturtevant et al. (eds.), op. cit. (n. 70), v. 14, pp. 598–615; Doris Morris Maxfield, "Natchez", in Malinowski and Sheets (eds.), op. cit. (n. 70), v. 1, pp. 463–467; Chartrand, *Forts of... the Great Lakes...*, op. cit. (n. 72), pp. 48–50.
- 102 George E. Lankford, "Chacato, Pensacola, Tohomé, Naniaba, and Mobila", Sturtevant et al. (eds.), op. cit. (n. 70), v. 14, pp. 664–668; Frederick Webb Hodge, *Handbook of American Indians North of Mexico*, "Smithsonian Institution, Bureau of Ethnology 30", Washington, DC, 1907; John R. Swanton, *The Indian Tribes of North America*, "Smithsonian Institution, Bureau of American Ethnology 145", Washington, DC, 1952.
- 103 Chartrand, *Forts of... the Great Lakes...*, op. cit. (n. 72), pp. 53 and 57–58; and maps by N. de Fer, *Les Costes aux Environs de la Riviere de Misisipi. Decouvertes par Mr. de la Salle en 1683. et reconnues par Mr. le Chevallier d'Iberville en 1698. et 1699. Par N. de Fer, Geographe de Monseigneur le Dauphin*, Paris, 1701: Bibliothèque Nationale de France, Département Cartes et Plans, GE D-13313; de Fer, *Partie Meridionale de la Riviere de Missisipi*, op. cit.



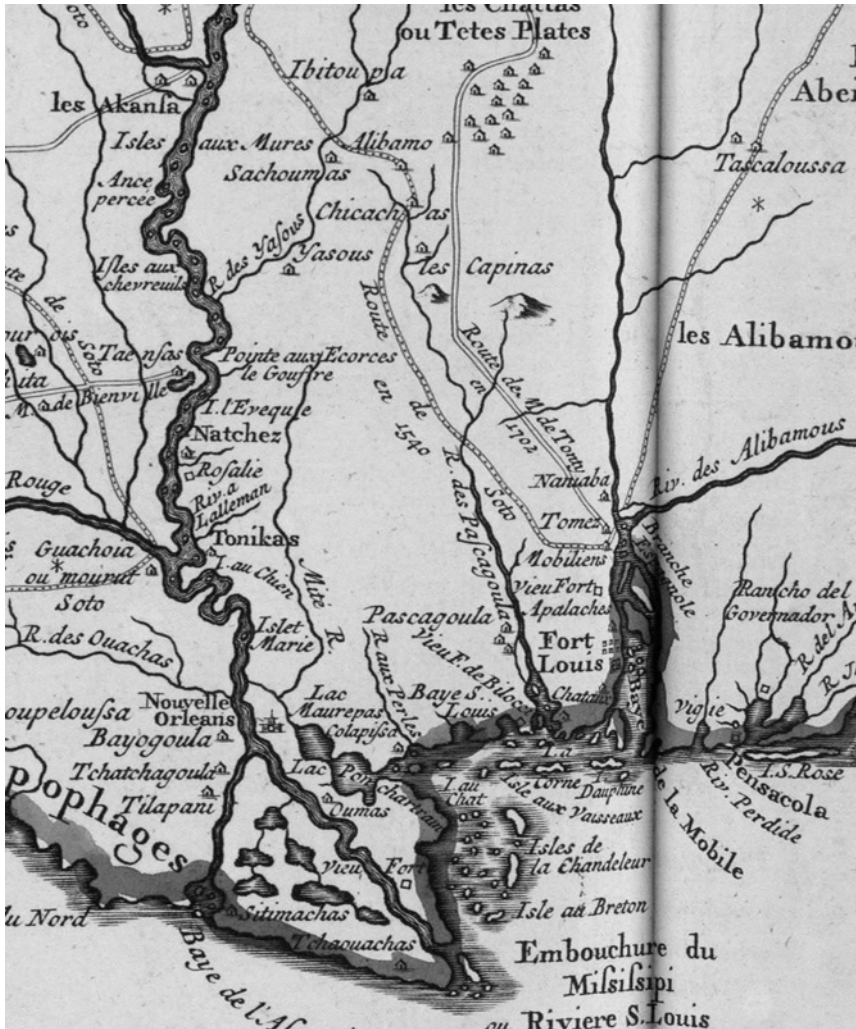


FIGURE 7.19 *The Akansa and Natchez people along the Mississippi River, the Tohomé on the Mobile River, and the Pensacola along the Gulf coast are identified on this map, along with Fort Rosalie, New Orleans, Fort Louis, and Dauphin Island. Guillaume de Lisle, Carte de la Louisiane et du Cours du Mississipi, Amsterdam, 1742, detail.*

DAVID RUMSEY HISTORICAL MAP COLLECTION, 4638.095.

(n. 98), which shows the tribal villages very clearly; de Lisle, *Carte de la Louisiane...*, op. cit. (n. 94); MOLL, *A New Map of ye North Parts of America...*, op. cit. (n. 78); and Emanuel Bowen, *A New & Accurate Map of Louisiana, with Part of Florida and Canada*, London, 1747: David Rumsey Historical Map Collection, 3733.058.

As for the other cities on this sundial, the importance of *Paris 49*. needs no discussion. Lima, Peru (*Lima au Perou* . M. 12.) was of interest to the French after the transfer of the Spanish Crown to the House of Bourbon in 1700. And *La Rochelle 46*? This western coastal city of France was active in the triangular trade of slaves from Africa, sugar from plantations in the West Indies, and fur from Canada. In 1718, the French West India Company sent eight hundred colonists from La Rochelle to Louisiana. Among them was Antoine-Simon le Page du Pratz. He was appointed superintendent of the public plantations, but is now better known for his ethnographic account of Louisiana, which provided much information about the lives of native peoples and colonists at the time this sundial was made in Paris.<sup>104</sup>

### Conclusions

What can we conclude from all these remote forts, tribal lands, trading posts, sugar plantations, and colonial administrative seats inscribed in brass, silver, and ivory? What do we make of sundial relics plowed up on old battlefields or discovered in collections? These tangible things shed light on what French, British, and Spanish administrators, instrument makers, and users thought most important to have and identify in the vastness of colonial North and South America. In a European city, for instance, a sundial's magnetic compass was a mere accessory for orienting the instrument to find time. In the forests and plains of the Americas, however, the compass became essential for finding one's way, while the hour scale was secondary. Perhaps this was why British officers were willing to carry single-latitude compass sundials whose time-finding accuracy was never very good. Their choice also shows us that "gentlemen of the military" of British and French backgrounds favored different styles of sundial in the field, just as they did back home in Europe. In addition, a hierarchy of class and rank is manifest in the materials employed and the quality of the engraving on the sundials. The extant dials, by virtue of the latitudes for which they were made, also enable us to gauge the variety and geographical range of potential users. These included plantation owners, wealthy merchants, military officers, colonial officials, and missionaries,

104 Antoine-Simon le Page du Pratz. *Histoire De La Louisiane, Contenant La Découverte De Ce Vaste Pays; Sa Description Géographique; Un Voyage Dans Les Terres; L'histoire Naturelle, Les Moeurs Coûtumes & Religion Des Naturels, Avec Leurs Origines; Deux Voyages Dans Le Nord Du Nouveau Mexique, Dont Un Jusqu'à La Mer Du Sud; Ornée De Deux Cartes & De 40 Planches En Taille Douce*, Paris, 1758.

all of whom were predominantly white males, but could also have been prosperous men and women who were freed black slaves or individuals of mixed race.

The sundials are also evidence of the transmission of cartographic and ethnographic knowledge gathered by missionaries, explorers, soldiers, and colonial merchants. At the same time, the dials testify to the wish of the colonial administrators to circumscribe and minimize the boundaries of the aboriginal populations by limiting their ranges to single latitudes on the instruments. The sundials, moreover, illustrate the tug-of-war of opposing imperial powers in their assignment of names to wilderness places and indigenous peoples. French and English names were swapped back and forth for settlements and geographical features, and the labels of native groups were often slurs imposed on them by invaders who were led by native guides belonging to tribal enemies of the people being classified. More disturbingly, the sundials also demonstrate a zeal for marketable commodities and military might by individuals and governments who were willing to enslave, resettle, and massacre Africans and Native Americans in their pursuit.

Lastly, the European sundials destined for colonial use surprise us by their practicality; especially as material evidence that Europeans wanted to have time discipline in a wilderness that did not run on Western notions of time.