

Becoming *bons marins sur terre*: State Knowledge, Self-Fashioning, and the Arnoul Family's Turn to the Sea, 1665-1726

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Sometime during his second tenure as Royal Intendant of the Galleys at Marseille (1710-1719), Pierre Arnoul received a sonnet composed in his honor by his *procureur*, Ricard. Ricard opened by saluting the precocious intelligence and maturity that had propelled Arnoul to a well-traveled career as an administrator of the king's navy and galleys: "Epitome of virtue, model of wisdom / Arnoul sees what we have seen from his earliest years / Giving a thousand embellishments to several ports / And joining prudence to the fire of youth." Initially Ricard characterized the intendant's return to Marseille as a divine gift, but the poem's final lines made clear that Arnoul the administrator had not simply arrived fully formed from the heavens: "A true and illustrious image of your father. / Without fighting, you know how to emerge victorious in combat / And will cause it to be said, in following in his footsteps / That he could never surpass you except in age."¹ It was only in emulating his renowned father, Nicolas, who had preceded him as intendant (1665-1673), that Pierre had been able to match and even to outstrip his achievements as an official of France's fleets and ports.

As both a resident of Marseille and a longtime client of the family, Ricard knew how active Arnoul *père* had been in grooming Pierre as his successor, even if that process was hardly as pre-ordained as the *procureur*'s sonnet made it seem. In 1665 Nicolas had

¹ The full text of Ricard's sonnet reads: "Abregé de vertu, modele de sagesse / Arnoul voy qu'on a vû de ses plus jeunes ans / Donner a plusieurs ports mille embellissements / Et joindre la prudence au feu de la jeunesse. / Pour faire son portrait vainement je m'empresse / Ma voix ne peut pousser que de foibles accens / Tandis que je voudroit v'offrir un digne encens / Ma meuse sans parler veut v'admirer sans cesse. / Le Ciel avec nos voeux semblant être d'accord / Te fait pour nôtre bien intendant de ce port / De ton pere fameux illustre et vraye image. / Sans combattir tu sçais vaincre dans les combats / Et vas faire avouer en marchant sur ses pas / Que jamais il ne pût te surpasser qu'en age." Ricard to Pierre Arnoul, Bibliothèque nationale de France, Nouvelles Acquisitions Françaises [hereafter BnF NAF] 21416, fol. 146 (ca. 1710-1719).

been “horrified” to learn that his son wished to become a Jesuit priest. With the encouragement of his patron, Controller-General of Finances and de facto Minister of Marine Jean-Baptiste Colbert, he had plucked Pierre from a brilliant career at the elite collège de Clermont in Paris and brought him to Provence to learn firsthand the art of managing the king’s slave ships.² The training up of a royal official at his father’s side was not unusual in Old Regime France, but this particular apprenticeship was unique: no one had ever been raised for a career administering the fleets and ports of the realm.³ Pierre’s instruction would combine for the first time the technical as well as the bureaucratic aspects of maritime service, ultimately fashioning him into a new kind of royal officer, the naval administrative specialist. In mastering the variety of skills necessary to project French power overseas, Pierre would not only assure himself and his kinsmen a prominent role within Louis XIV’s burgeoning empire—serving as intendant at Marseille, Toulon, Havre, Rochefort, and Cadiz while moulding his younger brother, Nicolas-François de Vaucresson, into an intendant of Martinique and of the galleys—but

² Colbert assured Nicolas that he was doing the right thing: “Je suis bien aise que vous soyez content de vre fils, et que vous ayez esperance, parce qu’il pourra sur vostre exemple, se rendre un jour capable de servir le Roy. Quand vous continuerez a l’eslever dans cet esprit je croy que vous ferez autant et mesme plus pour luy selon Dieu, que si vous luy inspiriez celuy de Religion, par ce que la vie active qui nous met en estat de servir nre Prince et le public, est sans doute aussy agreable a Dieu que celle qui est seulement renfermée dans son culte particulier.” Colbert to N. Arnoul, BnF NAF 21306, fols. 169v-170 (Nov. 20, 1665). Pierre’s biographer made a point of mentioning that Nicolas intervened to have Pierre withdrawn from school without warning him or asking for his consent: “Il se sentit a la fin de seconde beaucoup de penchant a se faire jesuite et il l’ecrivit a M. son Pere qui le regardant comme l’apuy de sa famille fut peut estre bien aise de l’en detourner, mais sans luy rien temoigner la dessus il en ecrivit d’abord a M. Colbert qui de son autorité le tira du college et l’envoya sur le champ a son pere a Marseille, a la fin de l’année 1665...” “Memoire sur la vie et sur les services de M. Arnoul a present intendant des galeres et du commerce,” BnF NAF 21416, fol. 117 (ca. 1715).

³ For some examples of royal officials trained by their fathers or other male relatives in this period, see John Rule, “A Career in the Making: The Education of Jean-Baptiste Colbert, Marquis de Torcy,” *French Historical Studies* 19, no. 4 (1996): 967-996; Jacob Soll, “Managing the System: Colbert Trains His Son for the Great Intendancy,” in *The Information Master: Jean-Baptiste-Colbert’s Secret State Intelligence System* (Ann Arbor, 2009), 84-93; Louis Delavaud, *Un ministre de la marine: Jérôme Phélypeaux de Pontchartrain. Son éducation et ses premiers emplois, sa visite des ports de France en 1694, 1695 et 1696* (Rochefort, 1911).

also advance a radical reorientation of his family's ambitions and lifestyle from Paris to Provence and from the land to the sea.⁴

The household apprenticeships of Pierre and Vaucresson provide an occasion to balance competing claims about the tectonic shift from an early-modern culture of royal service predicated on personal loyalties and patron-client bonds to one based increasingly (though never entirely) on formal instruction and technical expertise.⁵ Many scholars have attributed the emergence of a professionalized state service to bureaucratization, the formation of royal corps and *écoles*, and the application of state power to ever more complex administrative tasks.⁶ The careers of the Arnoul show how the instruction of

⁴ Pierre served as intendant of Marseille (1673-1675, 1710-1719), Toulon (1675-1679), Havre (1680), Bayonne and the Île de Rhé (1681-1683), and Rochefort (1683-1688), in addition to stints as *intendant des classes* (1692-ca. 1710) and intendant of Marine at Cadiz (1702-?), among other posts mentioned below. Vaucresson served as intendant of Martinique (1704-1715) and of the galleys (1719-1726) after spending two decades in lesser positions on campaign and in the ports.

⁵ Studies of state-affiliated agents and institutions in the modern period show that the rational, disinterested bureaucracy described by Max Weber has never been more than an ideal type. See, for example, the touchstone works of Pierre Bourdieu on the social embeddedness of the modern state. Pierre Bourdieu, Loïc J. D. Wacquant, and Samar Farage, "Rethinking the State: Genesis and Structure of the Bureaucratic Field," *Sociological Theory* 12, no. 1 (1994): 1-18; Bourdieu, *The State Nobility: Elite Schools in the Field of Power*, trans. Lauretta C. Clough (Palo Alto, 1996); Max Weber, *Economy and Society: An Outline of Interpretive Sociology*, eds. Gunther Roth and Claus Wittich, 2 vols. (Berkeley, CA, 1978), esp. II: 956-1031.

⁶ Some leading examples of this voluminous literature, which varies widely in its conclusions about the Old Regime state's "modernization" and modes of governance, include James Collins, *The State in Early Modern France* (Cambridge, UK, 1995); Michel Antoine, *Le Cœur de l'État: Surintendance, contrôle général et intendances des finances, 1552-1791* (Paris, 2003); William Beik, *Absolutism and Society in Seventeenth-Century France: State Power and Provincial Aristocracy in Languedoc* (Cambridge, UK, 1985); Sharon Kettering, *Patrons, Brokers, and Clients in Seventeenth-Century France* (New York, 1986); Guy Rowlands, *The Dynastic State and the Army under Louis XIV: Royal Service and Private Interest, 1661-1701* (Cambridge, UK, 2002); Julian Swann, *Provincial Power and Absolute Monarchy: The Estates General of Burgundy, 1661-1790* (New York, 2003); Fanny Cosandey and Robert Descimon, *L'Absolutisme en France: histoire et historiographie* (Paris, 2002). For a critical overview of some of this literature, see Beik, "The Absolutism of Louis XIV as Social Collaboration," in *Past and Present*, no. 188 (Aug. 2005): 195-224; David Parker, *Class and State in Ancien Régime France: The Road to Modernity?* (London, 1996). On the royal corps and *écoles*, see René Taton, ed., *Enseignement et diffusion des sciences en France au XVIIIe siècle* (Paris, 1964); Frederick B. Artz, *The Development of Technical Education in France, 1500-1850* (Boston, 1966); Jane Langins, *Conserving the Enlightenment: French Military Engineering from Vauban to the Revolution* (Boston, 2003); Anne Blanchard, *Les ingénieurs du Roy de Louis XIV à Louis XVI: étude du corps des fortifications* (Montpellier, 1979); Isabelle Laboulais, "Serving Science and the State: Mining Science in France, 1794-1810," *Minerva* 46, no. 1 (2008): 17-36; Terry Shinn, "Science, Tocqueville, and the State: The Organization of Knowledge in Modern France,"

administrators on the ground could impart specialized knowledge and expand the state's realm of governance long before the crown established fixed avenues of training and promotion for intendants, military officers, engineers, and other royal servants. Their experience suggests that the initiative in the pre-history of bureaucracy could come not only from ministers and monarchs eager to enlarge their authority, but also from ambitious families at the kingdom's margins who anticipated their patrons' desires and fashioned themselves accordingly. In their profound commitment to embodying and applying knowledge in the naval service of the king, the Arnoul demonstrated the growing power of technology, imperial expansion, and an "expert" persona as sources of social and professional advancement—an early case of one household's "personal identity at epistemological work" on behalf of the state.⁷

Royal administrators such as the Arnoul have long been a focus of historical writing about the rise of the Old Regime state.⁸ First cast by Tocqueville as all-powerful agents of royal despotism, then by social and political historians as glorified negotiators whose fragile authority depended upon collaboration with local notables, the intendants are now coming under scrutiny in a different role: as purveyors of knowledge. In recent years, historians have redirected the study of state formation toward the development of state

Social Research 59, no. 3 (1992): 533-566. For sociological works on professionalization and its history, see Jean-François Kesler, "Le développement de la fonction publique en France," *L'Année sociologique* 28, 3e série (1977): 213-230; Howard M. Vollmer and Donald L. Mills, eds., *Professionalization* (Engelwood Cliffs, NJ, 1966); Magali S. Larson, *The Rise of the Professions: A Sociological Analysis* (Berkeley, CA, 1979), esp. 2-9; Philip Elliott, *The Sociology of the Professions* (London, 1972); Andrew Abbott, *The System of Professions: An Essay on the Division of Expert Labor* (Chicago, 1988).

⁷ Here I apply Steven Shapin's formulation about natural philosophers to royal administrators, whose claims to knowledge and truth were likewise mediated by social status, reputation, patronage, and comportment. Shapin, *A Social History of Truth: Civility and Science in Seventeenth-Century England* (Chicago, 1995), xxviii.

⁸ See Alexis de Tocqueville, *The Old Regime and the French Revolution*, trans. Stuart Gilbert (New York, 1998) and the works on state formation cited above. Some prominent studies of the intendants in particular are Vivian Gruder, *The Royal Provincial Intendants: A Governing Elite in Eighteenth-Century France* (Ithaca, NY, 1968); Anette Smedley-Weill, *Les intendants de Louis XIV* (Paris, 1995); Jean-Claude Dubé, *Les intendants de la Nouvelle-France* (Montreal, 1984).

information.⁹ How did the king and his ministers collect, digest, and act upon the intelligence gathered by their agents? How did they train those agents to report and classify the sort of knowledge they considered most useful? And how did new, more sophisticated methods of compiling, organizing, and exploiting information change the role of the state in French society under the monarchy and beyond?

These questions not only engage with older lines of inquiry about the transition of the absolute monarchy from “feudal” to “modern,” but also shed new light on traditional problems and personalities in the field. Thus Jacob Soll has recast Colbert as “a scholar of state learning: not simply a bureaucrat but an expert” whose “secret state intelligence system,” drawing on rich intellectual origins that included humanist scholarship as well as merchant practices of accounting and observation, became a powerful tool of governance that encouraged the critical use of knowledge toward “public” ends.¹⁰

Chandra Mukerji has proposed a more “distributive” view of state knowledge under Colbert, showing how entrepreneurs and noble officeholders transformed the vernacular “collective intelligence” of lower-status “technical experts”—engineers, artisans, financiers, and peasant women—into impersonal knowledge through the media of paperwork and numeracy, imbued it with their own authority, and then marshalled it in

⁹ In addition to the works by Soll and Mukerji discussed below, see Giora Sternberg’s study of the royal ceremonial record under Louis XIV and its manipulation by figures at Court. Sternberg, “Manipulating Information in the Ancien Régime: Ceremonial Records, Aristocratic Strategies, and the Limits of the State Perspective,” *The Journal of Modern History* 85, no. 2 (2013): 239-279. For a comparative perspective, see Randolph Head, “Knowing Like a State: The Transformation of Political Knowledge in Swiss Archives, 1450-1770,” *The Journal of Modern History* 75, no. 4 (2003): 745-782; Mary Poovey, *A History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society* (Chicago, 1998), 92-143. On the broader culture of information management in early modern Europe, see Ann Blair, *Too Much to Know: Managing Scholarly Information Before the Modern Age* (New Haven, 2010).

¹⁰ Soll, *Information Master*.

the king's name to carry out major public works over the opposition of provincial elites.¹¹ James McClellan and François Regourd have characterized the colonial administration headed by Colbert and his successors as a “machine” that translated scientific observations into imperial dominion.¹² Despite their differences, all of these scholars portray knowledge and power as inextricably bound under the Old Regime in ways that appear at once rooted in early-modern cultures of learning and statecraft and suggestive of a modern *bürokratischer Staat*.¹³ Together their research reveals an impulse among Louis XIV and his leading servants to cultivate in themselves a more “intelligent” brand of rule.

The Arnoul shared that impulse, but their case does not fit neatly into conceptions of state knowledge as the object of ministerial mastery, the disembodied product of collective intelligence, or the cognitive fuel of a well-oiled imperial machine. Although some aspects of their experience conform to these models—the hard-driving influence of Colbert, the common origins of technical learning, and the ability of royal agents to bring new *sciences* under crown control in exchange for prestige and promotion—others suggest a relationship between knowledge and the state that is less rational, more deeply embedded in the social relations of power. Viewing this relationship in light of one

¹¹ By fusing noble and non-noble cultures of knowledge, Mukerji argues, the minister and his collaborators introduced a “more modern and effective” form of territorial control, as well as a growing tension between patrimonial conceptions of power and abstract discourses of technical proficiency. Chandra Mukerji, “Jurisdiction, Inscription, and State Formation: Administrative Modernism and Knowledge Regimes,” *Theory and Society* 40, no. 3 (2011): 223-245; Mukerji, *Impossible Engineering: Technology and Territoriality on the Canal du Midi* (Princeton, 2009).

¹² James McClellan and François Regourd, *The Colonial Machine: French Science and Overseas Expansion in the Old Regime* (Turnhout, 2011).

¹³ Soll and Mukerji join other historians of “political knowledge” in placing their work in dialogue with the touchstone theories of Weber and Michel Foucault. See Mukerji, “Jurisdiction, Inscription, and State formation”; Soll, *Information Master*, 9-14; Michel Foucault, *Discipline and Punish: The Birth of the Prison* (New York, 1977); Foucault, *Power/Knowledge: Selected Interviews and Other Writings, 1972-1977*, ed. Colin Gordon (New York, 1980); Foucault, *Security, Territory, Population: Lectures at the Collège de France 1977-1978* (New York, 2007).

family's history of service, moreover, makes it possible to see how closely administrative expertise remained tied to the bodies, behaviors, and spaces of the experts even as it transformed them in ways befitting a nascent bureaucracy. These social and cultural variables add an element of uncertainty to the knowledge-state equation. If the careers of the Arnoul show that knowledge could be passed down from one generation to the next, built upon, and used to secure social and occupational rewards to the mutual benefit of individuals and the monarchy, they also speak to the contingent link between expertise and advancement for members of the same family, who, despite having access to a shared body of knowledge transmitted within the household, nonetheless experienced varying levels of success as a result of shifting patron-client bonds, differences of personality and talent, and evolving standards of training and promotion.

The Arnoul case therefore underscores the necessity of bridging the gap between epistemological and sociological approaches to state formation. That gap persists because historians continue to adopt competing definitions of the state itself: as an intellectual construct, a series of discourses, an institutional complex, a group of officials, or relationships of power and authority grounded in the social. In this article, I seek to reconcile some of those definitions by linking one family's service to a strategy of upward mobility dependent upon self-fashioning, the appropriation of monarchical ambitions, and a particular brand of epistemic work. A case study of one household has limitations, to be sure. But to understand how and why such a strategy could succeed (or fail) at different moments and for different individuals, and what its implications were for state development, we need to see the knowledge it produced as the outcome of social as

well as discursive practices that shaped the daily lives of royal agents on the ground—an approach that requires detailed, long-term analysis of particular cases.¹⁴

Taken alone, epistemological and sociological perspectives tend toward opposing, equally distorted images of the state. The danger of the first approach is clear: knowledge is only as good as its use, and the mere acquisition of it did not always mean that the monarchy—a fragmented, factious construct under the Old Regime—was able to marshal it effectively in a way that advanced the king’s interests.¹⁵ Still, as Paul Cheney and Loïc Charles have demonstrated, it is possible to examine the relationship between intelligence and the state without assuming a linear, teleological connection between them.¹⁶ The sociological perspective poses a different hazard. Scholars once used studies of kinship and client networks to revise the prevailing image of Louis’s administrators (Colbert chief among them) as Weberian bureaucrats, showing how deeply

¹⁴ What we know of the Arnoul stems largely from their administrative correspondance and the private records they left behind, which include personal letters, household accounts, and a pair of unfinished biographies commissioned by Pierre for himself and his father around 1715. Neither biography was completed, but, like Ricard’s sonnet, they survive among the family’s papers to this day. Both are peppered with Pierre’s own line edits and supported by dozens of folios of autobiographical notes presumably intended for his biographer’s use. Biography of Nicolas Arnoul, BnF NAF 21416, fols. 1-2v; “Memoire sur la vie et sur les services de M. Arnoul a present intendant des galeres et du commerce,” fols. 3-78v, 117-117v and 120-127v (ca. 1715). Pierre’s motives in ordering these works are unclear, but they may have been meant for his own son’s benefit as a sort of family “textbook,” a common aim of elite noble biographies under the Old Régime. For the use of such sources elsewhere, see Mark Motley, *Becoming a French Aristocrat* (Princeton, 1990); Jay Smith, *The Culture of Merit: Nobility, Royal Service, and the Making of Absolute Monarchy, 1600-1789* (Ann Arbor, 1996), esp. 65-89; and Yuval Harari, *Renaissance Military Memoirs: War, History and Identity, 1450-1600* (Woodbridge, UK, 2004).

¹⁵ See, for example, the case of the comte de Mirabeau, Governor of Guadeloupe (1753-1755), whose superiors routinely ignored or dismissed his scientific discoveries and proposals for administrative reform. Paul Cheney and Loïc Charles, “The Colonial Machine Dismantled: Knowledge and Empire in the French Atlantic,” *Past and Present* 219, no. 1 (2013): 127-163; also Pernille Røge, “‘Legal Despotism’ and Enlightened Reform in the Îles du Vent: The Colonial Governments of Chevalier de Mirabeau and Mercier de la Rivière, 1754-1764,” in *Enlightened Reform in Southern Europe and its Atlantic Colonies, c. 1750-1830*, ed. Gabriel Paquette (Burlington, VT, 2009), 167-182. For another example of knowledge breakdown, see François Regourd, “Kourou, 1763: succès d’une enquête, échec d’un projet colonial,” in *Connaissances et pouvoirs: les espaces impériaux (XVIIe-XVIIIe siècles). France, Espagne, Portugal*, eds. Charlotte de Castelnau-L’Estoile and François Regourd (Bordeaux, 2005), 233-251. The collapse of Colbert’s information system following his death also testifies to the contingent, non-linear relationship between knowledge-gathering and state power. Soll, *Information Master*, 153-162.

¹⁶ Cheney and Charles, “The Colonial Machine Dismantled”: esp. 127-133.

entrenched they were in a self-seeking culture of power shot through with patronage.¹⁷ The Arnoul themselves were cast by this literature as key lieutenants in Colbert's "mafia."¹⁸ But as Robert Descimon, Jean-Frédéric Schaub, and Bernard Vincent have observed, this perspective, if taken too far, risks reducing the state to a series of family-factional dominions controlled like gangland turf. A more promising approach, they argue, privileges the records produced by administrators as a means to reconstruct a crown-sponsored "normative discourse about society" that increasingly "calibrated, measured, and described the phenomena over which it claimed authority."¹⁹ Already we are beginning to see how that discourse, informed by knowledge gathered and produced by individuals operating within traditional structures of patronage, ultimately helped to shape and even to provoke Enlightened debates about the nature of French society and the monarchy's role within it.²⁰ Balancing sociological and knowledge-based perspectives thus promises to capture the dynamism of Old-Regime political culture while remaining attentive to its enduring patrimonial character.

¹⁷ Some leading examples of this scholarship include Daniel Dessert and Jean-Louis Journet, "Le lobby Colbert: Un royaume ou une affaire de famille," *Annales: Économies, Sociétés, Civilisations* 30, no. 1 (1975): 1303-1336; Kettering, *Patrons, Brokers, and Clients*; Beik, *Absolutism and Society*; Beik, "The Absolutism of Louis XIV."

¹⁸ Dessert, *La Royale*, 46-55; Dessert and Journet, "Le lobby Colbert": 1334n40; Kettering, *Patrons, Brokers, and Clients*, 23-24, 200-201.

¹⁹ Robert Descimon, Jean-Frédéric Schaub, and Bernard Vincent, eds., *Les figures de l'administrateur: Institutions, réseaux, pouvoirs en Espagne, en France et au Portugal, 16e-19e siècle* (Paris, 1997), 12-15.

²⁰ Michel Antoine, "La monarchie absolue," in *The Political Culture of the Old Regime*, ed. Keith Michael Baker, vol. I, *The French Revolution and the Creation of Modern Political Culture* (New York, 1987), 3-24; Soll, *Information Master*, 153-168; Mukerji, "Jurisdiction, Inscription, and State Formation"; Cheney and Charles, "The Colonial Machine Dismantled": 160-161; Michael Kwass, *Liberté, Égalité, Fiscalité: Privilege and the Politics of Taxation in Eighteenth-Century France* (Cambridge, UK, 2000); Rafe Blaufarb, "Noble Privilege and Absolutist State-Building: French Military Administration after the Seven Years' War," *French Historical Studies* 24, no. 2 (2001): 223-246; Robert Darnton, "The High Enlightenment and the Low-Life of Literature," in *The Literary Underground of the Old Regime* (Cambridge, MA, 1982), 1-40; Daniel Roche, "Milieux académiques provinciaux et société des lumières. Trois académies provinciales au XVIIIe siècle, Bordeaux, Dijon, Châlon-sur-Marne," in Alphonse Dupront, François Furet et al., *Livre et société dans la France du XVIIIe siècle* (Paris, 1965), 93-184; David Bell, *Lawyers and Citizens: The Making of a Political Elite in Old Regime France* (Oxford, UK, 1994).

The Arnoul brothers came of age amid an unprecedented expansion of French seapower and the administrative apparatus that serviced it. In the 1660s, fixed maritime intendants were a recent phenomenon, part of the naval renaissance that Louis and Colbert believed necessary to challenge the seafaring economic might of the English and the Dutch.²¹ Until Colbert's reforms the day-to-day business of the navy, galleys, and colonies had been overseen only on an ad hoc basis, by private companies, individual entrepreneurs, or officers attached to a particular campaign; beginning with Nicolas and his counterparts in France's major ports, the minister ensured that all three branches of the service were staffed exclusively and on a permanent basis by salaried officers bearing royal commissions.²² His insistence that they develop the naval know-how necessary to meet the unique demands of their work—directing the construction and repair of ships, outfitting fleets, and managing the business of ports and colonies—distinguished these *intendants de la marine* from their fellow intendants in other parts of the kingdom.²³

Between 1661 and 1672 alone they helped to increase the number of rated vessels in the French navy from nine to 172 and to raise the total of galleys from seven to twenty-four,

²¹ Charles Cole's classic study remains the best reference for Colbert's commercial ambitions, although more recent work has emphasized the minister's pragmatic approach to policy over any coherent mercantilist design. Charles Cole, *Colbert and a Century of French Mercantilism*, 2 vols. (New York, 1939), I: 356-532, II: 1-131, 549-558; James Pritchard, *In Search of Empire: The French in the Americas, 1670-1730* (Cambridge, UK, 2004), 234-237; Alisa V. Petrovich, "Revisioning Colbert: Jean-Baptiste Colbert and the Origins of French Global Imperial Policy, 1661-1683" (PhD diss., University of Houston, 1997): 7-34. On colonial trade, emulation, and imperial rivalry in this period, including Colbert's role in them, see Sophus Reinert, *Translating Empire: Emulation and the Origins of Political Economy* (Cambridge, MA, 2011), esp. 13-72; Daniel Dessert, *La Royale: Vaisseaux et marins du Roi-Soleil* (Paris, 1996), 9-10.

²² Dessert, *La Royale*, 9-11, 15-55; René Mémain, *La marine de guerre sous Louis XIV. Le matériel : Rochefort, arsenal modèle de Colbert* (Paris, 1937), 263-269, 361-381. As minister of Marine (1669-1683), Colbert himself would enjoy a new position designed to streamline the administration of the king's fleets, one that united many of the functions previously shared between the Grand-Maître de la Navigation and individual admirals. Michel Vergé-Franceschi, *La Marine française au XVIIIe siècle: Guerres, administration, exploration* (Paris, 1996), 33-43, 203-215.

²³ Claude Aboucaya, *Les intendants de la marine sous l'ancien régime: contribution à l'étude du département, du port et arsenal de la marine de Toulon* (Marseille, 1958), 21-25; Mémain, *La marine de guerre*, 263-283, 367-371.

a massively complex enterprise that harnessed thousands of acres of virgin oak forest, enormous quantities of money and matériel, and the collective specialized and non-specialized manpower of all the major ports.²⁴ Given the scale of this effort, it is no accident that royal shipyards—and those who staffed them—were at the leading edge of developments in state expertise.

Learning the *Cordages*: Pierre Arnoul and the Galleys

The apprenticeships of Pierre and Vaucresson fit within a long-term pattern of strategic self-fashioning that had already marked their father's career. Nicolas was descended on both sides from several generations of royal servants, based in Paris and Picardie, that included military officers, king's councillors, tax receivers, and secretaries of the royal household.²⁵ As a young man he learned to ride at an academy with the aim of becoming a soldier, but his older brother, an aide (*commis*) to Minister of War Sublet de Noyers, instead sought to place him in Noyers' service. At first meeting Nicolas the minister balked,

not believing that this young man could ever apply himself nor discipline himself sufficiently for a position of this kind [aide], because he saw that his inclination was for arms and

²⁴ Pritchard, *In Search of Empire*, 293; Dessert, *La Royale*, 15-16, 61-137; Paul Bamford, *Fighting Ships and Prisons: The Mediterranean Galleys of France in the Age of Louis XIV* (Minneapolis, 1973), 24; Biography of Nicolas Arnoul, BnF NAF 21416, fols. 1-2v (ca. 1715). To cite one example, the *Royal Louis*, flagship of the Mediterranean fleet in the 1670s and 1680s, required 47,780ft² of Burgundian and Provençal oak to build, in addition to vast amounts of other raw and finished materials. Guillaume Hayet, *Description du vaisseau "le Royal Louis", dédiée à messire Pierre Arnoul...* (Marseille, 1677), 10. In 1660 the crown spent approximately 300,000 *livres* on its navy, whereas in 1670 it spent 13,400,000; during the intervening decade the average annual budget for the navy was 10,000,000 *livres*. Cole, *Colbert and a Century*, I: 451-452.

²⁵ Among these forebears were a *trésorier des cent gentilhommes de la maison du Roi*, a cavalry lieutenant, a *secrétaire du Roi*, and a *contrôleur* of the queen's household, on his father's side, and a *conseiller du Roi* and a *receveur des tailles et des aides* at Mans on the side of his mother, Marguerite Taron, daughter of a rich Picard family. Gaston Rambert, *Nicolas Arnoul, Intendant des Galères à Marseille (1665-1674)* (Marseille, 1931), 9-10; Biography of Nicolas Arnoul, BnF NAF 21416, fol. 1.

that he always dressed in extraordinary finery—in contrast to which M. de Noyers was a very simple and extremely modest man; [Noyers] said that he was very doubtful that their dispositions were compatible and that it would be better to leave [Arnoul] on the path he had already taken.

At his brother's insistence, Nicolas abandoned "all his fripperies and the worldly air that he had" and "presented himself to M. de Noyers as if he were entering into a seminary, which made M. de Noyers receive him all the more agreeably for having seen this young man show the strength to overcome his inclination and his temperament."²⁶ It was this sudden, radical transformation from a worldly soldier-dandy into a monkish secretary that proved Nicolas's ability to "discipline himself [*s'assujétir*]," launching his career as a *commis* at Noyers' side, a fortification-builder and military supplier in Picardie, an ambassador and spy under Richelieu, and a commissioner-general of the navy at Toulon.²⁷ After the Cardinal's death he retired from public life to pursue his fortune, only to return two decades later following a financial collapse and the timely intervention of Colbert. Thus, when Nicolas began grooming Pierre as his successor in 1665, he was already engaged in a familiar task, reinventing himself to please a powerful patron.²⁸

²⁶ BnF NAF 21416, fol. 1. On Noyer's famously austere disposition and approach to his work, see Orest Ranum, *Richelieu and the Councillors of Louis XIII: A study of the Secretaries of State and Superintendants of Finance in the Ministry of Richelieu, 1635-1642* (Oxford, UK, 1963), 100-120.

²⁷ Rambert, *Nicolas Arnoul*, 10-13. Nicolas's biography claimed that Richelieu wished him to spy on Louis XIII, but that Nicolas refused, explaining honorably that he could not serve two masters. Later the Cardinal planned to give Arnoul a post as *intendant des Finances*, but delays forced him to appoint Séraphin de Mauroy instead. After Richelieu's death and Noyers's retirement, Nicolas believed he would succeed Noyers as Minister of State for War, but was passed over in favor of Michel Le Tellier. BnF NAF 21416, fols. 1-1v; Rambert, *Nicolas Arnoul*, 16.

²⁸ Daniel Dessert and Louis Journet suggest that Nicolas sought Colbert's patronage in order to rebuild his fortune as a tax farmer. Dessert and Journet, "Le lobby Colbert," 1334n40. Sharon Kettering agreed, adding that the minister's protection was probably secured by one of Nicolas's friends, François Berthelot, a military supplier, financier, and Colbert client. Kettering, *Patrons, Brokers, and Clients*, 200. The family's anonymous biographer told a different story, claiming that Nicolas had been the first to hire Colbert into royal service and that the minister therefore appointed him out of friendship and obligation: "M. Colbert estoit deslors entré dans le ministere et comme il estoit amy particulier de m. arnoul qui luy avoit donné le premier employ qu'il eut jamais eu le fit rendre pour scavoir s'il vouldroit de nouveau

As a fortification-builder Nicolas had already discovered one niche of service in which the crown desperately sought to cultivate and reward home-grown expertise; in the galleys he found another.²⁹ At the time of his appointment to Marseille, the royal slave ships were an ideal place to rebuild a lost fortune and elevate a family's prospects. Louis and Colbert were committed to building a fleet to rival those of Spain, the Sultan, and the Italian states. Beyond coastal defense and anti-piracy campaigns, galleys were largely outmoded as vessels of war, but they still held immense symbolic value to a young king eager to punish Ottoman insults and establish himself as a Christian warrior-monarch in the crusading tradition. Over the next twenty years he would invest tremendous sums of money and manpower to replace his six "old hunks of galleys" with the largest fleet in Europe.³⁰ Elite families saw an opportunity and clamored to place their sons among the Knights of Saint John, whose ranks produced around half of France's galley officer corps in these years.³¹ In 1666 Henri d'Oppède, *président* of the Parlement of Aix and a powerful ally of the Arnoul, endorsed the trend by obtaining captaincies for his brother and a cousin.³² Nicolas envisioned the same future for his youngest son, Nicolas-François, whom he placed in the Order two years later.³³ Meanwhile he used his position as intendant to secure lucrative supply contracts, pay off his creditors, and amass a fortune that included profitable lands adjoining the arsenal of Marseille, two fiefs near

s'attacher a la marine dans le dessein ou il estoit de la relever, et M. arnoul l'ayant accepté il fut fait intendant des Galeres en l'année 1665." BnF NAF 21416, fol. 2.

²⁹ On the monarchy's efforts to harness the practical knowledge produced by military engineers during the Wars of Religion and the Thirty Years' War, see Langins, *Conserving the Enlightenment*, 39-41.

³⁰ Cole, *Colbert and a Century*, I: 451.

³¹ Bamford, *Fighting Ships and Prisons*, 97-101.

³² Kettering, *Patrons, Brokers, and Clients*, 54. Oppède's portrait would accompany Pierre to Rochefort and Toulon. "Estat de mes meubles venûes de Toulon qui doivent se trouver encore a Carpentras et a Baume," BnF NAF 21417, fol. 260 (Oct. 2, 1699).

³³ Decision of Nicolas Cotoner, Master of the Hospital of Saint John of Jerusalem and of the Military Order of Saint Sepulchre, regarding the request of Nicolas Arnoul and Genevieve Saulger, BnF NAF 21416, fols. 231-232v (Jan. 19, 1668).

Paris and Avignon, and 300,000 livres.³⁴ For an impecunious but ambitious noble family such as the Arnoul, Louis's galleys were a much-needed fount of wealth and prestige.

Nicolas used both money and influence to reorient his son's education toward the needs of the service. He hired a governor to complete Pierre's study of belles lettres, provided him lessons in geometry and trigonometry with a mathematician loaned to him by the general of the galleys, and ensured that he learned the "science of fortifications" under a M. de Combe, reputedly "the finest engineer of his time, much more profound than [Commissioner-General of Fortifications] M. de vauban."³⁵ Instead of pursuing the rhetoric and philosophy that would have occupied his final years at collège (and advanced his career in the priesthood), Pierre developed a mind for figures and angles. He applied himself to his lessons "with so much devotion that he had his meals brought to him and placed at the edge of the table where he labored, without leaving his work, the usual amount of study time not being enough for him."³⁶ If his masters were as gifted and his dedication as constant as he and his family biographer later claimed, he would have received as good or better an education in these subjects as the highest-ranking military officers of his day.³⁷

³⁴ In 1669 Nicolas bought a collection of lands known as *le Marquisat*, located along the port's Rive-Neuve, for 15,600 *livres*. Then, in 1671-1672, he spent 74,689 *livres* to build lodgings and magazines on those lands that brought a substantial return which, by 1710, was earning Pierre 11,130 *livres* per year. Pierre Masson, *Les galères de France (1481-1781): Marseille, port de guerre* (Paris, 1938), 367n1; Kettering, *Patrons, Brokers, and Clients*, 200-201; Rambert, *Nicolas Arnoul*, 33-44.

³⁵ "Memoire sur la vie et sur les services de M. Arnoul a present intendant des galeres et du commerce," BnF NAF 21416, fol. 117 (ca. 1715). Pierre's autobiographical notes are more modest about Combe's reputation, referring to him only as "un des plus grands ingenieurs de son temps." Autobiographical notes of Pierre Arnoul, BnF NAF 21416, fol. 23 (ca. 1715).

³⁶ "Memoire sur la vie et sur les services de M. Arnoul a present intendant des galeres et du commerce," BnF NAF 21416, fol. 117.

³⁷ On the education of élite sword nobles destined for officers' commissions, see Motley, *Becoming a French Aristocrat*, 68-70.

Unlike those officers and perhaps every other young nobleman in France, however, Pierre's instruction also included a crash course in a subject normally foreign to young nobles: carpentry.³⁸ In 1668 Colbert responded to a proposal from Arnoul:

It is good to apply your son to everything that could concern the service or anything that depends upon the service of the galleys. If he undertakes under your supervision and the guidance of [master carpenter Pierre] Hubac to make himself a carpenter [*se rendre Charpentier*], I am convinced that he will become one very soon, and that he will know perfectly all the pieces of wood that enter into the construction of a galley and the method of assembling them.³⁹

The minister, who was eager to end French dependence on foreign ship-builders by training homegrown experts, implied that instruction in naval carpentry should form part of a broad familiarity with all aspects of the service necessary to a future intendant; in the absence of written manuals, that instruction would have to come directly from a master carpenter.⁴⁰ The guiding presence of Hubac, a specialist in galley construction and the son of Brest's renowned master shipbuilder, Laurent Hubac, would ensure that Pierre received the best teaching available.⁴¹ In the end he dutifully spent 18 months as Hubac's

³⁸ In dictionaries of the period, carpentry is not mentioned among the undignified *métiers* associated with derogation, but *menuiserie*, a closely-related occupation, was sometimes judged *dérogant*. J.-B. Dumoulin, *Lettres de noblesse accordées aux artistes français (XVIIe et XVIIIe siècles)* (Paris, 1873), 3. Derogation was an ambiguous and flexible concept, both juridically and socially, and one way in which an otherwise derogative activity could become more dignified was to be attached to warfare or the manufacture of arms (as in the case of metallurgy). Thus the construction of ships for the king's fleet likely would have been considered more dignified than other, similar works of carpentry. On derogation and its causes, see Laurent Bourquin, *La noblesse de la France moderne (XVIIe au XVIIIe siècles)* (Paris, 2002), 15-18.

³⁹ Colbert to N. Arnoul, BnF NAF 21308, fols. 147v-148 (August 3, 1668).

⁴⁰ Cole, *Colbert and a Century*, I: 454-457; Dessert, *La Royale*, 91. The first guide to naval architecture would not appear until 1677, and it was more of a manual to the elements of a ship than a description of how they could be assembled in phases according to mathematical principles. The first "true manual of construction" written by a "veritable technician" was a 1683 manuscript penned by the Toulonnais carpenter, François I Coulomb. Dessert, *La Royale*, 123.

⁴¹ Dessert, *La Royale*, 83.

“disciple,” learning the technical side of ship-building while overseeing the construction of two galleys and a galeasse commissioned by the king.⁴²

Seventeenth-century ships were products of imagination, improvisation, and practical know-how, and in learning how to build them Pierre likely relied as much on the cognitive tools bestowed by his Jesuit education as any formal principles of mathematics or engineering.⁴³ Paul Nelles has described the close link between visualization, contemplation, and note-taking in Jesuit pedagogy and devotional practice. The order encouraged its members to record their visions of the divine as a spiritual exercise and an aid to future meditation; students at Jesuit collèges were taught to use notebooks as “short-term memory aids” designed to accelerate their appropriation of course material.⁴⁴ Pierre’s ability to internalize and creatively re-formulate his lessons had ranked him among the best in his class at Clermont (alongside Colbert’s son and successor, the Marquis de Seignelay), and his talent for rendering conceptual imagery into verse and prose had won him prizes from his instructors.⁴⁵ Throughout his life he would continue to write poetry, much of it consisting of descriptive first-person “portraits” of devotional

⁴² “Memoire sur la vie et sur les services de M. Arnoul a present intendant des galeres et du commerce,” BnF NAF 21416, fol. 117; Autobiographical notes of Pierre Arnoul, BnF NAF 21416, fols. 23-23v. For Pierre’s orders to build and design the galeasse and galleys, see Colbert to N. Arnoul, BnF NAF 21308, fol. 395v (Mar. 23, 1668); Colbert to N. Arnoul, fol. 86 (May 18, 1668); N. Arnoul to Colbert, fol. 123v (Jul. 7, 1668).

⁴³ See the paragraph and citations below. The same was true of fortifications, whose construction in this period, despite requiring advanced mathematics, was more an art than a science. Langins, *Conserving the Enlightenment*, 39-62.

⁴⁴ Paul Nelles, “Seeing and Writing: The Art of Observation in the Early Jesuit Missions,” *Intellectual History Review* 20, no. 3 (2010): 317-333. For more on the education of *gens de robe* and life in the collèges, see L. W. B. Brockliss, *French Higher Education in the Seventeenth and Eighteenth Centuries: A Cultural History* (New York, 1987).

⁴⁵ “M. Arnoul a esté élevé chez les jesuites au college de Clermont depuis la sixieme jusqu’a la fin de seconde. Il estoit toujours des premiers dans ses classes et a toujours eu des prix a la fin de chacune, de prose, de poesie ou de memoire. Il estoit aussy de toutes les declamations avec M. le Marquis de Seignelay qui estoit dans le meme temps que luy au college, et de la meme classe, et comme il y avoit une espece d’emulation entr’eux deux, on pretend que M. Colbert le donnoit souvent pour exemple a M. son fils.” “Memoire sur la vie et sur les services de M. Arnoul a present intendant des galeres et du commerce,” BnF NAF 21416, fol. 117.

subjects such as Jesus, the nativity, a soul in Purgatory, and a converted sinner.⁴⁶ This facility for turning mental images into recorded observations—whether poetic, epistolary, or administrative—is what allowed Jesuit missionaries to “order and codify” their experience of new worlds into “objects of knowledge.”⁴⁷ Pierre, having learned their techniques, was equipped to do the same for the unfamiliar world of the shipyard.

The details of Pierre’s apprenticeship to Hubac are unknown, but later events would demonstrate his appropriation of these lessons and their importance to his reputation and career. In 1677, two years after his appointment as intendant at Toulon, he was hailed by one of his subordinates in a published description of the *Royal Louis* (b. 1666-1670), then the flagship of the Mediterranean fleet and a vessel built under Pierre’s indirect supervision. In an epigraph preceding his dedication to Arnoul, the author imagined that the ship, “having been built by so great a man / Will cut down the vast enemies of the French / So that such a glorious ruler of the seas, Arnoul, watching over them so / Is known to all who meet him.”⁴⁸ The following year Colbert ordered Pierre to prepare with meticulous precision all of the pieces of a 30-gun vessel so that he could “undertake to build, or more precisely, to assemble in its entirety” a spectacular “chef-d’oeuvre” over

⁴⁶ Pierre’s poems are undated, but internal evidence suggests that they were written across several decades. The devotional pieces are in BnF NAF 21400, fols. 127-142.

⁴⁷ Nelles, “Seeing and Writing”: 327-333.

⁴⁸ As the commissioner’s dedication made clear, the ship was not built under Pierre’s direct supervision (at the time he was in Marseille, overseeing the construction of a galleasse and two galleys of his own design), but rather under the direction of the carpenter Rodolphe Gédéon and the Marquis d’Infreville, then a *commandant du navire* of the Mediterranean fleet. I am grateful to Nathan Daniels for help with the Latin translation. Hayet, *Description du vaisseau “le Royal Louis”*, front matter; Dessert, *La Royale*, 324. Edmund Dummer, a future Surveyor of the Royal Navy, toured the *Royal Louis* during his visit to Toulon in 1683 and found it wanting: “[She is] a great ship and glorious in her first carving, no doubt; but to my judgment not of good proportion, nor good workmanship, her figure under water I know not, nor is that above to be admired.” Quoted in Celina Fox, “The Ingenious Mr Dummer: Rationalizing the Royal Navy in Late Seventeenth-Century England,” *Electronic British Library Journal* (2007): 17, www.bl.uk/ebli/2007articles/pdf/ebliarticle102007.pdf.

three or four days in case Louis were ever to visit Toulon.⁴⁹ Some months later he earned kingdom-wide publicity for overseeing the construction of a 103' ship in under seven hours. *La Gazette* wondered at the feat, which involved 700 workers, forty port holes, and 2,000 pieces of rigging.⁵⁰ Such an achievement could not have failed to impress Colbert, who had been trying unsuccessfully for years to match the speed of ship-building in Venice, where galleys were routinely assembled in less than a day, and in England and Holland, where ships of the line were constructed in three or four months (compared to France's sluggish twelve to eighteen).⁵¹ He also had been working doggedly to extract the arcane secrets of naval construction from a renowned Marseillais family of *constructeurs*, the Chabert, who refused even to give lessons in carpentry for fear of losing their trade.⁵² For the minister, then, Pierre's triumph likely represented not only the promise of increased efficiency, but also an important victory against the sort of self-

⁴⁹ Colbert to P. Arnoul (Aug. 3, 1678), reproduced in Pierre Clément, ed., *Lettres, instructions et mémoires de Colbert*, 7 vols. (Paris, 1861-1882), III¹: 115-117. By comparison, the minister had once asked Nicolas to be ready to build a light galley in fewer than twenty-four hours; when he asked another intendant to do the same for a ship-of-the-line, the official protested that he would need more than a week. Colbert to N. Arnoul (Oct. 17, 1670), reproduced in Clément, *Lettres*, 299 and 299n1.

⁵⁰ *La Gazette* (Jul. 29, 1679), quoted in Clément, *Lettres*, 299-300n1; see also Archives nationales [AN], Fonds Marine B³ 32, fols. 389-393, cited in Dessert, *La Royale*, 157. The *Gazette*'s report of a similar stunt in Marseille some months later describes the ordered pageantry involved in these staged constructions: "Le sieur Brodart, intendant des galères à Marseille, y a fait bâtir une galère dans l'espace de dix heures et demie. Le marquis de Seignelay, secrétaire d'État, étant arrivé à l'arsenal à six heures du matin, à peine y fut-il entré que le sieur Brodart fit paraître d'un coup de sifflet huit cents ouvriers qui commencèrent à bâtir une galère. Ils étaient de plusieurs métiers, tous distingués par leurs habits différents, afin qu'ils pussent se reconnaître en travaillant, et qu'il n'y eût pas de confusion. Ils commencèrent à travailler à six heures et demie du matin et, à cinq heures du soir, la galère étant achevée et équipée, le maréchal duc de Vivonne, le marquis de Seignelay et le chevalier de Noailles, lieutenant général des galères, montèrent dessus et allèrent jusqu'au Château-d'If." *La Gazette* (Nov. 11, 1679), quoted in Masson, *Les galères de France*, 188-189. The Musée national de la Marine's online exhibition, "La construction navale en bois aux XVIIe et XVIIIe siècles," gives a sense of the enormous scale and difficulty involved in designing and building a ship at this time: www.musee-marine.fr/programmes_multimedia/construction_navale/ (accessed Feb. 26, 2013).

⁵¹ Colbert ordered Toulon, Brest, and Rochefort to experiment with pre-fabricated materials in order to increase the efficiency of naval construction. Both Ponant ports fell short of Toulon's standard, requiring twelve to fifteen hours to build a ship of similar proportions. Pierre was able to repeat his achievement in Seignelay's presence when the marquis visited Toulon several months later. Dessert, *La Royale*, 146-158.

⁵² Bamford, *Fighting Ships and Prisons*, 74-76; Cole, *Colbert and a Century*, I: 454.

interested concealment of knowledge that perpetually limited the king's sphere of action. Whatever the case, Pierre himself believed that ship-building was crucial to his standing as a client. When he returned to service following a brief (and somewhat ironic) disgrace in 1679—Colbert blamed the loss of two ships in a storm on rushed repairs under Pierre's supervision—he thanked Seignelay for arranging his reappointment, promising above all to take further lessons in construction.⁵³ The selection and “method of assembling” pieces of wood into ships had by then become a defining feature of his administrative persona.

Pierre could be intimately involved in the building of ships because, as intendant, he was responsible for initiating the construction process and ensuring that it was carried out according to the king's financial interests—i.e., as cheaply as possible. Once he received the order to build a vessel (or several), he would seek out a master carpenter to request a detailed estimate of the work. The carpenter's proposal would include the proportions of the ship he planned to build—carefully chosen since these would determine its performance on the water—and occasionally the qualities of the wood required. He would then list the specific costs of parts and labor before proposing a total. Work began when the intendant approved his estimate.⁵⁴ There was a great deal of room for negotiation in this process, since the intendant could withhold his approval, holding out for a lower estimate or, if he were knowledgeable and assertive enough, for specific principles of design.⁵⁵ In 1671, due in large part to Pierre's own recommendations, Colbert instituted *conseils de construction* composed of carpenters, naval officers, and

⁵³ P. Arnoul to Seignelay, BnF NAF 21328, fols. 82-82v (Mar. 10, 1681).

⁵⁴ Dessert, *La Royale*, 123-124.

⁵⁵ This working relationship could be difficult regardless of the intendant's leverage. Simon Chabert, proud of his family's three centuries of ship-building experience, was “very able, but hard to manage and to chasten,” according to Pierre. Masson, *Les galères de France*, 388.

intendants at each of the ports, which met to approve and supervise the work of construction in order to ensure that French ships were built longer and smaller, with flat-timber bottoms, a lower gun deck, and reduced height between the bridges, among other innovations meant to mimic the strengths of English and Dutch vessels.⁵⁶

Pierre's interventions in ship-building made him a valuable contributor to two of Colbert's broader projects: the standardization of the tools of political economy, and a "data bank" of all knowledge useful to the state.⁵⁷ In the early 1670s Pierre would write firsthand accounts of foreign ports and construction methods whose actionable intelligence immediately earned them a place in the minister's massive library (see below). Only a few years later, Colbert revealed the extent of his ambitions for Pierre's expertise when he asked him to help develop "a theory on the subject of ship construction," including the precise proportions of a "perfect" ship and the pieces that composed it, so that in future the king's fleets could be built according to proven standards of measurement and method—to ensure, as he put it to another official, that "that which has until now depended upon the fancy [*fantaisie*] of carpenters is founded upon certain and invariable rules."⁵⁸ The minister believed that warships, like tolls or laws or weights and measures, could be regularized in order to make the outcomes of royal policy more efficient and predictable.⁵⁹ He ordered Arnoul to choose the best

⁵⁶ See Ordinance of Mar. 12, 1671 and AN Marine B2 13, fols. 51-54, discussed in Dessert, *La Royale*, 142-143.

⁵⁷ On the minister's efforts to impose standards of quality on French economic life, see Eli F. Heckscher, *Mercantilism*, 2 vols. (1931; repr. New York, 1955), I: 102-106, 110-127, 157-184; Cole, *Colbert and a Century*, II: 363-457. On his data bank, see Soll, *Information Master*; Soll, "From Note-Taking to Data Banks: Personal and Institutional Information Management in Early Modern Europe," *Intellectual History Review* 20, no. 3 (2010): 373.

⁵⁸ Colbert to Desclouzeaux, AN Marine B² 38, fol. 462 (Nov. 19, 1678), quoted in Dessert, *La Royale*, 149.

⁵⁹ On Colbert's campaign to standardize tolls, laws, industrial production, weights and measures, and other spheres of domestic life, see Cole, *Colbert and a Century*, II: 132-548; Heckscher, *Mercantilism*, 102-106, 110-127, 157-184. One of the chief successes of this campaign was the unification of weights and

vessels of each rank at Toulon, oversee the technical drafting of their profiles and designs, confirm the accuracy of these drawings by examining the ships himself, and then assemble a *conseil de construction* of three or four fellow experts to sound them out about what should be included among “the [just] measures and proportions necessary to perfect constructions.”⁶⁰ The minister sent similar requests to all the ports, but Pierre’s *mémoire* detailing his meeting with Toulon’s master carpenters and Admiral Abraham Duquesne drew special praise from Colbert and revealed a deeper involvement in the deliberations than did the reports of his Ponant counterparts.⁶¹ His firsthand experience with naval carpentry thus positioned him to serve as a rare conduit between the practical know-how of naval craftsmen and Colbert’s budding empire of paper-based knowledge, allowing the crown to exert greater control over the construction of its own fleet even if it could not always prevail over the “fancy” of carpenters.⁶²

Pierre’s apprenticeship taught him to apply this translative skill not only to naval constructions, but also to the broader work of administration. He watched up close as Nicolas organized the outfitting of ships, asserted royal prerogatives to police and expand the port, and oversaw the acquisition and care of several thousand convicts and slaves to

measures between the various naval arsenals and Paris, suggesting that in this area, too, the ports were a key site of monarchical centralization.

⁶⁰ Colbert had long resolved to pursue such a theory, but had been forced to wait until “many years of experience” had accumulated before launching the endeavor. Colbert to P. Arnoul (Sep. 12, 1678), reproduced in Clément, *Lettres*, III¹: 125-126.

⁶¹ Duquesne was considered an authority in naval constructions in his own right, and both Arnoul and Colbert tended to defer to his judgment, believing that those who actually navigated vessels were more reliable witnesses to their quality than those who built them. Colbert did not trust that any one individual had complete knowledge of ship-building, however, which explains why he wanted intendants, carpenters, and naval officers to work together toward this “theory.” Some of his most trusted advisors on the policy of naval construction were the Arnoul, Seignelay, Duquesne, Intendant of Rochefort Colbert de Terron, Intendant of Brest Jean-Baptiste Chertemps de Seuil, and Admiral Anne Hilarion de Costentin de Tourville. Mémain, *La marine de guerre*, 697-707; Dessert, *La Royale*, 139-157. Saint-Simon later wrote of Tourville, “[he] had a perfect grasp of all aspects of the navy, from that of the carpenter to that of an excellent admiral.” Louis de Rouvroy, duc de Saint-Simon, *Memoires de Saint-Simon*, ed. Arthur-Michel de Boislisle, 22 vols. (Paris, 1873-1886), III: 18.

⁶² Dessert, *La Royale*, 149-150.

row the galleys, all while maintaining a web of correspondence that stretched across France and the Mediterranean.⁶³ These duties involved a series of comings and goings punctuated by intensive paperwork. A steady stream of merchants, craftsmen, naval officers, *échevins*, foreign dignitaries, and subjects-in-need called at his residence, the *Maison du Roi*, while the daily business of the port took him and his small team of commissioners (*commissaires*) and scribes (*écrivains*) out to the shipyard and its workshops, the magazines, the galleys, and other sites around Marseille's growing arsenal.⁶⁴ Along the way he supervised, inspected, and participated in the production of documents that translated his oral encounters into recorded observations for his and Colbert's reference. Performing these tasks demanded more than a wide-ranging grasp of administrative, judicial, and financial law; they also required him to assert himself over master craftsmen and ship's officers, which could only be done to the extent that he could discuss with them the issues relevant to navigation and the labor of the different workshops.⁶⁵ The same could be said for his interactions with the king's storekeeper and his inventories, or with naval suppliers and the technologies of credit. His work demanded, in other words, both a multitude of *connaissances* and the ability to deploy them credibly with a range of actors in a variety of settings.

Nicolas gradually phased Pierre into this work while keeping their patron informed of his son's progress. In addition to supervising the construction of ships, Pierre served

⁶³ The following composite account of the Arnouls' daily activities draws upon the correspondence between Nicolas and Colbert conserved in the Arnoul papers and in sub-series B² 6 of the AN's Fonds Marine. Zysberg's *Les galériens* and Dessert's *La Royale* likewise provide useful information about the routine work involved in administering the galleys.

⁶⁴ Some of the Arnouls' more eminent callers stayed to dine as guests; their identities are listed in the family's daily table expenses. "Comptes de dépenses tenus par Tournay secrétaire de l'intendant des galères," Archives Départementales des Bouches-du-Rhône, 5E 17 (1674-1675).

⁶⁵ These insights draw upon René Mémain's study of the intendency of Rochefort in this period. Mémain, *La marine de guerre*, 370.

as his father's copyist and part-time secretary, and he was left in charge whenever Nicolas was called from town.⁶⁶ In this way he became directly familiar with the routines and conventions of administering the port.⁶⁷ According to Nicolas, Pierre proved "conscientious" during these absences and "likes the work, not being at all idle."⁶⁸ Only three years after bringing his son to Marseille, he reported proudly that Pierre was mastering the various demands of the intendency:

My son is working at everything under me for the sake of his instruction. [I am] seeking to make of him a *bon marin sur terre*, and I dare say paternally that he is not doing a bad job of it; rather he is enjoying it and applying himself entirely to the economy of the galleys, which he now knows. The vessels with whose construction you are pleased to task me will show him the rest. I will have him oversee [it] under the master [carpenter], since he has [already] overseen a galley.⁶⁹

Knowledge of ship-building remained Pierre's most distinctive selling point as a client, but it was his ability to perform well at "everything" that would demonstrate his readiness for a post of his own.⁷⁰

⁶⁶ N. Arnoul to Colbert, BnF NAF 21306, fol. 296v (Jan. 16, 1666); N. Arnoul to Colbert, BnF NAF 21306, fol. 324 (Feb. 6, 1666). For passing mention of Pierre's roles as copyist and secretary, see Autobiographical notes, BnF NAF 21416, fol. 23v; "cest [mon fils] qui ecrit les lettres que j'ay l'honneur de vous mander," N. Arnoul to Colbert, BnF NAF 21307, fol. 77v (Mar. 12, 1667).

⁶⁷ Pierre also would have seen how his father, as the administrator of a new and expanding service, attempted to resolve problems of information mobility and overload. For example, Nicolas tried to replace bulky convict registers with a system of blank playing cards on which the name of every *forçat* in each chain gang was inscribed, which he hoped would allow galley captains to trade crews efficiently and without losing track of which convicts were working under them. The experiment failed when the captains repeatedly lost their cards. Zysberg, *Les galériens*, 46-47.

⁶⁸ "Mon fils fait icy pour moy en mon absence et par la raison que c'est mon fils je n'auserois dire qu'il fait bien. Je vous diré seulement qu'il est soigneux ayme le travail n'estant pas evanté vous me pardonneriez aisement vous este pere." N. Arnoul to Colbert, BnF NAF 21306, fol. 296v (Jan. 16, 1666).

⁶⁹ N. Arnoul to Colbert, BnF NAF 21307, fols. 464v-465 (Mar. 19, 1669).

⁷⁰ Nicolas had incentive to make a favorable impression of his son's progress to Colbert—already Nicolas was seeking an appointment for him, as captain of the arsenal—but as a client he also risked his credit and perhaps his position if he misled the minister about Pierre's abilities, a fact of which Colbert had taken care to remind him. N. Arnoul to Colbert, BnF NAF 21308, fol. 212v (Sep. 11, 1668); Colbert to N. Arnoul, BnF NAF 21308, fol. 256 (Sep. 21, 1668); Colbert to N. Arnoul, BnF NAF 21306, fol. 472 (Sep. 17, 1666).

Although Colbert endorsed Pierre's apprenticeship at each step, it was Nicolas who proposed nearly every element of his son's instruction. The minister had been pleased to remove Pierre from collège and send him to Provence, but he did so only at Nicolas's urging. Pierre's lessons in mathematics, fortifications, and ship-building were likewise carried out on the Arnouls' initiative. Colbert was by no means a hands-off patron—he scrutinized Pierre's progress and took an active role in encouraging him, using monetary incentives, praise, and criticism as necessary to excite him “to do better and better”—but his approach to the Arnoul was decidedly more laissez-faire than the micromanaging of his own son's training or of other affairs of state.⁷¹ The apprenticeship that he and Nicolas gave to Pierre was not a top-down project imposed or designed by the minister. Instead it was a collaboration in which Nicolas instructed his son according to the demands of the intendancy and to what he thought Colbert desired, adjusting his “lessons” only when the minister reacted negatively or made a suggestion.⁷² Like provincial elites who used their influence on the king's behalf in exchange for his ideological and financial support, then, the Arnoul were active collaborators who offered

⁷¹ In response to one of Nicolas's letters praising Pierre, Colbert wrote, “Je suis tres aise que vre fils s'applique au bien et que vous en soyez satisfait, Car quoy que vous l'aymiez comme Pere Je suis assure que s'il ne se portoit pas volontairement aux choses qui peuvent contribuer a son instruction vous ne vous en loueriez pas comme vous faites. Vous pouvez sans difficulté luy donner 30 pistolles pour l'encourager, et le disposer de mieux en mieux a bien faire.” Colbert to N. Arnoul, BnF NAF 21306, fol. 472 (Sep. 17, 1666). Colbert sometimes criticized Pierre like a schoolmaster: “J'ai reçu vos lettres du 3 et 10 de ce mois. Je vous avoue que je ne puis lire votre écriture et qu'il n'est pas bien à un jeune homme comme vous d'écrire si mal que vous faites. Il faut à l'avenir écrire d'un caractère une fois plus gros.” Colbert to P. Arnoul, AN Marine, B² 15, fol. 198 (Nov. 21, 1671), quoted in Dessert, *La Royale*, 45. In another letter Colbert critiqued the style of one of Pierre's missives: “Je vous avouë que j'ay esté surpris & un peu scandalisé de voir le billet (cy joint) escrit de la main de vre filz et conçu dans les termes qu'il est. Tout ce que l'on peut alleguer pour l'en excuser en quelque façon est que c'est encore un jeune garçon, Mais a la verité ce stile n'est pas propre pour une personne qui doit avoir l'Inspection et la conduite sur plusieurs autres.” Colbert to N. Arnoul, BnF NAF 21307, fols. 157-157v (Sep. 2, 1667).

⁷² For example, the minister insisted that Nicolas deliver on his proposal to send Pierre on a voyage to Italy, even chastising him when Nicolas sought to delay his son's departure; the minister also made detailed suggestions about what Pierre should do and observe during the journey to “perfect his knowledge of the galleys,” which Nicolas promised to incorporate into his instructions for the voyage. Colbert to N. Arnoul, BnF NAF 21309 (letters of May-Dec. 1669).

the crown a means to better govern areas of the realm that were previously out of reach or resistant to royal authority.⁷³

To further encourage and justify Colbert's protection, the Arnoul gave regular proofs of Pierre's progress that demonstrated the breadth of his learning. His first project was a proposal to rationalize the distribution of funds within the galleys. Nicolas claimed that this reorganization of accounts would be more than an abstract exercise: "when the book that I am having my son write, covering all that concerns the galleys, is complete, I hope that His Majesty and you, from your study [*cabinet*], can prevent [even] the greatest scoundrel from robbing 2,000 *escus* from the galleys or from paying them out without our seeing it."⁷⁴ The book would not only show that his son "knows" the "economy of the galleys...to which he is applying himself entirely," it would also serve as a practical tool of governance, making Pierre's value to the state immediately apparent.⁷⁵ The minister's enthusiastic response suggests that he agreed.⁷⁶ Pierre's other projects included a treatise on the construction and arming of a galley, which he dedicated to Colbert, and the design of the grand staircase of the hospital of Marseille, which he

⁷³ On the theme of collaboration between provincial elites and the crown, see for example Beik, *Absolutism and Society*; Beik, "The Absolutism of Louis XIV"; Collins, *Classes, Estates and Order in Early-Modern Brittany* (Cambridge, UK, 1994); Kettering, *Patrons, Brokers, and Clients*; Blaufarb, "The Survival of the *Pays d'États*: The Example of Provence," *Past & Present* 209, no. 1 (2010): 83-116.

⁷⁴ "Je vous renvoye le memoire des apostilz de l'estat respondu, et quand le livre que je faicts faire par mon fils de tout ce qui concerne les galeres sera achevé j'espere que S. M. et vous de vostre cabinet vous pourez empescher le plus grand fripon de dérober 2000 escus sur toutes le galeres ny les doner a gagner sans qu'on le voye on dit que je gaste le metier." N. Arnoul to Colbert, BnF NAF 21307, fol. 52v (Feb. 12, 1667).

⁷⁵ N. Arnoul to Colbert, BnF NAF 21308, fols. 464v-465 (Mar. 19, 1669); N. Arnoul to Colbert, BnF NAF 21307, fol. 52v (Feb. 12, 1667); "il aura l'honneur de vous pn'ter son livre quand il y aura mis la dernier main pour eschantillon de son caprice," N. Arnoul to Colbert, BnF NAF 21307, fols. 77-77v (Mar. 12, 1667).

⁷⁶ Colbert was so enthusiastic about the proposal, sight unseen, that he immediately asked for Pierre's age and height as well as an assessment of his constitution and fitness for service. Colbert to N. Arnoul, BnF NAF, fols. 62v-63 (Feb. 25, 1667); Autobiographical notes, fol. 23v.

completed without any previous architectural training.⁷⁷ In providing such “demonstrations of his intellect [*echantillons de son caprice*],” Pierre displayed a precocious grip of administrative style, a capacity for both logical and creative thinking, and a knack for grabbing his patron’s attention—qualities that rapidly earned him favor from a minister whose obsessive information-gathering and exacting standards of performance were already legendary.

Crucially, Pierre was able to demonstrate his technical knowledge not only on paper, but also in face-to-face encounters with his superiors. In 1667 Colbert sent him away from his father’s side for the first time to oversee fortification works elsewhere in Provence. Nicolas prepared his son for the task by giving him model bills of payment to contractors, dispatching an experienced treasurer to offer help and advice, and laying out meticulous orders that included how to produce durable masonry, where and when to pay laborers, and a reminder to keep his daily account book in his study.⁷⁸ Despite these precautions, Pierre floundered when local authorities mocked his youth (he was then fifteen) and refused to follow his orders; when the minister called him to Court to explain himself, however, he so impressed Colbert and Minister of War Louvois that they granted him two audiences with the king, the first an hour-long interview in Louis’s *cabinet* to discuss plans for a proposed fort (drawn up in relief by Pierre himself), and the second to present the king with a model of the Arsenal of Marseille “in the presence of the entire

⁷⁷ “Memoire sur la vie et sur les services de M. Arnoul a present intendant des galeres et du commerce,” BnF NAF 21416, fol. 117; Autobiographical notes, BnF NAF 21416, fols. 23-23v. Pierre’s treatise has not survived among the family’s papers in Paris or Marseille.

⁷⁸ N. Arnoul, “Ordres qui seront observées a la conduite de la fortification de Pignerol par les Srs. Arnoul et du Cayron que le Roy a choisy pour la conduite des travaux des fortifications de cette place,” BnF NAF 21307, fols. 106-107v (Apr. 12, 1667).

Court.”⁷⁹ Afterward Louis, Colbert, and other leading ministers all praised his maturity and intelligence.⁸⁰ Pierre’s first foray into public life had been a failure, but in the presence of his patrons he was able to perform his budding expertise well enough to regain their confidence and “enter the world” as an intendant-in-waiting.⁸¹

Pierre’s ascension rested in good part on his ability to distinguish himself as a hybrid administrator-technician who could satisfy in concrete ways the emulative impulse that underpinned French naval and commercial policy in these years.⁸² Upon returning from Court in May 1668 he oversaw the construction of a galeasse and two galleys of his own design, honed his draftsmanship, negotiated the purchase of slaves at Livorno, and

⁷⁹ Within three months of Pierre’s arrival at Pignerol, the site of these fortifications, the minister ordered Nicolas to visit the works in person to put them back on a stable footing. Colbert to N. Arnoul, BnF NAF 21307, fols. 148-148v (Jul 4, 1667). Colbert was unhappy with the plaintive appeals he received from Pierre, but softened his criticism to account for the boy’s youth: “Je vous avouë que j’ay esté surpris & un peu scandalisé de voir le billet (cy joint) escrit de la main de vre filz et conçu dans les termes qu’il est. Tout ce que l’on peut alleguer pour l’en excuser en quelque façon est que c’est encore un jeune garçon, Mais a la verité ce stile n’est pas propre pour une personne qui doit avoir l’Inspection et la conduite sur plusieurs autres.” Colbert to N. Arnoul, BnF NAF 21307, fols. 157-157v (Sep. 21, 1667). Pierre traveled to Court with orders to present sketches of the galleys, a model of the proposed Arsenal of Marseille, several interesting rocks and beads, and two “turcs levantin” destined to serve as models for the Academie Royale de Peinture; he was also ordered to give Colbert a full account of affairs under his father’s charge, including the works at Pignerol. He was accompanied on his visit by the famous Genoese sculptor and architect, Pierre Puget, then serving as an advisor to Nicolas on the construction of the Marseille arsenal, who was far less warmly received by the minister. Colbert to N. Arnoul, BnF NAF 21307, fol. 273v (Dec. 30, 1667); fol. 313v (Jan. 2, 1668); fol. 364v (Feb. 17, 1668); Masson, *Les galères de France*, 177. On the audiences Pierre received, see Autobiographical notes, BnF NAF 21416, fols. 23v-24 and “Memoire sur la vie et sur les services de M. Arnoul a present intendant des galeres et du commerce,” fols. 117-117v.

⁸⁰ The king expressed “all the more satisfaction [with him] because he did not seem to be more than 17 or 18 years old”; Colbert wrote Nicolas that Pierre “is well made...wise and moderate”; and the Minister of Foreign Affairs, Hugues de Lionne, judged him “very well made and sharp witted,” adding that he would be happy to render the boy some service in future. Colbert to N. Arnoul, BnF NAF 21307, fol. 370 (Feb. 23, 1668); Lionne to N. Arnoul, BnF NAF 21308, fol. 8 (Apr. 8, 1668).

⁸¹ Mark Motley has defined “entering the world” as the moment when young nobles crossed the threshold from household care and instruction to maturity, formal service, and an individual identity at Court—a moment of passage often marked by a public test and triumph. Motley, *Becoming a French Aristocrat*, 169-203.

⁸² As Sophus Reinert has noted, military and commercial policy were closely linked in Colbert’s mind, since he perceived finances to be the lifeblood of Louis’s war efforts. His desire to mimic the best attributes of the Italian, Dutch, and English fleets reflected a broader pattern of competitive emulation that characterized the political economies of early modern European empires. See Reinert, *Translating Empire*, esp. 17; Cole, *Colbert and a Century*, I: 450, II: 1-32.

sailed the coast of Provence aboard the fleet.⁸³ These feats prepared him, in the minds of Nicolas and Colbert, for intelligence-gathering missions to Italy, Holland, and England.⁸⁴ Tours of Europe were common among sons of the high nobility, but Pierre's travels were unique in that he received strict orders from Colbert to use his advanced training in navigation, fortifications, construction, machinery, and drafting to produce detailed memoranda about anything that might give France's navy and galleys an edge over their competitors.⁸⁵ In the event, each of his reports was more exhaustive and actionable than

⁸³ Colbert to N. Arnoul, BnF NAF 21308, fol. 395v (Mar. 23, 1668); Colbert to N. Arnoul, fol. 86 (May 18, 1668); N. Arnoul to Colbert, fol. 123v (Jul. 7, 1668); N. Arnoul to Colbert, fols. 464v-465 (Mar. 19, 1669). Pierre had already been tasked with drawing for his father, who claimed to have neither the patience nor the talent for it himself. N. Arnoul to Colbert, BnF NAF 21308, fols. 464v-465 (Mar. 19, 1669); N. Arnoul to Colbert, fol. 197v (Sep. 11, 1668).

⁸⁴ Details about Pierre's voyages are scattered across the correspondence of his father and Colbert as well as Pierre's autobiographical notes. Some of the relevant sources are listed here: Colbert to N. Arnoul, BnF NAF 21309, fols. 31-32v, 34v (May 10, 1669); Colbert to N. Arnoul, fols. 62v-63 (May 31, 1669); Colbert to N. Arnoul, fols. 122-122v (Jul. 12, 1669); N. Arnoul to Colbert, fols. 143-143v (Jul. 27, 1669); Colbert to N. Arnoul, fol. 156v (Aug. 9, 1669); Colbert to N. Arnoul, fol. 228v (Oct. 11, 1669); Colbert to N. Arnoul, fol. 248v (Oct. 25, 1669); N. Arnoul to Colbert, fols. 289-290 (Nov. 16, 1669); Colbert to N. Arnoul, fol. 306 (Nov. 29, 1669); Colbert to N. Arnoul (Aug. 16, 1669), reproduced in Clément, *Lettres de Colbert*, III¹: 153; Colbert to N. Arnoul (Oct. 24, 1670), in Clément, *Lettres de Colbert*, III¹: 302; Colbert to N. Arnoul (May 1, 1671), in Clément, *Lettres de Colbert*, III¹: 363; Autobiographical notes, BnF NAF 21416, fols. 24v-25v; "Memoire sur la vie et sur les services de M. Arnoul a present intendant des galeres et du commerce," fol. 117v.

⁸⁵ Although Pierre was accompanied by a draftsman and a carpenter, Colbert insisted that he make his own observations: "Prenez bien garde, pendant le séjour que vous faites à présent en Hollande, d'observer avec grand soin tous les ouvrages qui se font en ce pays-là pour l'avantage et la facilité de leur navigation, de prendre des dessins de toutes les machines dont ils se servent pour vider leurs ports, pour la construction de leurs vaisseaux et généralement pour tout ce qui nous peut estre utile aux travaux que nous entreprenons. Surtout ne vous contentez pas de la superficie comme la plupart des jeunes gens; mais approfondissez les matières et faites un journal exact de tout ce que vous verrez un peu extraordinaire jour par jour." Colbert to P. Arnoul (Oct. 24, 1670), excerpted in Clément, *Lettres de Colbert*, III¹: 302n2. The carpenter was imprisoned in Venice on suspicion of espionage. Colbert to N. Arnoul, BnF NAF 21309, fol. 131v (Jul. 19, 1669); N. Arnoul to Colbert, fols. 143-143v (Jul. 27, 1669); "Memoire sur la vie et sur les services de M. Arnoul a present intendant des galeres et du commerce," BnF NAF 21416, fol. 117v. Nicolas again offered instructions and advice, this time drawing on his diplomatic background to educate his son about the identities of England's most important royal and naval officers, the structure of its nobility, and the necessity of holding his tongue when the English styled their king "Roy de France." "Memoire pour servir d'instruction a mon fils allant en angleterre et holande, et ce outre les memoires cy apres concernant les vaisseaux remarquera en holande principalement," BnF NAF 21399, fols. 252-257 (ca. 1671). On the European travels of young court nobles of the period, see Motley, *Becoming a French Aristocrat*, 187-192; F. Du Soucy, *L'Art de voyager utilement où l'on apprend à bien servir son prince, sa patrie, et soy mesme* (Paris: 1650); Pierre Clément, ed., *L'Italie en 1671. Relation d'un voyage du marquis de Seignelay* (Paris, 1867).

the last.⁸⁶ At Pierre's urging, Colbert ordered that the Italian method of choosing, preserving, and drying wood be adopted immediately; several years later, Pierre would draw on his experience in Holland to import a labor-saving device, the sawmill, to France.⁸⁷ His recommendations reflected an increasing ability to see the work of ship-building from a carpenter's perspective.⁸⁸ Colbert was so pleased with Pierre's reports that he "made it a pleasure and a study to have each chapter produced by [Arnoul] read to him the same day it was written, during the evening time when he relaxed with his children." He also made them required reading for Seignelay before the Marquis's own journeys abroad, filed them away in his personal library, and in 1672 rewarded Pierre with a commission as controller-general on campaign with the fleet at Rochefort.⁸⁹

This appointment completed Pierre's training as a craftsman-administrator of Louis's navy and galleys. In seven months on the Channel he learned how to outfit and disarm an entire war fleet, oversaw the payment of its crews, managed his own team of commissioners and scribes, and improvised solutions to thorny logistical problems such

⁸⁶ These *mémoires* on the arsenal at Venice, the Dutch fleet, and the English navy are in BnF NAF 21399, fols. 115-138v (Venice), 186-204v (Dutch), 258-279 (English).

⁸⁷ Colbert to P. Arnoul (Oct. 24, 1670), reproduced in Clément, *Lettres de Colbert*, III¹: 302.

⁸⁸ For example, after describing the phases of naval construction practiced by Dutch builders, which allowed them to examine and re-size timbers throughout the building process by eyeballing the contours of the hull, he wrote: "What I find most advantageous in this method is that [the carpenters] have the leisure to consider the curve of their ship and to adjust it up to the point where they no longer find fault with it, instead of having the timbers [*varangues*] posed so that a carpenter—who could only examine his work once this was done—cannot recognize its faults until there is no longer time to fix them. This leads me to conclude that [the Dutch] method, on this point, is the easiest and most sure, even though it seems that the rules followed by most of our master carpenters for the cutting of their timbers is more certain than a [carpenter's] eye that relies only on the practice and experience that he has acquired." This method, he argued, allowed the ship's sides to be joined more securely, and gave carpenters the freedom to examine the hull from inside and out. *Mémoire* concerning the Dutch fleet, BnF NAF 21399, fols. 186-204v; also in BnF Cinq Cents de Colbert 201, fols. 9-10, quoted in Dessert, *La Royale*, 125-126.

⁸⁹ "[Colbert] se faisoit un plaisir et une estude de se faire lire chaque jour ce que m. arnoul avoit fait cette mesme journée dans le temps que se delassoit le soir avec m. ses enfans." Autobiographical notes, BnF NAF 21416, fol. 25. On Pierre's appointment as *commissaire-général*, see fols. 25v-27. By this time, Colbert's library was already well on its way to becoming "a documentary collection based on the interests of administering the state." Soll, *Information Master*, 95.

as the delayed arrival of reinforcements and an outbreak of scurvy that afflicted 4,000 men.⁹⁰ One year later he became intendant at Toulon, at just twenty-four years old the youngest intendant the king had ever appointed.⁹¹ When Nicolas died in 1675, Pierre became co-intendant of Marseille and Toulon as well as guardian to his younger siblings, including Vaucresson, whose own education and appointment immediately became one of his brother's chief preoccupations.

Pierre Arnoul's apprenticeship reflected a new administrative reality that made specialized knowledge of maritime affairs a prerequisite for appointment. In a joint effort that united familial self-interest with reason of state, Nicolas and Colbert sought to make of him "*un bon marin sur terre*"—a landed seaman whose mastery of naval skills would be matched only by his command of paperwork.⁹² Pierre's training therefore anticipated the instruction of Seignelay, which likewise drew upon a complex array of intellectual sources—the humanist tradition, Jesuit pedagogy, administrative *usages*, the law, and the commercial world of bookkeeping and travelogues—all of which privileged lucid prose, detailed and organized reporting, and massive amounts of red tape.⁹³ His apprenticeship conditioned him to the specific routines and demands of his father's work: in his speech, his writing, and his habits, Pierre learned to embody the image of an able administrator and a consummate expert in all aspects of maritime service, one whose presence in the

⁹⁰ Draft of biography of Pierre Arnoul, BnF NAF 21416, fols. 26-26v.

⁹¹ Upon Pierre's return from Rochefort he spent four hours in Colbert's *cabinet* answering questions about the campaign as Seignelay copied out his responses, part of the future minister's own instruction. Autobiographical notes, BnF NAF 21416, fols. 27-27v. On Pierre as the youngest intendant ever appointed, see Seignelay to P. Arnoul, BnF NAF 21314, fol. 312 (Jul. 24, 1673). Not long after Pierre's appointment Colbert described him as an "effective man who works in an orderly fashion. He is still young, but there is reason to hope that in a few years he will make himself capable of serving the king well. He was almost born in the job (*métier*) and has seen 12 years in it during which his father served." Colbert to Colbert de Terron (Apr. 30, 1675), AN Marine B² 30, quoted in Mémain, *La marine de guerre*, 439.

⁹² N. Arnoul to Colbert, BnF NAF 21308, fols. 464v-465 (Mar. 19, 1669).

⁹³ Soll, *Information Master*, 86-88.

ports could bring France's fleets under greater royal control. Maintaining that image would assure his position as a leading voice in the articulation of French naval, commercial, and diplomatic policy for a further five decades.

The Strategy Stymied: Pierre and Vaucresson at Toulon and Rochefort

On its own, Pierre's training seems to represent a successful union of family strategy, specialized knowledge, and state power. Yet the experience of Pierre's youngest brother, Vaucresson, reveals how highly personalized and conditional that union was. Despite the mentorship and protection of his powerful brother, Vaucresson was unable to inherit Pierre's technical expertise, and instead of following in his footsteps he seemed, for the two decades preceding his own appointment as intendant of Martinique, to toil in Pierre's shadow. Several other factors may explain his deferred advancement: fraternal negligence, a failure of patronage, the deaths of Nicolas and Colbert, relative incompetence, a reputation for debauchery, newly-fixed standards of promotion, or social bias against cadet brothers. Whatever the case, knowledge passed down and built upon *de père en fils* did not translate *de frère en frère*. In a regime where "state knowledge" still resided in the minds or personal papers of individual servants rather than in archives, such a failure represented a serious epistemic breakdown. Expertise that was not passed down from one official to another or recorded in an accessible place was as good as lost. This sort of "breakdown" is rarely accounted for in works that define state knowledge only as the disembodied content of written sources, yet

in the case of Vaucresson, it helped reduce a productive union of expertise and monarchical ambition to a dull marriage of passable service and delayed rewards.⁹⁴

At the time of Nicolas' death, Vaucresson appeared destined for a career as a soldier of God. In 1668 his parents had placed him with the military Order of Saint Sépulchre at just five years old, with the understanding that until he could begin his noviciate and take his vows his education would be in the hands of the hospitallers of Saint John at Marseille.⁹⁵ Had he remained in the Order he likely would have become a galley captain, but plans for him changed when his father died and the children's inheritance was thrown into doubt, and at age ten he was placed by Pierre on a ship bound for war against the Dutch.⁹⁶ The following year he began studies at the collège de Clermont under the care of a *précepteur*.⁹⁷ At some point Pierre decided that his youngest brother "appeared more suited to the pen [than the sword]" and "pushed him in that direction."⁹⁸ In 1679 Pierre wrote Seignelay that he was training his brother for service.⁹⁹ Over the next decade Vaucresson would rotate between Toulon, Paris, Brest,

⁹⁴ On the failure of current models of the knowledge-state equation to account for "breakdown," see Cheney and Charles, "The Colonial Machine Dismantled."

⁹⁵ Vaucresson's young age required his parents to obtain a special dispensation from the master of the Order. "Décision de Nicolas Cotoner, maître de l'hospital de Saint Jean de Jérusalem," BnF NAF 21416, fols. 231-232v (Jan. 19, 1668). A later letter between the two brothers suggests that Vaucresson indeed spent much of his early youth at the hospital. Vaucresson to P. Arnoul, BnF NAF 21430, fol. 295v (Feb. 17, 1715).

⁹⁶ Vaucresson to P. Arnoul, 17 February 1715, NAF 21430, fol. 292.

⁹⁷ Compte de dépenses de M. de Vaucresson, 1676, Archives Départementales des Bouches-du-Rhône [hereafter ADBR], 5E 23.

⁹⁸ Autobiographical notes, BnF NAF 21416, fol. 80.

⁹⁹ P. Arnoul to Seignelay, BnF NAF 21327, fols. 211v-212 (Aug. 15, 1679). Vaucresson later pointed to this year as the beginning of his career in service. Vaucresson to Pontchartrain, Archives nationales d'Outre-Mer (hereafter ANOM), C^{8A} 16, fol. 390 (Aug. 22, 1708).

Havre, and Rochefort, learning the practice of administration under his brother while taking lessons in arms, dance, writing, Latin, and arithmetic in his spare time.¹⁰⁰

The evidence of Vaucresson's early schooling is patchy, but there was more to his education than formal instruction and on-the-job training: the household environment in which he was raised, too, likely shaped him as a person and an administrator. The two intendant's residences where the Arnoul lived during his childhood served both as the administrative hearts of Toulon and Marseille and as training centers for future officers of the Marine. From their second-story rooms at the *Maison du Roi* of Marseille, members of the family could observe all of the workshops and construction sites within the arsenal.¹⁰¹ Two cousins, barely older than Vaucresson, lived with the Arnoul and took writing lessons before receiving commissions under Nicolas and Pierre; a third Arnoul brother, Raoul, was put to work by Pierre arming ships and learning hydrography and cannonry from local experts before entering the naval officer corps.¹⁰² In addition to witnessing up close the business of the intendency and the training of his closest kin, Vaucresson was exposed to the array of classical, Christian, royal, and maritime imagery that decorated his family's home. This included a dozen naval maps; portraits of Louis, Colbert, Seignelay, Louvois, Oppède, and Louis's late Superintendent of Navigations,

¹⁰⁰ Compte de dépenses de M. de Vaucresson, 1679, BnF NAF 21416, fol. 408; Bill for items provided by Du Cunoy to Mr. de Vaucresson for writing lessons, fols. 421-421v (Jun. 30, 1682); Bill for writing lessons and materials given by M. de Biere to M. de Vaucresson, BnF NAF 21417, fol. 11 (Oct. 6, 1685); Bill for Latin and dance lessons, fol. 12 (Oct. 6, 1685). All bills were signed by Vaucresson himself and paid through Pierre's agent in Paris. These payments are listed elsewhere among Pierre's personal expenses for the years 1679, 1682, and 1685. "Estat de la recepte et despence faite pour Monsieur Arnoul," BnF NAF 21403, fols. 41, 43-44 (1679), 115 (1682), 291-291v (1685). See also the accounts for these years and those of 1676, 1684 contained in ADBR, 5E 23-24.

¹⁰¹ Masson, *Les galères de France*, 181.

¹⁰² P. Arnoul to Seignelay, BnF NAF 21327, fols. 211v-212 (Aug. 15, 1679). These lessons in cannonry and hydrography were first established by Nicolas. On the writing lessons and appointments of the Croiset, cousins of the Arnoul, see "Recette et Depence que j'ay fait pour Monsieur l'Intendant," BnF NAF 21416, fols. 239-252 (May 1, 1674); "Liste generale des off. de finances et de plumes de la Marine, des Galeres, et des Colonies, et autres entretenus," AN Marine C² 55, fol. 95v.

Cesar de Vendôme; as well as paintings of the burning of Rome, the miracles of Saint Mark, and the sale of Joseph by his brothers.¹⁰³ At Toulon the Arnoul coat of arms was etched into the four corners of the *magasin général*.¹⁰⁴ To what extent these images served a didactic purpose or moulded the values of Vaucresson is impossible to say, but neither he nor Pierre—nor any of their visitors—could have remained long in these surroundings without knowing what their family’s faith was, who their patrons were, and how important royal service and the sea were to their family’s present and future prospects.¹⁰⁵

During and after the years of Vaucresson’s apprenticeship, the brothers’ residences reflected a deepening identification with maritime life and intellectual pursuits. Their shared home at Rochefort displayed paintings of a galleasse, a tempest, and the beginnings of the arsenal of Marseille, and they kept collections of seashells and Dutch medals. They also owned a pair of spyglasses, a barometer, a thermometer, architectural instruments and books, and guides to navigation and hydrography.¹⁰⁶ At Rochefort,

¹⁰³ Where and how the family displayed these images is unknown, but most of them were framed at the time of Nicolas’s death. “Memoire des meubles qui ont estes Embarquis sur la Barque du patron Jacques decagis de la Ciontat, le 9e fev 1675,” BnF NAF 21416, fols. 288-291v; “Estat des meubles portez par l’inventaire faict apres le deces de Nicolas Arnoul lesquels n’ayant point alors esté estimez n’estant pas apparamment l’usage du pays ont a present esté mis a prix suivant ce qu’on eu connoist et sur l’avis d’un tapissier et Chaudronier conseillez a ce sujet,” fols. 305-307v (ca. 1686?).

¹⁰⁴ According to Nicolas’s biography, he was “so beloved” following his first stint at Toulon that “when he left this intendency, the *consuls en chaperon* placed his arms at the four corners of the [magazine], which remained there always, even up to the time when the new arsenal was built.” Biography of Nicolas Arnoul, BnF NAF 21416, fol. 1v. Among the family’s papers is a piece of masonry, presumably from this building, in which the Arnoul coat of arms has been carved.

¹⁰⁵ The boys also would have come into contact with a stream of honored guests who joined the family at table. The Arnouls’ expense accounts for 1674-1675 list galleys captains, commissioners, Venetian and Spanish ambassadors, the chevalier Le Febvre de La Barre (chef d’escadre, former governor of Cayenne, and future governor of Canada), and the chevalier de Valbelle (in whose fleet Vaucresson would serve that year) among those who dined at the intendant’s residence at Toulon. *Comptes de dépenses tenus par Tournay, secrétaire de l’intendant des galères*, ADBR, 5E 17.

¹⁰⁶ “Meubles qui doit se trouver au Comtat de ceux sont venus de Rochefort,” BnF NAF 21417, fols. 258-258v (Oct. 2, 1699). On the purchase of the barometer, thermometer, architectural instruments, and books, see *Comptes domestiques* for 1676 and 1679, ADBR, 5E 23-24.

Toulon, and Marseille, their assortment of patrons' and allies' likenesses grew to include portraits of Seignelay, Pontchartrain, and the military engineer Vauban; the Marshal of France and Caribbean naval specialist, Jean II d'Estrées; Intendant of the Galleys Jean-Baptiste-Nicolas de Brodart and the intendant of Marseille and Rochefort, Michel Bégon; as well as a medal depicting the Grand Admiral of France and governor of Brittany, Louis-Alexandre de Bourbon.¹⁰⁷ In addition to many religious tableaux, Pierre owned paintings of maritime scenery, a shipwreck, naval battles, the port and arsenal of Marseille, and two "philosophes," together with maps of Naples, Rome, Genoa, London, Copenhagen, Messina, Nantes, La Rochelle, Marseille, Provence, England, Asia, and the Mediterranean, all of which eventually hung throughout his *château* at Rochegude.¹⁰⁸ Vaucresson, for his part, later acquired two tables whose gilded legs were carved to resemble African figures—a motif that may have been inspired by his years in Martinique—as well as seven maps of French provinces that he kept in his study.¹⁰⁹ These practical and decorative objects suggest that the brothers' patterns of consumption and display were bound up intimately with royal patronage, the cultivation of knowledge, and the naval-colonial world in which they lived and worked.

¹⁰⁷ "Estate de mes meubles venûes de Toulon qui doivent se trouver encore a Carpentras et a Baume," NAF 21417, fols. 259-261 (Oct. 2, 1699). Vaucresson's note on fol. 262v states that these possessions had been transported from Rochefort to Toulon before being moved to the family's estates at Carpentras and Baume. On Brodart as co-*tuteur* of Pierre's surviving children, along with Vaucresson and others, see notarial record of guardianship in BnF NAF 21418, fols. 297-298.

¹⁰⁸ "Rôle des tableaux appartenants à la succession de feu Mr. arnoul, qui n'ont pas esté vendûs," BnF NAF 21418, fols. 242-244 (Dec. 29, 1722); "Inventaire General des Meubles qui se sont trouvées dans le Chateau de Rochegude donts le sr. Anselme Ecclesiastique s'est chargé le dixieme octobre mil sept cent dix huit, et qu'il rend à mrs. Pierre Terrasse et Joseph Gaud, deputés et Commis par Monseigneur l'Intendant de vaucresson, le douze juin mil sept cens vingt deux," BnF NAF 21418, fols. 225-241 (Jul. 12, 1722).

¹⁰⁹ The tables were kept in his bedroom. "Inventaire des meubles, Linge, argenterie, et autres Effets appartenant a M. de Vaucresson, Intendant general des galeres," BnF NAF 21418, fols. 251-259v (Aug. 14, 1725).

The family's marriage alliances further cemented its place in that world. Shortly after Nicolas's death, his widow remarried to Horace-Joseph de Rus, *seigneur de Raffelis*, the elder son of a ship's captain from Carpentras. Pierre's youngest sister, Geneviève, was promised to Horace-Joseph's younger brother, Pierre-Dominique, a captain of the galleys. And Pierre himself married the two brothers' widowed mother.¹¹⁰ These alliances did not necessarily reflect a conscious strategy to marry into the world of naval officerdom—Pierre later claimed to have been bewitched by Madame de Rus when he consented to them—but that was their effect: the children and grandchildren of Pierre-Dominique and Geneviève would include five officers of the navy and galleys, and Pierre would remarry to Brodart's daughter.¹¹¹ Nicolas had removed his family from its base in Picardy and Paris (where the Arnoul nonetheless maintained a home and the nearby seigneuries of Vaucresson and La Tour Ronde), but within a generation his children managed to entrench themselves within the pen and sword nobilities of Provence and the Comté-Venaissin. Rooting themselves along the Mediterranean ensured the Arnouls'

¹¹⁰ The royal genealogist who recorded these marriages in the Arnoul family history marveled that “par l'arrangement singulier de cette femme ingénieuse [Madame de Rus], Pierre Arnoul devint tout à la fois beau-père de ses deux fils, beau-fils de l'aîné et beau-frère du puiné, tandis qu'elle devint elle-même belle fille de son fils aîné et belle-soeur de son fils puiné, le fils aîné beau père de sa mère et de son beau-père, le fils puiné beau-frère de sa mère, beau-fils de son frère et gendre de sa belle-soeur, etc. ; et tout [231] cela sans dispense et sans inceste.” BnF Cabinet des titres, dossier bleu 744: Arnoul, quoted in Saint-Simon, *Memoires*, VI: 230n1. See also Jean-Antoine Pithon-Curt, *Histoire de la noblesse du Comté-Venaissin, d'Avignon et de la principauté d'Orange* (1750; Paris, 1970 repr.), IV: 566-573.

¹¹¹ Madame de Rus was Françoise de Soissans de la Bédosse, an aristocratic *intrigante* and friend of the royal mistress, Madame de Maintenon. According to Pierre and several contemporaries, Rus manipulated the family's grief and Pierre's distraction to contract the triple marriage and thereby seize the Arnoul fortune. Autobiographical notes, BnF NAF 21416, fols. 27-80; “Memoire pour la justification du sr. Arnoul sur ce qui peut avoir causé sa disgrâce outre la perte des travaux,” NAF 21416, fols. 396-399v (1679 or 1680); Anne-Marguerite Du Noyer, *Mémoires et lettres galantes de Madame du Noyer (1663-1720)* (Paris, 1910), 134-139; Saint-Simon, *Memoires*, VI: 222-231. Pierre's 1704 marriage contract with Henriette de Brodart testified to the riches accumulated by the Arnoul in the four decades following Nicolas's appointment to Marseille. Brodart provided a dowry of 287,000 *livres*, while Pierre made her a gift of diamond earrings, a diamond and peridot *carquan*, a diamond buckle, two *toilettes* (one of velour, the other for silverware), pieces of gold-braided fabric, a fur stole, scarves, a repeater watch, and more, at values ranging from upwards of 500 to nearly 25,000 *livres*. Masson, *Les galères de France*, 368.

long-term stake in an ongoing effort to integrate one of France's fiscal-military "frontiers."¹¹²

For Vaucresson, the family's deepening identification with maritime service did not lead him to develop a unique persona or fund of knowledge independent of Pierre. The uncertainty of Pierre's temporary disgrace in 1679 may have distracted both of them from his apprenticeship.¹¹³ Vaucresson did attend collège during this time, but he was still learning Latin, writing, and arithmetic when he received his first appointment as commissioner in 1681. Despite Pierre's later claims that he had "hired all sorts of masters and forgotten nothing that could have contributed to [his brothers'] education," there is no evidence that Pierre paid for Vaucresson to receive the same expert tutoring in mathematics or fortifications that Nicolas had provided for him, nor that he sent him into the shipyards for months of study with master craftsmen.¹¹⁴ Nor is there any sign that Vaucresson sought to emulate his brother in any respect but his wealth.¹¹⁵ As a result,

¹¹² Blaufarb, "Survival of the *Pays d'États*."

¹¹³ Seignelay to P. Arnoul, BnF NAF 21326, fols. 96-96v (Feb. 3, 1679); Seignelay to P. Arnoul, fol. 296v (Mar. 18, 1679); Seignelay to P. Arnoul, fols. 341-343 (Apr. 3, 1679); Seignelay to P. Arnoul, fols. 410-410v (Apr. 15, 1679); Colbert to P. Arnoul, BnF NAF 21327, fol. 241 (Sep. 6, 1679). Ironically, Pierre's devotion to paperwork counted against him in the months preceding his disgrace: Colbert excoriated his tendency to lock himself up in his study writing useless *mémoires* instead of performing his duties in the arsenal. Colbert to P. Arnoul (Nov. 8, 1679), excerpted in Clément, *Lettres de Colbert*, III²: 170-171.

¹¹⁴ Vaucresson's study of Latin and writing continued for at least another three years. Autobiographical notes, BnF NAF 21416, fol. 87. Later in life Vaucresson would reproach Pierre for giving him a second-rate education. Vaucresson to P. Arnoul, BnF NAF 21430, fol. 292 (Feb. 17, 1715).

¹¹⁵ During Vaucresson's tenure at Martinique, the brothers quarreled to the point of estrangement over Pierre's alleged mismanagement of their inheritance. Vaucresson accused him of having given his siblings only miserly stipends during their youths, while Pierre insisted that he had been generous even in the leanest of times. Eventually they reached a settlement and reconciled with the help of an arbiter. Vaucresson to P. Arnoul, BnF NAF 21430, fols. 291-297 (Feb. 17, 1715), 299-301v (Mar. 14, 1715). Some of Pierre's autobiographical notes appear to have been written during this time, since he stresses repeatedly and perhaps defensively the good he had done for his siblings "from their earliest years." Autobiographical notes, BnF NAF 21416, esp. fols. 79-90; also see the letters laying out his side of the dispute with Vaucresson and their sisters, fols. 91-104. Vaucresson had reason to be jealous of Pierre's wealth, which in these years included a yearly salary of around 14,000 *livres*, a 6,000-*livre* annual pension as inspector of commerce, Henriette de Brodart's dowry of 287,000 *livres*, several fiefs, the revenues of *le Marquisat*, much valuable silver and plate, and a small army of servants that included a factotum (at 800 *livres* per year), a *maître d'hôtel* (400), a head cook (300), numerous cooks and cook's assistants (100-

Vaucresson began his career with very little training, no technical knowledge, and none of the reputation with his patrons that Pierre had enjoyed at the same age.

The unexpected change of scenery from Provence to the Ponant nonetheless reoriented Vaucresson's career toward the Atlantic.¹¹⁶ In 1682 he received appointments as commissioner at Brest and at Havre before joining Pierre at Rochefort three years later.¹¹⁷ As a *commissaire*, Vaucresson's duties required him to supervise on his brother's behalf a range of business including mustering, magazines, artillery, and ship-building and repairs.¹¹⁸ To what extent he applied himself to his work is unclear—there were rumors that he was a pleasure-seeker—but Pierre would contend later that his own encouragement, combined with his brother's "probity" and "constant attention to his duties," gave Vaucresson a firm enough grounding in the service that he was able to earn posts "as great as his own."¹¹⁹

The details of Vaucresson's apprenticeship to his brother at Rochefort are obscure largely because Pierre was not nearly as enthusiastic an advocate as their father had been

150), two coachmen (154 each), a gamekeeper (120), and several lackeys (100 each). Masson, *Les galères de France*, 368-369; the family accounts and inventories after death cited above also attest to Pierre's wealth.

¹¹⁶ This was equally true for Raoul, who received an appointment aboard the king's ships as an ensign in 1681. Raoul, also known as Naugeville, makes no further appearances in the archives except for a passing reference to his untimely death in Pierre's notes. P. Arnoul to Seignelay, 23 January 1681, BnF NAF 21328, fols. 23v (Jan. 23, 1681), 46v (Feb. 15, 1681); Autobiographical notes, BnF NAF 21416, fol. 79v.

¹¹⁷ Vaucresson likely served as an uncommissioned scribe. No official evidence of his service on this campaign survives, but Pierre's expenses for December 1679 included 110 *livres* "pour [Vaucresson's] necessitez de la camp'e sur le parfait." "Estat de la recepte et despence faite pour Monsieur Arnoul," BnF NAF 21403, fol. 45 (Dec. 1679). For Vaucresson's commissioned appointments, see "Liste generale des off. de finances et de plumes de la Marine, des Galeres, et des Colonies, et autres entretenus," AN Marine C² 55, fol. 11.

¹¹⁸ Claude Aboucaya, *Les intendants de la marine*, 39-40; Mémain, *La marine de guerre*, 466-469;

¹¹⁹ Autobiographical notes, BnF NAF 21416, fol. 87. When lower positions in the Marine became venal, Pierre helped Vaucresson purchase the office of *commissaire*—a position he had already held for two decades—as a necessary prerequisite for his appointment as intendant of Martinique. "Déclaration de Panon, Chancelier du Consulat de la nation française à Cadix," BnF NAF 21417, fols. 171-172 (Apr. 24, 1703). On Vaucresson's pleasure-seeking, see Sara Chapman, *Private Ambition and Political Alliances: The Phélypeaux de Pontchartrain Family and Louis XIV's Government, 1650-1715* (Rochester, NY, 2004), 126.

for him. Pierre consistently passed up chances to nominate Vaucresson for advancement or for special missions that might have let him prove himself to the minister, and he never left his brother in charge when he was away, as Nicolas had done for him at a much younger age, perhaps because Vaucresson indeed loved his pleasures excessively.¹²⁰ In 1684 the brothers did travel together to Amsterdam to purchase ships and gunpowder on Seignelay's orders, but the fate of their mission is unknown, and in any case it produced no further opportunities of its kind for Vaucresson.¹²¹

Despite failing to distinguish himself in these years, Vaucresson's time in the Ponant eventually gave him enough experience to become a plausible candidate for promotion to an intendancy. At Rochefort he worked directly under Pierre, who was responsible for provisioning the colonies, arranging transport for newly-appointed intendants and governors, and maintaining correspondence with his counterparts in the New World. If Vaucresson ever became curious about the islands, he could have asked his brother to lend him a two-volume history of the Antilles that Pierre owned; if he wanted to learn about New France, he could have questioned his close friend and cousin,

¹²⁰ It was in Pierre's interest to recommend only capable candidates for promotion, and if Vaucresson was indeed a poor worker, he may have been a risky appointment; or Pierre, already assured of his brother's loyalty, may have been focused on building an extra-familial network of clients in the port. Whatever the case he reserved all of his praise for his senior *commissaire*, Mauclerc, and another commissioner, Du Guay, whom he cited respectively as "le plus capable" and "le plus intelligent" among his staff. In 1687 it was Mauclerc whom he proposed over Du Guay for the vacant position of commissioner-general, without any mention of Vaucresson. P. Arnoul to Seignelay, BnF NAF 21332, fol. 120v (Sep. 21, 1685); P. Arnoul to Seignelay, BnF NAF 21334, fol. 92v (May 6, 1687); P. Arnoul to Seignelay, fol. 105 (May 15, 1687).

¹²¹ The orders were sent directly to Vaucresson, and they presumed that he would know how to assess the quality of the ships' construction and to outfit them for a journey from Holland to Provence at minimal expense. Vaucresson had probably been recommended for this mission by Pierre, but Seignelay clearly had little idea of who he was, expressing confusion about whether he should call him Arnoul or Vaucresson. Seignelay to Vaucresson, BnF NAF 21330, fol. 6 (Jan. 11, 1684); Seignelay to P. Arnoul, fol. 24 (Feb. 6, 1684); Seignelay to Vaucresson, fol. 35 (Feb. 28, 1684); "Estat de la recepte et despence faite pour Monsieur Arnoul," Jul. 1682-Jun. 1684, BnF NAF 21403, fol. 234. Pierre made no further requests on his brother's behalf during their time at Rochefort, except to have Vaucresson's salary raised to equal that of his fellow commissioners and to beg Seignelay's indulgence when he fell sick with fever for over six months. Despite Vaucresson's illness, Pierre wrote, somewhat ambiguously, that he "s'est toujours appliqué autant qu'il a pû." P. Arnoul to Seignelay, BnF NAF 21331, fol. 246v (Jun. 12, 1685).

Croiset, at that time chief scribe at Rochefort, who sailed to Québec on campaign in 1687; and if he wished to follow the latest news of Europe and the New World, he could read the foreign gazettes to which his brother subscribed.¹²² Whether or not he took an interest is unknown, but between word-of-mouth, the publications at hand, and the demands of his position, Vaucresson had access to a steady stream of information about the fleets, commerce, and colonies of France and its rivals.

Whereas Pierre's appointment as intendant appears to have been in good part a consequence of his ability to master and apply useful knowledge, Vaucresson's seems to have resulted only from patronage, nepotism, and some amount of chance. It would take an additional eight years as *commissaire* at Brest, seven more as commissioner-general and controller at Marseille (a position Pierre obtained for him over two more senior candidates, including another Croiset cousin), and a fortunate meeting with Minister of Marine Louis de Pontchartrain's hard-drinking son, Jérôme, to bring Vaucresson his appointment as intendant at Martinique in 1704.¹²³ Neither Pierre, nor Jérôme, nor any of Vaucresson's contemporaries attributed this promotion to his superior administrative or intellectual qualities. Pontchartrain described him only as "well established...loyal, wise, hardworking" and "the brother of M. Arnoul," and Vaucresson's commission included

¹²² This must have been the *Histoire naturelle et morale des Îles Antilles de l'Amérique*, published in 1667 and attributed to Jean-Baptiste du Tertre. Pierre's expense accounts for Apr. 18, 1673 show the purchase of this and several other books, including a history of La Rochelle, Pascal's *Pensées*, Richelieu's *La perfection du chrestien*, Grenade's four-volume *Catechisme*, and the New Testament in duodecimo.

"Despence faitte par boulliet a commencer du [blank] octobre apres avoir arresté les comptes du voyage d'Italie," BnF NAF 21402, fol. 48v (Apr. 18, 1673). Pierre's expenses for 1683 included 3 *livres* and 4 *sous* "pour les gazettes de bruxelles qui ont esté envoyées aud. sieur arnoul pendant lesd. mois." BnF NAF 21403, fol. 225v (May 1683). On Croiset's appointments and voyage to America, see "Liste generale des off. de finances et de plumes de la Marine, des Galeres, et des Colonies, et autres entretenus," AN Marine C² 55, fol. 95v; Croiset to P. Arnoul, BnF NAF 21334, fols. 298-300 (Aug. 22, 1687).

¹²³ Vaucresson met Jérôme de Pontchartrain while serving at Brest in 1695. Jérôme was then on a tour of the ports at his father's behest, learning the ways of the navy and recruiting young clients among its commissioners and scribes. He arrived at Brest drunk on brandy and bloodied from a fall, after which he and Vaucresson became friendly. Chapman, *Private Ambition and Political Alliances*, 126-127.

nothing more than the usual bland formalities.¹²⁴ Pierre credited his own influence.¹²⁵

The coincidence that Pierre was empowered to act as the minister's representative to the Royal Asiento Company at nearly the same time that Vaucresson received his appointment to Martinique suggests that Jérôme may have been seeking to consolidate control over the slave trade by positioning loyal, cooperative clients at both ends.¹²⁶

Vaucresson, for his part, insisted that his brother had neglected to push his candidacy strongly enough over the years, despite the clout he held with Seignelay and the Pontchartrain; it was his own "seniority...the number of my campaigns, and my application in the arsenals" alone that had secured his advancement.¹²⁷

¹²⁴ After meeting Vaucresson at Brest, Jérôme praised him to his father: "The sieur de Vaucresson has served in all the employs of the arsenal, and so is very well established. He has always gone onto the ships when they have an army or strong squadron at the port. He has proven to be loyal, wise, hardworking, and, because he is such an able worker, it is good to give him many duties. He is the brother of M. Arnoul. Some have accused him in the past of loving his pleasures, but at present, he has returned to fulfilling his duties with exactitude." Several months later Jérôme wrote Vaucresson to assure him of his protection. Chapman, *Private Ambition and Political Alliances*, 126-127. For Vaucresson's commission as intendant of Martinique, see BnF NAF 21417, fol. 282 (Dec. 1, 1704).

¹²⁵ "That the intendency of America having been vacated, M. Arnoul did not cease to solicit Pontchartrain father and son until he had obtained it for [Vaucresson]...although the services of M. de Vaucresson, his experience and his integrity could have earned it, it was no certainty that he would have obtained it—the ministers not lacking for creatures and men of worth to place—without the kindness they have always had for M. Arnoul." Pierre added, perhaps to reassure Vaucresson, who felt that his appointment to Martinique was a form of "exile," that "an intendency of America is worth more than one in France, because the provisions that must be sent there are worth double what they cost in France and moreover because there is the help of the *negres* which other intendants do not have...it is one of the rewards of this intendency that some of those who have held it before him have gained 4 and 500 livres [annually?] from it." Autobiographical notes, BnF NAF 21416, fol. 88; Vaucresson to P. Arnoul, BnF NAF 21430, fol. 301 (Mar. 14, 1715)

¹²⁶ "Arrest qui commet le Sr. Arnoul à la place du Sr. Deshaguais pour en l'absence et sous les ordres du Sr. de Pontchartrain remplir les mesmes fonctions qu'il feroit s'il estoit present aux Assemblées de la Compagnie de l'Assiente," AN Marine C⁷, dossier Arnoul, fols. 10-10v (Aug. 19, 1704). Six years later, when Vaucresson was still serving in Martinique, Pierre was granted inspection of the Royal Africa Company, which required him to familiarize himself with the details of the company's trade and to report his findings to the minister. "Arrest qui commet Mr. Arnoul pour avoir Inspection sur la Compagnie d'Affrique," AN Marine C⁷, dossier Arnoul, fol. 12 (May 21, 1710).

¹²⁷ "Je conviens au reste que je dois avoir de la reconnoissance de ce que vous avez fait pour mon avancement. mais est-ce à vous à mettre à un si haut prix vos bons offices à cet egard, et devriez vous par quelque fois songer que j'estois d'un nom à me pousser dans la marine, que j'ay esté mis tres jeune dans le service, que je n'ay esté avancé que suivant mon ancienneté, et que le nombre de mes Campagnes, et mon application dans les arsenaux pourroient méritoit de [possédé]?" Vaucresson to P. Arnoul, BnF NAF 21430, fol. 293v (Feb. 17, 1715).

Vaucresson's failure to transform himself into an administrator capable of wielding useful, specialized knowledge coincided with adverse changes within the Marine and the crafts that supported it. It was still possible in these years for colonial and naval intendants on the make to distinguish themselves through individualized learning, as the careers of Antoine-Denis Raudot (versed in economics) and Michel Bégon de la Picardière (law) attest.¹²⁸ But the structures of training and promotion within the navy had shifted unfavorably since the 1660s and 1670s. On the military side, young officers were now required to pass through *écoles de la marine* that gave special instruction in navigation, hydrography, cannonry, fortifications, and carpentry.¹²⁹ Officers of the pen had no schools of their own, but after 1689 they were expected, in principle, to ascend through fixed stages of advancement designed to impart the sort of “perfect familiarity with all aspects of the service” that Colbert had once demanded of Pierre.¹³⁰ Household apprenticeships for administrators had become old-fashioned—Pontchartrain actively discouraged them—and in 1684 the crown had begun to recruit “young men from good families” who were willing to work their way up as scribes and commissioners.¹³¹ Meanwhile, by the time of Vaucresson's appointment to Martinique, the navy was already experimenting with institutional means of co-opting or instructing its own ship designers, engineers, and *constructeurs*. From the early decades of the eighteenth

¹²⁸ See their respective biographies in Dubé, *Les intendants de la Nouvelle-France*; entries on “Michel Bégon de la Picardière” and “Antoine-Denis Raudot,” in *Dictionary of Canadian Biography* online: www.biographi.ca.

¹²⁹ Vergé-Franceschi, *Marine et éducation sous l'Ancien Régime* (Paris, 1991), 72-98, 175-193, 209-217.

¹³⁰ Vergé-Franceschi, *La Marine française*, 203; Dessert, *La Royale*, 32.

¹³¹ Gruder, *Royal Provincial Intendants*, 88; Mémain, *La marine de guerre*, 361.

century onward, specialization within the service would increasingly divide administrators and technicians into separate spheres.¹³²

Ironically, the same institutional changes that may have delayed Vaucresson's appointment were a product, in part, of his family's numerous contributions to state knowledge about the Marine and galleys. Nicolas and Pierre were trusted authorities whose recommendations helped forge over time a consensus about how to guarantee the *bon fonctionnement* of the fleets. That consensus was codified in comprehensive regulations governing the administrative and technical aspects of the service, including promotion, known as *Ordonnances de la Marine*. Nicolas was one of a handful of authors credited by Colbert with the *Ordonnance* of 1674; Pierre took a leading hand in drafting its more thoroughgoing successor fifteen years later.¹³³ Successive ministers sent copies of these regulations to every port, where they were to be posted, enforced, and read (and re-read annually) in order to ensure that all personnel could benefit from the accumulated expertise of the navy's leading lights.¹³⁴ Vaucresson, who owed his career to his family's ability to remake the service in Colbert's rationalizing image, may have experienced it as a mixed blessing.

Conclusion: State knowledge, administrative personas, and overseas empire

¹³² Taton, ed., *Enseignement et diffusion*, esp. Paul Gille, "Écoles de constructeurs de la Marine," 477-478.

¹³³ When Intendant of Rochefort Honoré Lucas de Demuin wished to make changes to the Ordinance of 1674, Colbert reminded him, "il faut qu'il (Demuin) considère que ces réglemens ayant été faits sur les avis et mémoires du sieur Colbert de Terron, du feu sieur Arnoul, du sieur de Seüil et de tous les plus habils et plus anciens officiers de Marine, il doit s'appliquer à les faire exécuter..." quoted in Mémain, *La marine de guerre*, 276. On Pierre and the Ordinance of 1689, see Dessert, *La Royale*, 30-32.

¹³⁴ Demuin's instructions, for example, urged him to do a thoughtful and extensive reading of all documents and regulations concerning the Marine, past and present, including all of his predecessor's correspondence. In his first months at Rochefort he produced *mémoires* based on these readings that demonstrated his grasp of their contents. Mémain, *La marine de guerre*, 271, 371, 422-423, appendix VI. At the end of each year the intendants were supposed to review the previous ten years' worth of regulations in order to refresh their memory of them. Mémain, *La marine de guerre*, 369.

Even at the apex of their careers, the Arnoul brothers sometimes struggled to make knowledge work for them, and by extension for the crown. In Martinique Vaucresson suffered from the slowness and inconsistency of transatlantic communications, complained about the rats that chewed up his books, and, like the governor of Guadeloupe studied by Cheney and Charles, proposed reforms to liberalize colonial commerce that fell on deaf ears despite being “well-considered” and approved by “those who know this trade *à fonds*.”¹³⁵ Pierre devised a system of apprenticeship for diplomats, based on personal experience and conceived at a time of serious need, and received no formal response.¹³⁶ Beyond what survived in the *Ordonnances de la Marine*, moreover, the brothers’ expertise seems to have been lost with their deaths. Pierre used his influence to advance his nephews’ careers, but there is little evidence that he trained them, and his own sons appear not to have entered royal service; Vaucresson died unmarried and childless.¹³⁷ However much the Arnoul contributed to the long-term bureaucratization of France’s navy, galleys, and colonies, the knowledge they produced remained fundamentally tied to their bodies, their personal authorities, and the material and institutional conditions in which they worked.

¹³⁵ For his complaints about the rats, see Vaucresson to Pontchartrain, ANOM, Fonds ministériels, C^{8A} 20, fol. 103v (Oct. 26, 1714) and C^{8A} 19, fol. 349 (May 20, 1713). For Vaucresson’s proposal to reform trade and the lack of response, see Vaucresson to Pontchartrain, C^{8B} 2, fol. 92v (Jun. 1, 1708); Pontchartrain to Vaucresson, B 31, fols. 95-99v (Jul. 25, 1708). On the slowness and uncertainty of transatlantic communications, see Kenneth Banks, *Chasing Empire Across the Sea: Communications and the State in the French Atlantic, 1713-1763* (Montréal and Kingston, 2003).

¹³⁶ Arnoul’s proposal resembled Colbert de Torcy’s Académie politique, founded in 1712. Guy Thuillier, “Aux origines de l’académie politique de Louis XIV: Le projet de Pierre Arnoul (1696 ?),” *La revue administrative*, 42e année, no. 247 (Jan.-Fev. 1989): 15-18.

¹³⁷ Pierre did, however, make provision in his will for his third son to receive 15,000 *livres* per year beyond his annual stipend of 12,000 *livres* as soon as he reached majority and “est en estat de tenir galere au service de la Religion de malthe.” Draft of the last will of Pierre Arnoul, BnF NAF 21418, fol. 187v (ca. 1718). Vaucresson left his entire fortune to the *Hôtel-Dieu* of Marseille. Masson, *Les galères de France*, 369.

Despite these instances of breakdown, there were ways in which the Arnouls' careers represented the successful union of knowledge and state power. That union lasted because the Arnoul were willing to give Colbert what they thought he wanted—when he did not ask for it explicitly—in exchange for rewards that rescued the family from ruin and elevated it to a prominent place among Louis's most favored servants. Pierre owed his rapid ascent in large part, of course, to his father's reputation and guidance, ministerial protection, and the timely expansion of Louis's overseas ambitions, but his ability to master technical as well as administrative skills made him uniquely valuable in his own right. In a kingdom where power devolved from the monarch and weakened at every remove from his person, Pierre, like his contemporary and sometime collaborator Vauban, was one of the rare royal servants capable of strengthening the state at its borders (and even beyond). Also like Vauban, he did so by placing artisanal know-how under crown control for the first time. Although Colbert left the day-to-day business of training Pierre to Nicolas, he groomed him much as he had groomed Vauban and would soon groom Seignelay, moulding him into a valuable craftsman of state knowledge.¹³⁸ In each case the emphasis was different. Pierre was neither a born-and-bred minister of state nor a specialist in urban fortifications, although his training equipped him to deal intelligently with both. He was, instead, a landed administrator who could make the king's presence felt overseas by constructing, staffing, and servicing his ships and ports.

The Arnoul case thus serves as a reminder that state formation occurred not only in courts, colonies, and provincial capitals, but also on the edges of the sea. The family's ability to govern areas that had remained stubbornly beyond royal control was as

¹³⁸ On Colbert's influential role in Vauban's approach to paperwork, see Michèle Virol, "Les carnets de bord d'un grand serviteur du roi: les agendas de Vauban," *Revue d'histoire moderne et contemporaine* (1954-) 48e, no. 4 (2001): 66-67.

significant to its patrons as any specialized learning.¹³⁹ That effort required daily interactions with rough-hewn locals (“great belly-achers who say more with their shoulders than their tongues, and who speak more evil with their gestures than their mouths”), lower-status craftsmen (who labored by “*fantaisie*”), and the king’s most marginal subjects (“I oversee four or five thousand of the meanest rogues on earth”).¹⁴⁰ The work was sometimes distasteful and often overwhelming: Nicolas lamented the necessity of having to “become an investigator [*soliciteur*] when there is someone to punish,” and Pierre took meals “over his papers” and had himself transported every night in a litter between Toulon and Marseille in the frantic months following his father’s death.¹⁴¹ Yet the ability of the Arnoul and officials like them to overcome such obstacles and impose a sense of order upon the ports was a precondition of sustained imperial ventures. If the problem of extending European sovereignty to new lands began upon the oceans, we might fairly ask if the construction of early-modern empires originated along metropolitan shores.¹⁴²

By studying the knowledge-producing role of families such as the Arnoul, historians of state and empire formation can identify changes in administrative culture

¹³⁹ Nicolas’s biography emphasized this theme, explaining his appointment to Toulon under Richelieu as part of the Cardinal’s attempt to reduce Marseille, which then “had a reputation as a town that was proud of its privileges and little attached to the king’s service.” One of Nicolas’s main challenges as intendant of the galleys was to expand the arsenal of Marseille against the opposition of the town’s municipal leaders. Biography of Nicolas Arnoul, BnF NAF 21416, fols. 2-2v; Rambert, *Nicolas Arnoul*.

¹⁴⁰ N. Arnoul to Colbert, BnF NAF 21307, fols. 26v-27 (Jan. 25, 1667); N. Arnoul to Colbert (Dec. 13, 1670), AN Marine B⁶ 2, fol. 28, quoted in Zysberg, *Les galériens*, 162.

¹⁴¹ “Je ne suis point intendant de justice. Je ne le souhaite mesme pas. On a assez de ses peschez, ce n’est pas une chose trop agreable que de conda’ner du monde mais je voy que le service le veult.” N. Arnoul to Colbert, BnF NAF 21307, fol. 4 (Jan. 5, 1667). On Pierre becoming overburdened by work, see draft of biography of Pierre Arnoul, BnF NAF 21416, fols. 27v-28; Rambert, “Une aventurière à Marseille et à Toulon au XVIIe siècle, la dame de Rus,” *Provincia, bulletin trimestriel de la Société de Statistique d’Histoire et d’Archéologie de Marseille et de Provence* 5 (1925): 14-16; and the letters from Colbert preceding Pierre’s disgrace in Clément, *Lettres de Colbert*, III²: letters of May 1677-Nov. 1679.

¹⁴² Lauren Benton, *A Search for Sovereignty: Law and Geography in European Empires, 1400-1900* (Cambridge, UK: Cambridge University Press, 2010): esp. 104-161.

under the Old Regime without making presentist assumptions about their “modernity.” Even as the Arnoul brought new forms of knowledge and power to the state, the family used its position primarily to generate wealth and status for its members within a traditional system of patronage. Successes on both fronts reinforced each other. The Arnouls’ frequent “proofs” of loyalty and *caprice* allowed them to build their own local network of allies and dependents, marry into the maritime service elite of Provence, purchase lands in Marseille and the Comté-Venaissin, etch their coat of arms onto the *magasin général* of Toulon, and, most importantly, invest their children back into the service. These achievements in turn created further opportunities to buttress the family’s reputation for naval-administrative expertise. The *connaissances* developed by Pierre and (to a lesser extent) Vaucresson cannot be understood without reference to their apprenticeships, and those apprenticeships make little sense independent of a household strategy that sought ministerial favor, personal gain, and upward mobility through the cultivation of knowledge.

Cultivating knowledge, however, involved more than lessons in ship-building, accounting, or mathematics: it also implied the fashioning of a persona. Nicolas’s ability to “*s’assujétir*” in swapping arms, “fripperies,” and “the worldly air that he had” for a sober life counting royal *deniers* was only the first example of a more general pattern of discipline that reworked the minds, bodies, and habits of young Arnoul men. In learning to police the *moeurs* of convicts and slaves, Pierre and Vaucresson also were urged to police their own. Successfully honing manners of speech, writing, and self-presentation reinforced Pierre’s epistemic standing, while the failure to do so beyond a minimum threshold helped prevent Vaucresson from establishing a reputation for anything more

than unremarkable competence. More specifically, their commitment to the unique demands of administering fleets and ports encouraged them to identify themselves with the trappings of maritime knowledge. Those trappings—paintings and maps, spyglasses, books and instruments—bolstered the family’s claims to authority over all affairs relevant to the navy and galleys. In spaces and media ranging from the king’s *cabinet* to printed manuals to *conseils de construction*, the Arnoul, like provincial intendants and natural philosophers of their day, drew on more than reasoned arguments to command trust and respect.¹⁴³

For Pierre, realizing Colbert’s ideal of the maritime intendant meant transforming himself into a carpenter, an architect, an engineer, a draftsman, a spy, and an accountant—not to mention a *bon marin sur terre*—an assortment of roles that no other royal servant had ever been asked to play. For Vaucresson, who enjoyed neither his father’s guidance nor his brother’s reputation nor the exacting protection of Colbert, the family’s turn toward the sea meant learning the basics of colonial and maritime affairs within the *cursus honorum* of naval administration that took shape toward the end of the seventeenth century. Taken together, the Arnouls’ careers provide a means of humanizing the link between knowledge production and Louis’s empire at the moment of its making. By mining the rich body of sources they left behind, we can follow the self-conscious rebirth of a family that took advantage of French overseas ambitions to turn a would-be soldier, a would-be Jesuit, and a would-be captain of the galleys—landsmen all—into three maritime administrators and nearly nine decades of service combined.

¹⁴³ Orest Ranum, “Courtesy, Absolutism, and the Rise of the French State, 1630-1660,” *Journal of Modern History*, 52 (Sep. 1980): 426-451; Shapin, *A Social History of Truth*; Shapin and Christopher Lawrence, eds., *Science Incarnate: Historical Embodiments of Natural Knowledge* (Chicago and London, 1998).

