

"The Abbé de Saint-Pierre and the Emergence of the 'Quantifying Spirit' in French Enlightenment Thought"

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It is a time-honored ritual for scholars of Charles Irénée de Castel, abbé de Saint-Pierre (1658-1743) to begin their work by lamenting the anonymity into which this most interesting of eighteenth-century savants seems inevitably to fall. In 1912, Joseph Drouet proposed to “pull the abbé from oblivion,” and he began by noting the scholarly silence that separated his work from that of his scholarly predecessors, Mrs. Molinari and Goumy, who each published works on Saint-Pierre in 1857 and 1859 respectively.¹ Another four decades passed before Merle L. Perkins found a new justification for revisiting the work of Saint-Pierre. The abbé was one of the Enlightenment’s earliest and most famous theorists of international collective security, and Perkins, writing in the first decade of the post-World War II international order, found new relevance in Saint-Pierre’s thought when viewed from this perspective. Yet he too lamented the lack of attention that had been devoted to this important thinker.² Within the last two decades, both Nannerl Keohane and Thomas Kaiser have found further reason to revisit Saint-Pierre’s writings.³ The recent turn toward studying Old Regime French political culture, especially its political languages, has led each to a “rediscovery” of Saint-Pierre’s importance. But it has also led each to acknowledge what Kaiser calls the “historical terra incognita” that surrounds the abbé and his work.⁴

Saint-Pierre certainly remains remarkably understudied, and he may in fact be the most important unknown thinker of the French Enlightenment. What fame Saint-Pierre does possess, moreover, is derived from but one narrow part of an extremely varied and distinguished body of

work. The abbé’s *Projet de traité pour rendre la paix perpétuelle en Europe* (hereafter *Paix perpétuelle*) first appeared in 1713 and the book made Saint-Pierre internationally famous.⁵ It also established him as a founding member of the Enlightenment international law school today associated most famously with Immanuel Kant, who was in fact one of Saint-Pierre’s most avid and interested readers. Consequently, to judge Saint-Pierre solely on the basis of his *Paix perpétuelle* is not unwarranted. The work, as Perkins shows, was a grand summation, and it was certainly a project to which Saint-Pierre devoted a great deal of attention. It also generated significant international interest and debate.

Saint-Pierre’s theory of international governance also commands new interest today given the recent challenge to the United Nations and the wider post-war international order. Indeed, in a world which Robert Kagan has recently described as divided between Hobbesians and Kantians, Saint-Pierre’s position as a thorough-going Hobbesian who nevertheless laid the foundations for Kantian international law theory could not be more relevant.⁶ Yet to view the abbé only through the lens of international relations theory is to miss both the wider context that gave his work meaning and the polymathy of the thinker who produced it. Thus I would like to propose a more historical reason for focusing attention on Saint-Pierre, one rooted beyond his justly famous international security theories and instead in the otherwise unknown work of this unfortunately obscure savant.

Beyond the fame of his *Paix perpétuelle*, Saint-Pierre was a representative man of letters of the late seventeenth and early eighteenth century who pursued a variety of different intellectual projects simultaneously. The ten volumes of his *Ouvrages politiques* published in 1734 include an astonishing array of texts on topics ranging from Barbary piracy to the science of agriculture, and from Islam (*Mohametisme* to Saint-Pierre) to the education of women.⁷ They

reveal a man who aspired to become an erudite polymath, an identity which recent scholarship has shown was highly esteemed within the early modern Republic of Letters.⁸ They also reveal a thinker working in the mainstream of the intellectual currents of his day. Saint-Pierre’s work, therefore, is not important because of its originality; it is important, rather, because of the breadth, diversity, and vitality of his thoroughly ordinary intellectual preoccupations. For this reason, moreover, Saint-Pierre’s writings should not be mined for their path-breaking achievements or seminal innovations; they should instead be used to explore the depth and breadth of the French Enlightenment as whole.

An unfinished manuscript by Saint-Pierre currently held in the Gimon Collection at Stanford University yields fruitful results when situated in terms of the ubiquity and banality of its author’s conceptions. Entitled “Bibliomètre, ou méthode pour estimer la valeur des livres et des autres monuments humains,” the text is a representative example of Saint-Pierre’s thoroughly representative brand of Enlightenment thought.⁹ At the center of his argument, for example, is the belief that human pleasure constitutes the real foundation of any value judgment. His argument, therefore, offers an early and rich illustration of the marriage between sensationalist psychology and hedonistic morality that would become the hallmark of Enlightenment utilitarianism. In further developing his utilitarian calculus of value, Saint-Pierre also makes a point of using it to overturn traditional hierarchies, noting in one impish passage how it follows from his method that the work of the lowliest artisan is often more valuable than that of the most esteemed savant or sovereign. Here Saint-Pierre participates in the general Enlightenment redefinition of Old Regime hierarchy and in its meritocratic critique of the honor codes of the Society of Orders. More vectors of this sort could be isolated, but the overall point is

that Saint-Pierre’s “Bibliomètre” reveals how tightly his thought is intertwined with critical aspects of eighteenth-century thought.

Seeing Saint-Pierre as a thoroughly banal thinker casts light on another dimension of his thought -- the one upon which I want to focus here: his interest in numbers and quantification. John Heilbron, writing on behalf of a group of Swedish and American scholars, spoke in 1990 of a “quantifying spirit” which permeated many areas of eighteenth-century intellectual life.¹⁰ While Heilbron’s work, and that of the scholars represented in the eponymous volume which he, Tore Frängsmyr and Robin E. Rider edited, is devoted primarily to the history of the natural sciences, the “quantifying spirit” which they identified can be seen as a crucial element in the intellectual environment that influenced Saint-Pierre.

Political economy, for example, emerges into its modern form in the eighteenth century through a continual engagement with the new quantifying impulses of the period. From William Petty’s political arithmetic to Malthus’ quantitative demography and Ricardo’s “iron law of wages,” the so-called “dismal science” was born through a continual engagement with number, mathematics, and the power of quantification.¹¹ Saint-Pierre was typically at the center of these developments. He wrote extensively on Old Regime tax policy, the nature of commerce and international trade, and the foundations of agriculture and industry to name only a few of the political economy topics he explored. He also applied his particular brand of quantitative thinking to each. “Bibliomètre” illustrates this convergence as the text shifts seamlessly between discussions of literature, science, the law and taxation all in the service of an overall argument about how to correctly measure and then calculate the value of intellectual achievements.

In the following two part discussion, I will therefore use Saint-Pierre to pursue a more general exploration of the early history of the quantifying spirit in French Enlightenment

thought. First, I will discuss Saint-Pierre’s biography, situating him at the nexus of a set of intellectual, institutional, and political currents that provided the context for Saint-Pierre’s particular interest in and devotion to quantification. Second, I will discuss Saint-Pierre’s call for a new “science politique” and his efforts at answering it, situating his work alongside that of others who moved in his circles and shared many of his aspirations. Throughout, my argument will be that Saint-Pierre’s life placed him at the intersection of a set of key Enlightenment currents, especially the new Newtonian mathematical mechanics and its connections to a set of new institutional and political formations in France.

Une cabane au faubourg St. Jacques: Saint-Pierre and Mathematical Science in Paris

Saint-Pierre’s intellectual career began in 1680 when, after his father’s death in 1675, the twenty-two year old Norman took his sizeable inheritance and went to Paris to pursue his career.¹² As the second son of considerably well-off aristocratic parents, Saint-Pierre had been destined for the clergy. But once in possession of his fortune, he left the priesthood, retaining only the honorary designation of abbé, and charted a course for himself instead as a man of letters in Paris. The transfer of the royal government to Versailles in the previous decade had allowed Paris to be refocused as the capital of French culture and learning. Both the older *Académie française* and its newer sibling the *Académie royale des sciences* were meeting weekly in Paris by this date, and their physical home, the *Bibliothèque du roi*, was also beginning its transition into a modern public library. Swirling around the official academies, moreover, was a vibrant urban society devoted to learning and culture. Intellectual salons, public lecture courses, theater, music, book shops, and the fledging culture of the new cafés—each of these venues was

open to Saint-Pierre and by all accounts, including his own, he completely immersed himself in them.

At first, it was the “new science” of the seventeenth century that most attracted his attention. “My college studies having been completed,” Saint Pierre reminisced later, “I had the pleasure of passing three or four years studying physics.”¹³ “Physics” had a much broader meaning in the seventeenth century, connoting the general study of the causes of all natural phenomena, and Saint-Pierre’s studies exposed him to the full range of this discipline. At the *Jardin du roi*, another important site of Parisian intellectual sociability, he attended the anatomy lectures of M. du Verney and the chemistry lectures of M. Lemery, both members of the Royal Academy of Sciences. He also attended the Parisian “conférences de fiziques” as Saint-Pierre called them offered by Mr. De Launay and the abbé Bourdelot.

De Launay’s gatherings were more intimate and erudite, befitting their location in what was once the library of the famous Cabinet du Puy. Here Saint-Pierre honed his skills as a learned conversationalist while being exposed to the philosophy of Gassendi which was Launay’s trademark. The self-proclaimed “academy” of abbé Bourdelot was quite different. Founded in the 1660s by the Prince de Condé, Bourdelot hosted a weekly gathering of savants in his Parisian home, in effect creating one of the most important scientific institutions of the period. Its audience, which on one occasion was estimated at over 400 persons, included three classes of participants: listeners (the vast majority), occasional speakers, and active savants who constituted the core membership of the group. The latter were invited to dine with their host after the session, and these dinners were but one part of Bourdelot’s work as master of ceremonies, intellectual director, and all-purpose impresario of the entire enterprise.¹⁴

Unlike Launay, Bourdelot self-consciously eschewed any commitment to a single philosophical viewpoint. Instead, his academy, in the words of Harcourt Brown, was “a free college of all the talents, an entertainment as well as a means of acquiring and displaying facile erudition.”¹⁵ As facile as they may appear today, gatherings like Bourdelot’s were crucial training grounds for young intellectuals like Saint-Pierre. As he noted himself, countries like France had no established system of post-graduate education in the sciences, and thus after college the aspiring savant depended on gatherings like Bourdelot’s to acquire the formation necessary to move into the ranks of the intellectual elite.¹⁶ Furthermore, even if they look today like a confusing combination of serious learning and elite entertainment, Bourdelot’s gatherings were actually representative of the new institutions that fostered the birth of modern science. Esteemed savants such as Christian Huygens and Leibniz (who resided in Paris in the 1670s) were regular members, as were more than half of the academicians of the Royal Academy of Sciences founded in 1666. For a young man like Saint-Pierre, access to minds such as these and their discussions—the discussions that literally defined serious science in this period—was invaluable.¹⁷

Saint-Pierre also pursued an aggressive program of individual reading and study. This included reading not only the leading books of the day, which were easily accessible at the numerous Parisian bookshops, but also the discourse about them found in the new learned periodicals which began to appear in the 1670s and 80s. He also availed himself of his personal ties to other savants in the city, and it is here that his more precise ties to the mathematical sciences were formed. Among the savants that Saint-Pierre consulted during these years was the distinguished philosopher Malebranche. The Oratorian father’s 1674-5 *Recherche de la vérité* had established him as one of the leading, and controversial, thinkers of the day, and Saint-Pierre

mentions reading Malebranche’s work during these years and then meeting with him to “express some objections to certain parts.” He goes on to mention that he also had several “comrades” with which he would “walk and dispute on these matters,” and these reminiscences offer a suggestive window upon Saint-Pierre’s entrée into the precise intellectual circles that would be most formative for him.¹⁸

Malebranche’s *Recherche*, the third and expanded 1678 edition of which Saint-Pierre read in the 1680s, was a characteristically Baroque treatise in its topical sweep and eclectic erudition. Yet among its many arguments was a presentation of natural philosophy rooted deeply in the new mathematical thought of the seventeenth century, especially the new analytics of Descartes, Pascal, and Fermat. Drawing out the prevalence of this mathematical thought in Malebranche’s thought, one scholar has even gone so far as to suggest number as the core idea that unifies all of his philosophy.¹⁹ Be that as it may, it is clear that Malebranche’s philosophy was steeped in the newest mathematics of the period, and that any student of it would have been exposed to these ideas as well. Based on his interest in mathematics and on his notoriety more generally, Malebranche also played a crucial role in bringing together a circle of French thinkers at the cutting edge of seventeenth-century mathematics.²⁰ How closely Saint-Pierre was associated with the actual work of the “Malebranche Circle” is not clear, but what is certain is that he was intimately connected with two of its most important and influential members.

Both shared with Saint-Pierre ties to Normandy, and especially to its premiere Jesuit school, the *Collège de Caen*.²¹ The first, Pierre Varignon, was Saint-Pierre’s classmate at Caen even though each came from a very different place in Norman society. Varignon and Saint-Pierre first met in the classroom where they became allies in their increasing disillusionment with the clerical careers they were pursuing. They quickly became roommates, and when Saint-Pierre

received his inheritance, he used a portion of it to endow a trust for Varignon suitable to sustain a modest living. Their friendship thus cemented, the two men then moved together to Paris in 1680, renting a modest townhome in the Faubourg St. Jacques which they shared with another aspiring savant from Normandy, Vertot. Once installed, the three young Normans then set about making their fortunes.²²

The original union between Saint-Pierre and Varignon had been forged within the intellectual disputation characteristic of the Jesuit classroom, and once in Paris, their disputations continued, now strengthened by the intellectual sociability into which each immersed himself. While Saint-Pierre began to pursue the many and varied intellectual interests that would characterize his work throughout his lifetime, Varignon likewise initiated his own life-long career path by focusing his energies instead on a single topic: advanced mathematics.²³ In 1687, after years of intense, single-minded work, Varignon published the fruits of his labor: a treatise on mechanics that was received with great acclaim. Along with notoriety, the book also earned Varignon two important positions: an appointment into a new mathematics chair at the *Collège Mazarin* and a seat in the Royal Academy of Sciences.

Varignon’s new status after 1687 as one of the leading mathematicians in France brought him into contact with others, including the Marquis de l’Hôpital who was beginning to devote himself full-time to the study of mathematics. Both men began to correspond with Johann Bernoulli in Basel, arguably the leading European mathematician of the day. During these years, Leibniz’s new differential calculus was the hot mathematical topic, and through continual collaboration, conversation, and contestation Varignon, l’Hôpital, Bernoulli and Leibniz began to develop and extend the power of the new analytical mathematics. Malebranche, who had helped to steer l’Hôpital into advanced mathematical work, also assumed his role during these years as a

unifying figure for the group.²⁴ Thus, as the 1690s opened, the “Malebranche Circle” began to serve as both the gathering point for the leading mathematicians in Paris and as the central mechanism for the reception and diffusion of the new differential calculus into French science.

An expansion of the Royal Academy of Sciences in 1699 created seats for Malebranche and other circle members, and soon Varignon and l’Hôpital started to assume leadership positions within the newly reformed institution. In this way, the “Malebranche Circle” became after 1700 not only the leading site of advanced mathematical thinking in France, but also a site of some of the leading scientific thinking *tout court*. The stage was thus set for the arrival after 1687 of Newton’s *Principia* and the new mathematical mechanics that it offered.²⁵

There is no evidence that Saint-Pierre was a member of the “Malebranche Circle,” or even that he had sufficient mathematical knowledge to participate as a peer in Varignon’s work. In fact, most evidence suggests that he did not. What is clear, however, is that the two men were intense intellectual companions, passing hours in discussion and dispute whenever Saint-Pierre could drag Varignon away from his calculations. Varignon was probably the principle “comrade in disputation” to whom Saint-Pierre referred when he reminisced about his life during these years, and the new analytical mathematics of the 1680s and 90s was a key part of this conversational mix.

Varignon’s work and that of the Malebranche Circle became an important part of French science in this period and even an important part of the wider intellectual culture of France as whole. Indeed, in 1696 the *mondain* periodical the *Mercure galant* attested to the wide interest in the new calculus by declaring that “today mathematics is very fashionable (*tres à la mode*), especially with women.”²⁶ During these years, “Malebranche Circle” member and Varignon protégé in the royal academy Louis Carré also began to earn his title as “mathematician of the

ladies” by offering private lessons to elite women interested in sampling the new science of infinitesimals.²⁷ Saint-Pierre was an active participant in the wider sites of sociability where this vogue for advanced analytical mathematics was most evident and he also shared intimately in it by living closely with one of its leading luminaries. His singularly rich engagement with the practices, assumptions, and intellectual agendas of late-seventeenth-century mathematics was, therefore, a key component in his intellectual development.

His intellectual formation was further rounded out by his intimate connection with another Norman during these years, Bernard le Bovier de Fontenelle.²⁸ Fontenelle had crossed paths with both Varignon and Saint-Pierre at the *Collège de Caen*, and departing for Paris a few years earlier than the others at the age of nineteen, he was already becoming an established man of letters when his two friends arrived in 1680. In his eulogy of Varignon, Fontenelle offered intimate reflections about his time spent at the *cabane* of Saint-Pierre, Varignon, and Vertot. He was in many respects a fourth roommate of the trio even if he maintained a residence of his own during these years. He also circulated in the same Parisian scientific circles as Saint-Pierre, and his 1686 *Entretiens sur la pluralité des mondes* which made him ever after famous was in many respects a celebration of the mixed-sex scientific sociability that was prevalent in the city during these years. Based on this work and his other writings, Fontenelle entered the *Académie française* in 1691, but more importantly for this discussion he also entered the academy of sciences in 1697 becoming its second Perpetual Secretary.²⁹

The Perpetual Secretary was not like the other academicians in that his primary function was to record and publicize the work of the other members, a role that was intensified after 1699 when a reform created the new duties of writing an annual history and reading eulogies at the newly instituted twice-annual public assemblies. Fontenelle was clearly well suited to these

public tasks, performing them with great distinction throughout his forty-year tenure as academy secretary. But he was also a producer of original scientific work even if these efforts pale in comparison to his work as a writer of plays, poems, and literary works or his efforts as the public spokesperson for the royal academy. Interestingly, the precise scientific topic that attracted his focused intellectual attention was the new analytical mathematics. Fontenelle spent his lifetime studying the new calculus, and his work culminated in a 1727 treatise entitled *Eléments de la géometrie de l’infini*. He too had close ties to the “MalebrancheCircle,” writing the “Preface” to l’Hôpital’s pioneering 1696 treatise on the infinitesimal calculus *L’Analyse des infinimens petits*. In his role as historian of the academy he also used his pen to offer a detailed, year by year account of their work. He also used his tremendous rhetorical gifts to advocate for advanced mathematics before the public at large. Saint-Pierre was again at close hand during these and all of Fontenelle’s other intellectual endeavors, and the influence on his own thought and work was unmistakable.³⁰

In the wake of the new mathematical interests of his Norman comrades, however, Saint-Pierre chose neither to pursue a career in mathematics like Varignon, nor even a career which made mathematical work a significant part of a diverse set of intellectual practices like Fontenelle. Instead, he charted his own course while nevertheless carrying the legacy of his mathematical encounters with him. When Varignon’s appointment earned him lodging at the *Collège Mazarin* in 1687, the “cradle of the eighteenth-century” as one scholar has called the *cabane* in the Faubourg St. Jacques was abandoned.³¹ Vertot went his own way, becoming a leading scholar of antiquities and a member of *Académie royale des Inscription et Belles-lettres*, while Saint-Pierre looked elsewhere for opportunities.

Most important was his turn away from Paris and toward Versailles during these years, a turn which grew out of the abbé’s increasing interest in politics. When in Paris, Saint-Pierre remained active in Parisian society, joining Fontenelle as a leading member of the salon of Madame Lambert and earning a seat in the *Académie française* in 1694 thanks largely to their connections.³² Increasingly, however, his attentions were focused on the activities of the royal state. In 1692 he purchased a plumb tutoring position with “Madame,” the sister-in-law of the King, and the mother of the future Regent Louis Philippe d’Orleans. This position was largely a sinecure, but for Saint-Pierre it was a tremendous opportunity. It gave him a reason to reside full-time at Versailles and to pursue what would become his most serious vocation: the study of politics.

Installed at court, the abbé was able to form contacts with the leading political figures of the day, including those like Marshall Vauban who shared his interest in science and mathematics. Saint-Pierre described Vauban as “un esprit ferme et solide,” and he noted at the time that he loved to “listen to [Vauban] reason about his *métier*.”³³ Mathematics and science helped to cement this bond. Saint-Pierre also began to climb within the ranks of the administrative monarchy, buying and selling offices or accepting appointments as circumstances warranted, all in a quest to place himself in the life of the French crown. His efforts were largely successful, or at least as successful as administrative self-fashioning could be within the privilege-bound world of the Old Regime. In this way, he equipped himself with a deep understanding of how royal politics worked.

In this climate, Saint-Pierre began to lay the foundation for what would be his most intense intellectual project, the creation of what he called a new “science politique” rooted in the

application of the reasoned methods of the natural sciences to the practices of statecraft. As he described the change of direction at the time:

After spending three or four years studying physics, I read the *Pensées* of M. Pascal. Afterwards I understood that the progress I could make in studying morality would be more useful in increasing my well-being and that of the others with which I lived. Thus I gave up the study of physics and began to study and meditate upon morality. ... After various readings, however, ... I perceived that the well-being increases or decreases most dramatically with respect to laws. ... It was this realization that led me to apply myself to the study of government. ... The reflection returned again and again to my mind, and it persuaded me that moral science is not the most important for the well-being of men. Instead, it is politics or the science of government since a wise law can render incomparably more people happy than a hundred good moral treatises. Therefore, with the goal of becoming more useful to society, I abandoned the study of morality for the study of politics.³⁴

The move from the scientific training of his twenties to the new political science of his thirties was a natural one for Saint-Pierre, and the science which he created bore the deep traces of his earlier experiences, especially his connections to advanced mathematics.

Quantification in Saint-Pierre’s *Science Politique*

Three themes dominate Saint-Pierre’s political science-- information, circulation, and quantitative calculation. Each was a product of the abbé’s formative experiences in Paris in the final decades of the seventeenth century, especially his dual encounter with the new natural sciences of the period and the new practices of administrative monarchy. The imperative toward information in Saint-Pierre’s thinking derived from his appreciation of the role of direct observation and empirical facts in the new physical science of the seventeenth century. The emphasis upon circulation, especially the public dissemination and discussion of political knowledge, likewise derived from Saint-Pierre’s experiences within the new culture of public scientific practice characteristic of the same period. Finally, the bias toward quantification and the belief that a true political science would result in a rational calculus of political decision-

making emerges directly out of Saint-Pierre’s encounters with the new analytical mathematics of the period.

The integration of these three themes is evident in a characteristic speculative *projet* published in his *Ouvrages politiques*. In it, Saint-Pierre proposes the creation of a class of paid *Analistes* whose job it will be to “conserve for posterity authentic and richly detailed (*bien circonstancié*) annals of all the principal events that happen during the reign of our kings.”³⁵ He imagines six such *Analistes* each paid a pension of two thousand livres annually. He further imagines them being chosen and supervised by a new *Académie politique* which he links to a number of his speculative projects of reform. The goal of both is the improvement of the knowledge upon which the king and his ministers conduct the business of state. As Saint-Pierre writes:

Up until now the state has employed no such *Analistes*, and it is thus only by chance that we have any ancient annals at all. Even these were badly composed by monks who were very ignorant and unformed about public affairs. These annals possess no exact understanding of the facts, the causes of events, circumstances, or the esteem owed to the talents, ambitions, and actions of princes and their ministers. ... This negligence by the state in the establishment of a sufficient number of well-informed and properly equipped *Analistes* marks well the ignorance, the hardheadedness, and the lack of prudence of our ancestors ... It is high time that we began to leave this barbarism behind by adding to our administration (*police*) an establishment that will cost very little while at the same time being very useful and agreeable to our posterity.³⁶

Saint-Pierre’s project, and especially the language of its presentation, reveals his immersion in the discourses of the seventeenth-century Scientific Revolution. Like Francis Bacon, a figure which the abbé helped to canonize in France as a founding figure of modern science,³⁷ Saint-Pierre thinks of government as a science rooted in judgments about empirical facts. He also looks with suspicion on the religiously laden structures of knowledge that for centuries have blinded thinkers from seeing these fundamental truths. Bacon spoke of the need

for a revolution whereby the reign of priests and superstition would be replaced by the reign of science and facts. Here Saint-Pierre frames his own approach to political science in similar terms, calling for an escape from ignorance and barbarism and movement into Enlightenment. Key to this revolution for him is a new imperative toward attentive observation, disciplined record-keeping, and scrupulous restraint from speculation. Baconian science was insistent that the production of reliable knowledge depended first and foremost on the prior production of a reliable archive of facts, and Saint-Pierre likewise conceives of his political science as built upon the same foundation.

By framing the epistemology of his political science in these terms, Saint-Pierre was echoing the larger epistemological assumptions of the new empirical physics. He was also following in the footsteps of a previous generation of political thinkers who had likewise seen in Baconianism a new framework for modernizing the practice of statecraft. In France, the ministry of Jean-Baptiste Colbert which began in 1661 was noteworthy for its attempt to make fact-gathering a fundamental practice of state. It was Colbert who sponsored the creation of the Royal Academy of Sciences in 1666, and even if the institution was never the pure corps of utilitarian state servants that the minister hoped for, it was an important cog in the minister’s practice of scientific statecraft. The Royal Observatory founded in 1673 was similarly conceived to foster the accumulation of utilitarian astronomical data for such state projects as navigation, map-making, and civil engineering projects like roads, canals, and bridges. Other Colbertian projects, such as his new population censuses or his attempts to rationally scrutinize the fiscal and legal systems, also speak to his interest in reforming monarchy through a reorientation toward the accumulation and application of scientific facts.³⁸

Colbertism is important for Saint-Pierre because the former represents the maturation of a newly scientific approach to royal administration that the abbé carried on in his own work. By the 1690s, the Colbertian conception of administrative monarchy had become a powerful force within the French monarchy, so much so that when Saint-Pierre circulated in the intellectual society of Paris or navigated the royal court of Versailles he found himself among a growing number of like-minded colleagues both inside and outside of the state who shared with him this scientific understanding of statecraft. The ascendancy of the Phelypeaux de Pontchartrain family to ministerial prominence after the death of Louvois in 1691 further marked a revival of the original Colbertian agendas. First under Louis de Pontchartrain, and then under his son Jérôme after Louis's appointment as chancellor in 1699, the old Colbertian institutions of the the *Maison du roi* (i.e. the academies, the royal library, the newly public Louvre), the navy, and the fiscal apparatus of the Controller-General's office (i.e. the intendants, the royal manufacturies, the trading companies, and roads and bridges) were reinvigorated. New censuses were proposed, the royal trading companies and manufacturies were reformed, colonial initiatives were revisited, and the entire fiscal system of France was scrutinized anew. At the core of each of these enterprises was a new imperative toward the gathering of empirical, scientific information in the spirit of Colbert. The state organs of information collecting, especially the academies, were reinvigorated by these impulses as well. Saint-Pierre was at the center of these developments, and his political science was both a participant in and a reflection upon these neo-Colbertian administrative currents.³⁹

Informed by these wider developments, scientific information became for Saint-Pierre the essential building material of his political science. However, if information was the raw material, its rational management and wide circulation was the architecture that put this building material

to work. Especially important was the role of the public as both an authoritative judge and target audience for Saint-Pierre’s new political science.⁴⁰ Here again the abbé’s exposure to the intersecting practices of scientific sociability and administrative monarchy after 1680 provided the crucial context for his thought.

At the center of Saint-Pierre’s various reform projects, including the plan for a new class of state-supported *Analistes*, was a new role for academies and other public institutions in the production, circulation, and adjudication of political knowledge. His new *Académie politique*, which Saint-Pierre conceived as something like an all-powerful information ministry, was crucial to this vision. This institution would choose the official *Analistes* and administer their information gathering and archiving. But this was only one part of a much larger set of responsibilities which Saint-Pierre imagined for this new body. In another set of reform tracts published in his *Ouvrages politiques*, the abbé discusses how the existing academies of letters and the sciences can be improved. His solution for each is to make them satellites of the central *Académie politique* and to make the latter the supervising center of the entire academy system.⁴¹

In the case of the *Académie française*, the parent institution would administer admission to the body, choosing *gens de lettres* who were committed to what for Saint-Pierre were the three principle objectives of a literary academy: the study of correct diction, grammar and orthography; the scholarly exploration of monuments, medals, and inscriptions; and the development of rhetorical tools which instill morals and inspire great deeds. In short, the production of accurate dictionaries and grammars, antiquarian scholarship, and morally-driven history. To foster this work Saint-Pierre imagined reorganizing the existing institution into three *bureaux* devoted to each of these projects. Guiding each would be an imperative toward serving the public interest through the production of utilitarian knowledge.⁴²

A newly reformed academy of sciences would share in this effort. Just as the new *Académie des Bon Ecrivains*, as Saint-Pierre called his reformed *Académie française*, would be forced to let go of its attachments to frivolous pleasure and distracting literary diversion, the newly reformed academy of sciences would likewise be required to let go of its attachment to theoretical speculation. Instead, it would devote itself to the production of “useful knowledge which improves the well-being of the citizens.”⁴³ The central *Académie politique* would determine what work was in the interests of society as a whole, and the academies would then perform it. It would also administer a widespread program of information dissemination through the management of a set of journals for scholarly discussion and gazettes for the circulation of news.⁴⁴ Since the current education system was failing in its role as a producer of citizens equipped to participate in this new public system of knowledge, the *Académie politique* would also institute a set of public conferences designed to train citizens in these new knowledge-making practices.

At the top of Saint-Pierre’s agenda was the creation of a set of public physics courses centered at the *Bibliothèque du roi* but managed through the academy of sciences. These institutions would recreate Saint-Pierre’s own entrance into the scientific culture of the period by offering public access to the kind of scientific sociability he experienced as a young man.⁴⁵ They would be joined by the creation of still more specialized institutions of knowledge such as an academy of medicine and separate academies for the military and naval sciences. Like the public physics courses, these specialized academies would help train the public in disciplines useful to society as a whole.⁴⁶ Each would also be linked to reforms in the administration of the state which would allow the information produced by these new academies to flow in and out of the monarchy with greater ease. In the end, the overall goal was to provide the public with the

knowledge necessary to make each citizen a more active participant in political life while at the same time making each state administrator a more knowledgeable and rational decision-maker.

All of the speculations discussed above were presented by Saint-Pierre within a larger discussion of how to improve the interior administration of the state as whole. They thus reveal the interpenetration of his views about appropriate scientific practice with those about appropriate governmental practice. Once again the 1690s proved to be an important context for Saint-Pierre’s thought in this regard. In many respects his speculations read like a blue-print, albeit a hopelessly utopian and ambitious one, for a number of reforms which the Pontchartrain administration actually attempted after 1691. The history of these ministerial reforms illustrates well the ties that bound Saint-Pierre’s political science to the administrative-scientific milieu that formed it.

Like Saint-Pierre, Louis de Pontchartrain, and even more so his son Jérôme, saw the production and circulation of scientific knowledge as a crucial mechanism in the functioning of a well-ordered state. Consequently, from the moment they assumed ministerial power they began to enact changes in the knowledge circulation structures of the French crown. The changes at the royal academy of sciences were most pronounced. In 1691, the academy of sciences remained a relatively closed body of about a dozen polymaths and *érudits* with few formal connections to the wider public of science. Some academicians circulated outside the institution in venues such as the academy of abbé Bourdelot. Others maintained active correspondence networks with savants within the wider Republic of Letters. Still others pursued private publication initiatives through the press and the learned periodicals. But the institution itself had no formal publicity organs, nor was it oriented toward the wider public in the manner of its great sibling the Royal Society of London. The Pontchartrains changed that.

As early as 1692, the ministers ordered the academy to begin publishing monthly reports of its activities. They also instituted a royally-sponsored periodical to serve as the vehicle for these efforts.⁴⁷ These reports ultimately proved too burdensome, but by 1700 the academy had its own annual publication—the *Histoire et Memoires de l’Academie royale des sciences*—as well as a new set of regulations that required academicians to in effect “publish or perish.” The official French *Journal des savants*, which had been instituted by Colbert in 1666 to act as an organ for such dissemination, was also reformed in these years as well. Further attached to these initiatives was a new imperative that the academy better serve the utilitarian interests of the state. Alongside the classical *érudits* that had dominated the early academy, the reform of 1699 added a new class of *mécaniciens* who were chosen because of their skill in the applied sciences, especially those with utilitarian promise for the state. The Pontchartrains also used the occasion to revive a dormant project of Colbert, the production of a set of volumes rationally describing the methods of production in a number of key industries. This project was turned over to the new *mécaniciens* of the academy thus cementing a direct link between the scientific institution and the agendas of administrative monarchy.⁴⁸

1699 also brought an expansion in the number of academicians and the creation of a new set of official protocols governing elections, academic titles, pensions, and decorum. The result was an academy that was bigger, more rationally administered, and more directly linked to the administrative state than before. It also created a more public academy since the reform instituted not only the new annual publication requirements but a further requirement that academicians maintain connections with the wider public of science. Formalizing the latter, it instituted a ritual of twice annual public assemblies where the academy invited the public at large to witness its work. Part public relations effort and part cooptation of the public sociability that had

characterized Bourdelot’s academy, the new public assemblies were but one part of a broad effort by the Pontchartrains to modernize the absolutist monarchy through the public circulation of information. Comparable publicizing efforts were undertaken at the other established academies during these years, and they were joined by other initiatives within the state, such as the creation of a new *Bureau du Commerce* in 1701 which linked royal ministers with the merchant community in what one historian has called a new “public information network.”⁴⁹ Saint-Pierre was close to the ministers that advocated for these changes and his political science reads often as the mission statement for their efforts.

The 1699 academy reform also affected Saint-Pierre in an intimate way since it was these changes that brought his friend Fontenelle into a new position of public prominence as master of ceremonies for the new public academy. It also brought Malebranche and many of his circle into the academy for the first time, while giving these mathematicians a new set of public vehicles for the articulation and dissemination of their mathematical views.

Commanded by the new regulations to declare a future program of research and publication, Varignon announced in 1699 that he would pursue the development of a new science of motion. In the second of the new public assemblies held in the spring of 1700, he presented his early work, a paper which applied the Leibnizian calculus to a set of mechanical problems posed in Newton’s *Principia mathematica* of 1687. Newton’s work had crossed the channel soon after its publication, and it attracted great attention within the Malebranche circle because of the new applications for advanced mathematics in the practice of mechanics which it suggested. In the early monthly academy reports of 1691 and 1692, both l’Hôpital and Varignon had begun working through the implications of applying Leibniz’s calculus to Newton’s mechanical principles, and the result was the creation of a new science—analytical mechanics—

which would engage some of France’s leading scientific lights-- Clairaut, Maupertuis, d’Alembert, Condorcet, Lagrange, and Laplace to name only the most distinguished— throughout the next century.⁵⁰ From the perspective of Saint-Pierre, what is important about the new science is how it became entangled from its inception with the alliance between sociable scientific practice and administrative monarchy that had been forming for some decades. It was in this entanglement that Saint-Pierre’s particular conception of quantified political science took shape.

The new analytical mechanics was rooted essentially in the practice of thinking about the motion of moving bodies through the mathematical concept of number. Mechanics prior to the invention of analytical mechanics had conceived of motion in terms of the geometrical conception of magnitude. Descartes analytical geometry developed in the 1630s, however, offered a new framework by translating the spatial magnitudes of geometry into the numerical coordinates of algebraic analysis. Leibniz’s calculus extended the power of analytical geometry by developing tools for dealing with one its most vexing features, the problem of continuity, especially the continuity of curvilinear motion. Equipped with differential calculus, mathematicians could treat physical phenomena like the fall of bodies or the movement of the planets in terms of algebraic equations, and the result was a powerful new approach to mechanics. Newton’s *Principia* exploited the potential of these new approaches in the development of a provocative new system of the world, but he oddly avoided using the new calculus in his work even though he had invented his own equivalent at roughly the same time as Leibniz. Newton thus seemed to leave the door open to a new set of scientific possibilities which he did not seem interested in pursuing. Instead, from the 1690s onward, the members of the

Malebranche circle, guided by l’Hôpital and Varignon, began to systematically explore the new science of analytical mechanics suggested by Newton’s work.

A detailed history of analytical mechanics in France is not necessary for understanding Saint-Pierre’s political science.⁵¹ Instead, the general features which shaped his quantitative approach to political science can be isolated. The emphasis upon number, while apparently obvious, is in fact the most significant. The early efforts by Colbert and others to amass “statistics,” or state information, had of course been rooted in an epistemological belief in the value of empirical, scientific fact gathering. But these efforts were not necessarily rooted in a conception of quantitative data collection or in an epistemological belief that number and mathematics were powerful tools for satisfying these utilitarian agendas. When asked to do a new census of their region, for example, as royal *intendants* were often asked to do under Colbert, many responded by giving narrative accounts which highlighted the natural features of the region, its people, and customs along with discursive presentations of the region’s major resources, industries, and agricultural products. In presenting the empirical features of France in this non-quantitative way, moreover, the *intendants* were on the whole fulfilling the expectations of the ministers in charge of these initiatives.⁵²

As the seventeenth century waned, however, a new interest in quantification began to take hold within the fledgling world of statistics. The pioneering work of William Petty in this regard has been well documented, and his “political arithmetic” as he called it did circulate in France and exert an influence on people like Saint-Pierre. But France also had its own indigenous tradition of quantitative statistical science even if it has not been as thoroughly studied. The historical obscurity of French quantitative statistics stems largely from the fact that the practitioners were rarely book-writing savants but instead royal administrators serving in the

anonymous world of the state bureaucracy.⁵³ Marshall Vauban’s status as a favored aristocrat under Louis XIV gave him the leisure and the political access necessary to produce serious works of statistical science, and for this reason he often figures in accounts of the early history of mathematical statistics.⁵⁴ Yet Vauban’s quantitative statistics, which he began to develop in the late 1680s, was not unique but merely the most visible product of a much larger fusion of administrative monarchy with the new mathematical science in France during the final decade of the seventeenth century. Vauban was closely associated with the Pontchartrains, serving in some measure as Jérôme de Pontchartrain’s political tutor. Moreover, given their shared intellectual outlook, their alliance helped shape the ministry’s own turn toward quantified state science at this time as well. Saint-Pierre also identified with Vauban and through the abbé as well the marshall further shaped the political-mathematical thinking of the period.

Saint-Pierre’s turn toward number and quantification in his political science was thus overdetermined by the political and scientific currents of the time. The new analytical mechanics of Varignon, however, was about more than just the collection and manipulation of quantitative data, and here Saint-Pierre’s more precise approach to quantitative science can also be seen as a product of his specific intellectual network. What Varignon and his colleagues appreciated, over and beyond the mere ability of number to represent empirical phenomena, was the way that mathematical laws derived from the practice of analytical mathematics could provide stunningly powerful accounts of observed natural phenomena. In the case of planetary motion, for example, Newton showed that by treating planetary bodies according to a precise set of mathematical relations, their behavior could be predicted with a precision that was heretofore impossible to achieve. In making the move to this more mathematized approach to physics, questions about why the planets moved in this particular way, or explanations of what physical factors caused

this of all possible motions became less important than the project of finding the mathematical relations that could account for the phenomena with the greatest possible precision. In this way, French analytical mechanics pioneered a highly mathematized approach to physical science that made quantitative prediction a basis for scientific explanation.

For Saint-Pierre and others like him, this success offered a powerful model to contemplate. Did other phenomena, such as those that pertained to social and political life, admit of the same quantitative regularities? And if so, could one conceive of a political science that would embrace the same mathematized approach to empirical investigation that Varignon and others had shown to be powerful in the construction of analytical mechanics? Petty laid the foundation for such a science by showing that “number” could serve as a representation for political and social phenomena. But he did not show how the relations between these numbers could be used to construct a predictive calculus of economic and political phenomena comparable to analytical Newtonian mechanics. Equipped with an appreciation of the methods of the latter, Saint-Pierre stepped into this breach developing a political science which attempted to actualize these quantitative agendas.

Saint-Pierre of course did not have the mathematical training to become a true innovator in this area. Instead it was other mathematicians closer to the new analytical mathematics itself—figures like Jean and Daniel Bernoulli or Pierre De Moivre—that developed the quantitative tools in probability theory and statistical analysis that made Saint-Pierre’s political science possible.⁵⁵ Pierre Rémond de Montmor, another Malebranche circle member and a royal academician with close ties to Fontenelle, Saint-Pierre and their circle, was at the center of these mathematical efforts.⁵⁶ His 1708 *Essay d’analyse sur les jeux de hazard* was, as its title suggests, a work in the theory of probability rooted primarily in games of chance. But in conception and

motivation it was also directed toward the new fusion between scientific quantification and administrative monarchy that was growing in importance in France. He noted the larger issues in his opening “Avertissement,” celebrating the “marvelous alliance made over the last fifty years between mathematics and physics.” “They have forced men to recognize that mathematics is not without foundation. What glory for this science if it could further serve to regulate the judgments and the conduct of men in the practice of their daily lives.”⁵⁷ Montmor believed that the mathematical tools for such decision-making were available, and his book offered a synthesis of contemporary works on calculating outcomes in the face of uncertainty. He further went on to sketch how these tools could be applied to economic, political and moral thinking.

The daily life of humans, Montmor reasoned, is just like that of the gambler.⁵⁸ Consequently, as he explained through a comparison to an obscure eighteenth-century game of chance, “the same method that [game players use to determine what course of action to take] could be employed, although with more difficulty, in determining when in the course of daily life it is necessary to sacrifice a small good in the hope of achieving a bigger good later on.”⁵⁹ In other words, analytical mathematics offered tools for a precise scientific calculus of political and moral action. Montmor further offered the routine profit calculations of Dutch and English merchants as another illustration of this practice of calculating future returns in the face of uncertainty. Adding a scientific cache to these efforts, he also cited the work of Petty and the astronomer Edmund Halley, famous for his prediction of comet regularities, whose article about the calculation of life insurance annuities (*rentes viagères*) based on mortality rates was published in the *Philosophical Transactions of the Royal Society of London* and was widely discussed in France.⁶⁰

Montmor thus made significant gestures toward applying the new analytical mechanics in the “dissipation of the clouds which seem to obscure civil life.” Yet he stopped short of fully developing these applications, saying only that they are beyond the scope of his expertise.

Instead, the author concluded with the following declaration

Mathematical analysis (*l'Analyse*) is an instrument that can be applied to everything when one knows how to use it. All truths are tied to one another, and when one applies oneself a bit to learning the exact notions of number and extension which we now possess, they can be applied with great success toward the less exact understandings that are the objects of our mind. ... Questions of economics, politics, and morality just like questions of gambling can [thus] be resolved using the same ... rules. It is certain that treated with care many subjects of politics and morality can be treated with the same exactitude as mathematical truths.⁶¹

Montmor's conviction here bespeaks his close ties to Malebranche and the analytical mathematicians of his circle. While focusing more on the raw facts of experience, especially the experience of political and social life, Saint-Pierre's political science articulates the same convictions. It also goes one step further than Montmor in attempting to apply the spirit of the new analysis to the construction of a set of explicitly quantitative political and economic arguments.

Several of the works in his *Ouvrages politiques* point to this emphasis upon quantification, and one, “Sur l'utilité des dénombrements,” opens up the general frameworks within which the rest operate.⁶² Most interesting is Saint-Pierre's attempt to use quantitative data to understand long-term processes of social change. The work begins with a 1682 census of Paris conducted by Colbert, one of the earliest attempts at a truly quantitative measure of the city's population. The census estimates the population at eight hundred thousand people, and Saint-Pierre begins his work by employing this number in a speculative calculation of population trends over time. What contributes to the increase or decrease in population? Here he tries to further quantify the effects of natural mortality, wars, famines and other factors on long-term

population trends. Using Paris as the base measure, he then tries to extrapolate French, European, and world population trends by the same calculation. By his reckoning, France rivals England and Holland (taken together) as the most populous nation in Europe (20 million inhabitants) while Asia overall has double the population of Europe (360 million people) and Africa and America the same number of people (180 million). These numbers are obviously crude and imprecise, but Saint-Pierre’s achievement should be judged less in terms of its empirical accuracy than according to his beginning attempt to identify and quantify a set of natural social processes at work.

Having calculated these numbers, he then spends the rest of the article exploring the implications of these calculations. He concludes, for example, that the Egyptians and the Assyrians were mistaken about the age of the earth since his population numbers indicate a very different timetable of world history. He also continues into a set of speculations about the future growth of population and the factors that shape it, citing the example of long-term celestial mechanics and noting how astronomers can calculate these trends and predict the ultimate outcomes.⁶³ Concluding, he argues that increasing population is a key factor in the improvement of society, and that calculating that improvement is an important role for a utilitarian science of government to play. Citing Halley’s work, he ends by advocating the creation of a *Bureau des Dénombrements*, to be attached of course to the *Académie politique*, that would perform this important quantitative, demographic work.

Two aspects of Saint-Pierre’s approach here are most important. Beyond the simple attempt to use numbers to capture social phenomena is the conception of social realities like population as constituted within dynamic social processes that are susceptible to advanced mathematical analysis. This is where Saint-Pierre shows his greatest debt to the analytical

mechanics of Varignon and his colleagues. Like Saint-Pierre, Varignon had begun by conceiving of celestial mechanics in terms of a series of quantified data points. His celestial mechanics then involved the development of mathematical equations that could account for and predict the motions of the planets. Achieving this end required ignoring the moment by moment details of instantaneous change and instead examining change over time with an eye toward the quantitative patterns that were revealed. The claim of such an approach was that a new predictability was possible through the power of analytical mathematics to capture the underlying complexity of natural processes. Montmor had argued that humans will forever be ignorant of the actual processes that bring about the outcomes we see. But, he added, analytical mathematics offers the power to predict these outcomes, despite our ignorance, with a high degree of certainty. In the same way, Saint-Pierre offers quantitative demography as a tool for gaining control over the mysterious forces that shape society and politics.

In many of Saint-Pierre’s other political and economic writings this same approach is applied in a more concrete way. In an essay entitled “Sur le Ministère des finances,” for example, Saint-Pierre writes: “My design in these essays is to gather a set of general observations that I have made about the collection of taxes, the payment of annual ordinary subsidies, and the extraordinary subsidies in order to redistribute these with the greatest balance, and levy them with the least cost possible so as to avoid the mistakes of their administration.”⁶⁴ A typically quantitative discussion of fiscal flows follows. Similarly, in a fascinating discussion of the bread economy which precedes by many decades the work of the physiocrats, the abbé attempts to reduce the production and distribution of bread to a set of quantified data points (among them the quantity of wheat and flour needed, the cost of transportation and labor, the cost of fire wood, etc.). He then constructs a set of mathematical arguments from this data,

which, if followed, would assure the avoidance of famine.⁶⁵ In each of these cases, Saint-Pierre uses quantified empirical observation to calculate the complex flows of otherwise mysterious political and economic processes. He performs these calculations, moreover, within an argument that claims exceptional utilitarian value for the knowledge produced in this manner. His other writings on tax policy, on tariffs and trade policy, on poor relief, legal reform, and other social welfare concerns also reveal a similar interest. Taken as a whole, they show a thinker convinced that society, like nature, is a regular, natural system susceptible to quantified mathematical understanding.

Saint-Pierre’s writings further reveal a thinker who, once possessed of correct, scientific understanding, believes it is imperative for the state to seize upon this knowledge so as to harness it for the good of the public. Saint-Pierre’s political science calculations invariably conclude with an appeal for state action, usually through the empowerment of state institutions like his beloved *Académie politique* to produce knowledge of this sort and put it to use. In this way, Saint-Pierre’s quantitative political science offers not just a new understanding of politics, but also a new politics itself, a politics rooted in scientific knowledge production as the key to benevolent, efficient statecraft. The irony is that Saint-Pierre’s own efforts in this respect resulted in scandal and disgrace. His 1719 *Discours sur la polysynodie, où l’on démontre que la polysynodie, ou pluralité des conseils, est la forme de Ministère la plus avantageuse pour un Roi et pour son Royaume* articulated a detailed program for reforming contemporary France conceived according to the larger program of his *science politique*.⁶⁶ The polysynodic councils that Saint-Pierre recommended were little more than a pragmatic application of his general academy system to the administrative realities of the royal French state. They also offered a theoretical road-map for the efforts at concillar government that were in fact instituted by the

Regent Duke d’Orléans in the years immediately after the death of Louis XIV. Saint-Pierre was close to the Regent and was influential in these political developments, yet the abbé’s published criticisms of the Sun King published in the *Discours* created a scandal that neither he nor the Regent could contain. Saint-Pierre was expelled from the *Académie française* while the Regent re-concentrated royal government in the hands of a single first minister. Thus, in this precise case, the effort to apply Saint-Pierre’s ideas resulted in a failure. The future, however, would be more promising for the abbé’s integration of information, circulation, and scientific quantification in the pursuit of modern statecraft. It is this legacy that his work deserves to be connected to.

Notes

¹ Joseph Drouet, *l'Abbé de Saint-Pierre. L'Homme et l'oeuvre* (Paris: Honoré Champion, 1912), v.

² Merle L. Perkins, *The Moral and Political Philosophy of the Abbe de Saint-Pierre* (Geneva: E. Droz, 1959).

³ Nannerl O. Keohane, *Philosophy and the State in France: The Renaissance to the Enlightenment* Princeton: Princeton University Press, 1980), 361-376; Thomas E. Kaiser, “the Abbé de Saint-Pierre, Public Opinion, and the Reconstitution of the French Monarchy,” *Journal of Modern History* Volume 55, Issue 4 (December, 1983): 618-643.

⁴ Kaiser, 619.

⁵ Charles Irénée Castel de Saint-Pierre, *Projet pour rendre la paix perpetuelle en Europe*, 2 vols. (Utrecht: Schouten, 1713).

⁶ Robert Kagan, *Of Paradise and Power: America and Europe in the New World Order* (New York: Alfred A. Knopf, 2003).

⁷ *Ouvrages politiques de Mr. L'Abbé de St. Pierre, Charles Irenée Castel*, 10 vols. (Rotterdam: Jean Daniel Berman, 1734). Hereafter *OP*.

⁸ See Ann Goldgar, *Impolite Learning: Conduct and Community in the Republic of Letters, 1680-1750*. (New Haven: Yale University Press, 1995); Peter Miller, *Peiresc's Europe. Learning and Virtue in the Seventeenth Century* (New Haven and London: Yale University Press, 2000).

⁹ Saint-Pierre, “Bibliomètre, ou méthode pour estimer la valeur des livres et des autres monuments humains,” ms., Gimon Collection, Stanford University Library.

¹⁰ John L. Heilbron, “Introductory Essay,” in Tore Frängsmyr, John L. Heilbron, and Robin E. Rider eds., *The Quantifying Spirit in the Eighteenth Century* (Berkeley: University of California Press, 1990), 1-23.

¹¹ For a rich account of the role of number in the emergence of eighteenth-century political economy, see Mary Poovey, *A History of the Modern Fact: Problems of Knowledge in the Sciences of Wealth and Society* (Chicago: University of Chicago Press, 1998).

¹² The following biography is drawn primarily from Drouet.

¹³ *OP*, V: 324.

¹⁴ Harcourt Brown, *Scientific Organizations in Seventeenth-Century France, 1620-1680*. (New York, 1967).

¹⁵ *Ibid.*, 244.

¹⁶ *OP*, V: 317.

¹⁷ See Brown, ch. XI.

¹⁸ *OP*, V: 324-5.

¹⁹ Michael E. Hobart, *Science and Religion in the Thought of Nicolas Malebranche*. (Chapel Hill: University of North Carolina Press, 1982).

²⁰ The best account of the formation of the “Malebranche circle” is Pierre Costabel, “Introduction,” in André Robinet ed., *Oeuvres Complètes de Malebranche*, Volume XVII-2: *Mathematica* (Paris, 1968), 309-316. See also André Robinet, “Le groupe malebranchiste introducteur du calcul infinitésimal en France,” *Revue d'histoire des*

sciences (1960): 287-308; *Malebranche de l'Académie des sciences. L'oeuvre scientifique, 1674-1715* (Paris, 1970), 47-62; and “Les Académiciens des Sciences Malebranchistes,” in *Oeuvres complètes de Malebranche*, XX: 162-74.

²¹ There is a good local study of the scientific culture in Caen in this period: David S. Lux, *Patronage and Royal Science in Seventeenth-Century France: The Académie de physique in Caen* (Ithaca: Cornell University Press, 1989).

²² In addition to Drouet, see Fonenelle, “Eloge de M. Varignon,” in Alain Niderst ed., *Oeuvres complètes de Fontenelle*, 8 vols. (Paris: Fayard, 1990-97), VII: 19-33. Hereafter *OF*.

²³ *Ibid.*, 22.

²⁴ On Varignon and the Malebranche circle, see Pierre Costabel, *Pierre Varignon (1654-1722) et la diffusion en France du calcul différentiel et intégral*. (Paris, 1965). Also helpful to my understanding of Varignon has been Michel Blay, *La Naissance de la mécanique analytique: la science du mouvement au tournant des XVIIe et XVIIIe siècles* (Paris: Presses Universitaire de France, 1992); Michael S. Mahoney, “Pierre Varignon and the Calculus of Motion” (Unpublished paper).

²⁵ I have discussed this history more fully in “Before Voltaire: Newtonianism and the Origins of Enlightenment in France, 1687-1734,” (PhD. Dissertation Stanford University, 2000), ch. 4.

²⁶ “Nouveau élémens de mathématiques et d’algebre, *Mercure galant* (February, 1698) : 276-8.

²⁷ Fontenelle, “Eloge de M. Carré,” *OF*, VI: 251-3.

²⁸ The best biography of Fontenelle is Alain Niderst, *Fontenelle* (Paris: Plon, 1991).

²⁹ I discuss the history of Fontenelle’s work at the Académie royale des sciences extensively in “Before Voltaire.”

³⁰ The best overview of Fontenelle’s mathematical work is “Introduction,” in Michel Blay and Alain Niderst eds., *Fontenelle, Éléments de la géometrie de l’infini* (Klincksieck, 1995), 7-32.

³¹ Cited in Drouet, 30.

³² On the salon of Madame Lambert, see Roger Marchal, *Madame Lambert et son milieu* (Oxford: Voltaire Foundation, 1991).

³³ Cited in Drouet, 38.

³⁴ From Saint-Pierre’s personal papers at Rouen. Cited in Drouet, 32-3.

³⁵ *OP*, IV: 226.

³⁶ *Ibid.*, 226–7.

³⁷ Jean-Claude Bonnet, *Naissance du Panthéon: essai sur le culte des grands hommes* (Paris: Fayard, 1998).

³⁸ Jean Mayer. *Colbert* (Paris: Fayard, 1985); Roger Hahn, *The Anatomy of a Scientific Institution: The Paris Academy of Sciences, 1666-1803*. (Berkeley: University of California Press, 1971).

³⁹ Scholarship on the Pontchartrains is not abundant. Charles Frostin has most recently tried to revive interest in the Pontchartrain ministry and his work offers the best modern account of the ministry and its legacies. See “Les Pontchartrain et la pénétration commerciale française en Amérique espagnole (1690-1715),” *Revue historique* 498 (1971): 307-36; “La famille ministérielle des Phelypeaux; esquisse d’un profil Pontchartrain (XVIe-XVIIIe siècles),” *Annales de Bretagne* 86 (1979): 117-40; “L’Organisation ministérielle sous Louis XIV: cumul d’attributions et situations conflictuelles (1690-1715),” *Revue historique de droit français et étranger* 58 (1980): 201-26; “Pouvoir

ministériel, *voies ordinaires de la justice* et *voies de l'autorité* sous Louis XIV: le chancelier Louis de Pontchartrain et le secrétaire d'Etat Jérôme de Pontchartrain (1699-1715),” in *107e Congrès national des sociétés savantes*, 3. vols (Brest, 1982), I: 7-29; “Le chancelier de France Louis de Pontchartrain, ‘ses’ premiers présidents et la discipline des cours souveraines (1699-1714),” *Cahiers d'histoire* 27 (1982): 9-34. Other, less direct accounts of the role of the Pontchartrains in the history of Louis XIV's monarchy are found in Elmo Stewart Saunders, “The Decline and Reform of the Académie des Sciences à Paris, 1676-1699” (Ph.D. diss., Ohio State University, 1980); Francois Bluche, *Louis XIV*, trans. Mark Greengrass (Oxford, 1992); Emmanuel Le Roy Ladurie, *The Ancien Régime: A History of France, 1610-1774*, trans. Mark Greengrass (Oxford, 1996); James B. Collins, *The State in Early Modern France* (Cambridge, 1995); and Thomas Schaeper, *The French Council of Commerce, 1700-1715: A Study of Mercantilism after Colbert* (Columbus, 1983).

⁴⁰ Kaiser's account offers an especially rich discussion of the importance of publicity and transparency in Saint-Pierre's political thought.

⁴¹ The creation of a new *Académie politique* is a component of a number of the abbé's concrete political proposals. Perhaps the most comprehensive treatment, however is found in “Sur le Ministère de l'Intérieur de l'Etat,” *OP*, VII: 1-279.

⁴² See also “Projet pour rendre l'Académie des bons Ecrivains plus utile.” In *OP*, IV: 165-195.

⁴³ *OP*, VII: 137.

⁴⁴ *Ibid.*, 132-5.

⁴⁵ “Projet pour des conférences de Fizique,” *OP*, V:317-344. For discussion of how these institutions were related to political publicity and transparency, see also “Conférences politiques tres avantageuses aux particuliers et au service du Roi et de l'Etat,” *OP*, IV: 88-101.

⁴⁶ “Utilité de l'Etablissement d'une Académie Militaire et d'une Académie de Marine,” *OP*, VIII: 191-267.

⁴⁷ *Mémoires de mathématique et de physique tirés des registres de l'Académie royale des sciences*, 2 vols. (Paris: Jean Anisson, 1692-1693).

⁴⁸ The 1699 academy regulations are found in Leon Aucoc ed., *L'Institut de France. Lois status, et Règlements concernant les anciennes academies et l'Institut de France depuis 1635 jusqu'à 1889* (Paris, 1889), LXXXIV-XCII. On the reform itself see Saunders, “Decline and Reform;” and Shank, “Before Voltaire.”

⁴⁹ David K. Smith, “Economic Policy-Making and Political Structure in Early Eighteenth-Century France: The Political Innovations of the Council/Bureau of Commerce,” *The Journal of Modern History* vol. 74, no. 3 (September, 2002): 490-537

⁵⁰ See for example Pierre Varignon, “Regles du mouvement en general,” in *Mémoires de mathématique et de physique tirés des registres de l'Académie royale des sciences*, Vol 1., Issue 11 (December, 1692): 190-195; and l'Hopital, “Solution d'une probleme pose dans le Journal de Leipzig, in *Mémoires de mathématique et de physique tirés des registres de l'Académie royale des sciences*, Vol 2., Issue 6 (June, 1693): 97- 101.

⁵¹ For a fuller discussion, see Blay, *La naissance de la mécanique analytique*; and Shank, “Before Voltaire.”

⁵² I am grateful to Robert Scafe, who is writing a doctoral dissertation on the development of the practices of the Old Regime French census, for this information.

⁵³ On Petty, see Poovey, *History of the Modern Fact*, esp. 141-165; Patricia Kline Cohen, *A Calculating People* (Chicago: University of Chicago Press, 1982), 28-30; John Brewer, *The Sinews of Power: War, Money, and the English State* (Cambridge: Harvard University Press, 1988), 223-25. The history of political arithmetic in France has received less study, but its importance is noted in Simone Meyssonier, *La Balance et l'Horloge: La genèse de la pensée liberale en France au XVIIIe siècle* (Paris: J. Vrin, , 1989), 66, 71, 141-2; and Joseph Klaitis, *Printed Propaganda Under Louis XIV: Absolute Monarchy and Public Opinion* (Princeton: Princeton University Press, 1975), 107, 178-9.

⁵⁴ See for example Harald Westergaard, *Contributions to the History of Statistics* (London: King, 1932); E. S. Pearson ed., *The History of Statistics in the 17th and 18th Centuries against the Changing Background of Intellectual, Scientific and Religious Thought: Lectures by Karl Pearson given at University College, 1921-1933* (London: Griffin, 1978); Helen M. Walker, *Studies in the History of Statistical Method* (Baltimore: Williams and Wilkins, 1929).

⁵⁵ The best account of the emergence of eighteenth-century probability theory is Lorraine Daston, *Classical Probability in the Enlightenment* (Princeton: Princeton University Press, 1988).

⁵⁶ On De Montmor see Fontenelle, “Eloge de M. De Montmor,” *OF*, VI: 465-477.

⁵⁷ Pierre Rémond de Montmor, *Essay d'analyse sur les Jeux de hazard*, 2eme edition (Paris: Jacque Quillau, 1713), iii.

⁵⁸ *Ibid.*, xiv.

⁵⁹ *Ibid.*, xv.

⁶⁰ Edmund Halley, “An Estimate of the Degrees of the Mortality of Mankind, drawn from curious Tables of the Births and Funerals at the City of Breslaw, with an Attempt to ascertain the Price of Annuities upon Lives,” *Philosophical Transactions of the Royal Society* (January 1692/3): 596-610.

⁶¹ Montmor, xviii-xix.

⁶² *OP*, IV: 255-267.

⁶³ *Ibid.*, 260.

⁶⁴ *OP*, VIII:6.

⁶⁵ “Police sur le pain pour eviter la famine,” *OP*, VII: 82-88.

⁶⁶ Charles Irénée Castel de Saint-Pierre, *Discours sur la polysynodie: où l'on démontre que la polysynodie, ou pluralité des conseils, est la forme de ministère plus avantageuse pour un roi, & pour son royaume* (Amsterdam: Du Villard & Changuion, 1719).