Chapter 2
"A Young Man's Game": Youth, gender, play, and power in the personae of mid-twentieth century global mathematics

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INTRODUCTION: A MATHEMATICIAN'S APOLOGY

Eminent English mathematician Godfrey Harold Hardy had neither the first nor the last word on what sort of person could be a mathematician and to whom the discipline belonged, but he certainly had one of the most memorable and oft-quoted formulations. "No mathematician should ever allow himself to forget," he opined in his famous 1940 meditation, *A Mathematician's Apology,* "that mathematics, more than any other art or science, is a young man's game."[1] The Cambridge don's sweeping pronouncements about the nature of mathematics and mathematicians hardly amounted to a universal orthodoxy, and his *Apology* provoked mixed reactions from the start.[2] As a towering figure in English and international mathematics, however, Hardy had for decades been in a distinctive position both to observe his profession and to shape it.

Hardy's remark framed an early section of the *Apology* on "this question of age," citing a handful of examples of incandescent youthful mathematics, great men who died young, and once-great men who were undistinguished throughout their relatively early intellectual dotage.[3] The special link between youth and mathematical talent was Hardy's excuse for pursuing the field single-mindedly while he could, and for turning to the vulgar pastime of apologia once advancing years denied him the hope of mathematical brilliance. Notwithstanding a mathematical network that already included such luminaries as Mary Cartwright, who trained with Hardy and his collaborators from the late 1920s and was elected a Fellow of the Royal Society in their third cohort to include women (1947), Hardy took for granted that the assertion that mathematics belonged specifically to young *men* did not need explanation or justification. That it was, for these young men, a *game* was part figure of speech, and part another taken-for-granted facet of Hardy's mathematical philosophy that defined a scholar's virtue by the harmlessness or uselessness of his endeavours. The best mathematics, one gathers from Hardy's *Apology*, was more profound than but ultimately comparable to ingenious play at the game of chess.

Across their history in multifarious contexts, mathematicians have been depicted as characteristically young or old, male or female, playful or serious. Each such characterisation

can be linked to historically specific circumstances of mathematical practice, to changing notions of the nature of mathematical thought, and to varied virtues and values attributed to mathematicians and their arts.[4] As Hardy composed his apology, the world of mathematics was transforming in ways that gave new life to mathematics as a "young man's game." Institutions and infrastructures of internationalisation specifically favoured mathematicians who could make themselves legible in terms of those three signifiers.

This chapter historicizes Hardy's remark, asking what bodies, gender identities, and sociabilities modern mathematicians and their institutions presumed and supported, and what consequences these had for mathematicians' disciplinary and knowledge formations. I begin by placing each of Hardy's three terms in longer histories of associations between mathematics and age, gender, and play. I then examine the persona of Nicolas Bourbaki, a collective pseudonym that became one of the most recognizable and controversial figures of mid-twentieth century mathematics. Bourbaki's collective construction opens a perspective on broader changes in mid-twentieth century mathematics and the importance of youth, masculinity, and play for mathematicians' ability to thrive amidst the period's distinctive challenges and opportunities. In particular, the disembodied, distributed persona of Bourbaki hinged on the articulation of specific kinds of embodied individuals who were never entirely hidden from view.

I argue that mid-century efforts to finance and underwrite a globalizing discipline tended to concentrate resources around elite cadres of young, charismatic, well-networked men such as those associated with the Bourbaki pseudonym. These structures and infrastructures, notably involving new philanthropic sponsors, gave special prominence to an abstract, synthetic, ludic approach to mathematics. This approach, also associated with Bourbaki, formed the more visible and internationally mobile extreme of a mathematical discipline defined by renewed orientations to both 'pure' and 'applied' research.[5]

Gendered and generationally-delineated forms of play, including puns and pranks, supported both intellectual and institutional developments and underwrote a specifically ludic global modernity for an elite segment of the mathematics discipline. Defining themselves and their subject in terms of tricks and play, mathematicians built separate social and conceptual worlds driven by playful pursuits of otherworldly abstraction. That is, there was a fundamental connection between the personae, ideas, infrastructures, and scales of travel in modern mathematics, derived in large measure from the conjoined challenges of moving people and their identities and ideations across the globe.

Bringing historical specificity to Hardy's decontextualized pronouncement about mathematics allows one to trace the embedded and embodied conditions and consequences of a distinctly influential ideal of the mathematician's persona. This persona's regulatory and disciplinary operation in international mathematics was firmly rooted in its historical moment, and in ideals and circumstances that do not appear at first glance to presume or depend upon the categories Hardy invoked. Rather, figurations like Hardy's worked to universalize and naturalize highly contingent and even idiosyncratic conceptions of who could be a mathematician. Historicization can, in this way, both explain the universalizing operation of persona construction and help to undermine it.

A YOUNG MAN'S GAME

Calculation, accounting, measurement, and other activities associated with the origins and applications of mathematics have always kept the subject firmly grounded in the worlds of serious reckoning and industry.[6] However, mathematical theory—especially the kind of mathematical theory that explicitly eschews such worldly matters and that would eventually dominate images of mathematics in philosophy and culture—was the stuff of games long before it was a systematic science. Recreations involving numbers and shapes can be found in the written and archaeological records of an enormous range of human cultures.[7] Puzzles and problems let people explore and articulate mathematical patterns, challenge each other, and demonstrate their wit and ingenuity. In the ancient Mediterranean, a context often marked as an origin for mathematics as a distinct theoretical social endeavour, play drove both mathematical ideas and their rhetorical forms.[8] Such ludic features, in varying guises, have often marked off mathematics as an intellectual or scholarly enterprise in opposition to its vulgar worldly settings and uses.[9]

Play appears in the history of mathematics in three main forms. Play has been an *object* of mathematics through the long-established genre of mathematical recreations, which deploy mathematical ideas and themes in puzzles and games for stimulation and amusement.[10] Games have been the *subject* of mathematical theory, furnishing problems that motivate debate and inquiry that can lead to quite serious applications, philosophies, and methodologies. The field of probability, notably, emerged from speculation and investigation regarding a small collection of games of chance.[11] Much later, the economically and geopolitically consequential field of game theory used play and games as both models and potent conceptual resources for theorizing about a wide range of phenomena, including the deadly serious hypothetical phenomenon of nuclear war.[12] Finally, play has been a *mode* or *framework* for mathematics, infusing a wide range of genres of and approaches to mathematical research. This place for play in mathematics inflects mathematical discourses with terms like 'tricks' and tropes like Hardy's about virtuous uselessness.[13]

These three strands of play in mathematics blend and interact across their history, affecting the personal repertoires available to would-be mathematical scholars and practitioners. Mathematical techniques and technologies can carry dual uses, doubling as recreational, commercial, or other kinds of devices.[14] New theories of probability made philosophical and political problems out of the pastimes of gentleman gamblers.[15] An entire genre of early modern recreational problem gave rise to practices and principles behind that period's pivotal reformulations of algebra, which in turn rendered those recreations trivial and dull.[16] This transformation took a broad class of arithmetical rules found predominantly in mercantile contexts and subordinated them to methods and speculations more associated with certain philosophers, dividing communities of mathematical discourse and practice in the process.

While most available records for earlier periods of these interweavings of mathematics and play come from sources that are explicitly or presumptively gendered male, one can infer from women's historical roles in education, commerce, household labour, and other areas that these were not exclusively masculine discourses. Schoolwork, with its associated puzzles and mnemonics, became an especially important early modern setting for female-gendered mathematical play.[17] The mathematical puzzles and solutions in the eighteenth-century *Ladies Diary* were avidly read and contributed by women and men alike, and exemplified a public

culture of mathematical problem solving where women participated as a matter of cultural attainment and men played mathematically in female-gendered spaces.[18] In this respect, recreational mathematics blended into other gendered pursuits of mathematics as a cultural value, class marker, and devotional practice.[19]

In the French Enlightenment, savants associated with the *Académie des Sciences* worked to monopolize the authority of mathematical expertise by distancing it from frivolous, recreational, or metaphysical matters, which the *Académie*'s men gendered as female.[20] This anti-metaphysical project placed mathematics as a sober, rational, and worldly pursuit progressively established as a form of natural knowledge accumulated by perceptive men.[21] Where pedagogical settings of mathematical mirth linked some parts of the subject to youth, this cumulative and naturalistic conception of the subject made mathematics squarely the province of seasoned scholars. One could be precociously or preternaturally perceptive in the eighteenth century, but this only hastened one's course on a path to mathematical wisdom won by sustained experience and belonging to men distinguished in attainment and age.

European mathematics started to become a young man's game in the sense of Hardy's remark during a period of pedagogical intensification in the first half of the nineteenth century. In Paris, new models of elite engineering education valorised abstract and technically demanding mathematical rigor as a means to cultivate and evaluate disciplined minds, developed in tandem with the military discipline of young men's bodies.[22] Meanwhile, across the Channel in Cambridge, a shifting examination culture and associated changes to students' technical training gave rise to an elitist model of education that tightly linked the energetic vigour of young men to a difficult and intricate style of mathematical problem-solving that drew on the new French mathematics and then developed into something all its own.[23] Cambridge colleges and examiners specifically excluded young women as lacking the physical wherewithal for their new mathematics, while mathematics tutors encouraged their male charges to train mind and body with drills on blackboards and rowing boats, on the page and sporting pitch, alike.[24]

This model was not without challengers. Sophie Germain persisted through class and gender barriers to make a mark in the polytechnical mathematics of early-nineteenth century Western Europe in part by employing a pseudonym, Le Blanc.[25] As young women fought for access to Cambridge mathematics and began to prove themselves the equals of their male counterparts, the dominant value systems surrounding these examinations and their associations with mathematical talent shifted alongside norms and expectations elsewhere to preserve male privilege while allowing space for exceptional women to participate in some capacities.[26] Technical perseverance and the corresponding stress on athletic prowess receded in favour of another form of play, idealizing innate male creative genius disconnected from corporeal vigor.[27] Hardy himself was sharply critical of his experience as a student and then professor in Cambridge's system, which he felt trivialized the imaginative work of creative mathematics, and became a fierce advocate for reform.[28] Farther afield, American mathematicians at the turn of the twentieth century articulated their own models of mathematical masculinity rooted in agrarian traditions and the trope of the self-made man.[29]

In the context of this chapter's argument about globalisation, it bears notice that Hardy certainly had in mind his brief mentorship of and collaboration with Indian mathematician Srinivasa Ramanujan, who made contact with Hardy by post in 1913 at the age of 26.

Ramanujan frustrated and dazzled the English mathematician with miraculous-seeming mathematical claims from his 1914 arrival in England until his death in 1920. His creative brilliance, persistent ill health, and alien style of reasoning offered Hardy an inspiring far-extreme contrast against the physically and technically demanding mathematics of Cambridge examinations. Germain's, Ramanujan's, and others' challenges to nineteenth century norms for mathematical personae arose and became visible in part through epistolary and embodied travel that connected these exceptional figures to new locales and institutions. Social and geographic distance made space for alternative identities and the tensions they could introduce, and mathematicians in the discipline's international and later global eras responded by supporting, tacitly and explicitly, new personal norms and modes that promised to transcend the seams and tensions of such troubling connections.

The young male genius at play in the mathematical world of his own mind was a long-brewing response to early-nineteenth century models of technocratic disciplinary elitism, one that incorporated prevailing cultural and philosophical images of Romantic (even tragic) male genius.[30] Even so, and notwithstanding a growing roster of young eminences heralded for their ingenious theories, the iconic personas of mathematics continued to include the serious, wrinkled, and worldly. For every meteoric youth like Bernhard Riemann, Évariste Galois, or Niels Henrik Abel, one could find a celebrated elder like Carl Friedrich Gauss (noted alike for his early precocity and later sagacity), Henri Poincaré, or David Hilbert, revered for wisdom and insight that shone undiminished late into their careers. By the early twentieth century, youth, masculinity, and play had strong associations for some with mathematical talent, but these were neither universal nor exclusive nor unequivocal. The remaining sections of this chapter examine the confluence of circumstances that propelled these aspects of a mathematical persona to a new prominence in the twentieth century.

MAKING BOURBAKI

To support themselves and win fame for their work, mathematicians have turned to a wide variety of patrons across their many historical contexts. In royal courts, elite academies, academic institutions, and other settings, mathematicians have depended on each other's and on third parties' evaluations of their skill, importance, and potential. Patronage matters to the history of mathematical personae because it structures whose opinions, evaluations, and suppositions matter to the allocation of resources and prestige. The people who control where and to whom such support is directed have an immense power to shape the kinds of personae that can thrive and become normative in the segments of the discipline that depend on them.

The story of pseudonymous mathematician Nicolas Bourbaki is not typically told in terms of patronage, but such relationships can explain a lot about the peculiar enterprise behind this iconic name.[31] The young, male, assertively playful mathematicians who would combine to create Bourbaki's persona starting circa 1935 were, in the preceding decade, among the earliest mathematical beneficiaries of a relatively new patron for their field, the network of educational and scientific organizations underwritten by Rockefeller philanthropy.[32] The Rockefeller Foundation and associated philanthropies, including the International Education Board, were in turn among a collection of large philanthropies supported by monopolistic American corporate wealth that profoundly shaped international science, politics, and development in the twentieth century.[33]

The advent of Rockefeller philanthropy for mathematics meant that assessments from a new kind of evaluator would become important for a significant segment of the profession. This evaluator, the philanthropic program officer, was steeped in the values of American philanthropy, often had scientific training, but was rarely versed in the latest mathematics—nor did he (always *he*) consider such expertise necessary or useful.[34] Program officers aimed to disburse their philanthropies' resources efficiently and effectively, and to leave a lasting mark over a wide institutional and geographic field with time-limited financial interventions. In this capacity, their philanthropies recapitulated the logic of financial speculation behind the commercial enterprises that funded them. When evaluating and investing in people, therefore, program officers aimed to develop effective non-mathematical proxies for identifying those mathematicians who would best achieve the long-term aims of short-term philanthropic support.

Intervening from the outside of the discipline and relying on its existing infrastructures to sustain their investment after the period of a grant or fellowship, program officers had to be sensitive to biases and power structures within a discipline, whether or not they approved of them. A funding recipient who would be unable to thrive after the funding ran out was not a sound investment, even if their failure to thrive had nothing to do with their personal ingenuity. For the male-dominated profession of mathematics, this made it hard to defend supporting women with limited foundation resources.[35] Biases within a discipline had a double effect on who could benefit from a Rockefeller grant, affecting a candidate's progress in the field—and hence visibility and legibility as someone worth funding—as well as the candidate's post-fellowship prospects.

To have the longest possible effect, a funding candidate should be as young as possible while still presenting a reasonable certainty of becoming established in the discipline. Program officers deliberately sought candidates at the earliest points in their careers where they could safely be regarded as a sound prospect, and not some uncertain flash-in-the-pan. Mathematicians recognized talent and ingenuity across a wide range of ages, but to a Rockefeller officer it was only the bottom end of that range that mattered for many kinds of investment. Referring in 1930 to "the rule that mathematicians develop early," officer W.E. Tisdale gave voice to a rule of thumb that mathematicians could be considered sound investments while comparatively young.[36] Such an evaluation need have no bearing on whether mathematical brilliance was exclusive to such young charges—indeed, aspects of scientific philanthropy necessarily assumed a certain longevity—but the logic of a short-term investment in a long-term prospect led officers to emphasize and to concentrate resources around the youngest possible men.

So it was that Wickliffe Rose, one of the original Rockefeller Foundation trustees and the founding president of the International Education Board, planned to create in the mid-1920s a series of "travelling fellowships for exceptional young men in mathematics" to develop international connections and promote the careers of promising European mathematicians.[37] Rose had little personal knowledge of the sort of mathematics being pursued then in European universities, but he was a well-connected and resourceful correspondent. Assembling information from American mathematical elites, Rose and a small team of subordinates developed a general sense of Europe's most significant institutions and enough information about career models and fellowship candidates to direct their available funds.[38] International Education Board and Rockefeller Foundation fellowships supported Szolem

Mandelbrojt (1924-26), André Weil (1926-27), Jean Dieudonné (1930-31), and René de Possel (1930-32), who would go on to be four of the founding members of the Bourbaki collaboration.

Beginning in December 1934, together with a slightly shifting cast of four to six others—mostly associated with the elite male École normale supérieure in Paris—and a number of occasional interlopers, these four beneficiaries of Rockefeller philanthropy resolved to undertake a collective project to reform the university mathematics curriculum with a multi-volume textbook under the pseudonym Nicolas Bourbaki.[39] Their project required creating and projecting a double persona: first, a pseudonymous persona for their assumed authorial identity of Nicolas Bourbaki; and second, a shared collective persona for the collaboration animating the pseudonym. Both of these personae played important roles for the group's work, reception, and significance to the period's mathematics.

The biographical narrative for Bourbaki, the pseudonym, was deliberately mythological, shifting, and gnomic. Initial presentations, for instance in the cover letter accompanying Bourbaki's first submitted article in 1935, described a refugee from Poldavia, an invented country first prominently used by agitators for the far-right Action française, recently situated in an ethnically-coded suburb of Paris and reluctantly persuaded to share his mathematical speculations.[40] This Bourbaki was, in some tellings, a decorated scholar now living in anonymity after being deracinated from the land where he had won recognition. In other tellings, his academic routes shifted to other obscure or imagined Eastern European locales, and he assumed more the character of an itinerant intellectual. Bourbaki's current and past employment varied with the collaborators' institutional situations and senses of the moment: at first he lacked an academic situation altogether, but would eventually claim affiliations with Hermann and Cie., the Rockefeller Foundation, the real University of Nancy, and the portmanteau University of Nancago (from Nancy and Chicago), among others.[41] Adopting the identity of an older, rootless mathematician from Eastern Europe gave Bourbaki's authorial persona the weight of an experienced voice whose previous anonymity could be explained away by institutional obscurity and the vagaries of geopolitics. This was someone who could be expected to have something important to say, who had paid his dues and could claim the right to be heard, not some brash upstart tilting over-confidently at the establishment.

A DOUBLE PERSONA

The collaboration that produced Bourbaki's pseudonymous works had its own separate but intertwined collective persona. Youth was a central feature of their self-characterizations and at points they promoted rumours of a mandatory retirement age, although the historical record is mixed on its observance in practice. The group loudly asserted its radical collectivity and anonymity, subsuming individual contributions into a whole they claimed could not be attributed to individual contributors.[42] However, membership in the group was something of an open secret, and many interlocutors knew and interacted with multiple collaborators by name.[43] Indeed, this open secret status was essential for members of the collaboration to accrue professional rewards from their participation, and was also a requirement for routine aspects of their work, especially related to funding: Nicolas Bourbaki could not sign a contract or deposit a cheque, but his collaborators (and, from 1952, a formally registered corporation under their control) could.

The collective insisted that every word attributed to Bourbaki had been debated, drafted, and extensively revised by every member. They disclosed a quasi-mythologized set of working practices to certain friends and colleagues, revolving primarily around regular meetings called Congresses, whose raucous proceedings were recorded in pun-laden accounts in the group's newsletter *La Tribu*.[44] Funded by sources including Rockefeller Foundation grants and royalties from the Bourbaki textbooks, Bourbaki Congresses were rambunctious, alcohol-fuelled affairs that combined a variety of recreations with demanding performances of mathematical virtuosity, typically in scenic environs. A 1949 edition of *La Tribu* reported that "The flood of francs and dollars dispensed by Freymann [director of the textbooks' publisher Hermann and Cie.] and Rockefeller spun the heads of the delegates, who gorged themselves with Armagnac."[45] A later interloper and Bourbaki sympathizer of long standing recounted to a correspondent that the Congress he attended "was great fun […]. The sessions were very lively, with cheerful insults flowing freely; one session broke up in disorder twice."[46] While some women were present at these Congresses, they were typically lumped in reports with locals and occasionally farm animals as 'extras' and under no circumstances were considered part of the mathematical enterprise.[47] Pranks, in-jokes, and what can fairly be described as systematic hazing reinforced collaborators' solidarity while letting outsiders know their peripheral place.

A Rockefeller Foundation grant summary described the group as "a small number of exceedingly brilliant young French mathematicians" making up "a research unit" organized to "bring to various areas of mathematics new imagination, clarity, and vigor."[48] For Rockefeller officers, the group's collective persona as a vigorous and youthful research group justified substantial funding. The group's aged individual pseudonymous persona appears in a secondary capacity, without reference to its associated biographical claims, as an aspect of the collective's character and practice. Here, the nakedly mythological character of the pseudonymous persona masks the more subtly mythological character of the collective persona, allowing the collaborators to benefit from an image of rigorous, egalitarian, radically creative authorship that they would have been hard-pressed to demonstrate otherwise. For the group, the need and opportunity to explain their individual pseudonym thus substituted for the more difficult prospective challenge of explaining and justifying their respective individual and joint personae and practices. The pseudonym's singular, male, typically-francophone voice further naturalized the collective's demographic homogeneity.[49]

If the collective persona of the energetic Bourbaki collaborators took the fore in backrooms and grant reports, the pseudonymous persona had pride of place in Bourbaki's most visibly prominent venue: the mathematical literature.[50] Most often, this persona appeared how most mathematical personae appear in this setting, as a name, a voice, and a collection of claims and demonstrations in a formal text. Where biographical details appeared, they often winkingly reminded a discerning reader—one already in on Bourbaki's open secret—of the pseudonym's fictional biography through invocations of place names, invented organizations, or other conventional status markers.

Other mathematicians' references to Bourbaki typically effaced the pseudonym's peculiarity by treating it as a normal name in the literature. The exceptions to this pattern diverted emphasis from the pseudonym to the collective persona, always treating the collaboration as a coherent whole and adopting its self-characterizations. Samuel Eilenberg, who regularly reported on Bourbaki's work for the abstracting journal *Mathematical Reviews* and who

ultimately joined the collaboration himself in 1950, wrote for *Mathematical Reviews* in 1942 that "Bourbaki is the pen name of a group of younger French mathematicians who set out to publish an encyclopedic work covering most of modern mathematics."[51] Emphasizing the collaborators' youth and crediting an extreme and unrealistic rendering of the group's goals alike legitimated their theoretical project and announced the group as an agent of lasting change worth joining.[52]

One of Bourbaki's most notorious pranks occupied the precarious middle ground between the pseudonymous and collective personae. The pseudonym twice tried and failed to become a member of the American Mathematical Society (AMS). The AMS received applications in 1948 and 1949 under two different avenues for membership, respectively for members of a subscribing department (at the University of Chicago) and of a foreign partner society (the Société Mathématique de France). Because the applications were prepared separately and because Bourbaki's mythologized pseudonymous biography resisted definitive standardization, there were significant discrepancies between the two application forms. These became a resource for the American Mathematical Society's Secretary to delegitimize the latter application, adopting a formalistic posture toward biographical assertions so that he could dismiss them on the grounds of inconsistency alone, rather than wade into the depths of play and imposture that characterized the Bourbaki collaborators' collective practice.[53]

Play was a vital resource for Bourbaki collaborators to create and project a group identity, but the AMS Secretary made clear that this same element disqualified their pseudonymous singular persona from participation in the formal organizational life of mathematics. Concerned for his organization's dignity, he observed in backroom discussions of the second application that "I rather resent membership in the Society being made a matter of jest."[54] One correspondent suggested a direct approach of declaring "that we know that there is no such person [as Bourbaki], but that the name covers a group of mathematicians" and denounced the prank as immature and "not worthy of seriously minded mathematicians."[55] The AMS Secretary went so far as to share his outrage with the Rockefeller Foundation's Warren Weaver, who duly diagnosed the prank as "quite childish" and suggested seeking a cooler head in the person of André Weil—never suspecting Weil's primary role as an instigator of this and other Bourbaki pranks.[56]

Only one higher-up in the American Mathematical Society countenanced embracing the prank and granting Bourbaki membership, and he did so by absorbing the group enterprise into the singular pseudonymous persona. "There is no question in my mind," he wrote, "but that N. Bourbaki has made a stronger imprint on present day mathematics and his fame will last longer than that of most of present members of our Society and it behooves us of taking cognizance of this fact."[57] For at least one later observer, the prank's very immaturity directly affirmed the merit of the collective persona's claim to reshape mathematics. Presenting Bourbaki to readers of the magazine *Scientific American,* Paul Halmos declared that "Yes, the joke may be sophomoric, but sophomores are young, and mathematics is a young man's profession" and added that "Bourbaki's emphasis on youth is laudable."[58]

As Bourbaki's mathematical program and its associated philosophies spread beyond professional mathematics to fields as varied as education, anthropology, economics, and literature, the double persona of an authoritative pseudonym and a young, radical collective continued to lend coherence and authenticity to what could often be an incoherent and

inauthentic undertaking.[59] Describing his involvement during Bourbaki's cross-cultural heyday, an American mathematician told a crime writer covering the group for the *Saturday Evening Post* that "Mathematics is like prizefighting. It's a young man's game."[60] Linking boxers' strapping young bodies to the Bourbaki collective's strapping young minds, the comparison naturalized the kind of scrappy belligerence required to fight for a title or to reform the foundations of a discipline. In boxing and mathematical foundations, there can only be one champion, at least in principle, and the wisdom of age is no protection against an up-and-coming contender. (One might add that in boxing and in mathematical foundations, there are, it turns out, many champions recognized and disputed by different authorities. In the messy realities of competing institutions coexisting with mythologized universalisms, too, the comparison holds.)

All this was of a piece with the generational challenge Bourbaki loudly presented to French and international mathematics, asserting primacy after a generation supposedly lost to the Great War.[61] In this context, it is worth observing that (at least by the crude measure of Google's n-gram corpus[62]) the phrase 'a young man's game' first gained widespread currency in English during the Great War in reference both to the war itself and to non-military pastimes, and saw a subsequent spike in usage with the Second World War.[63] The collective Bourbaki persona's youth embedded it in a philanthropic and war-inflected cultural logic of generational change, of brilliance over experience, and of the promise of perpetual renewal through (a mythical) mandatory retirement and influx of virile young bodies and minds. Its masculinity underwrote the group's entitlement to assault their discipline, and to do so as an assertively univocal collaboration. Its pranks, wordplay, fictions, and commitment to play showed Bourbaki's collective animators to be the right kind of young men for their project, men whose mental dexterity and freewheeling creativity opened up radical possibilities for mathematics.

ECONOMIES AT SCALE

Bourbaki's double persona succeeded in part because the world of professional mathematics was changing. In addition to changing patronage relationships, which helped launch and sustain the careers of individuals behind the collaboration and furnished resources for the collaboration itself, the new relevance of global scales of production and exchange created new demands and opportunities that Bourbaki was distinctively positioned to exploit. One can understand these changes and their interaction with Bourbaki and the model of a 'young man's game' through the respective reconfigurations of mathematicians' material, cultural, social, and political economies.

Successive inflows of philanthropic, military, and civilian government funding dramatically changed the material conditions of international mathematics in the decades following the 1920s.[64] Combined with new technologies of composition, print, and transportation, these made it possible for mathematicians to make long-distance travel a routine part of professional practice for some, while enabling the names and ideas of a far greater share of the profession to travel still farther through the periodical literature.

The Bourbaki enterprise relied on both of these mechanisms of propagation. Personal travel let them maintain an intensive and ludic collaborative culture through regular Congresses,

even as collaborators dispersed as war refugees and as political, economic, and professional migrants. As up-and-coming young men, Bourbaki collaborators lay privileged claim to sponsorship within programs designed to connect and develop national and regional mathematical infrastructures. After the Second World War, some of the first UNESCO technical assistance experts in mathematics were associated with Bourbaki, and the group's transgressive methods and ideology thrived in regions building new infrastructures for professional mathematics as a personally-reinforced shortcut to the discipline's vanguard.[65]

Expanded infrastructures for circulating texts, meanwhile, kept these intellectual and ideological communities meaningfully connected.[66] The individual persona of Bourbaki enjoyed a massive distribution through by-lines, citations, and textbooks. Hampered in the past by relatively expensive production requirements and limited markets, mathematical publishing became newly profitable as new sponsors poured resources into libraries and research budgets. This, in turn, created the conditions for systematic translation, large print runs of popular textbooks, a thriving trade in inexpensively produced lecture notes from advanced courses and seminars, and other developments that specifically contributed to the Bourbaki enterprise's global reach. Bureaucratic and publishing infrastructures sustaining these new material conditions for mathematics depended intensively on secretarial and administrative labour, typically performed by women, often typing and corresponding under the bylines of male mathematicians and administrative officers. Different customs of taking on others' names and personae thus reinforced masculine images and practices in mathematical-institutional hierarchies both from above and below.

As common academic institutions and shared locales became less necessary for sustained group solidarity in the mathematics profession, the groups that prospered best over long distances were those that adopted modes and methods like Bourbaki's. Myths, jokes, anecdotes, and a regular stock of cultural reference points gave groups a sense of coherence that could be maintained through letters, postcards, and irregular personal encounters. Corresponding features of methodological and theoretical programs—effectively, conceptual puns—gave a corresponding coherence to research distributed over wide geographies.[67] In these respects, play provided a significant and often underappreciated connective resource for mathematicians' new scales, one directly linking ludic personae to ludic approaches to mathematics.[68]

Indeed, in these circumstances mathematics itself could appear as a trickster. For Hardy, mathematics was "the most curious [subject] of all—there is none in which truth plays such odd pranks."[69] It was a curious subject fit to curious men. Hardy claimed mathematics to be "one of the most specialized talents," with a talented mathematician unlikely to exhibit much "general ability or versatility" or to do anything but "undistinguished work in other fields."[70] To open what was, in 1950, the largest ever gathering of mathematicians, American mathematician Oswald Veblen observed that "Mathematics is terribly individual," and that "The more one is a mathematician the more one tends to be unfit or unwilling to play a part in normal social groups."[71]

Mathematicians, according to Veblen, must "group themselves together *as* mathematicians" because being a mathematician was the surest sign that one was fit only for mathematical company. In the social economy of mathematical research, elite young men who were free to travel and could feel at home in the often-homogeneous company of fellow mathematicians

were distinctively positioned to benefit from a disciplinary matrix that so explicitly prized such walled-off homosociality. Like the cultural economy of play, this social economy had intellectual consequences, raising the profile of mathematics and mathematicians alike that flourished in orderly self-contained worlds of their own design. Reproduced across institutes, departments, and conferences and Congresses small and large, such social orders affirmed the primacy of mathematical insiders who could afford not to distract themselves with the cares and affairs of non-mathematicians.

Particular kinds of young men thrived in these social environs, while institutional and career structures placed them in the company of (and sometimes in conflict with) older mathematicians with their own sources of prestige and authority. Hardy's remarks have been associated with a persistent myth that ground-breaking mathematics is the exclusive province of the young, a notion that has not withstood empirical scrutiny.[72] At the same time, the social conditions that governed elite careers as Bourbaki came to prominence made visible brilliance a virtual requirement and expectation for new entrants that did not extend to those who were already established. Creative mathematics is difficult for young and old alike, and mathematicians can spend years working in an area before they feel capable of contributing significant new results.[73] Career gateways and patterns ensured that the question of why an elite young mathematician lacked brilliance could not come up, as such a would-be mathematician was effectively barred from the disciplinary elite in the first place. Older mathematicians were, by these same tokens, the only ones who could be considered simultaneously among the discipline's elite and in the midst of a creative drought, and their age was thus a ready explanation for this contrast with their younger counterparts for reasons entirely separate from the supposed association between age and creativity.

These material, cultural, and social economies found expression through mathematicians' new political economies. National and international organizations shared and extended each others' infrastructures, generally reinforcing the hegemony of American institutions with the resources to serve as infrastructural pivots. Reciprocity agreements between national societies —including the French-American agreement the Bourbaki collaborators exploited in their second application on the individual persona's behalf to the American Mathematical Society —were concrete expressions of an extensible solidarity. Such solidarity presumed that good-faith participation in one's immediate mathematical surroundings qualified one to participate in a global community alongside those one had never met nor might ever meet in person.

Investments and exchanges building up and connecting these institutional orders narrowed around those who fit the part of future disciplinary leaders. Young, male, charming, and mobile mathematicians took the lion's share of resources in a model of institutional development built around circulation and diffusion emanating from mathematical metropoles.[74] Those who could establish both social and theoretical coherence from brief contact and maintain these across long-distance exchanges offered precisely what such developmental frameworks presumed and required.

CONCLUSIONS: MAKING THE MEN OF MODERN MATHEMATICS

Next to (and perhaps including) Hardy's *Apology*, no book from the first half of the twentieth century did more to define the modern mathematical persona for subsequent generations than

number theorist Eric Temple Bell's 1937 *Men of Mathematics*, a colourful and often inventive tour of the biographies of modern European history's mathematical geniuses.[75] Bell's men (and one woman who appears in a dual-headed chapter with her male mentor), even those regarded in their own time as sober sages, appear here largely as precocious misfits, precisely the sort of young men at play to whom Hardy would grant mathematical priority just a few years later. The playful and irreverent author Bell declared his primary interest "in mathematicians as human beings" and so, in a nod to the genre of Great Man History, proposed through "an appreciation of their rich personalities" to illuminate the true significance of the achievements of modern science.[76] These mathematicians, in Bell's telling, were "as human as anybody else—sometimes distressingly more so."[77]

Bell's pretence of explaining the achievements of modern mathematics through a series of outlandish caricatures makes for dubious historiography. But his notion of locating something of the nature of modern mathematics in the persona of the mathematician—duly historicized—indicates something essential about the entangled operation of persona, context, and ideas in mathematical modernity. This chapter has argued that patronage relations, in the context of multiple intersecting economies of mathematical activity, supported mathematical personae adapted to the modalities and biases of disciplinary globalisation. Personae marked as young, male, and playful thrived for historically specific reasons whose contingency fell away in universalizing portrayals like Bell's and Hardy's. The project of transcending professional and intellectual contexts, for mid-twentieth century global mathematicians, depended on forms of support and solidarity that intensified the value and reach of very particular subject positions.

Perhaps the twentieth century's most successful occupants of the persona of the young man at play, also among the period's most successful agents and beneficiaries of globalisation, were a French collective of mathematicians who adopted the pseudonymous persona of a sometimes-reclusive Eastern European man of an older generation. Playfully posturing in Nicolas Bourbaki's name, this collective winkingly secured their own respective reputations as people worth supporting and following in mid-century mathematics. Such posturing allowed Bourbaki collaborators and their supporters to alternate subject positions, with Bourbaki's animators participating in international mathematics as a univocal disembodied author and a many-bodied association of ambitious young mathematicians.

Though the Bourbaki collaboration did not have a monopoly on the patronage, prestige, ideas, or personae of their mid-century period of ascendancy, their story marks at a relative extreme a transformation to the mathematical discipline that continues to be felt today. Bright young stars, still predominantly men who look and in many ways present themselves like the Bourbaki collaborators and come from similar social pedigrees, continue to dominate mathematicians' multifarious enterprises to identify and support talented leaders and to extend their reach around the world.[78] This visible and often insidious bias has deep roots in decisions about how to organize and support a growing discipline made before most currently active mathematicians were even born, and carried forward by generations thence. These historical traces call attention to latent tensions between mathematicians' global, even universal ambitions and the disciplinary infrastructures through which they pursue them, tensions manifest in the personae that became hegemonic in figures like the Bourbaki collaborators.

The radical imposture of Bourbaki's hybrid personae represented one highly effective critique of mathematical ideas and institutions whose dimensions, conditions, and consequences are manifest in the history of twentieth-century mathematics. Yet the Bourbaki collaborators by no means exhausted the critical potential of their own project. Consider, in counterpoint, the reconfiguration recently offered under the name Laboria Cuboniks, an anagram of Nicolas Bourbaki, turning the latter's confrontation, alienation, and universalism into a gnomic critical platform of xenofeminism seeking new relations between identity, technology, and nature.[79] Informed by the older feminist slogan that the personal is political,[80] a critical engagement with the politics and institutions of modern and contemporary mathematics must encompass the personal dimensions of disciplinary formations. Historicizing and reworking the contingent elements that made mathematics a young man's game may help bring into view other personae, other norms, other mathematics.

Works Cited

Archives

Records of the American Mathematical Society, John Hay Library, Brown University.
Archives Bourbaki, online.
Archives Mittag-Leffler, Djursholm, Sweden.
Rockefeller Foundation Archives, Sleepy Hollow, New York.
Papers of Frank Smithies, St. John's College Library, University of Cambridge, England.

Published Sources

Abrams, Ellen, "'Indebted to No One': Grounding and Gendering the Self-Made Mathematician," *Historical Studies in the Natural Sciences* 50, no. 3 (2020): 217-247.

Ágrafa Society. "Interview with Laboria Cuboniks: New Vectors from Xenofeminism." *Seminar* 1 (2019). http://www.zineseminar.com/wp/issue01/interview-with-laboria-cuboniks-new-vectors-from-xenofeminism/.

Alexander, Amir, *Duel at Dawn: Heroes, Martyrs, and the Rise of Modern Mathematics.* Cambridge, MA: Harvard University Press, 2010.

Alexanderson, Gerald L. and Mugler, Dale H., eds. *Lion Hunting & Other Mathematical Pursuits: A collection of mathematics, verse and stories by Ralph P. Boas, Jr.* Washington, DC: Mathematical Association of America, 1995.

Asper, Markus, "The two cultures of mathematics in ancient Greece." In *The Oxford Handbook of the History of Mathematics*, edited by E Robson and J Stedall, 107-132. Oxford: Oxford University Press, 2009.

Asper, Markus, "*Personae* at play. 'Men of Mathematics' in commentary." *Historia Mathematica* 47 (2019): 4-15.

Aubin, David, "The Withering Immortality of Nicolas Bourbaki: A Cultural Connector at the Confluence of Mathematics, Structuralism, and the Oulipo in France." *Science in Context* 10, no. 2 (1997): 297-342.

Aubin, David, *L' élite sous la mitraille. Les normaliens, les mathématiques et la Grande Guerre, 1900–1925*. Paris: Presses de l' École Normale Supérieure, 2018.

Audin, Michèle, "La Vérité sur la Poldévie," author's 'version (toujours) préliminaire' (2009). http://irma.math.unistra.fr/~maudin/poldevie.pdf, accessed 2020.

Barany, Michael J. "Mathematical Research in Context." MSc Diss., University of Edinburgh, 2010.

Barany, Michael J. "Remunerative Combinatorics: Mathematicians and their Sponsors in the Mid-Twentieth Century." In *Mathematical Cultures: The London Meetings 2012-2014* edited by B. Larvor, 329-346. Basel: Birkhäuser, 2016.

Barany, Michael J. "Fellow Travelers and Traveling Fellows: The intercontinental shaping of modern mathematics in mid-twentieth century Latin America." *Historical Studies in the Natural Sciences* 46 no. 5 (2016): 669-709.

Barany, Michael J. "The Fields Medal should return to its roots." *Nature* 553 (2018): 271-273.

Barany, Michael J. "Integration by Parts: Wordplay, Abuses of Language, and Modern Mathematical Theory on the Move." *Historical Studies in the Natural Sciences* 48, no. 3 (2018): 259-299.

Barany, Michael J. "The Officer's Three Names: the formal, familiar, and bureaucratic in the transnational history of scientific fellowships." In *Writing the Transnational History of Science and Technology,* edited by John Krige, 254-280. Chicago: University of Chicago Press, 2019.

Barany, Michael J. "Rockefeller bureaucracy and circumknowing science in the mid-twentieth century." *International Journal for History Culture and Modernity* 7 (2019):779-796.

Barany, Michael J. "Abstract relations: bibliography and the infra-structures of modern mathematics." *Synthese*, in press, (2020). DOI: 0.1007/s11229-020-02683-3.

Barany, Michael J. "Impersonation and Personification in Mid-Century Mathematics." *History of Science* (forthcoming).

Beaulieu, Liliane, "Bourbaki: Une histoire du groupe de mathématiciens français et de ses travaux (1934-1944)." Ph.D. Diss., Université de Montréal, 1989.

Beaulieu, Liliane, "A Parisian Café and Ten Proto-Bourbaki Meetings (1934-1935)." *The Mathematical Intelligencer* 15, no. 1 (1993): 27-35.

Beaulieu, Liliane, "Bourbaki's Art of Memory." *Osiris* 14 (1999): 219-251.

Belhoste, Bruno, "Un modèle à l'épreuve: L'École polytechnique de 1794 au Second Empire." In *La formation polytechnicienne, 1794-1994,* edited by Belhoste, Dahan Dalmedico, and Picon, 9-30. Paris: Dunod, 1994.

Biagioli, Mario, *Galileo, courtier: the practice of science in the culture of absolutism.* Chicago: University of Chicago, 1993.

Bouk, Dan, "Generation Crisis: How Population Research Defined the Baby Boomers." *Modern American History* 1, no. 3 (2018):321-342.

Cecire, Natalia, *American Literature and the Aesthetics of Knowledge.* Baltimore: Johns Hopkins University Press, 2019.

Chemla, Karine, "Explorations in the history of mathematical recreations: an introduction." *Historia Mathematica* 41, no. 4 (2014): 367-376.

Chevalley, Claude, "Variations du style mathématique." *Revue de Metaphysique et de Morale* 3 (1935): 375–384.

Corry, Leo, *Modern Algebra and the Rise of Mathematical Structures,* second revised edition. Basel: Birkhäuser, 2004 [1996].

Corry, Leo, "Writing the ultimate mathematical textbook: Nicolas Bourbaki's *Élements de mathématique*." In *The Oxford Handbook of the History of Mathematics*, edited by E. Robson and J. Stedall, 565-588. Oxford: Oxford University Press, 2009.

Costa, Shelley, "The 'Ladies' Diary': Gender, Mathematics, and Civil Society in Early-Eighteenth-Century England." *Osiris* 17 (2002): 49-73.

Cuboniks, Laboria, *The Xenofeminist Manifesto: A Politics for Alientation.* Brooklyn: Verso, 2018.

Cuomo, Serafina, "Exploring ancient Greek and Roman numeracy." *BSHM Bulletin: Journal of the British Society for the History of Mathematics* 27, no. 1 (2012): 1-12.

Dahan Dalmedico, Amy, "Sophie Germain." *Scientific American* 265, no. 6 (1991): 116-23.

Dahan Dalmedico, Amy, "An image conflict in mathematics after 1945." In C*hanging images in mathematics: From the French Revolution to the new millennium* edited by U. Bottazzini and A. Dahan Dalmedico, 223–53. London: Routledge, 2001.

Daston, Lorraine, *Classical Probability in the Enlightenment.* Princeton University Press, 1988.

Duchin, Moon, "The sexual politics of genius." (2004) Online, https://web.archive.org/web/20190923180852/https://mduchin.math.tufts.edu/genius.pdf.

Eilenberg, Samuel, review of Bourbaki, *Éléments de mathématique. Part I. Mathematical Reviews.* MR 3,55d, accessed as MathSciNet MR0004746, 1942.

Ellenberg, Jordan, "Is Math a Young Man's Game? No. Not every mathematician is washed up at 30." *Slate,* 16 May 2003, https://slate.com/human-interest/2003/05/is-math-a-young-man-s-game.html, accessed 2020.

Erickson, Paul, *The World the Game Theorists Made.* Chicago: University of Chicago Press, 2015.

Gillispie, Charles "Un enseignement hégémonique: les mathématiques." In *La formation polytechnicienne, 1794-1994* edited by Belhoste, Dahan Dalmedico, and Picon, 31-43. Paris: Dunod, 1994.

Goldstein, Catherine "La théorie des nombres en France dans l'entre-deux-guerres: De quelques effets de la première guerre mondiale." *Revue d'Histoire des Sciences* 62, no. 1 (2009): 143-175.

Hacking, Ian, *The Emergence of Probability: A Philosophical Study of Early Ideas about Probability, Induction and Statistical Inference.* Cambridge: Cambridge University Press, 1975.

Halmos, Paul R. "Nicolas Bourbaki." *Scientific American* 196 (1957): 88-99.

Hanisch, Carol, "The Personal Is Political." In *Notes from the Second Year: Women's Liberation* edited by Shulamith Firestone and Anne Koedt. New York: Radical Feminism, (1970).

Hardy, G.H. "The Case Against the Mathematical Tripos." *The Mathematical Gazette* 13, no. 181 (1926): 61-71.

Hardy, G.H. *A Mathematician's Apology.* Cambridge: Cambridge University Press, 1967 [1940].

Harris, Michael, *Mathematics Without Apologies: Portrait of a Problematic Vocation.* Princeton: Princeton University Press, 2015.

Heeffer, Albrecht "How Algebra Spoiled Recreational Problems: a Case Study in the Cross-cultural Dissemination of Mathematics." *Historia Mathematica* 41, no. 4 (2014): 400–437.

Hersh, Reuben and John-Steiner, Vera, *Loving + Hating Mathematics: Challenging the Myths of Mathematical Life.* Princeton, Princeton University Press, 2010.
Hill, Katherine, "'Juglers or Schollers?': negotiating the role of a mathematical practitioner." *British Journal for the History of Science* 31, no. 3 (1998): 253-274.
Hottinger, Sara N. *Inventing the Mathematician: Gender, Race, and Our Cultural Understanding of Mathematics.* Albany: State University of New York Press, 2016.
Høyrup. Jens, *In Measure, Number, and Weight: Studies in Mathematics and Culture*. Albany: State University of New York Press, 1994.
James, Kathryn, "Reading numbers in early modern England." *BSHM Bulletin: Journal of the British Society for the History of Mathematics* 26, no. 1 (2011): 1-16.
Jones, Claire G. *Femininity, Mathematics and Science, c.1880-1914.* Basingstoke: Palgrave Macmillan, 2009.
Kobler, J. "Who is Bourbaki?" *Saturday Evening Post* 239, no. 5 (1966): 34-35.
Kuisel, Richard F. *Seducing the French: The Dilemma of Americanization.* Berkeley: University of California Press, 1997.
Lehto, Olli, *Mathematics Without Borders: A History of the International Mathematical Union.* New York: Springer, 1998.
Mancosu, Paolo, "Mathematical Style." *Stanford Encyclopedia of Philosophy,* 2017. https://plato.stanford.edu/entries/mathematical-style/ (accessed 2020)
Mashaal, Maurice, *Bourbaki: Une société secrète de mathématiciens* (Paris: Éditions Pour la Science, 2002) translated by Anna Pierrehumbert as *Bourbaki: A Secret Society of Mathematicians,* Providence: American Mathematical Society, 2006.
Mazzotti, Massimo, *The World of Maria Gaetana Agnesi, Mathematician of God.* Baltimore: Johns Hopkins University Press, 2007.
Mazzotti, Massimo, "From Genius to Witch: The Rise and Fall of a Filosofessa." *Los Angeles Review of Books* 18 (2018).
Netz, Reviel *Ludic Proof: Greek Mathematics and the Alexandrian Aesthetic.* Cambridge: Cambridge University Press, 2009.
Jessica Marie Otis, "'Sportes and Pastimes, done by Number': Mathematical Games in Early Modern England." In *Playthings in Early Modernity: Party Games, Word Games, Mind Games*, edited by Allison Levy, 131-144. Kalamazoo: Western Michigan University, 2017.
Parmar, Inderjeet, *Foundations of the American Century: The Ford, Carnegie, and Rockefeller Foundations and the Rise of America Power.* New York: Columbia, 2012.
Paumier, Anne-Sandrine and Aubin, David, "Polycephalic Euclid? Collective Practices in Bourbaki's History of Mathematics." In *Historiography of mathematics in the 19th and 20th Centuries,* edited by V.R. Remmert, M.R. Schneider, H.K. Sørensen, 185-218. Switzerland: Birkhäuser, 2016.
Pétard, H. "A Contribution to the Mathematical Theory of Big Game Hunting." *American Mathematical Monthly* 45 (1938): 446-447
Phillips, Christopher J. "In Accordance with a 'More Majestic Order': The New Math and the Nature of Mathematics at Midcentury." *Isis* 105, no. 3 (2014): 540-563.
Phillips, Christopher J. "An Officer and a Scholar: Nineteenth-Century West Point and the Invention of the Blackboard." *History of Education Quarterly* 55, no. 1 (2015):82-108.
Porter, Theodore M. "How Science Became Technical." *Isis* 100 (2009):292-309.
Rankin, Joan, "Lady Wranglers." *The New Inquiry* 17 (November 2016), https://thenewinquiry.com/blog/lady-science-no-26-pt-2-lady-wranglers/, accessed 2020.

Richards, Joan, "Historical Mathematics in the French Eighteenth Century." *Isis* 97 (2006):700-713.

Siegmund-Schultze, Reinhard, *Rockefeller and the Internationalization of Mathematics Between the Two World Wars: Documents and Studies for the Social History of Mathematics in the 20th Century.* Basel: Birkhäuser, 2001.

Silver, Daniel, "In Defense of Pure Mathematics." *American Scientist* 103, no. 6 (2015): extended online version at DOI 10.1511/2015.117.418.

Smith, C.A.B. and Abbott, S. "The Story of Blanche Descartes." *The Mathematical Gazette* 87, no. 508 (2003):23-33.

Solovey, Mark, *Shaky Foundations: The Politics-Patronage-Social Science Nexus in Cold War America.* New Brunswick, NJ: Rutgers, 2013.

Steingart, Alma, "Conditional Inequalities: American Pure and Applied Mathematics, 1940-1975." PhD Diss., Massachusetts Institute of Technology, 2013.

Stern, Nancy, "Age and Achievement in Mathematics: A Case-Study in the Sociology of Science." *Social Studies of Science* 8, no. 1 (1978):127-140.

Terrall, Mary, "Émilie du Châtelet and the Gendering of Science." *History of Science* 33, no. 3 (1995): 283-310.

Terrall, Mary, "Metaphysics, Mathematics, and the Gendering of Science in Eighteenth Century France." In *The Sciences in Enlightened Europe* edited by William Clark, Jan Golinski, and Simon Schaffer, 246-271. Chicago: University of Chicago Press, 1999.

Terrall, Mary, "Masculine Knowledge, the Public Good, and the Scientific Household of Réaumur," *Osiris* 30 (2015): 182-201.

Weaver, Warren, *N.S. Notes on Officers' Techniques.* Rockefeller Foundation, 1946.

Veblen, Oswald, "Opening Address of Professor Oswald Veblen." in *Proceedings of the International Congress of Mathematicians, Cambridge, Massachusetts, U.S.A. 1950* edited by Lawrence M. Graves, Paul A. Smith, Einar Hille, and Oscar Zariski, 124-125.Providence: American Mathematical Society, 1952.

Wang, Jessica, "Physics, Emotion, and the Scientific Self: Merle Tuve's Cold War." *Historical Studies in the Natural Sciences* 42, no. 5 (2012):341-388.

Warwick, Andrew, "Exercising the Student Body: Mathematics and Athleticism in Victorian Cambridge," in *Science Incarnate: Historical Embodiments of Natural Knowledge,* ed. Christopher Lawrence and Steven Shapin, 288-326. Chicago: University of Chicago Press, 1998.

Warwick, Andrew, *Masters of Theory: Cambridge and the Rise of Mathematical Physics.* Chicago: University of Chicago Press, 2003.

Winter, Alison, "A Calculus of Suffering: Ada Lovelace and the Bodily Constraints on Women's Knowledge in Early Victorian England," in *Science Incarnate: Historical Embodiments of Natural Knowledge,* ed. Christopher Lawrence and Steven Shapin, 202-239. Chicago: University of Chicago Press, 1998.

Wohl, Robert, *The Generation of 1914.* Cambridge, MA: Harvard University Press, 1979.

Zaslavsky, Claudia, *Africa Counts: Number and Pattern in African Cultures.* Boston: Prindle, Weber and Schmidt, 1973.

[1] G.H. Hardy, *A Mathematician's Apology* (Cambridge: Cambridge University Press, 1967 [1940]), 70.
[2] Daniel Silver, "In Defense of Pure Mathematics," *American Scientist* 103, no. 6 (2015): extended online version at DOI 10.1511/2015.117.418.
[3] Hardy, *Apology,* 70-73.
[4] See e.g. S. Hottinger, *Inventing the Mathematician: Gender, Race, and Our Cultural Understanding of Mathematics.* (Albany: State University of New York Press, 2016).
[5] See Amy Dahan Dalmedico, ''An image conflict in mathematics after 1945,'' in *Changing images in mathematics: From the French Revolution to the new millennium*, ed. U. Bottazzini and A. Dahan Dalmedico, (London: Routledge, 2001), 223–53; Alma Steingart, "Conditional Inequalities: American Pure and Applied Mathematics, 1940-1975" (PhD Diss., Massachusetts Institute of Technology, 2013).
[6] See Jens Høyrup, *In Measure, Number, and Weight: Studies in Mathematics and Culture*. (Albany: SUNY Press, 1994).
[7] E.g. C. Zaslavsky, *Africa Counts: Number and Pattern in African Cultures.* (Boston: Prindle, Weber and Schmidt, 1973).
[8] Reviel Netz, *Ludic Proof: Greek Mathematics and the Alexandrian Aesthetic.* (Cambridge: Cambridge University Press, 2009).
[9] See e.g. Markus Asper, "The two cultures of mathematics in ancient Greece," in *The Oxford Handbook of the History of Mathematics*, ed. E Robson and J Stedall (Oxford: Oxford University Press, 2009), 107-132; K. Hill, "'Juglers or Schollers?': negotiating the role of a mathematical practitioner," *British Journal for the History of Science* 31, no. 3 (1998): 253-274.
[10] See Karine Chemla, "Explorations in the history of mathematical recreations: an introduction," *Historia Mathematica* 41, no. 4 (2014): 367-376.
[11] Ian Hacking, *The Emergence of Probability: A Philosophical Study of Early Ideas about Probability, Induction and Statistical Inference* (Cambridge: Cambridge University Press, 1975); L. Daston, *Classical Probability in the Enlightenment* (Princeton: Princeton University Press, 1988).
[12] Paul Erickson, *The World the Game Theorists Made.* (Chicago: University of Chicago Press, 2015).
[13] See Michael Harris, *Mathematics Without Apologies: Portrait of a Problematic Vocation.* (Princeton: Princeton University Press, 2015), esp. ch. 8.
[14] E.g. Serafina Cuomo, "Exploring ancient Greek and Roman numeracy," *BSHM Bulletin: Journal of the British Society for the History of Mathematics* 27, no. 1 (2012): 1-12, on 4-6.
[15] Hacking, *Emergence,* and Daston, *Classical*.
[16] Albrecht Heeffer, "How Algebra Spoiled Recreational Problems: a Case Study in the Cross-cultural Dissemination of Mathematics," *Historia Mathematica* 41, no. 4 (2014): 400–437.
[17] E.g. Kathryn James, "Reading numbers in early modern England," *BSHM Bulletin: Journal of the British Society for the History of Mathematics* 26, no. 1 (2011): 1-16. On this and related themes linking education, play, numeracy, and chance, see Jessica Marie Otis, "'Sportes and Pastimes, done by Number': Mathematical Games in Early Modern England," in *Playthings in Early Modernity: Party Games, Word Games, Mind Games,* ed. Allison Levy (Kalamazoo: Western Michigan University, 2017), 131-144.
[18] Shelley Costa, "The 'Ladies' Diary': Gender, Mathematics, and Civil Society in Early-Eighteenth-Century England," *Osiris* 17 (2002): 49-73.
[19] E.g. Massimo Mazzotti, *The World of Maria Gaetana Agnesi, Mathematician of God* (Baltimore: Johns Hopkins University Press, 2007); Mazzotti, "From Genius to Witch: The Rise and Fall of a Filosofessa," *Los Angeles Review of Books* 18 (2018).
[20] Mary Terrall, "Émilie du Châtelet and the Gendering of Science," *History of Science* 33, no. 3 (1995): 283-310; Mary Terrall, "Metaphysics, Mathematics, and the Gendering of Science in Eighteenth Century France," in *The Sciences in Enlightened Europe* ed. William Clark, Jan Golinski, and Simon Schaffer (Chicago: University of Chicago Press, 1999), 246-271. In view of the next section's argument about gender, patronage, and institutions, see also Mary Terrall, "Masculine Knowledge, the Public Good, and the Scientific Household of Réaumur," *Osiris* 30 (2015): 182-201.
[21] J. Richards, "Historical Mathematics in the French Eighteenth Century," *Isis* 97 (2006): 700-713.
[22] B. Belhoste, "Un modèle à l'épreuve : L'École polytechnique de 1794 au Second Empire," in *La formation polytechnicienne, 1794-1994* ed. Belhoste, Dahan Dalmedico, and Picon (Paris: Dunod, 1994), 9-30; C. Gillispie, "Un enseignement hégémonique: les mathématiques," in *La formation polytechnicienne, 1794-1994* ed. Belhoste, Dahan Dalmedico, and Picon (Paris: Dunod, 1994), 31-43; Richards, "Historical Mathematics," Cf. Phillips, "An Officer and a Scholar: Nineteenth-Century West Point and the Invention of the Blackboard," *History of Education Quarterly* 55, no. 1 (2015): 82-108. On the social and intellectual history of the 'technical' in relations between science and mathematics, see Theodore M. Porter, "How Science Became Technical," *Isis* 100 (2009): 292-309. For the connection to Porter's analysis, I thank Natalia Cecire, whose own work underscores the gendered dimensions of designating particular forms of knowledge as technical; Natalia Cecire, *American Literature and the Aesthetics of Knowledge* (Baltimore: Johns Hopkins University Press, 2019), esp. 128-133.
[23] Andrew Warwick, *Masters of Theory: Cambridge and the Rise of Mathematical Physics* (Chicago: University of Chicago Press, 2003).

[24] Andrew Warwick, "Exercising the Student Body: Mathematics and Athleticism in Victorian Cambridge," in *Science Incarnate: Historical Embodiments of Natural Knowledge,* ed. Christopher Lawrence and Steven Shapin (Chicago: University of Chicago Press, 1998), 288-326. Cf. Alison Winter, "A Calculus of Suffering: Ada Lovelace and the Bodily Constraints on Women's Knowledge in Early Victorian England," in Lawrence and Shapin, eds., *Science Incarnate,* 202-239.
[25] Amy Dahan Dalmedico, "Sophie Germain," *Scientific American* 265, no. 6 (1991): 116-23. Such gender-obscuring pseudonyms are widespread in many fields beyond mathematics.
[26] Claire G. Jones, *Femininity, Mathematics and Science, c.1880-1914* (Basingstoke: Palgrave Macmillan, 2009).
[27] Joy Rankin, "Lady Wranglers," *The New Inquiry* 17 (November 2016): online
[28] See G.H. Hardy, "The Case Against the Mathematical Tripos," *The Mathematical Gazette* 13, no. 181 (1926): 61-71.
[29] Ellen Abrams, "'Indebted to No One': Grounding and Gendering the Self-Made Mathematician," *Historical Studies in the Natural Sciences* 50, no. 3 (2020): 217-247.
[30] Cf. Alexander, *Duel at Dawn : Heroes, Martyrs, and the Rise of Modern Mathematics* (Cambridge, MA: Harvard University Press, 2010); Moon Duchin, "The sexual politics of genius," 2004.
[31] Elsewhere in the historiography of science, patronage and personae have well-established links. E.g. M. Biagioli, *Galileo, courtier: the practice of science in the culture of absolutism* (Chicago: University of Chicago, 1993).
[32] Liliane Beaulieu, *Bourbaki: Une histoire du groupe de mathématiciens français et de ses travaux (1934-1944)* (Ph.D. Diss., Université de Montréal, 1989), 69-102; R. Siegmund-Schultze, *Rockefeller and the Internationalization of Mathematics Between the Two World Wars: Documents and Studies for the Social History of Mathematics in the 20th Century* (Basel: Birkhäuser, 2001); C. Goldstein, "La théorie des nombres en France dans l'entre-deux-guerres: De quelques effets de la première guerre mondiale," *Revue d'Histoire des Sciences* 62, no. 1 (2009): 143-175.
[33] Inderjeet Parmar, *Foundations of the American Century: The Ford, Carnegie, and Rockefeller Foundations and the Rise of America Power* (New York: Columbia, 2012); Mark Solovey, *Shaky Foundations: The Politics-Patronage-Social Science Nexus in Cold War America* (New Brunswick, NJ: Rutgers, 2013).
[34] See Michael J. Barany, "Rockefeller bureaucracy and circumknowing science in the mid-twentieth century," *International Journal for History Culture and Modernity* 7 (2019):779-796.
[35] E.g. Warren Weaver, *N.S. Notes on Officers' Techniques* (Rockefeller Foundation, 1946), 30. This handbook is available online at online at https://rockfound.rockarch.org/digital-library-listing/-/asset_publisher/yYxpQfeI4W8N/content/n-s-notes-on-officers-techniques.
[36] Siegmund-Schultze, *Rockefeller*, 87.
[37] Rose to Mittag-Leffler, 27 Mar 1924, Archives Mittag-Leffler, Djursholm, Sweden.
[38] Barany, "Circumknowing"; Siegmund-Schultze, *Rockefeller*; M. J. Barany, "The Officer's Three Names: the formal, familiar, and bureaucratic in the transnational history of scientific fellowships," in *Writing the Transnational History of Science and Technology,* ed. John Krige (Chicago: University of Chicago Press, 2019), 254-280.
[39] Beaulieu, *Bourbaki: Une histoire*, ii:105-108; L. Beaulieu, "A Parisian Café and Ten Proto-Bourbaki Meetings (1934-1935)," *The Mathematical Intelligencer* 15, no. 1 (1993): 27-35; L. Corry, "Writing the ultimate mathematical textbook: Nicolas Bourbaki's *Élements de mathématique*," in *The Oxford Handbook of the History of Mathematics*, ed. E Robson and J Stedall (Oxford: Oxford University Press, 2009), 565-588.
[40] Liliane Beaulieu, "Bourbaki's Art of Memory," *Osiris* 14 (1999): 219-251, on 238-239; M. J. Barany, "Impersonation and Personification in Mid-Century Mathematics," *History of Science,* (forthcoming), DOI: 10.1177/0073275320924571, § "Cover stories"; see also M. Audin, "La Vérité sur la Poldévie," 2009 http://oulipo.net/fr/la-verite-sur-la-poldevie, accessed 2017.
[41] See Barany, "Impersonation," esp. § "From fiction to fraud."
[42] Beaulieu, "Memory," 246-248.
[43] Beaulieu, *Bourbaki: Une histoire,* 286. I explore the construction and consequences of Bourbaki as an open secret in length in an article currently under revision.
[44] Scanned editions of *La Tribu* can be found on the website of the *Archives Bourbaki,* http://archives-bourbaki.ahp-numerique.fr/.
[45] "Compte rendu du Congrès oecuménique du cocotier (avril 1949)," Archives Bourbaki, http://archives-bourbaki.ahp-numerique.fr/items/show/96 (accessed 2020), on 1. On Freymann and Hermann, see Maurice Mashaal, *Bourbaki: Une société secrète de mathématiciens* (Paris: Éditions Pour la Science, 2002) translated by Anna Pierrehumbert as *Bourbaki: A Secret Society of Mathematicians* (Providence: American Mathematical Society, 2006), 53.
[46] Frank Smithies to Ralph Boas, 3 May 1953, folder A10, Papers of Frank Smithies, St. John's College Library, University of Cambridge, quotation by permission of the Master and Fellows of St. John's College. This research was supported by a Grattan-Guinness Archival Research Travel Grant.
[47] Beaulieu, "Memory," 226.
[48] See Grant in Aid for the University of Nancy, Faculty of Sciences, Account RF 47139, September 1948, Rockefeller Foundation Archives, Record Group 6.1, sub-series 2: Paris Field Office, Box 8, Folder 55.
[49] Pseudonyms gave cover to homogeneous collectives even when diverging more significantly from those collectives' demographic features, e.g. the male Cambridge (UK) collective that wrote under the female-gendered pun name Blanche Descartes. See C.A.B. Smith and S. Abbott, "The Story of Blanche Descartes," *The Mathematical Gazette* 87, no. 508 (2003):23-33. The group explicitly modelled itself on and paid tribute to Bourbaki, on a smaller scale.
[50] Barany, "Impersonation," § "Cited, unseen."

[51] S. Eilenberg, review of Bourbaki, *Éléments de mathématique. Part I. Mathematical Reviews* MR 3,55d, accessed as MathSciNet MR0004746, 1942.
[52] I thank Natalia Cecire for recalling in this context the mid-century cultural association between youth, modernization, and Americanization in Franco-American relations, evident here in the positioning and reception of Bourbaki's collective persona. See, e.g., Richard Kuisel, *Seducing the French: The Dilemma of Americanization* (Berkeley: University of California Press, 1997).
[53] Barany, "Impersonation," § "From fiction to fraud."
[54] Records of the American Mathematical Society, John Hay Library, Brown University (hereafter "AMS records"), box 36, folder 11, Kline to Hildebrandt, 16 January 1950.
[55] AMS records, box 36, folder 11, Hildebrandt to Kline, 20 January 1950.
[56] AMS records, box 36, folder 11, Weaver to Kline, 7 March 1950.
[57] AMS records, box 36, folder 11, Hille to Kline, 8 March 1950.
[58] Paul R. Halmos, "Nicolas Bourbaki," *Scientific American* 196 (1957): 88-99, on 99. On youth and fun in the cultural politics of postwar physics, see Jessica Wang, "Physics, Emotion, and the Scientific Self: Merle Tuve's Cold War," *Historical Studies in the Natural Sciences* 42, no. 5 (2012):341-388, on 376-378.
[59] David Aubin, "The Withering Immortality of Nicolas Bourbaki: A Cultural Connector at the Confluence of Mathematics, Structuralism, and the Oulipo in France," *Science in Context* 10, no. 2 (1997): 297-342. Cf. C. Phillips, "In Accordance with a 'More Majestic Order': The New Math and the Nature of Mathematics at Midcentury," *Isis* 105, no. 3 (2014): 540-563.
[60] Kobler, "Who is Bourbaki?" *Saturday Evening Post* 239, no. 5 (1966): 34-35, on 34.
[61] David Aubin, *L'élite sous la mitraille. Les normaliens, les mathématiques et la Grande Guerre, 1900–1925* (Paris: Presses de l' École Normale Supérieure, 2018).
[62] Google Books Ngram Viewer, English (2012) corpus, search term "a young man's game," https://books.google.com/ngrams/graph?content=a+young+man%27s+game&year_start=1800&year_end=2008&corpus=15&smoothing=1, accessed 2020.
[63] On generational thinking in and around the Great War, see Robert Wohl, *The Generation of 1914* (Cambridge, MA: Harvard University Press, 1979). On the social history of generation discourse as a marker of generational conflict, cf. Dan Bouk, "Generation Crisis: How Population Research Defined the Baby Boomers," *Modern American History* 1, no. 3 (2018):321-342.
[64] Michael J. Barany, "Remunerative Combinatorics: Mathematicians and their Sponsors in the Mid-Twentieth Century," in *Mathematical Cultures: The London Meetings 2012-2014* ed. B Larvor (Basel: Birkhäuser, 2016), 329-346.
[65] Michael J. Barany, "Fellow Travelers and Traveling Fellows: The intercontinental shaping of modern mathematics in mid-twentieth century Latin America," *Historical Studies in the Natural Sciences* 46, no. 5 (2016): 669-709.
[66] Michael J. Barany, "Abstract relations: bibliography and the infra-structures of modern mathematics." *Synthese*, (2020), in press, DOI: 0.1007/s11229-020-02683-3.
[67] Michael J. Barany, "Integration by Parts: Wordplay, Abuses of Language, and Modern Mathematical Theory on the Move," *Historical Studies in the Natural Sciences* 48, no. 3 (2018): 259-299.
[68] One might say ludic 'styles' of mathematics, and indeed founding Bourbaki collaborator Claude Chevalley offered a significant forerunner to recent philosophical interest in mathematical 'styles.' Chevalley, "Variations du style mathématique," *Revue de Metaphysique et de Morale* 3 (1935): 375–384. See P. Mancosu, "Mathematical Style," *Stanford Encyclopedia of Philosophy,* (2017), https://plato.stanford.edu/entries/mathematical-style/ (accessed 2020).
[69] Hardy, *Apology*, 80.
[70] Hardy, *Apology*, 70.
[71] Oswald Veblen, "Opening Address of Professor Oswald Veblen," in *Proceedings of the International Congress of Mathematicians, Cambridge, Massachusetts, U.S.A. 1950* ed. Lawrence M. Graves, Paul A. Smith, Einar Hille, and Oscar Zariski. (Providence: American Mathematical Society, 1952), 124- 125.
[72] Nancy Stern, "Age and Achievement in Mathematics: A Case-Study in the Sociology of Science," *Social Studies of Science* 8, no. 1 (1978):127-140; Jordan Ellenberg, "Is Math a Young Man's Game? No. Not every mathematician is washed up at 30." *Slate,* 16 May 2003, https://slate.com/human-interest/2003/05/is-math-a-young-man-s-game.html, accessed 2020; Reuben Hersh and Vera John-Steiner, *Loving + Hating Mathematics: Challenging the Myths of Mathematical Life* (Princeton, Princeton University Press, 2010), 251-272.
[73] M.J. Barany, "Mathematical Research in Context," (MSc Diss., University of Edinburgh, 2010), 31-40. Available online at http://mbarany.com/EdinburghDissertation.pdf.
[74] This image found voice in one of the earliest homages to Bourbaki in the mathematical literature, a 1938 parody article under the pseudonym of lion-hunter H Pétard: "A Contribution to the Mathematical Theory of Big Game Hunting," *American Mathematical Monthly* 45: 446-447. See Gerald L. Alexanderson and Dale H. Mugler, eds., *Lion Hunting & Other Mathematical Pursuits: A collection of mathematics, verse and stories by Ralph P. Boas, Jr.* (Washington, DC: Mathematical Association of America, 1995); Barany, "Integration," 280-282; Barany, "Impersonation."; Blanche Descartes's (see note above) pun-filled poem "Hymne to Hymen" celebrating Pétard's wedding to Bourbaki's daughter Betti deserves its own close reading in connection with this chapter's themes and must, alas, be deferred to a future analysis.

[75] E.T. Bell, *Men of Mathematics* (New York: Simon and Schuster, 1937). Three ancient Greek mathematicians fall under the chapter heading of "modern minds in ancient bodies."
[76] Bell, *Men*, 3-4. For a provocative comparison between Bell's approach and Classical traditions of mathematical commentary, see Markus Asper, "*Personae* at play. 'Men of Mathematics' in commentary." *Historia Mathematica* 47 (2019): 4-15.
[77] Bell, *Men*, 8.
[78] See Michael J. Barany, "The Fields Medal should return to its roots," *Nature* 553 (2018): 271-273.
[79] Laboria Cuboniks, *The Xenofeminist Manifesto: A Politics for Alientation* (Brooklyn: Verso, 2018), online as *Xenofeminism: A Politics for Alienation,* https://laboriacuboniks.net/manifesto/xenofeminism-a-politics-for-alienation/, accessed 2020. It is perhaps significant that the collective animators of Cuboniks stress Bourbaki's valorisation of abstraction and generality rather than Bourbaki's gendered history when identifying the link between the pseudonyms. E.g. Ágrafa Society, "Interview with Laboria Cuboniks: New Vectors from Xenofeminism," *Seminar* 1, (2019), online, http://www.zineseminar.com/wp/issue01/interview-with-laboria-cuboniks-new-vectors-from-xenofeminism/, accessed 2020.
[80] Carol Hanisch, "The Personal Is Political," in *Notes from the Second Year: Women's Liberation* ed. Shulamith Firestone and Anne Koedt (New York: Radical Feminism, 1970), online at http://www.carolhanisch.org/CHwritings/PIP.html, accessed 2020.