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Placing a Global Mathematical Literature

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The Entire World Literature of Mathematics

The editorial statement at the front of the first issue of the *Zentralblatt für Mathematik und ihre Grenzgebiete* was duly immodest. Their task, the editors announced, was to review “the entire world literature of mathematics and its borderlands” quickly and reliably in monthly issues. The statement focused on what the editors meant by the titular “mathematics and its borderlands,” a geographical metaphor for a conceptual and disciplinary terrain that required a deliberate and ambitious approach to navigation. The other geography of their task, the Weltliteratur that united decidedly less metaphorical lands peopled by the mathematicians of every nation, occasioned no further comment in the editorial foreword.

Publications, particularly periodicals, were central to the transformation of the scale of institutions and networks of mathematical research from local and regional to national, international, and eventually a distinct multicontinental (even global) scale [see e.g. Pa; Ba2 ch. 1]. Research journals in the nineteenth century were crucial instruments and indexes of national and international communication, making it possible for mathematicians to see themselves as actively engaged in a common enterprise with interlocutors in faraway lands, even as much of their day to day mathematics often revolved around concerns and relationships much closer to home. Time and again, keeping up with the published and ongoing research of distant mathematicians has animated proposals and activities of international organizations, dating at least to the discipline's first international congresses at the turn of the twentieth century [see Ba7, pp. S6277-S6278; Ba3, p. 670].

Systematic bibliographic enterprises were the vital apparatus mathematicians adopted to keep up with each other. Together with international conferences, newsletters, and other connective infrastructure, review journals enabled mathematicians to imagine, comprehend, and to a significant degree access an imposingly vast body of published work. In this regard, as Siegmund-Schultze has argued [Si] the *Zentralblatt für Mathematik und ihre Grenzgebiete* marked a radical change in approach, prioritizing bibliography as dynamic instruments for accessing current mathematical literature as opposed to a static retrospective accounting of past literature. The *Zentralblatt's* founding editor and his approach crossed the Atlantic amidst geopolitical turmoil and inaugurated the American *Mathematical Reviews* in 1940. The two review journals, joined at times by others such as the Soviet *Referativny Zhurnal* in mathematics, were infrastructural lynchpins of mathematicians' global era.

I have recently argued that the geographically-embedded infrastructural and institutional transformations represented in review journals' central place in twentieth century mathematics were integrally intertwined with what historians have elsewhere identified as the period's definitive conceptual developments [Ba7]. Responding to a sense of disciplinary disintegration and the lived challenges of connecting at a distance, review journals facilitated a shifted emphasis in mathematical thinking and communication on the unifying conceptual relationships between of research interventions. Mathematicians' means of organizing their literature were simultaneously ways of organizing their discipline and their theories, and it is possible to identify direct links between these different dimensions of organization. Producing what I have called a “sociable structuralism,” mathematicians' conjoined interest in the social, institutional, and theoretical

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contexts of their work made it possible for mathematics to become a meaningfully global discipline, changing the nature and meaning of mathematics in the process.

While much of this expanded and transformed mathematical world remained concentrated in the discipline's geographic centers, the world mathematical literature also encompassed a significant share of work from comparatively peripheral countries and institutions. Review journals stood out as mechanisms of navigating, reconciling, and hiding geographic difference and its associated inequalities of prestige, resources, access, and information. Even relatively central institutions could not maintain comprehensive access to potentially relevant new mathematical research from around the world. It took a concerted effort in centers and peripheries alike to centralize information about the location and content of a world literature and to facilitate enough access to enough elements of this literature to give the impression of its unproblematic worldwide availability.

Geographic place appears and disappears at intervals in this process of review-based literature-making. Identifying explicit and implicit markers of place and of geographic difference in the archival record of review periodicals' production and use draws out personal, political, logistical, and other dimensions of mathematicians' text-driven globalization. Where geography appears, it indicates situated engagement with place-based conditions of knowledge making. Where it fades into the background, putting reviews in geographic context shows how such place-based knowledge could be seen and used as a unifying mechanism of a putatively universal discipline. The literature thus operated simultaneously as a situated enterprise, a means of joining disparate situations, and a mechanism of decontextualization, embedding place in placelessness and *vice versa* in the production of mathematics at a world scale.

What Literatures Do

To imagine a world literature and to undertake to index and review it alike depended on specific historical conditions. Mathematicians had to be able to imagine that their ideas mattered to distant people, that their research communities and professional identities extended to those they might never meet, whose names they may know only from the pages of periodicals. A world literature required a large number of active researchers, sufficiently numerous and geographically distributed that published texts (as opposed to collocated or personally written contact) provided the primary means for most to keep up with most others' research.

Such a literature required a substantial body of written work, sufficient to inform and sustain programs of research, as well as norms of producing and circulating work in writing to continually augment that written corpus. Mathematicians had to develop customs and deploy resources to produce not just notes and records of research and exposition but a robust supply of copies of those notes and records, often using recent technologies and infrastructures to reproduce texts and send them around the world. Mathematics libraries from Paris to Princeton to Buenos Aires, Berkeley, and Bombay brim with multifariously printed and bound periodicals, lecture notes, and other materials whose palpable diversity of textures and forms attests to the changing conditions of producing and moving literature at scale. Mid-twentieth century initiatives toward systematic classification associated with *Mathematical Reviews* were largely aimed to support more centralized services for producing and distributing offprints and reproductions [see Fr]. A world literature was both a result of such mobilizations and their motive, with text-mediated connections justifying further proliferations of texts and contacts and further efforts to connect and harmonize people, texts, forms, and norms.

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To function as a literature, there must be a sense among its producers and users that such texts are meaningfully connected and intellectually coherent. Part of this coherence comes from smoothing over divides of distance and language. Leaving out details and identifiers that situate work too particularly in a local setting of training and understanding allowed readers to believe and act as though their mathematics was far more fungible than it typically was in practice [Ba4]. Reviewing each other's texts gave opportunities to synthesize and reframe varied research programs into integrated theories, to make comparatively disconnected findings into contributions to shared undertakings, even when they were not initially formulated as such.

Finally, a literature is a living thing with a propulsive temporality: researchers must feel a sense of urgency and demand for each other's recent writing as a condition for their own activity. With citations and references, periodicals (including bibliographic ones) integrate and homogenize research into a progressively unfolding timeline. Literatures cast past results as contributions toward present and future knowledge, structuring networks of texts conceptually and argumentatively while endowing them with new kinds of significance. Bibliography looks backward at what has been published, but it also looks forward at how publications build and recombine toward new knowledge. At the same time, bibliographies detemporalize, collecting disparate results into a single momentary picture of what has been established and explained.

For mathematicians, these conditions and features are for the most part distinctively modern, deriving from fundamental changes to how mathematicians worked and communicated over the last two centuries. While some degree of long-distance communication in mathematics, for instance in the early modern Republic of Letters [see e.g. Os, We] or mathematical translation in contexts of distant cultural contact and transmission [e.g. Ha], helped shape a world where mathematicians built theories and institutions around a disciplinary literature, the definitive features of what the *Zentralblatt* statement called a "world literature" were in many respects categorically different in scale and kind. Originating in new relationships between mathematical research and periodicals in the nineteenth century, the modern roles and centrality of something like a coherent disciplinary literature in mathematics depended on distinctive late-nineteenth and twentieth-century dimensions of internationalization and globalization that intensified mathematicians' paper-based political economies of making knowledge and institutions.

Placing Review Journals

The covers of volumes of *Mathematical Reviews* do little to directly communicate matters of place. The American Mathematical Society's headquarters in Providence, Rhode Island, did not appear on the cover until volume 57 (1979), long after most work for *Mathematical Reviews* itself had moved to Ann Arbor, Michigan [see AMS, box 2 folder 8]. The language and identity of editors listed on the cover had geographic significance, to be sure, but as with the *Zentralblatt's* inaugural editorial statement the covers of *Mathematical Reviews* historically prioritized the metaphorical geography of research fields (in the form of tables of contents) over other geographies.

Open the volume, however, and the inside cover has much more to say about the places of *Mathematical Reviews*. While the review journal was part of the American Mathematical Society's publishing operation, from the start it drew on partnerships with other sponsoring societies, typically of national dimensions. The sponsor list in volume 1 unsurprisingly reflects the partnership between the American Mathematical Society, Mathematical Association of America, and London Mathematical Society. The Amsterdam Mathematical Society is perhaps also unsurprising in view of

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the place of Dutch mathematics and Dutch publishing at the time, but the National Academy of Exact, Physical, and Natural Sciences of Lima, Peru, may have done more to signal the breadth of the project's geographic ambitions. Reflecting new relationships between North and South American mathematics during World War 2 and the American Mathematical Society's explicit wartime pivot to South America, the Argentina Mathematical Union joined the roster in 1942 [see Ba3; AMS box 15 folder 33]. An expanding list of sponsors included the Indian Mathematical Society by 1948 as well as a growing roster of European institutions restored to international activity after the war.

Separate from the multi-national list of mathematical society sponsors, the inside covers of *Mathematical Reviews* also record the persistent importance of United States government, military, and philanthropic funding [see Ba1]. Asserting and reinforcing the United States as a geographic center of mathematical research was, indeed, an explicit rationale in discussions between mathematicians and major U.S. philanthropies around the journal's founding [e.g. CCN, RF]. The Carnegie Corporation of New York and Rockefeller Foundation were especially significant early philanthropic sponsors, together with the U.S. Office of Naval Research, joined as well by the American Philosophical Society the inside cover of early issues. Depending on the year, the listed government and military sponsor varied between the Navy, Air Force, and civilian National Science Foundation. Such funding for reviews underwrote mathematicians' professional activity more broadly. A 1948 memorandum from the American Mathematical Society secretary, for example, credited the "generous contribution from the Navy for the work of *Mathematical Reviews*" as the sole reason for "any hope that the Society's operations for the fiscal year 1948 may not show an excess of expenditures over receipts" [MCG].

The inside covers of the review journal also index the changing conditions of mathematical publishing. Difficulties in composing and editing mathematical texts for print made the American Mathematical Society and related organizations dependent on specialist publishers with the staff and setup to process their technical texts. The *Zentralblatt* did not have comparable considerations, launched initially by the specialist publisher Springer and maintaining a long-running association with the publisher even when other aspects of its operations moved under other auspices [Gö]. For *Mathematical Reviews*, composition and printing credits reflect a variety of arrangements including firms in the United States, the Netherlands, and the United Kingdom.

Turn past the cover and other geographic markers appear. The most obvious are the city names customarily attached to the names of reviewers, a practice adopted in both *Mathematical Reviews* and the *Zentralblatt* but not uniformly followed in either. This epistolary convention, providing a dateline for the author, suggested institutional coordinates and geographic connections without quite showing either in full. Texts in foreign languages to the respective journals whose titles appear in translation have a note indicating the source's language, which together with the source journal title or publisher conveyed geographical implications. Though the practice did not last long, the earliest *Zentralblatt* reviews sometimes included institutional coordinates for the reviewed work's author, a useful datum for addressing a request for offprints.

Moving Review Journals

When Evert M. Bruins arrived in Baghdad on a 1953 UNESCO Field Mission to improve collegiate mathematics instruction, he lamented the "deplorable state" of the lecture rooms and blackboards but found his host institution's library remarkably well stocked with books [FMB]. Conspicuously missing, however, were mathematical periodicals. Progress reports from Bruins show a persistent

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effort to obtain volumes of *Mathematical Reviews* at a discounted rate his hosts could sustain as a necessary connection to the periodical literature that could never be assembled in Baghdad but could at least be put within view. The review journal was an obvious ingredient for Bruins to connect teachers and students in Baghdad to a wider geography of scholarship, a condition of being part of the world of mathematics.

Time and again, agents of new enterprises for moving mathematical expertise around the world in the mid-twentieth century grappled with the problem of bringing their view of the mathematical world with them to these less-integrated locales. Time and again, they saw review periodicals as the indispensable resource for this aim. The state of a library's review journal subscriptions and back catalogue was a frequent early point of inquiry for traveling experts, and rectifying absences of the same was a frequent early proposal or initiative [cf. FMM].

Demand for review journals outpaced supply, especially for back issues that were no longer being printed. Mathematicians and those who assembled and maintained their libraries responded by sharing, sending, selling, and otherwise redistributing scarce bibliographic resources. There was enough demand that commercial brokerages could turn a profit as intermediaries in the back issue trade. An August 1964 form letter from a broker in Amsterdam, for example, sought back issues for purchase from libraries and individuals as far away as Australia, offering to pay a purchase price and shipping costs for spare issues of *Mathematical Reviews* and nine high-profile European and American journals [MAV].

Such investments in moving review journals around the world also facilitated moving people. Uruguayan mathematician José Luis Massera identified prospective universities and mentors for his 1947-1948 Rockefeller Foundation fellowship in the United States by consulting the relevant sections related to his research interests from editions of *Mathematical Reviews* available to him at the time of his application [Ba3, p. 685; see Ba3, Ba5, JLM, RF2]. Unfamiliar with the details of the reviewed research or the people whose work was reviewed, Massera substantially misjudged the fit of his proposed placement, and eventually relocated mid-fellowship. Emphasizing institutions and broad geographic indicators over the kind of geographic information most relevant to a fellowship candidate, *Mathematical Reviews* also led Massera to dramatically overestimate the mutual proximity of California institutions of interest and to overlook the relative ease of commuting between New York and New Jersey to work with mentors there, as he eventually managed to arrange after arriving in the United States.

While in Princeton during this latter phase of his fellowship, Massera signed up as a reviewer for *Mathematical Reviews*, declaring an interest in articles in English, French, German, Russian, Italian, Spanish, and Portuguese [MR]. His capability in Russian, related to his active role in Uruguay's Communist Party, was of particular interest to mathematical colleagues. His Princeton mentor Solomon Lefschetz, for instance, sent Massera two Russian-language articles in 1949 that had been initially assigned to Lefschetz for review, on the grounds that "you are the best master outside of the USSR" on their topic [JLM, 5A, Lefschetz to Massera 14 Feb 1949]. Massera went on to be a prolific reviewer for *Mathematical Reviews*, particularly of Russian-language literature, and also reviewed a number of Russian-language articles for the *Zentralblatt*. His continuing connection with the American bibliographic infrastructure exemplifies the continual interconversion of travel and relationships involving people and texts that sustained continent-crossing mathematics.

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Indexing Reviewers

Review journals maintained their geographic and intellectual breadth and relevance by maintaining good connections to the well-connected. Already in July 1940, the American Mathematical Society boasted to a *Mathematical Reviews* sponsor that the journal had "a corps of 400 reviewers including representatives of practically every country in the world ... in every field of mathematics, with knowledge of all the languages in which mathematics is written" [AMS box 15 folder 33]. While undoubtedly an exaggeration in some respects, such a claim reflected at least the editors' values and ambitions to particular geographic, topical, and linguistic comprehensiveness.

The large and expanding pool of potential reviewers stood ready to be matched to the mathematical literature in the form of information centralized in drawer after drawer of index cards. Editors worked with a voluminous file of reviewer cards with data entered either by the reviewers themselves or on their behalf based on information from other correspondence [cf. Ba6 pp. 786-789]. Beyond the reviewer's name and any annotations added later by editors, reviewer cards at *Mathematical Reviews* contained four crucial pieces of information, each liable to go out of date and each requiring regular maintenance and to remain useful for the reviewing enterprise.

The top of the card held the most important information, the main fields of interest to the reviewer. An editor, having roughly classified an item for review, could flip rapidly through index cards in search of key words that suggested a promising candidate reviewer. The parenthetical instructions to "state as specifically as possible" guided reviewers to claim sectors of the future mathematical literature as urgent, interesting, and within their expertise. These were areas where the reviewer could be counted upon to form an informed assessment and, just as importantly, to do so expeditiously.

The next line of the index card asked for fields of secondary interest. These could be topics where the reviewer felt expert and comfortable but not necessarily with the urgency of an active investigator. The word "interest" in the card signals the matter to be one of priority based on personal research agendas and curiosity, not a question of whether the reviewer can make an authoritative evaluation. Like the indication of "main" fields of interest, this line hid any geographic or personal indications. Though research topics and their associated terminology could very strongly depend on place and people, such features appeared only incidentally in reviewers' identifications.

Geographic considerations, rather, fill the lower half of reviewer index cards, the part that was difficult to see when flipping through a file in search of a reviewer but became rather more salient after identifying them. Presuming a male reviewer, the card prompts "He is able to review articles written in the following languages:" before a space for entering linguistic competencies. When an editor completed the card, these can be found in a quick shorthand such as "e f g" for "English, French, German." Being able to review articles in a language was a specific capability, distinct from speaking, writing, or even reading a language fluently in other contexts. Familiarity with terms and conventions of a research area let reviewers handle written work in a much wider range of idioms than they would customarily engage in other parts of their personal and professional lives. With the aid of translation dictionaries and specialized lexicons, and perhaps consulting friends and colleagues, mathematicians routinely engaged literatures in otherwise uncomfortable languages.

At the time French Mathematician Laurent Schwartz sent the information recorded as "e f g" on the above-noted card [MR], for instance, he was a confident reader of Classical Latin and Greek [Sch, p. 30] which he did not consider likely reviewing languages. He had also studied German in secondary school, but when it came to speaking in English he still only felt comfortable writing his presentation

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first in French and then then consulting a dictionary and his wife to assist in translating [Sch, p. 302]. Even then, he couldn't confidently take questions in English [Sch, p. 303], though over the next decade his travels and interests would lead him to gain at least some fluency with English, Spanish, and Portuguese, as well as lesser competence with Russian and Italian [Sch, p. 304; Ba3]. Before all that, in 1947, he nevertheless included English among his reviewing languages, considering it sufficiently routine a part of his research's linguistic ambit to take responsibility for texts in that uncomfortable language. While the barrier to reviewing was presumably somewhat higher than that for considering in the course of research, the index cards' attention to and presumption of a degree of linguistic range was indicative of a mathematical world that depended on mathematicians navigating multilingual literatures.

At the very end of the card, the most geographically specific information sat in the place least visible when assigning reviews but most critical for the next step of connecting article and reviewer. Beneath the reviewer's name on the bottom right corner was a small space for indicating an address. The secondary but crucial status of this information was of a piece with a wider shift in how mathematicians connected with and identified each other, with mathematicians often playfully exploiting new disconnections between names and coordinates [Ba8]. Indeed, one *Mathematical Reviews* editor had, before taking that post, published reviews for over a year under a pseudonym, quite possibly without the then-editor's awareness [ibid., 11-13].

The address on the index card could be either a full postal address or, where further information was unnecessary, simply the name of an institution. Especially under the changed funding and disciplinary conditions of the latter half of the twentieth century [Ba1, Ba3], a mathematician's career, and hence the coordinates for correspondence with a review journal, often involved multiple permanent and a great number of temporary addresses. In this light, the address on a reviewer card could be just the first step in a routine process of forwarding that mathematicians relied upon to receive articles and correspondence. The address on the reviewer card was thus not necessarily the reviewer's current location but could instead be somewhere where someone was likely to know a good forwarding address. When José Luis Massera first connected with *Mathematical Reviews* while a Rockefeller Foundation fellow in Princeton, for example, he left an index card that read simply "Princeton" for the address [MR], confident that either mathematics departments of Princeton University or the Institute for Advanced Study would know how to reach him when called upon.

The last key datum on each reviewer card was a mark indicating when it was created and updated. For cards created in-house, this could be a note such as "Letter, 2/6/47" (as for Laurent Schwartz [MR]) recording the source of the data. Cards mailed to reviewers for completion and return by ordinary mail could be dated by their postmark: Massera's was stamped by the Princeton post office on the evening of 30 January 1948 [MR]. Cards sent internationally that might be enclosed in other mail could be pre-stamped with a date before being sent to the reviewer: Australian mathematician Thomas Cherry filed a card (never returned) stamped "Nov 21 1962" along with a cover letter and instructions for reviewers that had been mailed to him from *Mathematical Reviews* headquarters in Providence, Rhode Island [MAV]. Such data helped editors maintain a viable index by signaling when a record might be stale and when infrastructural contact required renewal.

Instructing Reviewers

Updating information for reviewers served a variety of purposes for review journals. Cherry's unfulfilled 1962 request for updates suggests what *Mathematical Reviews* hoped to gain by

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periodically renewing contact. A cover letter from the Executive Editor asked Cherry to return the enclosed index card with information on his fields of interest and languages of competence, and reminded Cherry that he could also request specific items to review if he did so expeditiously—no small feat from his post in Australia. The cover letter noted that many reviews were now “being assigned from pageproof” and presumed that an active researcher would know enough from informal exchanges with international interlocutors to be able to request a forthcoming article for review before it went to press.

Maintaining a network to cover a global literature required continually expanding the pool of potential reviewers. The next paragraph of the cover letter asked for Cherry's suggestions for “competent scholars in your field” who might fit the bill. Tellingly, such requests situated reviewers in their disciplinary geography rather than their institutional or geopolitical coordinates. It was a mark of just how much specialist research communities in mathematics had transformed between the first part of the twentieth century and 1962 that (whether or not this was actually the case) *Mathematical Reviews* editors presumed he was more familiar with the expertise and competence of worldwide members of his field than with researchers in other fields with whom he might have personal or professional contact in his own city and country.

To promote “competent, authoritative and prompt reviewing” the cover letter closed by referring to a revised set of reviewer instructions enclosed along with the index card to be returned. The enclosed instructions explained that the purpose of reviews was to help a reader decide “whether or not he needs to read the original paper,” including notes of significant errors or redundancies but otherwise eschewing the evaluative goals of refereeing. Reviews could be submitted in English, French, German, or Italian, and were to be written in a plain style that would be accessible to a reader with “only moderate” comfort in the review language.

The time to complete a review “will depend on the length and importance of the paper” but should normally be two weeks. Expeditious reviews were also facilitated by protocols for returning or transferring items that turned out to be beyond the reviewer's competence or that otherwise could not be reviewed promptly. Reviewers were asked to assist in classifying the paper's subject to inform its placement in an appropriate section of *Mathematical Reviews*. As Fraser [FrISKO] observes, beyond these section headings the review journal's more formal and detailed system of subject identification that became the Mathematics Subject Classification over the course of the 1960s and 1970s was less prominent from authors' and reviewers' perspectives in that formative period.

Additional information concerned book reviews, changes of reviewer address or interests, and reviewer privileges including retaining items sent for review and subscribing to the review journal at a reduced price. Detailed instructions on manuscript preparation assured reviewers that the periodical's printer could handle any sufficiently well articulated printing challenge, but reviewers should take care to arrange formulas in ways that reduced excessive composition costs. Special characters and non-Roman scripts required identification, and bibliographic references were to be as complete as possible.

Much has stayed the same between the guide sent to Cherry and the instructions current reviewers for *Mathematical Reviews* receive on a dedicated webpage [MRG]. The goals of reviewing, the editorial process, the procedures for transferring reviews, and the perennial solicitation for further suggested reviewers all appear in similar terms. Submission and preparation are now electronic and presume LaTeX typesetting for mathematical symbols. Reviews are now accepted only in English, with a standard time of six rather than two weeks, and reviewers are expected to refer directly to the Mathematics Subject Classification in situating reviewed materials. These continuities and

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differences reflect a mathematical world that has become somewhat more homogeneous linguistically [see Go] and infrastructurally but that has preserved many of the functions and mechanisms of midcentury reviewing for sustaining disciplinary connections across geographic distances.

Conclusion

The mathematical literature described here embodies perhaps the defining tension of situated mathematics. Historians, sociologists, and mathematicians themselves are intimately aware of the context-rootedness of mathematical knowledge and its dependence on place-based practices, substrates, and communities. At the same time, mathematicians persistently act as though the knowledge they produce and share is capable of leaving its contexts of production behind, and is perhaps even defined as mathematical by a certain universality or placelessness. Place is integral to mathematical practice, but integral in a way that depends upon and underwrites the presumption that place is only ever incidental.

A world or global literature of mathematics is inevitably something that reaches far beyond its immediate contexts of production and use and extends far past what any one mathematician or local community ever encounters personally. This manner of extending beyond is characteristic of the kind of universalism mathematicians have long produced in various ways. It is a universalism whose precise twentieth century form and function was deeply connected to the transformed scales, forms, and products of mathematical institutions and research in that period.

A historical understanding of how a literature extends beyond its situated places must always return to those contexts, as indeed mathematicians who used these literatures to go beyond their own situated places had to engage the contextual signs and residues of the literature as part of their own local practices. Places appear in the mathematical literature because places mattered to what that literature meant and how it became meaningful and useful in situated mathematical scholarship. Drawing from and contributing to a world mathematical literature required persistent attention to how that literature knitted together a heterogeneous patchwork of people and places.

Combining evidence from central and peripheral mathematical sites shows the variegated practical achievement of a coherent world literature capable of absorbing profoundly different contexts of research into an integrated and dynamic totality. Twentieth century mathematical bibliography, here, articulates many of the specificities and particularities of a universalizing mathematical project whose historicity can be by design elusive. The paper-driven era of the *Zentralblatt* and *Mathematical Reviews* was qualitatively and quantitatively different from other epochs of mathematics imagined to be world-encompassing or universal. Placing these projects in space is thus a means of placing the resulting mathematics in history.

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