The Mathematical Imagination

Handelman, Matthew

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For Gerhard (later Gershom) Scholem, mathematics unlocked the critical possibilities hidden in language. Mathematical logic, in particular, dispatched with the representational troubles introduced to philosophy through the everyday use of verbal and written language. “The foundational assumption that the ideas of concept, judgement, and the other basic elements of logic lie beyond phonetic language [Lautsprache], but within the sphere defined by the teaching of signs [die Lehre von den Zeichen],” Scholem wrote while studying mathematics at the University of Jena in 1917, “constitutes the legitimation of [mathematical] logic.” This new logic, in which words became mathematical signs and followed mathematical operations, promised to expand the philosophical horizons of traditional logic, perhaps paradoxically, by restricting language to “the teaching of signs.” As discussed in chapter 1, it was such a reduction of thought to mathematics that, in the foundational texts of critical theory, not only threatened to liquidate language
and philosophy but also drove Enlightenment’s dialectical return to myth and barbarism. Accordingly, the elementary cognitive functions of calculation and equation that constitute the purest realm of mathematical thinking fulfilled Max Weber’s dictum of modernity as the “demystification of the world” with disastrous results: things—both nature and other humans—can be dominated and controlled through mathematics. For Scholem, however, the idea of stripping language of its usual representational features informed a metaphorics of structure and lack in his writing on the philosophy of mathematics that set the stage for what I call his theory of negative aesthetics. Scholem’s negative aesthetics drew formal literary strategies out of the restriction of language in mathematics in order to turn language into a productive marker of its own restriction and to symbolize ideas and experiences that exceed these representational limits of language.

This chapter charts the emergence, development, and deployment of the metaphorics of structure lacking features of representation in Scholem’s early work on mathematics, in which he received a university teaching degree (Staatsexamen) in 1922. This set of metaphors emerged from Scholem’s interest specifically in the philosophy of mathematics, which studies the ontological and epistemological conditions that make mathematics possible. For him, the philosophy of mathematics represented the enduring possibility of knowledge in the midst of diaspora, in a time disrupted by war and rife with intellectual skepticism. It constructed mathematical knowledge piece by logical piece, seemingly independent of the messy world of human affairs. In particular, the productive negative feature of mathematics resided in what Scholem came to see and describe as its privative (from the Latin participle privatus) linguistic structure which was able to represent but lacked the typical representational features of language such as phonetics and comparison; mathematics functioned, in Scholem’s words, “without analogy” (gleichnislos, S 1:264). We have seen how such restriction underpinned the dialectic of enlightenment for Horkheimer and Adorno, and thus I turn here instead to the generative moment during World War I when Scholem’s studies of mathematics and its elimination of representation in language entered his theorization of Jewish laments and his translation of the Book of Lamentations (eikhah) from the Hebrew Bible. How mathematics restricted the semantic function of language became, in Scholem’s hands, the nega-
tive aesthetics of lament, which took silence, monotony, and rupture as a poetic strategy that gave voice on the level of form to the historical experience of privation and catastrophe.

In critical circles today, Scholem stands as the founder of the academic study of Jewish mysticism, but his early thoughts on the traditions and histories of the Jews were influenced by his studies of mathematics as well. The philosophy of mathematics helped Scholem move beyond an impasse in his thinking brought on by the destructive assimilative nature of the German-Jewish dialogue, often exemplified in his memoirs and diaries by his father. The cost of the Enlightenment’s emancipation of the Jews was assimilation, in which they renounced their cultural and religious traditions in order to participate in German society; a printer by trade and German nationalist, Scholem’s father had readily paid this price, as Scholem recalls, working on Yom Kippur and lighting his cigar with the Sabbath candle. His father’s superficial observance of holidays and rituals threatened the accumulation and transmission of knowledge across generations of Jews, from the destruction of the Temples to the twentieth century. As with anarchist politics, mathematics offered a form of resistance—in particular, to his assimilationist father: “Despite it being Father’s birthday yesterday (an event in itself), and all his children were present (predictably, the older he gets the more he wants to have his children around), I read the book by Voss that had just arrived, On the Essence of Mathematics, which is the book of a pure algebraist, meant for people without an eye for geometry [das Buch eines reinen Algebraikers und für Geometrie ohne Organ seienden Menschen]” (S 1:275).

The idea that many modern mathematicians foregrounded the syntax of algebra in exchange for the intuition of geometry also opened up the theoretical possibility that the apparent erasures of assimilation did not spell the end for Jewish traditions. Instead, by negating representation in language, “the essence of mathematics” revealed, at least for Scholem, the prospect that there could also be a Jewish tradition—the poetic genre of lament—that functioned not despite, but because of the contemporary negation of Jewishness.

By locating the possibility of tradition in its seeming negation, Scholem’s work on negative mathematics responded to a particular crisis in the German-Jewish tradition, but it also opens up avenues in cultural criticism.
for thinking about the experience of exile and assimilation more broadly. Scholem’s negative aesthetics ran parallel to the cultural work of his German-Jewish peers such as Franz Rosenzweig and Martin Buber, who sought to reestablish, in theory and praxis, a lost sense of Jewish identity through their translation of the Hebrew Bible (among other cultural ventures). In contrast to Buber and Rosenzweig’s efforts, which concentrated on restoring immediacy with the spoken word of God, Scholem’s work on Jewish renaissance turned to the restriction of language repurposed from the philosophy of mathematics. Moreover, as Peter Fenves shows, concepts from the philosophy of mathematics addressed for Walter Benjamin a crisis in the inherited conceptions of language and translation, even as Benjamin eventually dismissed the critical efficacy of mathematics. Scholem’s aesthetics takes this underdeveloped contribution of mathematics’ negative relationship to language to its critical conclusion. It shows that negativity—privation and apparent discontinuity—can become an epistemological and aesthetic ally of tradition, by transforming absence into a positive index, the erasure of expression as a symbol of deprivation. For example, in such works as *Major Trends in Jewish Mysticism* (1941), finding the continuity of tradition in apparent rupture became the paradoxical theory of history that Scholem tells through mysticism, a cultural practice that flourished at and was thus constituted by historical moments in which the Jewish people faced expulsion or destruction. For traditions threatened by the homogenization of assimilation, as Scholem saw in Germany, this approach to negativity recommends strategies of mobilizing the limits of poetic language as a means of giving voice to experiences such as privation and loss. Scholem’s work on mathematics thus helped shape the theological—even the emancipatory—dimension of restriction and refusal that persists in the critical project. For peoples living in exile, his aesthetics offers techniques for constructing a tradition out of silence and linguistic erasure, by turning writing itself into a symbol of deprivation and discontinuity.

This chapter takes Scholem’s troublesome concept of tradition as its point of departure, where mathematical metaphors of structure and privation first emerge. For Scholem, tradition signified not only religions such as Judaism threatened by hyperrationality, secularization, and radical social politics but also the metaphysical paradigm governing the transmissibility (as in the
German, *Tradierbarkeit*) of knowledge as such. Tradition is, as Samuel Weber writes for Benjamin, the “structural possibility” of communicating thought between individuals and across generations. As Scholem most poignantly formulates it in terms of mysticism in 1958: “The Kabbalist claims that there is a tradition of truth that is transmissible [*tradierbar*]. An ironic claim, because the truth under consideration here is anything but transmissible. It can be known, but not conveyed [*überliefert*] and precisely that in it, which becomes conveyable, is what it no longer contains. Real tradition remains hidden; only the decaying tradition decays on an object and becomes visible in its greatness.”

This passage contains in nuce Scholem’s critical contribution to the project of negative mathematics. Just because a tradition such as mysticism may appear to resist transmission does not imply its discontinuity; instead, such traditions may only be signified in the negative, as they “decay.” The following analyses demonstrate how this metaphysical framework about mysticism developed for Scholem in dialogue with the philosophy of mathematics. Scholem’s studies and early writings on mathematics set the stage for this dialogue as they circled around the metaphorics of structure, privation, and the restriction of language. The point of metaphorical transference came when Scholem’s university studies in mathematical logic entered into his theorization of lament and translation of the five poems of the biblical Book of Lamentations, which recount the suffering of the Jewish people. The result, Scholem’s negative aesthetics, is what mathematics’ approach to negativity offers critical theories of history and tradition. Mathematics’ venture to produce knowledge by limiting representation suggests to Scholem the continuity of discontinuity: the histories of diaspora and exile consist not only in moments of traditions’ transmission but also in its seeming breaks, crises, and silences. This paradox constitutes the tradition of the Kabbalist, who can only transmit the immediate experience of the Godhead after the fact and through the imperfect medium of language, whose imperfection expresses the magnitude of the mystic experience. It also proposes a critical theory of tradition in diaspora, in which the experiences of rupture and catastrophe may seem, by all indications, to threaten the continuation of cultural traditions, while in truth the hidden core of tradition remains intact.
Scholem’s negative poetics, his contribution to the project of negative mathematics, originated in his work on the philosophy of mathematics, which, amidst the crises of assimilation and war, persisted for Scholem as a viable source of knowledge. The philosophy of mathematics encompasses theoretical discussions regarding the nature of mathematical thinking, engaging topics such as the foundations (*Grundlagen*) of mathematics as set theory or formal systems and the relationship among mathematics, logic, and language. Kant’s *Critique of Pure Reason* set many of the terms of these mathematical-philosophical debates, which, in the early twentieth century, were picked up and continued by mathematicians and logicians such as Gottlob Frege, Henri Poincaré, and David Hilbert. A central philosophical question in mathematics that informed Scholem’s negative poetics is what Klaus Volkert calls the “crisis in intuition,” rooted in the development of new mathematical theories and fields in the nineteenth century, such as non-Euclidean geometry, that evaded the usual reliance on spatial-temporal intuition. First, however, the philosophy of mathematics and proposed solutions to such crisis translated in Scholem’s early thought, which included holding imaginary lectures on “the foundations of mathematics” (*Grundlagen der Mathematik*) on his way to and from the university, into a metaphorics of structure and construction (as in the German term *aufbauen*). As war and revolution raged in Europe, mathematics offered a stable epistemological foundation on which knowledge, and the academic pursuits of a young intellectual, could build.

The foundationalism that the philosophy of mathematics provided for Scholem drew on both disciplinary discourse and philosophical debates reaching back to antiquity. Already in Plato, mathematics served as the pedagogical starting point for the higher education of philosophers, after their elementary training in music and physical education. The ability to distinguish numbers and to calculate exemplifies the “common thing that all kinds of art, thought, and knowledge use as a supplement.” Insights from mathematics also underpinned the pure forms of intuition in Kant’s critiques, which make synthetic judgments possible a priori, and form the key analogy for pure thought for Hermann Cohen. Around the turn of the past century,
the idea that mathematics served as the basic building block of reasoning was tied to its increasingly central role in the strict formulation of the natural sciences, as in popular textbooks frequented by Rosenzweig: *Introduction to the Mathematical Treatment of the Natural Sciences* (Einführung in die mathematische Behandlung der Naturwissenschaften, 1901) by Walter Nernst and Arthur Schönflies (Benjamin’s maternal great uncle). As Voss, whose *On the Essence of Mathematics* Scholem snuck away from his father’s birthday to read, explains: contemporary culture, in as much as it is concerned with the understanding and utilization of nature, finds its “actual foundation” (eigentliche Grundlage) in mathematics. This position, that mathematics plays a foundational role in knowledge, constituted for Scholem a basis for his fledgling intellectual program, which he calls his “teachings” (Lehre) and “science” (Wissenschaft). As he records in his journals at the beginning of his university studies: “I am still not sure whether the study of mathematics, to which I will devote myself, will make possible a starting point for my thinking from a mathematical standpoint [eine Grundlegung meines Gedankenkreises vom mathematischen Standpunkt aus], because the science is still temporarily closed off to me. For my best, I hope so” (S 1:177). This “hope” that mathematics could yield a “starting point” suggests that other academic fields could no longer provide such intellectual foundations. What mathematics affords is thus less a precise formulation of what thought or knowledge actually is than, in Scholem’s words, a point of epistemological orientation for his theories of poetics and history.

For Scholem, mathematics supplied a starting point for thinking, because it exhibited unique epistemological and linguistic properties vis-à-vis other intellectual pursuits. He claims:

Starting with Plato, all great thinkers have been mathematicians—consciously or unconsciously. Because, indeed, it is from here that something can be said: from mathematics and from history, where the last can only be taken in the highest and most complete sense, as if it were not, as in reality, subject to skepticism. Because these both are to be viewed as the path, as really the two foundational pillars of human spiritual life [Grundpfeiler des geistigen Menschenlebens] and the two singularly possible, eternal points of view, from which a starting point can be won: out of which one could essentially determine the concept of science. . . . Indeed, history is the unfree, mathematics the free
thought of science: because history fills one with disgust for the confusion that people call freedom, while mathematics fills one with the deepest joy of the necessary construction [dem notwendigen Aufbau]. (S 1:260)

Scholem’s point here is that mathematics remains the only approach to knowledge that still produces findings that are beyond reproach and skepticism. In contrast to history, on his example, mathematics circumvents contemporary intellectual doubt because it operates “free” from the world of human history and according to its own inner logic. Mathematics thus produces knowledge not relationally, but structurally, providing—note the repeated emphasis on origins and structure—a “starting point” (Ausgangspunkt) and “foundational pillar” (Grundpfeiler) for thought. In this passage we see the emergence of a metaphors of structure in Scholem’s writing on mathematics, in that history and mathematics provide here the “pillars” that anchor thinking and that the latter offers through its form of a logical, “necessary construction.”

If mathematics was potentially more epistemologically resilient than other subjects, then it could offer a framework to work through similar crises in modern thought. The skepticism that the passage above locates in history, often referred to as the “crisis of historicism,” exemplifies a larger sense of cultural aporia in the late nineteenth and early twentieth centuries. As Kra-cauer writes in his 1921 essay “The Crisis of Science” (“Die Wissenschaftskrise”) this crisis of science consists in the belief that the statement that historical and social values are relative to the times and societies that produce them, as he diagnoses in the work of Ernst Troeltsch and Max Weber, is equivalent to a broad-based relativist outlook on the world, which is ultimately reducible to nihilism. Such discussions of relativism, skepticism, and nihilism extended far beyond just the realms of history or science. They dovetailed on modernist suspicions surrounding the idea that language formed the basis for cognition and communication, which drew on Nietzsche’s interrogation of language’s relationship to truth and the language skepticism associated with the language crisis (Sprachkrise) of fin de siècle Vienna in the works of Fritz Mauthner and Hugo von Hofmannsthal. In particular, Mauthner’s Contributions to a Critique of Language (Beiträge zur Kritik der Sprache, 1901–1903), the reading of which inspired much of Scho-
lem’s early reflections on the relationship between mathematics and language, argues that language and thinking are at their core purely convention and, at best, possess an arbitrary relationship to reality or truth. As Benjamin Lazier explains, Scholem’s early intellectual efforts concentrate on wrestling a new type of synthesis from this sort of Nietzschean skepticism and nihilism, which for him is embodied in an “angel of uncertainty” that both haunted him as well as spurred him on to greatness (S 1:208). It is significant that, in the face of intellectual crisis, Scholem retains the belief that knowledge is possible: “In my heart, I still believe in the possibility of knowledge [an die Möglichkeit einer Erkenntnis], I still believe despite all skepticism and all reservations—history, grammar, logic—on the justification of science” (S 1:138). As we shall see through the repetition of the singular form “a knowledge” (eine Erkenntnis), this synecdoche for knowledge hinges for Scholem on the starting point and foundation offered by mathematics.

While I will return to the relationship that Scholem’s diaries posits between mathematics and history, it is first in the sphere of language and a theory of language that the initial kernel of knowledge afforded by mathematics begins to take shape. Indeed, the defense of language’s epistemological efficacy is as much a counter-argument to Mauthner in the 1910s as it is a life-long interest of Scholem’s. The origin of this interest lies in part with Scholem’s emergent interactions with Benjamin, in particular with Benjamin’s 1916 essay “On Language as Such and on the Language of Man.” The essay originated as an eighteen-page letter to Scholem that addresses such foundational themes as “mathematics and language, that is: mathematics and thinking, mathematics and Zion.” A well-spring for contemporary scholarship and theories of language and criticism, “On Language as Such” argues in the main against the instrumental and the mystical conception of language—the former, “bourgeois” conception reducing language simply to an instrument of communication and the latter conflating language with the mystical experience itself. As an alternative, and in conjunction with Kant and Cantor’s writings on mathematics, the essay postulates three distinct and infinite “orders” of language: the language of God, humans, and things. These three languages interconnect, in that humans and things are created by God’s word and human language participates in this divine language by giving names to things. The consequence of Benjamin’s conception of
language is language’s infinitude. Language as such thus has infinite permutations, meaning that “human” language makes up only a portion of language as a whole and what the infinitude of language can communicate.

The key conceptual ingredient that Benjamin’s essay offered can be found in its emphasis on the name, which revealed to Scholem the epistemological efficacy of mathematics to break through the impasses posed by skepticism and crises in tradition. In a certain sense, Benjamin’s conception of language agrees with Mauthner’s: a fundamental incongruence separates an object from the language we use to describe it, which “On Language as Such” identifies as the fall of language. And yet, for Benjamin, it was not always so. According to the essay’s interpretation of Genesis, God brings things into being through the creative word so that they are recognizable (erkennbar), and we give them names in that we recognize or “know” them (as in erkennen). Hence, the act of giving names (benennen) to things forms the linguistic essence of humans, and it is in the original, Adamistic form of the name in which objects and words coincide. Naming thus differs from the arbitrary designation of meaning (bezeichnen) that devalues mathematics in Benjamin’s eyes (see chapter 1). What is unique (indeed, magical on some accounts) about Benjamin’s idea of naming is how it allowed a type of intentional and self-reflexive signification that represents simultaneously itself and its putative object. One can think of the name as a semantic onomatopoeia, as a sign that mimics and discloses not its sound, but its own mechanism of signification. Although the act of naming (benennen) allows recognition (erkennen) for Benjamin in language, the creative epistemological force of mathematics resides for Scholem in mathematics absolute lack of “names”: “A highly significant remark, which follows necessarily from my way of seeing things and which immanently operates very strong in Benjamin: definition is knowledge [Definition ist eine Erkenntnis, ist die Erkenntnis]. Everything else is interpretation of the definitions. Mathematics is the nameless teaching [die namenlose Lehre]: is knowledge, indeed metaphysical knowledge” (S 1:467). Given the repetition of the singular synecdoche for “knowledge” (eine Erkenntnis), the passage suggests that, against Mauthner, the definition fulfills the same epistemic function for Scholem that the name does for Benjamin: it provides a foundation for knowledge. In contrast to Benjamin’s concept of the name, however, the epistemic power of the definition hinges on arbitrary significa-
tion, that is, on its “metaphysical” independence from the object it signifies—to which I turn in the next section. Note also how the passage already reinforces the sense of mathematics as a structure of definitions and interpretations, characterized, in particular, by privation (“name-less”).

This metaphors of structure in the philosophy of mathematics were the initial theoretical steps that, in the course of a year, lead Scholem to a negative aesthetics, but not because mathematics provided a rigorous justification for his emerging “circle of thoughts.” Instead, what Scholem’s work with the foundations of mathematics revealed was the simple structural possibility of knowing, the potential continuation of the Enlightenment project. Despite a crisis in tradition and the popularity and cultural weight of skepticism and nihilism in science, language, and history, there remained the possibility for knowledge (Erkenntnis) in mathematics that did more than just reiterate the limits of language. This possibility emerged in metaphors of structure itself—terms that, by no coincidence, bear a resemblance to those used by Carnap and other logical positivists. For Scholem, then, the possibility of knowledge lay less in Benjamin’s concept of the name in which subject and object intersect than in a theory of the arbitrary, mathematical definition, which eschewed language’s usual function of representation. At Scholem’s admission, the idea that a simple mathematical definition constitutes knowledge may seem trivial and, indeed, what Scholem means by the definition still lacks a certain definitiveness (S 1:467). This seeming lack of value or clarity, however, does not detract from what mathematics offers in terms of knowledge—instead, this sense of lack derives from the very nature of mathematics’ contribution to epistemology.

“A Great Tautology”: Negativity in the Privative Structure of Mathematics

If the philosophy of mathematics guaranteed the possibility of knowledge through a metaphors of structure, then its core structural characteristic consisted for Scholem in privation, its lack of connection to nonmathematical thought. Indeed, this troublesome relationship of mathematics to the rest of the world presented a mathematician like Poincaré, one of Scholem’s key
interlocutors, with an “irresolvable contraction” of mathematical reasoning. One the one hand, according to Poincaré, mathematics purports to be a logically deductive science. Its source lies in the consistent basis of logical inference aided only by arbitrary signs, which affords mathematics the widely acknowledged epistemological status of “complete irrefutability.” On the other hand, this sort of deductive, logical reasoning detached from experience struggles to come up with anything “essentially new,” beyond that which reduces to the identity principle, “A equals A.” All of mathematics thus equates to one massive tautology. We have seen this position, that mathematics is an assembly of self-referential logical statements, held by the logical positivists, which amounted, as Horkheimer and Adorno objected, to the reduction of thought to immediacy and repetition. In Scholem’s writing on the philosophy of mathematics, however, the idea of mathematics as a giant tautology shaped the metaphors of privation. In our exploration of negative mathematics, this structure—defined by lack, independence, and inaccessibility—constituted the generative negative element of mathematics for Scholem. It revealed mathematics’ ability to create knowledge despite what seems like privation from a human perspective, opening up a metaphysical framework in which poetics and tradition could potentially generate knowledge as well, in spite of the deprivation of exile and the erasure of assimilation.

The question of whether mathematical judgments borrow information from the nonmathematical world or are all just self-referential tautologies received its decisive formulation in Kant’s critical philosophy. His *Critique of Pure Reason* set many of the terms of the debate over the nature of mathematical thinking at play throughout this book. To briefly review his argument from the “Transcendental Aesthetic”: for Kant, judgments that draw from experience are a posteriori and those that do not—that is, pure and transcendental judgments—are a priori; likewise, he calls judgments that unpack what is already in a concept *analytic*, whereas those that integrate new information are *synthetic*. Countering the skepticism of David Hume, the first *Critique* seeks to delineate the possibility of synthetic judgments a priori, which lies between Hume’s designations of the objects of reason as “Relations of Ideas” (analytic judgments a priori) and “Matters of Fact” (synthetic judgments a posteriori). The prime example of this special cat-
egory of judgments—which integrate new pieces of information, but which are “pure” in that they precede the empirical—can be found, Kant believes, in mathematics in general and in algebra and geometry in particular. For Kant, mathematical judgments are clearly a priori; they “carry necessity with them that cannot be derived from experience.”

And yet a judgment in algebra (“7 + 5 = 12”) or in geometry (“the straight line between two points is the shortest”) is also synthetic, because it relies on an extra source of information, the idea of equivalence or that of shortness taken from time and space. This argument followed from Kant’s self-proclaimed Copernican Revolution: space and time are not products of empirical experience, but rather pure forms of intuition, the cognitive conditions that make experience possible. Mathematicians disputed Kant’s claim of the synthetic nature of their subject and Neo-Kantians later rejected space and time as pure forms of intuition. This post-Kantian debate over the synthetic or analytic nature of mathematical judgments provided the context in which Scholem’s ideas about the autonomy of mathematics and its privative structure emerged.

The self-containment of mathematics stems for Scholem from the belief that mathematical judgments do not borrow any information from non-mathematical sources, the so-called pure forms of intuition included. Scholem’s conviction of the independence of mathematics is perhaps most evident in his forceful disputation of the term philosophy of mathematics itself (even if this is how historians of mathematics later classified Scholem’s areas of mathematical interest). The foundations of mathematics and the essence of mathematical reasoning cannot, according to Scholem, be expressed in the foreign “jargon” of philosophy, because they constitute two separate modes of cognition (S 1:259). The creation of his “new science” (neue Wissenschaft) to overcome the nihilism and skepticism of Nietzsche and Mauthner hinges not on the “philosophy of mathematics,” but rather on the “mathematics of mathematics” (S 1:258–259 and 264). What is striking about this distinction is not only its reference to the German romantic poet-philosopher Novalis but also the self-reference it ascribes to mathematical reasoning. This notion expands and defines the metaphors of structure in which Scholem writes about mathematics: the structure of mathematics and the knowledge it creates exist and interact in a realm of their own, restricted, and only partially accessible to the nonmathematical world, including philosophy.
As an example of Scholem’s insistence on the independence of mathematics, consider his objection to Poincaré’s theory of mathematical induction. For Poincaré, induction was the only possible synthetic a priori judgment. The core idea of induction is that algebraic statements such as $2 + 2 = 4$ consist of the recurring operation of $x + 1$, executed two, four, or an arbitrary number of times. Given the lawfulness of human understanding, such a result can be generalized into the claim that, given a statement, if the case $n$ of the statement being true implies that the case $n + 1$ of the statement is also true, then the statement is true for the cases of all natural numbers ($1, 2, 3, \ldots$). For example, if I can prove that the sun rose today and if I can prove that the sun rising any day in the future (day $n$) implies that it will also rise the next day (day $n + 1$), then I have proved that the sun will rise every day, from today onward. New information thus enters, according to Poincaré, the otherwise tautological structure of mathematics. For Scholem, however, induction imports “an aid taken from a foreign domain, not belonging to mathematics,” relying on the idea from philosophy and psychology of a “potentially infinite imagination” (S 1:268). Such methodological borrowing from philosophy sold short the unique epistemological contribution of mathematical reasoning for Scholem, threatening the purity that made mathematics a structure of “free” construction immune to the skepticism of subjects like history. This idea is key: if the generative aspect of mathematics lies in its lack of relationship to the nonmathematical world, then perhaps there are languages in which aesthetic and cultural traditions can produce and transmit knowledge even when their relationship to the outside world has become problematic.

In particular, the epistemological contribution made by mathematics resides for Scholem in this negative relationship to the nonmathematical world: mathematical knowledge arises not in relation to experience, but instead through the absence of relation altogether. Clarifying this lack of relationship helped Scholem come to a resolution of the synthetic-analytic debate; it also underscores the creative element of negativity at work for Scholem in mathematics:

The expression, that mathematics is a great tautology $A = A$, has really nothing off-putting about it, if only understood correctly: mathematical propositions
and truths have all already been there since eternity, infinite mathematics is, as paradoxical as it sounds, indeed completed. Of concern is only that the human mind [menschlicher Geist] knows every single one of these infinitely many propositions through the logical connection of the already known. Maybe the propositions really express nothing but what lies in the definitions, but in these [definitions] lie an entire world folded together. The assignment of mathematical thinking is just to unfold them.

He elucidates this point with a comparison illuminating its proximity to mysticism:

All the wisdom of the world lies folded together in the twenty-five letters [sic] of the German language and it requires only the—admittedly “creative”—combination to derive Don Quixote out of it, which, as seen from here, is an analytic piece of wisdom. And in the fact that there are infinitely many combinations, as is easily understood, lies precisely that one can-not designate mathematics as tautology in human language [Menschensprache] (from God’s perspective, sure!), because precisely the wealth of truths can never be exhausted. Thus, mathematical knowledge can never come to an end; thus, ever anew will already existing truths be found in the “eternal empire of ideas.” An infinite tautology is, as seen by humans, not a tautology—that is the crucial point. (S 1:277–278)36

Two main ideas are at work in these passages. The first is the claim that, for Scholem, mathematics, “a great tautology,” consists entirely of analytic judgments, “A = A.” Both passages thus position him in line with the mathematical-philosophical perspective that views mathematics as an analytic construction unfolding from initial “definitions” as, in its different formulations, logical statements (Frege), formal axioms expanded by logical inferences (Hilbert), or the combinations of a universal alphabet of human thought (Leibniz).37 The second idea is mathematics’ structure of privation that distinguishes metaphysically between “God’s perspective” and “the human mind.” For Scholem, “the divine mathematician,” as he puts it elsewhere, comprehends the “infinite” totality of mathematics, while, “in human language,” the assignment of “mathematical thinking” lacks conclusion: “the wealth of truths can never be exhausted” and “mathematical knowledge can never come to an end.”38 This is the negative element of mathematics that
The Philosophy of Mathematics

held critical potential for Scholem: humans will never exhaust the infinity of mathematical truths, but can, nonetheless, gain mathematical knowledge by eternally unfolding its “infinite tautology.”

Scholem’s reference to “definitions” and “human language” in these two passages is further illuminating, because it suggests that the relationship between mathematics and language produces knowledge in mathematical thinking despite its privative structure. Around 1900, however, the definition was a disputed philosophical concept. For instance, the definition epitomizes the epistemological poverty of logic according to Mauthner: it takes part in a “societal game” (Gesellschaftsspiel) that either depends on the point of view of the subject (vom Gesichtspunkt abhängt) or unfolds as a “tautological examination” of a concept we all already know.39 In contrast, as Scholem hinted in his response to Benjamin, human mathematical thought creates knowledge of the infinite world of mathematics through the definition:

I cannot go along with Mauthner’s critique of the definition, that definitions are always tautologies. Because of mathematical definitions. The definition of a [straight] line is not a tautology, because a word which is entirely without meaning: LINE is rendered meaningful in connection with certain intuitions [Anschauungen], where one could just as easily (come up with) a different definition that would result in a completely different concept. Mauthner would have to claim that the definition only expresses what we somehow already know about a line. Sure, but how and from where do we then know something about a line, which after all is a fictitious, unreal ideal concept [ein erdichteter, unwirklicher Idealbegriff]. The definition is indeed meaningful here, even if it is not a synthetic judgment, because it adds nothing to the concept “line” that was not already in it, but rather only and merely expresses that which should be understood under the concept. (S 1:139)

The passage insinuates not only a division but also a linkage point between mathematics and Scholem’s developing ideas regarding language. The division follows the independent, metaphysical nature of mathematics: while we can associate its objects with a given “intuition” (Anschauung), they are ultimately, as with the “straight line,” ideals beyond reality (unwirklich), fictions invented (erdichtet) for, and independent of their use in human language. For Scholem, then, the definition served as the liminal point between this ideal world of mathematics and language; it provided knowledge about a
“straight line” by giving linguistic expression (sagt . . . aus) to the pure mathematical idea.

The “definition,” in the way it supposedly functioned for Scholem, gains more definite contours in comparison to the properties Kant ascribes to the definition in mathematics and in contrast to Benjamin’s concept of the name. For Kant, the core difference between philosophical and mathematical reasoning is that the former represents cognition that follows rationally from concepts, while the latter, drawing on the pure forms of intuition, first must synthesize or construct its concepts. Hence, if to define something means “to exhibit originally the exhaustive concept of a thing within its boundaries,” then a definition in philosophy is an “exposition of given concepts.” According to Kant, something different takes place in mathematics: “mathematical definitions can never err. For since the concept is first given through the definition, it contains just that which the definition would think through it.” Scholem’s concept of the definition picks up on and transforms Kant’s, as is clear in the previously cited objection to Mauthner. For Scholem, the definition is itself not a synthetic judgment a priori. Instead, Scholem writes, “[the definition is] an arbitrary naming. The thing, which is only there once between two points, we name—whether it exists or not—we call it straight line as a start.” Scholem’s standpoint differs from Kant’s in where they locate the creative cognitive moment: for Kant, it comes when pure intuition “gives” us the objects we cognize; for Scholem, it is in the linguistic act of defining that “expresses” and “names” (nennen) its object. Furthermore, we see again the similarity and difference between Scholem and Benjamin: both locate an origin for knowledge in language, but for Benjamin, this act (naming) was meaningful and necessary, whereas for Scholem, defining was stipulative and arbitrary. The specific arbitrariness of the mathematical definition was significant for Scholem, not only because it signaled mathematics’ special relationship to language but also because it suggested that language carries with it a symbol of its own limitation.

Scholem’s vision of mathematics as a “great tautology” embodies critical potential beyond the realm of mathematics, establishing a connection in the negative between “human language” and knowledge that lies beyond it. The notion that mathematics arises mechanically and analytically out of the statement “A = A” also serves as a theoretical dividing line, at least in
the area of mathematics, between Scholem and not only Benjamin but also Horkheimer and Adorno. In the context of Benjamin’s “On Language as Such,” Scholem called mathematics “the nameless teaching” (S 2:213); the critical project envisioned by Benjamin in The Origin of the German Tragic Drama opposed this lack of names in mathematics as an abandonment of representation and meaning (see chapter 1). Here Benjamin as well as Horkheimer and Adorno missed the positive negativity that mathematics offered Scholem, the latter two instead equating the restrictive features of mathematics with neurotic regression and the ritualistic repetition of myths. For Scholem, however, mathematics was not the instrumental application of number to thought and nature. Instead, mathematics delineated its own form of representation and field of knowledge that provided insight into how representation and knowledge work when presented with privation. In the face of this giant tautology, mathematicians found alternative means in order to represent a field that, for Scholem, only God can know in its totality. How mathematics contorts language and representation suggested to Scholem ways in which aesthetics and cultural traditions can also employ such contortions to express privation and lack.

Mathematical Platonism and the Limits of Language

For Scholem, investigating the relationship between mathematics and language completed the metaphors of structure and lack in the philosophy of mathematics by specifying the element that was absent in mathematics: representation. Mathematical-philosophical debates over the ambiguities of language provided the context. Bertrand Russell and Alfred North Whitehead, for instance, developed a symbolism for mathematical thinking to avoid the imprecision of “ordinary language”; Gottlob Frege, with whom Scholem briefly studied, developed a “concept notation” (Begriffsschrift) to overcome the “inadequacies of language” and avoid the ambiguities of representation. Accordingly, arbitrary symbols and lines designating relations communicate more clearly and concisely mathematical knowledge than the languages of English or German. For Scholem, the move from language to arbitrary symbols met the Platonic world of so-called “mathematics as such”
half way, not adding anything through language to “this pure mathematics” that is “absolutely logical, analytic, and here since eternity” (S 1:427). This move indicated to Scholem the generative aspect of negativity in mathematics, coded in a metaphorsics of structure lacking the figurative components of language, such as analogy. The move also matched mathematics to another of Scholem’s interests, mysticism. Mathematics and mysticism came to form two sides of the same coin, both expressing what lies beyond human experience; but where mysticism captures this knowledge in language, mathematics expresses it by restricting language. This is the point at which Scholem’s thinking on the philosophy of mathematics and his theorizations of aesthetics and culture start to collide.

The purity of mathematics referred, according to Scholem, not only to its independence from the nonmathematical world but also to its eschewal of representation in language. This notion of purity picked up and expanded on the Kantian tradition. For Kant, pure served as the key term in his discussion of space and time, which are not simply things I experience empirically, but rather are the “pure” cognitive forms that render my empirical experience possible. For a Neo-Kantian such as Cohen, the task of “pure” thinking in his 1902 Logic of Pure Knowledge was to eliminate from thought what the senses deliver to us as untrustworthy perceptions of the empirical world. According to Scholem, mathematics is “pure” in both terms of experience and language:

As mentioned above, mathematics distinguishes itself from all of the many other pursuits that one erroneously counts as science primarily through one thing: through its lack of analogy [Gleichnislosigkeit]. There are several things to say about this: it is nearly self-evident in language to speak in analogy, in symbol: most often that what is known cannot be said at all other than in symbols. Open any book: one finds everywhere the formulas of analogic speech: as if, just as, and similar expressions. The core cannot be said: nature, because nature is unsayable, rather it can only be alluded to imagistically, the pseudo-science is essentially allusion to an inexpressible fact [eines unaussprechlichen Tatbestandes], which can be experienced by humans and therefore is solely accessible through the medium of speech in analogy. Entirely different here is mathematics, which wants something entirely different, unheard-of, which puts mathematics in relation—in its goal—and in sharpest contrast—in its
I will return to the link between mathematics and mysticism, but what is striking in this passage is how it depicts mathematics through a privative judgment, in the Aristotelian sense of the term. In contrast to a judgment of negation (“A is not B”), a judgment of privation asserts that “A” lacks an attribute “A” normally possesses: while many branches of knowledge and science usually use analogies, mathematics is the “science” and “activity” defined by its lack (as with the suffix -losigkeit) of analogy (Gleichnis). According to the passage, lack (lessness) is not a source of epistemological impotence, but rather the attribute that allows mathematics to produce knowledge (grasp a “core” or “nature”) where other modes of knowledge resort back to the use of symbols, comparisons, and allusions. The passage even formalizes lack in that it leaves analogy ironically undefined and adrift among such other terms as symbol, formula, and allusion, suggesting that mathematics’ advantage lies in its capacity to function without the confusion that language introduces through representation.

Associating mathematics with such privation is not an arbitrary choice on Scholem’s part, but instead positioned Scholem in contemporary philosophical debates in mathematics, if not epistemology as a whole. In his musings on the subject, Scholem even “has the vague premonition” that he is heading in the direction of mathematical “Platonism” (S 1:278). Mathematical Platonists believe that mathematical objects (such as numbers, functions, or sets) exist and that their existence is independent of the human mind and language. In contrast to mathematicians such as Richard Dedekind and Aurel Voss, who believed that a mathematical object such as a number was a free creation of the human mind, Platonists would contend, to cite Scholem’s example, the idea of number exists independently of human modes of cognition and representation. Although humans may play a role in “inventing” numbers (erfinden), we merely “discover” (entdecken) them, just as Columbus “discovered” an America that already existed well before the arrival of Europeans (428). As humans, mathematicians simply give arbitrary signs to mathematical concepts. As a whole, according to Kurt Gödel, mathematics describes “a non-sensual reality, which exists independently both of
the acts and [of] the dispositions of the human mind and is only perceived, and probably perceived very incompletely, by the human mind.” As Scholem’s definition emphasizes lack (\textit{lessness}), the Platonist conception of mathematics also builds on words that hinge on lack and privation, such as “very incompletely,” “independently,” and “only.” To be clear, this Platonist “non-sensual reality” of mathematics is neither the Messianic Kingdom nor the mystical experience of the Godhead. Instead, mathematics and mysticism both attempt to express “an inexpressible fact”—mathematical reality and God, respectively—that exists in and unto a world independent of the very strategies of representation at our disposal to describe it.

More than a superficial commonality, the affinity between mathematics and mysticism articulated for Scholem the negative element in mathematics that serves as an epistemological ally to push through crises in tradition and history. He saw, however, a significant difference between the two in the degree to which they rely on the mechanism of representation in language: mysticism is the complete saturation of representation and mathematics its total absence. As his diaries explain:

Mathematics and mysticism: the core of both stands the test through the following: it is attempted, or much more, sensed as a self-evident assignment: to express the unity of the world, to express it in its essence. For that such a unity exists is, as a “philosophical” axiom, the foundation of everything. And precisely here the great antithesis reveals itself: mathematics can speak only naked, without analogy, mysticism only in image and analogy. For mysticism takes up a unity in its totality that is inaccessible to all knowing language, but mathematics rebuilds a broken-up but perceived unity in its own way. (S 1:265)

In contrast to mysticism, mathematics lacks for Scholem not only the comparative element of language (“analogy”) but also its rhetorical rules and strategies; it speaks “naked” and free of “images.” The passage thus affords mathematics a special status as representation that “expresses” knowledge by restricting the normative features of language. As the metaphorics of structure (“rebuids”) lacking analogy suggests, mathematics constitutes, to borrow a term from Hans Blumenberg, “absolute metaphors”: like God and truth, mathematics serves for humans as an irreducible “translation” of an object—“the unity of the world,” Platonic “mathematics as such”—to which
no perception corresponds.\textsuperscript{52} Analogy and figurative speech are absent in mathematics for Scholem, because they presuppose an idea of the object that they illustrate or represent. In contrast, the generative negativity of mathematics lies, according to Scholem, in its absoluteness as metaphor: mathematics produces and transmits knowledge in absentia of its objects, as we previously saw, through their arbitrary definition and logical interpretation. Mathematics’ privative structure even resembles on the level of negativity the Platonic world it describes, in particular, its ultimate isolation from human thought and language.

Scholem’s discussions of how his contemporaries related mathematics to philosophy and mysticism offer two examples that help clarify the epistemological contribution made by mathematics as absolute metaphor. This nuance will help later differentiate Scholem’s employment of negativity in mathematics and mathematical thinking from the other contributions to negative mathematics explored in this book. First, consider the difference between Scholem’s conception of mathematics and Cohen’s, which Scholem deems a “foolhardy perspective” (S 1:261). In Cohen’s \textit{Logic of Pure Knowledge}, mathematics illustrates via analogy the possibility of pure thought: infinitesimal calculus constructs its objects without recourse to intuition or empirical givens. To cite an example from Cohen that Scholem finds particularly problematic: “The coordinate axes form an important representative [\textit{Vertretung}] of the thought of substance” (276).\textsuperscript{53} Chapter 3 shows that concepts from mathematics such as infinitesimal calculus thus illustrate for Cohen pure thought, not because they are the mathematical avant-garde, but rather because by the end of the nineteenth century, mathematical ideas such as infinitesimal calculus were widely accepted and understood.\textsuperscript{54} Although we understand the idea of pure thought, mathematics provides, in Cohen’s and, later, Rosenzweig’s work, an analogy for the inner-working of pure thought, which, for nonphilosophers, may be more difficult to understand. In contrast, mathematics eschews for Scholem rhetorical strategies like analogy, because language not only has no bearing on the Platonic world of mathematics but also only serves to obscure it.

The second example concerns Scholem’s objections to the use of mathematics by mystics to represent and stand in as a comparison for the otherwise incommunicable. Scholem was positioning himself here against mystical
links between mathematics and occult forms of knowledge, exemplified for him in the writings of mystical thinkers, including Novalis, Oskar Goldberg, Martin Buber, and Rudolf Steiner. For instance, Steiner maintains in his speech “Occultism and Mathematics” (“Okkultismus und Mathematik,” 1904), empirical mathematical objects (Gebilde) only refer, serve as the “analogy” (Gleichnis) in experience for a “spiritual fact” (geistige Tatsache). Through training in the spirit of the mathematical, occultists could find one path toward cleansing themselves of the life of sensuality. Scholem would find Steiner’s employment of mathematics in the service of attaining occult-mystical knowledge problematically superficial, because according to it, mathematical objects naively step in for the meta-sensual strived for in anthroposophy. As such, numbers, in Scholem’s words, would be the letters of Galileo’s book of nature and, as a whole, mathematics would provide us access to the incommunicable as such (S 1:407). But Scholem was a student of mathematics and, later, a historian of mysticism. Although he often played with the mathematical-mystical calculations of Gematria, this line of thinking entailed and employed mathematics as either a mimetic corollary to or an analogy for the secret knowledge purported by mysticism—both of which ran against Scholem’s stricter conceptions of mathematical thought. In contrast, mathematics and mysticism were interrelated, not because mathematics offered the secret language of the incommunicable postulated by mysticism—but both of which spoke to the general and more salient logical perplexity (as shared “in their goal” in the passage previously cited) of representing that which exists independently of representation. The difference was that mysticism spoke to this perplexity by proliferating signs, while mathematics spoke to it—and this is the key to the next section—by restricting signification.

There is a striking similarity between Scholem’s position that mathematics is a structure lacking representation and his concept of tradition. Recall from the passage cited at the start of this chapter that the tradition of the Kabbalist consists, in his words, of a “real” core and its “decaying” instantiation in language. In Scholem’s framework, mathematics likewise consists of arbitrary definitions followed by logical construction, with the “real” core independent of thought and representation and knowable in full, in this view, only to God. If mathematicians create mathematical knowledge
by defining and interpreting the Platonic world of mathematics, then tradition can function according to the same logic: a tradition, take Judaism, is defined in the Torah as the absolute word of God, which each generation accepts, interprets, and passes on. This is not to say that mathematics illustrated or was itself God’s word—in fact, Scholem argues convincingly to the contrary (S 1:468). Instead, mathematics and a tradition like mysticism both ventured to describe realities that for Scholem exist beyond the limits of human mind and language: the mathematician and the mystic produce and transmit knowledge of their subject matter, even if this exists only in a “decaying” state. Indeed, negativity in mathematics—located for Scholem in the metaphors of structure lacking representation—suggests that this “decaying tradition” also serves as a marker of the fact that “real tradition remains hidden” beyond the limits of mind and language. The epistemologically generative eschewal of analogy in mathematics—its negativity—thus affirmed the possibility that some traditions may function not despite, but because of privation.

From Mathematical Logic to Jewish Lament

The year after Scholem read about the essence of mathematics on his father’s birthday, he held an in-class presentation (Referat) at the University of Jena that served as a key transition point between his works in mathematics and his theorization of aesthetics and tradition. Presented in Bruno Bauch’s seminar on logic, Scholem’s Referat defended mathematical logic (“Logistik”), the translation of logic into mathematical symbols and operations, against its detractors in philosophy, namely Hermann Lotze’s Logik (first published in 1843). In the weeks following the Referat, Scholem refocused his creative energies on another intellectual passion, Judaism, by translating the Book of Lamentations (איכה or Klagelieder) from the Hebrew Bible. Here we see Scholem’s prime contribution to negative mathematics: through the metaphors of structure defined by the restriction of representation, these theorization of lament as a poetic genre and translations of the biblical laments into German transformed the philosophy of mathematics’ approach to negativity into a creative literary strategy. Keep in
mind that this same disavowal of representation indicates, for Benjamin and the Frankfurt School, how mathematics excluded linguistic mediation, leading back to myth. In Scholem’s work on lament, however, restricting representation became a way of representing in negative, through a formal kinship of semantic absence in mathematics and poetic language. In the aesthetic forms of silence and monotonity, the lack of representation paradigmatic in mathematics could signify the hardship and deprivation of the Jewish people that Scholem’s translations lament. For critical theory, Scholem’s negative mathematics offers literary strategies that do not represent the unrepresentable, but rather indicate that the loss of diasporic peoples and the erasure of tradition through assimilation often exceed the limits of language.

Scholem’s study of mathematical logic built the bridge between his work on the philosophy of mathematics and lament. Mathematical logic attempts to clarify the problematic but also highly productive relationship between mathematics and logic. Around the middle of the nineteenth century, mathematics and logic formed two distinct branches of knowledge, yet by the 1850s logicians such as George Boole undertook measures to push logic past the traditional limits of Aristotelian logic—a development resisted by some philosophers and logicians such as Lotze. To expand logic past syllogistic reasoning, Boole’s algebra of logic translates logical statements into suitable symbolic-algebraic equations, manipulates these equations with the help of algebraic operations, and translates the results back to the language of logic. Take, for instance, the example Scholem would have encountered in Lotze: “the fundamental law of thought” is for Boole represented by the equation $x^2 = x$, which, through a few simple algebraic operations, equals $x(1 - x) = 0$, the principle of noncontradiction. Instead of drawing conclusions based on the linguistic statement, in Boole’s words, “it is impossible for any being to possess a quality, and at the same time not to possess it,” we write in symbols $x(1 - x) = 0$, which can be manipulated to derive further results using the rules of not language, but rather algebra. Mathematicians and logicians such as Frege, Russell and Whitehead, and Giuseppe Peano developed symbolic notations similar to Boole’s; together, these systems of logic are referred to as mathematical logic, logical calculus, and “Logistik.” Likewise, mathematical logic expresses mathematics through logically grounded axioms, logical rules of inference, and, above all, a neutral and
The Philosophy of Mathematics

formalized language of symbols. To be sure, any attempt to eliminate language appeared intellectually dubious to Scholem; his Referat hastened to emphasize the limits of mathematical logic, which forfeited questions of history and religion (S 2:66 and 111). But mathematical logic revealed to Scholem that there were other ways to communicate that not only work beyond the usual rhetorical and semantic structures of language but also employ the absence of rhetoric and semantics to their epistemological advantage.

The Referat provided a counterargument to Lotze’s critical assessment of attempts to formalize knowledge into arithmetic-mathematical syntax and logical operations, from number mysticism to Boole to more recent mathematical-philosophical trends in the German academy. While the bulk of the Referat addressed Lotze’s discussion of the careful—and, for Scholem, excruciatingly longwinded—application of the a priori principles of thought in language, it primarily disputes Lotze’s claim that Boole’s mathematical logic simply tells us something we already know (an objection analogous to Mauthner’s criticism of the definition). Where Lotze saw the unnecessary repetition of logical statements in mathematical syntax, the Referat finds the possibility of an inroad into how a limited view of language can be generative. It explains:

A real contestation of “Logistik” could only be based on evidence that logic has a language, which, on the one hand, is most intimately connected to phonetic language \([\text{Lautsprache}]\), but, on the other hand, would be representable not without remainder \([\text{restlos}]\) in written signs. Yet there is no prospect whatsoever, that such a proof can ever be delivered. In fact, the idea on which in the end the entire edifice of mathematical logic rests seems to have a lot going for it: that pure thought \([\text{reines Denken}]\) can only be represented without remainder in pure symbols. (S 2:110)

On the surface, the passage states Scholem’s support for Frege and Russell and Whitehead in, respectively, \(\text{Begriffsschrift}\) and \(\text{Principia Mathematica}\), which in the case of the former strives in fact to create a “formula language” \((\text{Formelsprache})\) of “pure thought.” But the passage also undertakes the Referat’s first philosophical step in that it answers the question what a “pure symbol” may be. Again, the term \text{pure} here deviates from the Kantian connotation: independent of experience. Instead, and via a markedly and, at
points, confusingly negative vocabulary (“no prospect” and “not without remainder”), the concept of purity builds on the metaphors of privation, like mathematics as a whole. The pure symbolism of the pure thought of “Logistik” assumes that there are no elements of thought that cannot be expressed in pure symbols (that its success depends on the lack of a “remainder”). Furthermore, these symbols can be fully decoupled from “phonetic language,” language enunciated out loud and language based on phonemes as the smallest units of meaning in speech. According to Scholem, the success or failure of “Logistik” thus lies in its ability to realize the constriction of representation—written and spoken—that he posited as the essence of mathematics above.

The Referat’s next philosophical move addressed the question that Poincaré raised at the beginning of the previous section: how mathematical logic can become “fruitful” beyond the “pure” tautological structure of mathematical reasoning. Scholem’s answer drew on and expanded Benjamin’s idea of language’s infinitude, reaching conclusions that must have alienated his listeners. The Referat’s solution to the problem of how mathematical logic may be fully realized, hinges on the idea that there may be other forms of language beyond human language:

The often-raised objection [against “Logistik”], that the principles and ur-symbols must themselves be first introduced through language, as a purely psychological objection, clearly misses the core of this intuition. For that this happens is based solely in the wish to communicate, as a human, knowledge to other humans, which naturally can only happen in phonetic language [Lautsprache]. The language of symbols, however, is silence [scheiden]. Only the thinking subject itself would understand thoughts if the means of phonetic symbols [Lautsymbolik] were not used—which, in itself, is thinkable. Beings, whose language would be silence and whose communication would consist in the sign not of phonemes, but of things, could communicate logic without remainder in the manner of calculus. (S 2:110)

This passage develops the metaphors of privative structure in mathematics; mathematics restricts representation in language by excluding not only rhetorical symbols (like analogy) but also the semantically meaningful sounds of human language. For Scholem, a pure, complete mathematical logic would
The Philosophy of Mathematics

consist of a language of nonsemantic, nonphonetic, self-referential signs (Zeichen). By emphasizing the cognitive potential of language, the Referat follows the epistemic transition charted out in Benjamin’s “On Language as Such”. Benjamin’s analysis of Genesis displaces the epistemological reference point, moving from a visual-geometric frame of knowledge (as in Plato, Euclid, and, later, Kant) to language and the efficacy of the word, as in Adam’s divine act of naming. And yet this passage also takes Benjamin’s thesis a step further, shifting the emphasis from a language dependent on its phonetic-semantic structure (Lautsprache) to symbolism (Symbolik) that speaks in a language of silence (Schweigen). The negativity of mathematical logic lies in this restriction of the rhetorical and phonetic features of language and its reliance, instead, on a language of “silence” composed of the syntactic grammar and logic of symbols. The Referat thus served as an index of and positioned itself in a deeper crisis of intuition in mathematics caused, as Volkert puts it, by the emergence of branches, such as mathematical logic, that function in algebraic and logical syntax, but evade visual-geometric intuition. Its proposed language of silent symbols also laid bare the central paradox that mathematical logic suggests: there may exist other and equally effective modes of language, even ones that do not function through the usual modes of representation available to language.

This paradox, however, is not a return to skepticism or nihilism, but rather the generative negativity that Scholem finds in the philosophy of mathematics. Expanding the idea of language by excluding “analogy” and “phonemes” but including “things” is the radical message the Referat delivers: it is “thinkable” that there may be “beings” who communicate through “silence,” purely silent algebraic symbols. Scholem may have taken this idea from Paul Scheerbart’s “asteroid novel” Lesabéndio (1913), which details the lives and aspirations of rubbery life forms who live on the asteroid Pallas. Scheerbart’s novel presents an extraterrestrial cosmos filled with different forms of language—such as those of light and pressure. Scholem’s language of silence combines this multiplicity of languages in Scheerbart (and Benjamin) with the metaphorical horizon of the privative structure of mathematics and its constriction of language detailed in this chapter. Hence, if Benjamin’s essay “On Language as Such” sought to overturn the bourgeois and mystical conception of language, then Scholem’s Referat wanted to reveal the
limits and alternatives to a “psychological” conception of language that takes
intersubjective communication as its primary concern. This alternative
language set the stage for the duality of a “true” versus “decaying” tradition
in Scholem’s theorization of mysticism, as the mythical union of the mystic
with God (unio mystica) remains as inaccessible to the human as the “great
tautology” of “mathematics as such.” The paradox revealed by mathe-
matical logic is thus a paradox that subverts not only mathematics but also tra-
ditions such as mysticism. We have a language to talk about the possibility
of realizing the totality of mathematical logic and the divine realm sought
and conveyed by mysticism. But this language is itself insufficient to com-
plete these tasks in its form as a phonetic language and must undergo a radi-
cal transformation—such as in a mathematical logic that strips language of
its rhetorical and phonetic-semantic register—to move past its inabilities.

The postulate in Scholem’s Referat of a language of silence served as the
point where the metaphors of privative structure and the restriction of lan-
guage in mathematics became operative as an aesthetic strategy in his work
on lament. Indeed, the language of silence provided the leitmotif for his the-
orization of lament in the short text “On Lament and Lamentation” (“Über
Klage und Klagelied,” 1917) and his translations of the Book of Lamentations
from the Hebrew Bible, both of which he composed directly following his
intensive study of mathematical logic. As a genre, lament (qinah) gives voice
to and petitions God to account for situations and experiences of loss, depriva-
tion, and pain, as captured in the Hebrew name for the Book of Lamenta-
tions in the incipit, eikhah (“how”; S 1:318). Although there are variants of
lament in Jewish literature and thought from the Bible to medieval songs of
lament, the translations of eikhah that Scholem completed in early 1918 are
likely based on his version of the Biblia Hebraica (1913). The eikhah lament
the ineffable horrors of the destruction of Judah and the Temple, decry the
enslavement of its people, their banishment and persecution in exile, as well
as call on God for reconciliation and redemption. The salient feature of la-
ment is that its content—the idea that God could let catastrophe befall the
chosen people—exceeds the tools available to language to represent it in full:
the extremity of these experience, like that of the Holocaust, lies beyond the
limits of representation. These lamentations and lament in general offered
Scholem not just a literary depiction of the Jewish historical experience of
inexplicable privation, but also an opportunity to reconfigure language in order to instantiate this sense of lack—language’s inability to represent such experiences—as a formal principle. Here lies the critical novelty of Scholem’s theory of lament and his translations: they turn inexpressibility into an aesthetic strategy that, taking its cue from mathematical logic, mobilizes structural lack as a formal feature of poetic language to represent, in negative, the Jewish experience of privation recorded in the eikhah.

For Scholem, what allows lament to undertake the paradoxical task of representing experiences for which there is no language lies in the idea that lament occupies the liminal “border” between two regions of language: revelation and concealment (“des Verschwiegenen”; S 2:128). As Scholem defines it, the fact that lament sits on this border region means that it neither reveals nor conceals its subject matter. Lament “reveals nothing, because the essence, which is revealed in it, has no content . . . and it conceals nothing, because its entire being [Dasein] is based on a revolution of silence” (128). Lament cannot fully reveal the loss and hardship of historical experience, because their extremity exceeds the limits of language. Lament mirrors mathematics for Scholem, in that it ventures to represents in language that which ultimately lies beyond language, instead of concealing it by not representing it at all. Indeed, as we saw in the absolute metaphors of mathematics, lament exhibits in Scholem’s writing a negative if not paradoxical relationship to its subject matter, which exists beyond the comprehension of human mind and language, but which it, nonetheless, attempts to represent in poetic verse.

In “On Lament and Lamentation,” this negative relationship between lament and its object becomes a matter of linguistic form. If the generative negativity in mathematics lies in a restriction of language, then lament takes this idea a step further: “Language in the configuration of lament annihilates itself [vernichtet sich selbst], and the language of lament itself is thus the language of annihilation” (S 2:129). What this passage means is that lament requires a special “configuration” of language, a “language of annihilation” that works against (“annihilates”) language itself. Lament “annihilates” specifically “itself” because, as I will show shortly, it employs linguistic and literary strategies to oppose literary language. What exactly does lament annihilate? The answer not only recalls Scholem’s mathematical Platonism but also distinguishes lament from mourning, in which images like the
memento mori’s skull and bones intuitively and fully symbolize loss. In the same way mathematics could not speak in “analogy” or “image,” lament cannot be “symbolic” or “objective” (gegenständlich), because what it represents has “no content”: the extremity of the experiences lamented makes them unavailable to the human mind to “symbolize” (128). Like mathematical logic, lament restricts representation in literary language by deliberately excluding symbolism; parallel to the privative structure of mathematics, lament constitutes “a fully autonomous order” cut off from the usual world of poetic symbolism. And yet this privation of language does not indicate lament’s communicative impotence, but rather the creative potential of silence, which lies in grinding away at the means through which poetic language represents. Lament retains this positive ability to signify that there are experiences that cannot be represented in language, because “language has indeed sustained the fall of humankind, but silence,” and with it lament, “has not” (133).

For Scholem, lament picks up where other forms of language fall short, because it redefines silence as more than just the absence of language. As Scholem calls mathematical logic a “revolution of logic,” lamentation also draws on “a revolution of silence” (S 2:109, 128). The “revolution” lies in the rehabilitation of silence’s epistemological and representative abilities:

The teaching [Die Lehre] contains not only language, it contains in a particular way the language-less, the concealed, to which mourning belongs, as well. The teaching, which in lament is not expressed, not hinted at, but rather concealed, is silence itself. And, therefore as well, lament can take possession of any language: it is always the not-empty, but extinguished expression, in which its wanting-to-die [Sterbenwollen] and inability-to-die [Nichtsterbenkönnen] are connected. The expression of the innermost inexpressible [Ausdruckslosen], the language of silence is lament. (131)

Programmatically, the passage expands a concept of knowledge (“the teaching”) beyond that which can be captured in language to include “the language-less” and the “concealed.” But the passage here gets more specific: it delineates how lament produces an inverted and mute version of representation, not by trying to represent the “empty,” but by presenting expression in the very process of being “extinguished.” Lament, as Adorno later put it,
serves as the “cipher” of the failed possibility of expression (A 7:178). To achieve this expressive annihilation of expression, Scholem’s theorization of lament turns to his work on mathematical logic. Recall that in the Referat’s discussion of mathematical logic, the completion of mathematical logic depended on a new language of “silence,” the eschewal of human language, its “phonetic” structure and symbols. “On Lament and Lamentation” translates this restriction of language in mathematics into formal poetic strategies, such as meter: “the silent rhythm [der schweigsame Rythmus], the monotony is the only thing of lament that sticks: as the only thing, which is symbolic about lament—namely, a symbol of the state of being extinguished in the revolution of mourning” (S 2:132). Here Scholem plays on the meaning of the word silence (Schweigen) in German, which means both the state of being silent and the process of falling silent. Where mathematical logic rejects phonemes altogether (it is silent), lament repeats them until the meaning they impart to words begins to erode (it silences meaning). The “silent rhythm” produced in Scholem’s translations thus not only enacts silence; by enacting, it also symbolizes on a poetic level the privation of language and, at the same time, the historical privation of the Jewish people that they lament.

Scholem’s translations of Jewish lamentations employ a host of formal methods to wear away at the creation of meaning in poetic language. For instance, in “A Medieval Lamentation” (“Ein mittelalterliches Klagelied,” 1919), Scholem’s translation elongates single sentences over twenty lines. Similarly, his translations of the eikhah from Hebrew into German emphasize such meaning-destroying monotony superficially by abandoning the traditional acrostic form as well as forgoing stanza breaks or verse numbers, as in the original Biblia Hebraica. These translations also accentuate the diminished stress of eikhah’s 3:2 bicolon, characteristic of qinah meter, by splitting the original half-lines (three stressed words followed by two stressed words) into two or three new lines. Take, for example, the sixth through ninth verses of the second lamentation:

Er zerstörte wie den Garten seine Hütte,
Verdarb seine Feste,
Vergessen ließ Gott in Zion
Festfeier und Sabbat
Und verwarf in seiner Zorneswut
König und Priester.
Verschmäht hat Gott seinen Altar,
Verworf sein Heiligtum,
Verschlossen in Feindeshand
Die Mauern ihrer Paläste.
Die Stimme erhoben sie im Hause Gottes
Wie am Tage der Festesfeier.
Gott dachte zu verderben
Die Mauer der Tochter Zion:
An legte er die Richtschnur,
Nicht wandte er seine Hand ab
Vom Verderben
Und gab Trauer über Mark und Mauer:
Sie sind verstört allzumal.

[Like a garden, he destroyed his huts,
Ruined his feasts,
God allowed Sabbaths and festivals to be
Forgotten in Zion
And dismissed in his indignant anger
Kings and priests.
God cast off his altar,
Discarded his temple,
Lost to the hands of the enemy,
The walls of her palaces.
They raised their voices in the house of God,
As on the day of a festival.
God thought to ruin the walls of
His daughter Zion:
He out stretched a line,
Did not restrain his hand,
From Ruination
And spread grief over rampart and wall:
They languished together.]

(S 2:116)
Although such splitting preserves the meaning of sentences, it emphasizes the monotony of the unequal three (“Vergessen ließ Gott in Zion”) followed by two stressed words (“Festfeier und Sabbat”). The breaking up of the half-lines defers the sentences’ semantic impact, intensifying how the original forces readers to wait, in translation over the line break, to learn “what God let be forgotten” and whom he “dismissed in his anger” (lines 3 to 6). The cumulative effect over the five lamentations is the wearing away and deferral of meaning, which forces readers to read the poems aloud, not as semantic communication (as a Lautsprache), but rather as the enunciation of an unequal, symbol-less rhythm. In their extinguishing of semantic meaning, their “silence,” Scholem’s lamentations signify on the level of form the inability to represent these events. The similarity and difference in mathematical logic and lament thus lies in that both restrict the symbolic function of language, but where mathematics strips language down to a syntax of arbitrary signs, lament wears away at language, leaving sounds that evince the erasure of meaning. Operative and creative in the philosophy of mathematics and lament for Scholem are these structures that abandon reference and semantics, indicating on the formal level the symbolization in negative of their own privation.

Scholem’s theorization of lament turned the privative structure of mathematics into an aesthetics through privation. At the same time, mathematical logic’s approach to negativity, its restriction of language, became in his translations of the lamentations from the Hebrew Bible a language that described historical privation, by enacting privation on the level of form. Lament, as Scholem writes, “only hints at the symbol” in its annihilation of symbolism and meaning (S 2:128). Benjamin, who would soon compose his own theory of translation, doubted the aesthetic success of Scholem’s translations, as he wrote in response to reading Scholem’s texts. But Scholem’s theory of lament and translations of the biblical lamentations nonetheless mark a significant point of conceptual transfer between mathematics and aesthetic theory. Both in theory and practice, Scholem’s work on lament propose a set of critical techniques—a negative aesthetics—that represent the experience of diaspora, erasure, and loss through the removal of symbol, tireless monotony, the breaking of poetic verse, and an idea of silence not as inexpression, but rather as the erosion of expression and sense. In the context
The Philosophy of Mathematics

The privative structure that developed out of Scholem’s work on the philosophy of mathematics yielded in his work on lament strategies for representing the experience of exile and loss—a negative aesthetics. In Scholem, negative mathematics reveals more about the nature of language and its potential uses in critical theory than Horkheimer and Adorno would suggest. Recall from chapter 1 that the same mathematical logic that Scholem studied in Jena threatened, in Horkheimer and Adorno’s interpretation of logical positivism, to eliminate language and poetry as meaningless metaphysics, to render philosophy, as they said, “mute.” In contrast, negative mathematics offers new configurations of language, suggesting a poetic and even a critical dimension to such silence. By elucidating the seemingly paradoxical relationship between the absolute realm of mathematics and humans, negative mathematics provides critical theory with such a form of language, one that functions through restriction, taking the restriction of representation as a form of representation itself. Indeed, for Scholem, the deeper dimensions of representation revealed by negative mathematics were not a question of language alone but also, as shown in this chapter, a question of history and tradition. The structure of lack that Scholem found in mathematics bears the possibility of transmitting histories and traditions that,
like lament, function not despite, but because of privation. As in the Kabballist, whose mystical tradition goes beyond the capacities of language as its medium of transmission, negative mathematics offers cultural criticism the idea that there may be histories and traditions that function through the very moments when historical representation and cultural transmission seem to break down.

Like Scholem’s negative aesthetics, mathematics reveals a theory of history more open to the historical experiences of erasure and diaspora—experiences such as catastrophe, homelessness, and assimilation that challenge the limits of historical representation. Readers familiar with critical theory may recognize here a similarity to Benjamin’s image of the “angel of history”: while we attempt to represent history as a “series of events,” the angel of history sees “a single catastrophe that relentlessly piles ruins upon ruins and hurls them before his feet.”

Negative mathematics as a productive aesthetic theory in lament sheds new light on this theory of history, shifting the emphasis from the series of events that we call history and the singular catastrophe that Benjamin ironically calls the “progress of history” to the piles of ruins themselves. This theory of history not only challenges the notion of history as a narrative of progress but also tells history through these ruins, from the perspectives of exile and discontinuity, erasure and assimilation. In this regard, the writing of history would function along the lines of the privative structure of mathematics: it would dwell less on what remains of the historical record in language than it would attempt to construct history out of its silences, its lacks of meaning, and, as Michel Foucault puts it, “the irruption of events.”

As is evident in Scholem’s work on lament, negative mathematics offers critical perspectives on history and potential strategies for reconfiguring history to include—alongside narratives of what is representable and transmissible in language—indexes of events and experiences that the language of history and its narrative strategies cannot represent.

Consider briefly Scholem’s own history of Jewish mysticism as an example of how such a theory may look in practice. Mathematics and mysticism both venture to represent phenomena that exceed the limits of the human mind and language, but mysticism, opposite of mathematics, depicts the mystic experience by employing—even, at points, to excess—the symbolic
tools available to language. Texts such as *Major Trends in Jewish Mysticism* create a history out of mystical responses to Jewish persecution—persecution by the Church in the fourth century, the expulsion of Jews from Spain in 1492, if not also the “great cataclysm” of Scholem’s own lifetime.\(^84\) “The more sordid, pitiful, and cruel the fragment of historical reality allotted to the Jew amid the storms of exile,” Scholem later wrote, “the deeper and more precise the symbolic meaning it assumed, and the more radiant became the Messianic hope which burst through it and transfigured it.”\(^85\) The privative structure of mathematics is at work here, only in inverse: where mathematics and lament fall silent, mysticism produces an excess of symbolic language as a marker of experiences and privations that lay beyond languages’ limit. History configured around the negativity of mathematics would take into consideration the events and experiences, such as that of the mystic, otherwise not fully representable and transmissible in language. This theory of history could give voice to the voicelessness of diaspora and erasure by finding historical continuity in silence as well as the excess of symbols that covers up the silences of inexpressible experiences.

Furthermore, the privative structure of mathematics active in lament suggests a deeper dimension to the notion of historical continuity, bearing the possibility for traditions that continue despite historical rupture. As in the example of the Kabbalist that provided the starting point for this chapter, I refer here to tradition not only as the passing on of cultural practices and knowledge between generations but also the theoretical possibility of transmissibility as such. Take also the transmissibility of the Torah, the first five books of the Hebrew Bible and the rabbinic commentaries, which, in Scholem’s words, starts to resemble the definitions and interpretations that attempt to express the negativity of mathematics:

What is *Torah*? Under this term, I mean: (1) the principal, according to which the order of things is formed. Now, according to the perspective of Judaism, this principle is knowable too as the language of God [*die Sprache Gottes*] and, even in a specific manner, in the transmission of humans [*Überlieferung der Menschen*]. (It is here that the concept of tradition, as a corollary to that of the teaching, receives its unique meaning.) Within Judaism, to whom we owe the term, this implies (2) Torah as the integral, the epitome of religious transmision of Jewry, from the first days to the day of the Messiah.\(^86\)
Although the divine laws given to Moses and recorded in the Torah are anything but arbitrary, this definition of tradition likewise separates the “language of God” and the “transmission of humans.” Parallel to “mathematics as such,” the first definition of Torah as “the language of God” exists independent of the accumulation (in Scholem’s mathematical terms, “integral”) of religious knowledge passed on across time. If this world of “mathematics as such” exists independent of our linguistic representations of it, then the divine definition of tradition would persist even when human interpretations were to come under threat from assimilation or catastrophe. As was the case with lament, the problematic transmission of the Torah would thus serve as the marker of the absolute division between knowledge passed on by humans and the divine word of God.

The negativity of mathematics affords a vocabulary to conceptualize such a theory of tradition that continues despite rupture. Indeed, for Scholem, the concept of continuity is deeply tied to mathematics; “is truth continuous,” he writes in his so-called mathematical theory of truth, “is it always differentiable, that is, does everything have a concept and every truth an inner form?” (S 1:418). The passage invokes the mathematical ideas of continuity, a property of a function that lacks gaps or breaks, and differentiation, which determines the direction and rate of change of a function for a specific value. A person’s height, for example, is a continuous function of time, while the amount of money in my wallet is discontinuous, because it increases by a discrete amount when I am paid and decreases when I buy coffee. Traditionally, the continuity of a function for a certain value meant that one could also calculate the differential at that value. Yet developments in the nineteenth century on the syntactic-algebraic side of mathematics similar to mathematical logic challenged the intuitive relationship between continuity and differentiation. For instance, Karl Weierstraß developed pathological, “monster” algebraic functions with a uniquely privative structure: they are continuous everywhere but are differentiable nowhere. In other words, this function would have no gaps, but we could not determine any second-order knowledge regarding its rate of change or direction—as Fenves explains regarding the “curve” of time: it “takes a sharp turn at every point.” This suggestion carries special significance for a theory of tradition, in as much as it implies that contemporary crises in tradition do not
entail a full break with tradition as such. As in lament, the privative structure of mathematics renders legible here how we can think of tradition as functioning not only in terms of the positive transmission of knowledge but also in the negative, as a symbol of tradition’s independence from its own transmission. In this regard, tradition continues, even if contemporary observers may be unaware of, in mathematical terms, its direction or rate of change; “real” tradition persists, even as its “decay” seems to fade away. Such a theory of tradition would take such points of crisis, seeming erasure, and inexpressibility as not signs of discontinuity, but rather as the constitutive elements, like silence in lament, of tradition itself.

As with Scholem’s negative poetics, these possibilities for theorizing history and tradition would take the privations of history and erasures of tradition as their generative spark—in writing a history of exile and a cultural tradition of lament. By turning history and tradition into an index of their own silences and erasures, they thus would encompass and afford theoretical room to historical experiences and cultural practices that rationalist discourse, majority cultures, and national, world-historical narratives may more readily marginalize or assimilate. Negative mathematics reveals these possibilities for aesthetic and cultural theory neither because it is somehow opposed to language, as Horkheimer and Adorno suggested, nor because it somehow calculates the trajectory of history or the limit of tradition. Instead, negative mathematics constitutes its own epistemological realm alongside history and mysticism, illuminating, based on its problematic relationship to language, the dark corners and hidden pathways of representation. But what if we allowed mathematics to speak with analogy and image—to work with the “integral” of tradition, the “continuity” and “derivative” of truth? What if we applied mathematics more directly to cultural criticism? What possibilities, if not also dangers, arise in using mathematics as an instrument of thought? It is to these questions that the next chapter turns.