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Unit Operations

To unpack the relationships between criticism and computation, I will rely on the notion of *unit operations.* Unit operations are modes of meaning-making that privilege discrete, disconnected actions over deterministic, progressive systems. It is a term loosely amalgamated from several fields, including software technology, physics, and cybernetics, but it could be equally well at home in the world of literary theory. I contend that unit operations represent a shift away from *system operations,* although neither strategy is permanently detached from the other.

In literary theory, unit operations interpret networks of discrete readings; system operations interpret singular literary authority. In software technology, object technology exploits unit operations; structured programming exhibits system operations.[1] In human biology, DNA nucleotide bonding displays unit operations; the Darwinian idea of acquired characteristics illustrates system operations. In effect, the biological sciences offer an especially salient window into the development of unit operations. Over the last two hundred years, biology has revised its conception of natural life from the random wholeness of natural selection (Darwin) to the command-and-control directedness of genomics (Mendel, Crick and Watson) to the periodicity of punctuated equilibrium (Gould) to the complexity of autocatalysis (Kauffman). In the 1980s and 1990s, independent researchers associated widely disparate genetic deformations as "causes" of mental disorders like manic depression and schizophrenia.[2] As scientists learn more about the human genome, they increasingly realize that no skeleton keys exist for human pathology; the nature of life is not so simple as

crafting maps of biological processes that organisms follow like molecular tourist guides. Since the successful decoding of the human genome in 2000, biology has entered a "postgenomic" phase, recognizing that knowledge about the genes themselves is not very useful. Instead, scientists seek to understand the functions between individual genes, and how the complex configurations of genetic functionality underlie complex behavior. The shift from genes as holistic regulatory systems to genes as functional actors in a larger intergenetic play marks a move away from system operations and toward unit operations. Unit operations are characteristically succinct, discrete, referential, and dynamic. System operations are characteristically protracted, dependent, sequential, and static. In general, unit operations privilege function over context, instances over longevity.

Yet the relationship between units and systems is not a binary opposition. A world of unit operations hardly means the end of systems. Systems seem to play an even more crucial role now than ever, but they are a new kind of system: the spontaneous and complex result of multitudes rather than singular and absolute holisms. Unit-operational structures might also reaffirm systematicity, even if they deploy the most discrete types of unit functions, a kind of growing pain that relocates holism even as it attempts to expand beyond it. We need the integrity of systems to identify physical, conceptual, or cultural phenomena. But these new types of systems are fluctuating assemblages of unit-operational components rather than overarching regulators. The difference between systems of units and systems as such is that the former derive meaning from the interrelations of their components, whereas the latter regulate meaning for their constituents. Postgenomic biology does not strip genes of all value; rather, it reconfigures the role of genes in the systems of organic life from one of causality to one of contribution. Genetics becomes a process of gene combination, rather than a circumstance of gene existence.

The shift in focus from systems to units can also be understood as a special form of complexity. For the last half century, complexity has moved slowly from the esoteric domain of pure mathematics into every field of the physical and natural sciences. The first form of complexity was conceived in the 1940s, as biologist Ludwig von Bertalanffy's systems theory. Systems theory focuses on the interrelation between parts of a system as the primary basis for understanding that system.[3] It informed the growing area of cybernetics in the middle of the century, and it generally informs areas of complexity theory and self-organization. The last decade has witnessed an explosion of interest in a specific

kind of complexity theory, often called *complex systems theory* or *complex network theory.* Complexity is heavily tied to the logic of networks, and the contemporaneous popularity of computer networking and the Internet helped fuel the fire. Complexity is a metascience that understands the operation of stable systems as sets of organized but nonpredictive individuated functions.

To understand the shift and its specific importance for our discussion, it will help to formally define the notions of unit, system, and operation. I have chosen the term *unit* because it does not bear the burden of association with a specific field. In essence, a *unit* is a material element, a thing. It can be constitutive or contingent, like a building block that makes up a system, or it can be autonomous, like a system itself. Often, systems become units in other systems. Software classes are models for computational behavior that instantiate in multiple software frameworks, and software frameworks assemble into multiple software applications. The word *object* is a suitable generic analogue, one used by philosopher Graham Harman in his innovative and related concept of an *object-oriented philosophy.*[4] Harman interprets Heidegger's analysis of *Zuhandenheit,* or readiness-to-hand, as a quality available to entities other than *Dasein.* Shedding the Heideggerian jargon, Harman suggests that all objects in the world, not just humans, are fundamentally referential, or form from relationships that extend beyond their own limits.[5] This is the sort of claim that complex network theorists are exploring in biology, pathology, sociology, and economics.

I am avoiding the term *object* and especially the phrase *object-oriented* because, as I will discuss later, these concepts have special meaning in computer science. Nevertheless, understanding units as objects is useful because it underscores their status as *discrete, material things* in the world. The notion of the object also carries the timbre of a reference or relation to other things, as do grammatical predicates—a verb takes a *direct object,* on which it acts. Harman insists on inanimate objects as necessary subjects for philosophy; while I include in my understanding of units ordinary objects such as the ones Harman favors ("person, hammer, chandelier, insect, or otherwise"), I also claim that units encompass the material manifestations of complex, abstract, or conceptual structures such as jealousy, racial tension, and political advocacy.[6]

When thought of in this way, units not only define people, network routers, genes, and electrical appliances, but also emotions, cultural symbols, business processes, and subjective experiences. Aggregates of these units, such as works of literature, human conditions, anatomies, and economies can properly be called *systems,* but such systems are fundamentally different from the kind units

have unseated in the many disciplines noted above. Moreover, such systems can be understood in turn as units themselves. In a famous example, autopoetic system theorists Francisco Valera and Humberto Maturana showed that the neurology of the frog operates as a system that regulates the organism's behavior.[7] But that system also exhibits the properties of units in the form of neurological directives, for example to respond to insects with a flick of the tongue. Within its environment, the frog exchanges information with other systems around it, creating "structural couplings" or feedback loops between the organism and its environment. Taken further, the neurological system itself can act as a unit, as in predator–prey relationships within swamp ecosystems. Sociologist Niklas Luhmann extends the same privilege to social systems, which he claims regulate themselves by "creating and maintaining a difference from their environment, and [using] their boundaries to regulate this difference."[8] In Luhmann's systems theory, communication is the basic unit of social systems.

System operations are thus totalizing structures that seek to explicate a phenomenon, behavior, or state in its entirety. Unlike complex networks, which thrive between order and chaos, systems seek to explain all things via an unalienable order. For centuries, systematicity was the fountainhead of the sciences. Natural selection explained the origin of life based on a few fundamental, universal rules. The Newtonian world operates under a similar system of static behavior. In the social and human sciences, structuralism expresses the most affinity toward systematicity. Mark C. Taylor characterizes the structuralists' obsession with systems as an attempt "to discover reason in history by uncovering forms and patterns that are permanent and universal rather than transient and arbitrary."[9] Stability, linearity, universalism, and permanence characterize system operations.

System operations pay the price of openness for certainty. Accordingly, they often depend on attitudes or values that inform the approaches that created the systems in the first place. More so, systems imply a fundamental or universal order that an agent might "discover," one that exists by natural, universal, or common law. These factors help differentiate totalizing systems from the complex systems in which individual units relate. Complex systems are typically autopoietic or at least arbitrary, and characterized by exploration or interpretation rather than discovery.

Heidegger called the grasp of totalizing systems *Gestell,* or Enframing. Enframing is the modern condition of ordering the potential of structures in the world only to conceal and hold onto their energy for potential future use. Hei-

degger gave the name *Bestand,* or "standing-reserve," to the output of "everything [that] is ordered to stand by."[10] For example, the availability of cut, packaged poultry undermines our relationship with the tilling of the land for feed and the tending of the flock. Packaged poultry is *Bestand,* or standing reserve. Agriculture becomes a practice of putting things away for later, and the energy of the earth is harnessed such that we might be able to ingest whatever appeals to us, whenever it appeals to us. Heidegger's eco-pastoral perspective notwithstanding, his thinking shows how *Gestell* forces us to see the world only in terms of its quantifiable energy content. Systematic scientific work seeks to quantify, measure, and control the world, drawing it further away from human experience.

The distinction between systems as totalizing structures and systems as assemblages of units is not exactly like Heidegger's distinction between Enframing and "bringing-forth," or poiesis. But his perspective on technology points to the struggle waged between totalizing structures and componentized structures. We cannot escape systems, but we can explore them, or understand ourselves as implicated in their exploration. Heidegger's essay on technology is structured as a haptic analysis, akin to a walk in the woods, by which the stroller happens upon matters of interest. He takes this casual encounter as a paradigm for resistance. Like Heidegger's logic of the promenade, unit operations meander, leaving opportunities open rather than closing them down. Rather than give in to Enframing, Heidegger suggests that the only way out of its dangerous grasp is through identifying possible reconfigurations of its elements, "through our catching sight of what comes to presence in technology, instead of merely staring at the technological."[11] For Heidegger, this is the realm of art, expressive units that reconfigure our relationship with technology in new ways. Unit-operational systems are only systems in the sense that they describe collections of units, structured in relation to one another. However, as Heidegger's suggestion advises, such operational structures must struggle to maintain their openness, to avoid collapsing into totalizing systems.

In systems analysis, an *operation* is a basic process that takes one or more inputs and performs a transformation on it. An operation is the means by which something executes some purposeful action. Mathematical operations offer fundamental examples, especially the function as outlined by Leonhard Euler. Other kinds of operations include decisions, transitions, and state changes. I use the term *operation* very generally, covering not only this traditional understanding but also many more. Brewing tea is an operation. Steering a car to avoid a pedestrian is an operation. Falling in love is an operation. Operations can be

mechanical, such as adjusting the position of an airplane flap; they can be tactical, such as sending a regiment of troops into battle; or they can be discursive, such as interviewing for a job. A material and conceptual logic always rules operations. In their general form, the two logics that interest the present study are the logic of units and the logic of systems. In the language of Heidegger, unit operations are creative, whereas system operations are static. In the language of software engineering, unit operations are procedural, whereas system operations are structured.

Complex networks are open, adjudicated by the nonsimple interaction of a variety of constantly changing constituents. The Internet, the brain, human genetics, and social fads are examples of complex, unit-driven networks. The systems that unit operations transition away from are not these complex systems. The movement away from systems thinking is really a movement away from the simple, orderly, static categorization of things. The gesture of a system operation is one of definition and explication. System operations can redundantly affirm the principles of an organizing system, as do Levi-Strauss's interpretations of cultural myths, but they do so only to affirm the validity and completeness of the orchestrating system. Unit operations articulate connections between nodes in networks; they build relations. Rather than attempting to construct or affirm a universalizing principle, unit operations move according to a broad range of diverse logics, from maximizing profit to creating new functional capacity. Such a broad understanding of the *operation* is required to facilitate the common processes of the artistic and technological acts that are my subjects.

Two characters from the history of philosophy help clarify the origins of complexity and the mutual transitions between system and unit operations: Benedict de Spinoza and Gottfried Wilhem von Leibniz. Apart from his role as a fundamental influencer of Gilles Deleuze, to whom I will return in chapter 10, Spinoza's thought itself informs the traditions that culminate in the present interest in complexity.

Spinoza held that there is only one substance comprising the whole of the universe. This substance is God or Nature (*Deus sive Natura),* two acting as one for Spinoza. As a fundamental Spinozist principle, *Deus sive Natura* itself offers a prototypical paradigm for a unit operation. The two terms, God and Nature, are related via the complex disjunction *sive.* The strict semantic meaning of *sive* in Latin is *or,* as it is translated here. But the force of *sive* is one of alternative equality, *either this or that, it doesn't matter which,* or *on the one hand . . . on the other hand . . .* This is the or of "chicken or pasta," not the or of "Catholic or Protestant." Un-

derstood in this way, *Deus sive Natura* not only articulates Spinoza's unitary substance but also sets the two forms of substance in perpetual, open relation to each other, across the bridge of the unit operational *sive.* The one substance expresses itself in the form of attributes that appear to us in an infinity of different modes. Spinoza's radical holism offers a single framework, Being, for every gesture of agency. Or, in the words of Deleuze, "What is involved is no longer the affirmation of a single substance, but rather the laying out of a *common plane {plan} of immanence* on which all bodies, all minds, and all individuals are situated."[12]

From the purview of this common plane of immanence, Spinoza's philosophy opens up the manifold relations between substances unified under Nature. This remarkable principle of radical universality organizes the whole of the universe. The unified substance ebbs and flows among itself in modes, or "affectations of a substance."[13] Consider the following extract from Spinoza's *Ethics:* "The mind imagines a body because the human body is affected and disposed as it was affected when certain of its parts were struck by the external body itself."[14] And soon after: "From this we clearly understand what memory is. For it is nothing other than a certain connection of ideas involving the nature of things which are outside the human body."[15] Spinoza's worldview merges ontological and epistemological materiality. Rather than conceiving of fixed bodies that have epistemic interactions with other bodies, in the excerpt above memory becomes a transgressive, unbounded space. The human mind not so much encounters and controls the objects of its memory as it does memorize the objects that interweave with that mind.

Spinoza's philosophy sets up a network-like superstructure for almost any kind of material relation. Like a ball of twine bunched up so that every point touches every other, Spinoza's singular substance sets the stage for future forms of complex systems. The crucial seed that Spinoza plants is that of innumerably re-creatable relations between objects.[16] Such language looks forward to forms of material relation like Valera and Maturana's autopoiesis, as well as the dynamic structure of software information systems.

Spinoza's open universe of relations stands in subtle opposition to that of his contemporary, Leibniz. Leibniz conceives of a world constructed of units called monads. Leibniz holds that these monads are "windowless," meaning that they are completely self-contained from their beginning into eternity. The universe is constructed of an infinite number of monads in consecutive succession from "clearest" (God) to "cloudiest" (inorganic matter). Because monads are windowless, their essences are predefined from the beginning of existence. The

interrelation between monads is not relational in the Spinozist sense, but entirely preconceived by God, who dictated the interactions between the monads. In spite of his conception of discrete atoms that may seem to have much in common with our units, Leibniz arrests the universe into a preordained set of compunctions. Unlike Spinoza's world of shifting attributes, which hosts discrete affects of Nature in flux between subjects, Leibniz's universe arrests systems that fall in line according to an elemental divine order. Even though binary calculation is among Leibniz's many inventions, Spinoza is the more digital thinker.

Perhaps the closest philosophical precedent for unit operations is contemporary philosopher Alain Badiou's application of set theory to ontology. Transfinite set theory, first devised by nineteenth-century German mathematician Georg Cantor, deals with the representation of infinity, a concept previously left only to contemplation. In philosophy and mathematics alike, infinity was largely correlated with religion (the infinite as the "immeasurable" or the "indefinite"). Cantor's solution was to combine the notion of the infinite with that of the set, a coherent totality.[17]

Cantor's key innovation is important. Since the infinite is not mathematically measurable, Cantor needed to devise a replacement for measurement. Instead of trying to compute the size of the infinite, Cantor focused on the numerical order of different infinities, representing them as sets: "By a set *S* we are to understand any collection into a whole of definite and separate objects *m* of our intuition or our thought."[18] Any set of elements that could be made to correspond to the natural numbers is denumerable, and any infinite denumerable set has the same size. Cantor represented the size of this set, which corresponds to the size of the set of all the natural numbers, as $\aleph_0$, read "aleph-null."

Set theory allows for "subsets," articulations of different possible arrangements of the elements in a set. For example, the set {a, b, c} has among its subsets {a, b} and {b, c}. Cantor observed that the number of possible subsets of an infinite set, while still infinite, is clearly larger than $\aleph_0$. Cantor called this second, larger infinite cardinal *C*. *C* would equal the total number of possible subsets of an infinite set of size $\aleph_0$. The number of possible subsets of a finite set of size *n* happens to be 2^n, and thus is referred to as the *power set* of a given set, making *C* equivalent to $2^{\aleph_0}$. Cantor's famous "continuum hypothesis" (referred to as simply CH in mathematics) supposed that the power set *C* might be the transfinite cardinal just larger than $\aleph_0$, and therefore might be called $\aleph_1$. CH plays a colorful role in the twentieth century and remains neither provable nor disprovable under mathematics' standard rubrics.

After Cantor, philosophy's interest in set theory mostly centered on structural applications. The most well known of these are assuredly those of Gottlob Frege and Bertrand Russell: the "intensional" conception of a set as a collection of objects held together by a common predicate.[19] In an intensional set like "the set of all red things," "redness" serves as the foundation of the set. Such sets require a coherent and clearly defined set of properties, and as such intensional sets are top-down affairs: system operations. An opposite, "extensional" conception understands a set only by the collection of objects that it contains. The extensional set is fundamentally constructed from the bottom up. As Peter Hallward describes it, "such a set is simply a result, the result of collecting together a certain bundle of elements."[20]

Badiou's philosophy offers a concept of multiplicity that simultaneously articulates coherent concepts and yet maintains the unitarity of their constituents. For Badiou, there is only "the multiple without any predicate other than its multiplicity."[21] For this reason, Badiou has little interest in intensional sets. A set for Badiou is a collection of elements selected from the infinite possible collections of elements. These elements in turn must be thought of as multiplicities, as sets themselves. This concept of membership, borrowed from set theory, forms the basis of Badiou's ontology: "To exist is to be an element *of*."[22] The method of inclusion in a set is left entirely open; it does not rely on an intensional principle of selection and construction.

Like the mathematics that grounds it, Badiou's philosophy is rich and complex, covering ontology and ethics, art and politics, psychoanalysis and love. I have no fantasy of offering a complete treatment of his thinking in the present context, but two core principles will help relate unit operations to this thinker's emerging legacy, namely, what Badiou calls the "count as one" and the "situation."

Because a multiplicity comprises multiplicities in turn (for all sets are multiplicities), any given multiplicity must be articulated or "made singular." Somehow, every multiplicity must be instantiated; as Hallward puts it, "every presented multiplicity is presented as one-ified."[23] Badiou calls this process the "count as one" (*compte-pour-un*). As a process or a frame for *a* multiplicity, the count as one *produces* a *particular* set; it takes a multiplicity and treats it as a completed whole. Because each "one" is always a multiple for Badiou, the set itself can never properly be called a unity (or a unit). But the result or "output" of the count as one, at the risk of tautology, is considered to be one; it is taken as one. Because Badiou relies on the extensional definition of a set, every count as one is its own gesture, its own operation.

This leads us to Badiou's notion of the "situation," a special extension of set-theoretical belonging. A situation is Badiou's name for an infinite set; being is a matter of belonging to a situation.[24] The situation is itself a "structured presentation," a set of *specific* elements arranged in a certain way.[25] As a set, the situation can be counted as one, but the form of that counting is omitted from the operation. The count as one itself is never part of the set it assembles; it is expended in the very act of counting as one. To address this problem, Badiou argues that the structuring process itself can be counted as one independent of the selection of the elements in a situation. This metastructure is the philosophical equivalent of Cantor's power set; Badiou calls it the "state" of a situation.[26] Hallward reminds us that Badiou uses the term "state" to refer both to the political and ontological senses of the set: it is "what discerns, names, classifies, and orders the parts of a situation."[27] Just as the cardinality of the transfinite power set eludes certain definition within the mathematical laws of set theory, the metastructure holds in check a fundamental disruption of the structure of the set, an occurrence that always remains possible. Badiou notes that all multiplicities rely on this void; he inscribes the void onto the set-theoretical notion of the empty set (Ø), which is always present in every set. He articulates this disruption of the set as an *event,* a concept I will return to in chapters 8 and 9.

In the early twentieth century, a group of mathematicians (including von Neumann) grounded Cantor's theory in a set of axioms, known as the Zermelo-Fraenkel (ZF) system. ZF formalized contemporary set theory's dedication to the extensional approach to set definition. Badiou's philosophy simultaneously extends set theory into the sphere of philosophy and remedies analytical philosophy's previous cooption of set theory for the support of top-down structures of knowledge. Badiou makes several gestures that resonate with my goals, starting with his general support of the extensional over the intensional. More important, however, is Badiou's insistence on "unit" as the fundamental building block for ontology.

Unit Analysis

For Badiou the set *qua* unit is never actually unitary; it is always a multiplicity, and more precisely it is a multiplicity of multiplicities. This fundamental principle might seem to distance Badiou's philosophy from the critical approach I am calling unit operations, but in fact it underscores the fundamental properties of organization and reorganization intrinsic to structures of all kinds. Both set theory and Badiou's philosophical adaptation of it articulate strategies of *configuration.*

Badiou has his quarrels with Spinoza's thinking, especially the latter's exposure of the infinite to an intellectual mode, but the two both posit belonging at the center of being.[28] Configuration's role is already apparent in the conflict between Spinozist and Leibnizian thought, a conflict that parallels the future divergences between relational unit operations and universalizing system operations: Spinoza suggests that an almost infinitely interchangeable set of substances (units) stumbles on complex modes of relation (operations), whereas Leibnizian thought maintains that static structures organize the worlds.

Where Badiou moves far beyond Spinoza is precisely in his treatment of the process of configuration. Badiou offers a means of thinking about the process of configuring things of any kind—the multiples of sets—into units, namely the count as one. The count as one serves as a process for constructing a specific multiplicity, enacted by an agent, formal or abstract, conceptual or substantive. Badiou's reliance on the formal structure of mathematics offers a logical and historical conduit to computational representation. At the same time, his transformation of set theory into a philosophical discourse unifies mathematical representation with cultural representation, a core requirement of a comparative procedural criticism.

In *Hamlet on the Holodeck,* Janet Murray argues that digital environments share four essential properties: they are procedural, participatory, spatial, and encyclopedic.[29] The first and in my opinion the most important of these properties, procedurality, Murray defines as the computer's "defining ability to execute a series of rules."[30] More specifically, procedurality refers to the practice of encapsulating specific real-world behaviors into programmatic representations. Murray's favorite example of a procedural system is Joseph Weizenbaum's famous Eliza agent, a computational representation of a Rogerian psychologist. Eliza crafted appropriate responses, typically in the form of leading questions, based on a set of natural language transformation rules. For example, Eliza might respond to a statement such as "Perhaps I could learn to get along with my mother" into "Tell me more about your family."[31] Procedurality is a name for the computer's special efficiency for formalizing the configuration and behavior of various representative elements.

The figure of the count as one helps serve as a ligature between computational and traditional representation, creating a common groundwork for understanding texts of all kinds as configurative. The count as one is the closest extant philosophical concept to what I am calling unit operations: an understanding, largely arbitrary, certainly contingent, of a particular situation, compacted and taken as a whole.

At the same time, the count as one tells us scarcely little about the way that the configured elements of a set function: what they do, and how they do it. In this way, Badiou's ontology bears some similarity to what computer scientists typically mean when they refer to an "ontology." In computer science and especially in artificial intelligence, an ontology is just a "conceptual model of the domain," typically a hierarchical framework of entities and relations of belonging between those entities.[32] These ontologies serve as frameworks for subsequent computational systems designed around the particular domain concept. As such, ontologies in the computer sciences sense of the word enable, but do not specify, the functional relationship between their constituent parts. Unit operations, however, strive to articulate both the members of a particular situation *and* the specific functional relationship between them. In Badiou's philosophy, this would be equivalent to a situation and its state; in computer science, it would be equivalent to an ontology and its procedural implementation.

Unlike Espen Aarseth's notion of the cybertext, which relies on configuration as a formal property of the artifact itself, unit operations are located both at the textual and the critical level. Aarseth articulates a "traversal function" that assembles a particular string of readable signs (what he calls "scriptons") from a possible array of textual signs (what he calls "textons").[33] At first glance this gesture may seem quite similar to Badiou's count as one, or my unit operation, and indeed Aarseth is describing a configurative practice. However, Aarseth musters his understanding of configurative texts as an ontological, not a critical tool; a cybertext is a work, not an instance of a particular critical practice. Taken to an extreme, cybertextual analysis could even be seen as a system operation; it seeks to construct an ontological domain that includes and excludes certain works by virtue of their overall function.

By contrast, a unit operation may be observed in any artifact, or any portion of any artifact, rather arbitrarily. I insist on this broader understanding of unit operations to allow its logic to resonate across expressive forms, from literature to film to software to videogames. While different media certainly exhibit qualitative differences in configurability—a videogame is more configurable than a poem in the "scriptonic" sense—the process of criticism might very well expose fungible unit operations at work in any text. More important, there is no reason to believe that the degree of configurability of a text might be directly proportional to its expressive relevance in a particular situation. For this reason, analytical practice by means of unit operations need not limit itself to computer texts.

In her exposition of digital environments, Janet Murray draws an analogy between procedurality and T. S. Eliot's notion of the objective correlative, a kind of literary formula for the production of an emotion.[34] Murray calls for the development of "new narrative art" that applies the themes of literature to the digital. Instead of articulating a divide between the literary and the digital, I want to suggest that unit operations give us a lever for understanding any form of human production as potentially procedural. Moreover, I do not contend that unit operations are necessarily components of narrative production, a topic that has become a thorn in the side of game studies and to which I will return in chapter 5. I am not particularly concerned with identifying and classifying works through new ontologies. Nor am I willing to make the reductionist suggestion that all works are digital works *avant la lettre* because all can be read as configurative. Indeed, I am not interested in making general statements about media forms of any kind.

Unit analysis is the name I suggest for the general practice of criticism through the discovery and exposition of unit operations at work in one or many source texts. Unit analysis is especially useful in comparative criticism across legacy and computational media, and it should prove equally useful in criticism of literature, film, or other artistic works. Each medium carries particular expressive potential, but unit analysis can help the critic uncover the discrete meaning-making in texts of all kinds.

Consider Steven Spielberg's 2004 film *The Terminal.* Studio publicity and online movie Web sites characterize the film's story as relatively traditional and rather mediocre. Viktor Navorski (Tom Hanks) comes to New York City from a fictional Eastern European country called Krakozia to carry out his father's last wish—collecting the one missing signature in a comprehensive collection of album covers of American jazz greats. While Navorski is in transit across the Atlantic, a coup overthrows the Krakozian government. The United States responds by repudiating any diplomatic ties with the country's rebel government, thus voiding Navorski's passport. U.S. Immigration refuses to allow Navorski entry into the country, but they also cannot deport him. Authorities tell Navorski to remain in the airport's international arrivals lounge until his situation can be resolved. This premise was based on a real man, Merhan Karimi Nasseri, an Iranian refugee who has lived in the departure lounge of Paris's Charles de Gaulle airport since 1988. Nasseri was awarded refugee status and a resident permit in 1999, but he refused to leave the airport. He has kept diaries since his arrival, versions of which were adapted into an autobiography and a French film, *Tombés du ciel* (Lost in Transit).[35]

In Spielberg's high-visibility Hollywood treatment, Nasseri is but an inspiration. Despite the fact that Spielberg's DreamWorks studio reportedly paid Nasseri "several hundred thousand dollars"[36] for rights to his rather remarkable story, *The Terminal* garnered largely mixed reviews, with many critics pouring scorn on its trite, saccharin, comic optimism.[37] In *The Terminal,* Navorski remains in the airport for an unspecified duration, perhaps a year, which offers enough of a temporal canvas for the film to touch a great many characters and themes. The recombinations of time horizons in the airport terminal allow Spielberg to paint the medium-term struggles of many characters, the long-term struggles of a few, and the short-term struggles of the airport itself. As different characters interact along one or more of these time horizons, the film's unit operations become apparent, and *The Terminal* reveals itself not as a film about a man struggling against governments for his identity, but as one about various modes of *waiting.*

Most obviously, Viktor Navorsky is waiting to enter the country. In the context of the film's story, he waits for the United States to decide how to respond to the new government of the fictional state Krakozia. But in a more abstract sense, Viktor is waiting for bureaucracy of the general kind; he is caught up in the absurdity of large organizations' slow response to unusual change. In this case the organization is governmental, but the experience Viktor endures resonates with anyone who has been oppressed in the "good-faith error" of a bureaucracy—victims of identity theft come to mind just as easily as accidental refugees. Despite the absurd condition under which he is withheld, Viktor waits patiently, accepting—even embracing—the bureaucratic red tape by which he is detained. Each day he files the same paperwork with customs, and each day the same immigration agent (Torres, a key character in another of the film's units) red-stamps it. Viktor's absurdist acquiescence to the bureaucratic rules of immigration even disrupts the immigration office itself. Office chief Frank Dixon expects Navorsky to try to escape the terminal since only sliding doors stand between Viktor and the United States.

But Viktor is also waiting for news of his homeland and waiting to gain an adequate mastery of English to understand the cryptic reports on the CNN broadcasts scattered throughout the terminal. In this sense, Viktor awaits clarity in an entirely unclear situation, one whose impetus and resolution are out of his grasp. Viktor abides this uncertainty, never giving up hope that his homeland will return to some semblance of its former state. When Dixon presses Na-

vorsky to apply for refugee status in America, the latter refuses, reminding the former, "Krakozia is home."

Both the bureaucratic figure of the wait without guaranteed end and the political figure of the wait without certain resolution underscore a more basic kind of waiting that we might call the "uncorroborated wait," a waiting despite any guaranteed resolution. This figure constitutes the fundamental unit operation at play in the film.

Indeed, Viktor's very reason for visiting the States is motivated by such an uncorroborated wait. Viktor keeps a peanut can with him, and midfilm its contents are finally revealed to us: his father was a jazz lover, and in his youth he sent requests to every American jazz great in Art Kane's famous 1958 *Esquire* magazine photo, asking for a signature from each.[38] Slowly, replies made their way back to Krakozia, and Viktor's father collected them in the can. Only one remains, hard-bop tenor saxophonist Benny Golson, and Viktor comes to New York for the sole purpose of retrieving this last autograph for his father's collection, nearly fifty years later.

The film iterates the unit of the uncorroborated wait in each of its minor characters as well. Two characters wait for love: Enrique the airline food-cart driver courts Dolores Torres, the customs agent who denies Viktor passage every day. Enrique first uses Viktor as a kind of lover's scout, then months later as a messenger of his marriage proposal and requited love. Amelia the flight attendant waits for love too, this time the unrequited love of a married man with whom she conducts a sporadic affair during her stopovers in the city. Amelia simultaneously suspends several different yet complementary kinds of uncorroborated wait. For one part she waits to arrive in a city where she can meet her lover, unsure where her work schedule will take her next. For another part she waits for her lover to leave his wife and take her in legitimately. And for a third part she waits for him to call it off, leaving her stranded as a spinster in her late-thirties with no hopes for legitimate companionship. Viktor gets caught up in Amelia's interpersonal drama, the latter attracted to Viktor's apparent schedule—he, like she, seems to be constantly in transit.

Navorsky poses a special problem for Dixon whose promotion review happens to coincide with Viktor's arrival. Dixon has few options for handling Viktor's unique situation; he can't legally authorize passage, nor can he arrest or otherwise detain Navorsky. At the same time, Viktor's rogue presence as an ad hoc resident of the airport threatens to draw undesirable attention during

Dixon's review. Just as Navorsky waits for the resolution of his ambiguous political situation, Dixon waits for the resolution of his ambiguous professional one. But unlike Viktor, Frank Dixon has a much harder time facing the unknowable status of his professional review. Desperate to be rid of Navorsky, he even encourages Viktor to escape the terminal so that another law enforcement body might pick him up: their problem, not Dixon's. The minor character Gupta Rajan, a grumpy janitor, shares Dixon's bilious attitude toward the airport's passengers. In an effective portrayal of black humor, Gupta is often shown sitting in the food court waiting for unsuspecting travelers to slip and fall on his carefully placed patches of newly washed floor. But as Dixon's vitriol toward problem travelers reveals his own intolerance for waiting through uncertainty, so Gupta is revealed to carry the burden of a similar situation. Gupta, wanted for a violent crime in his native India, has spent the last twenty-six years waiting to find out if he will be discovered. While certainly a less honorable kind of waiting than Navorsky's stoic lawfulness, the film reveals the bitter Gupta to carry more human empathy than Dixon, even though the stakes of the former are much higher.

As a story about Viktor Navorsky and Frank Dixon's struggle against one another within a bureaucratic system, *The Terminal* hangs together only by threads; its narrative structure confuses the passage of time, and each character's motivation remains undeveloped at best, trite and contrived at worst. But when the viewer stops regarding the film as a story about a man's quest, *The Terminal* becomes a much more subtle meditation on the unit operations for various kinds of uncorroborated waiting. For my part, I was inspired to see *The Terminal* in this light only when it was properly contextualized: I watched it a second time on a transatlantic flight. The function of the in-flight movie itself is a medium for waiting; it is provided to distract passengers as they wait for the next milestone in the flight. We wait for the food or drink cart (or we wait for it to move out of the way, so we can once again see the in-flight movie). We wait for the seatbelt light to stop illuminating so that we can get up and wait for the lavatory. We wait to disembark so that we can wait to be cleared at customs.

The in-flight movie is an especially appropriate means of dissemination for *The Terminal.* As a film, the work is linear, told in the form of a rather forgettable, admittedly trite story about Navorsky's quest to fulfill his father's last wish. But when steeped in the experience of the airline flight, the viewer's proximity to airport experiences invites him to engage the film differently: not as a specific narrative about key characters, but as a framework of general figures for

waiting. This impetus serves as an invitation for the viewer to perform a unit analysis on the film, to understand it as a procedural system rather than a narrative one. As the film plays out the interwoven stories of Viktor, Dixon, and Amelia, it challenges the viewer to abstract the film's specific representations of waiting into general, individual units of meaning that the viewer naturally recombines with his or her own experience. This process of viewership and of criticism exposes *The Terminal* as inherently unit operational, in contrast to the film's mediocre narrative coherence.

Analyzing an artifact like *The Terminal* as a unit-operational film about themes of waiting rather than a system-operational film about the story of a handful of developed characters thus demands a novel critical framework. In my unit analysis of the film, the story serves as the glue for a configurative work about specific modes of uncorroborated waiting. This approach is quite different from the inverse, an analysis of the story of Viktor, Amelia, Dixon, and others with common touch points in the common theme of waiting. Such a distinction is core to the critical process of unit analysis, which privileges discrete components of meaning over global narrative progression. It is tempting to argue that *The Terminal,* when viewed as a set of unit operations, ceases to function as a traditional film and begins to resemble a piece of software or a videogame. But I want to avoid such a deterministic view and instead suggest that unit operations naturally occur across media, and it is the job of criticism to shed light on them.