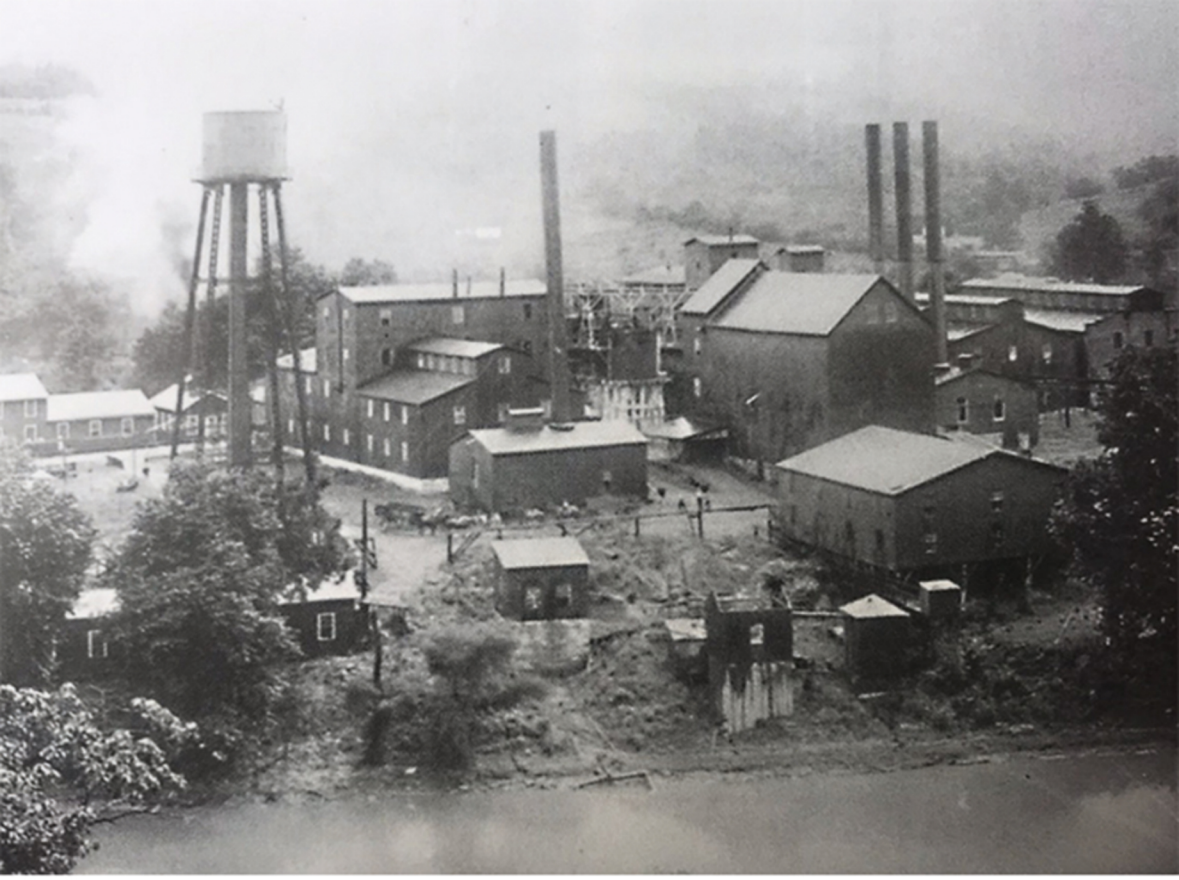

ROUTLEDGE STUDIES IN SOCIAL AND POLITICAL THOUGHT

SOCIAL CHANGE IN A MATERIAL WORLD

THEODORE R. SCHATZKI

ROUTLEDGE

SOCIAL CHANGE IN A MATERIAL WORLD

Social Change in a Material World offers a new, practice theoretical account of social change and its explanation. Extending the author's earlier account of social life, and drawing on general ideas about events, processes, and change, the book conceptualizes social changes as configurations of significant differences in bundles of practices and material arrangements. Illustrated with examples from the history of bourbon distillation and the formation and evolution of digitally-mediated associations in contemporary life, the book argues that chains of activity combine with material events and processes to cause social changes. The book thereby stresses the significance of the material dimension of society for the constitution, determination, and explanation of social phenomena, as well as the types of space needed to understand them. The book also challenges the explanatory significance of such key phenomena as power, dependence, relations, mechanisms, and individual behavior. As such, it will appeal to sociologists, geographers, organization studies scholars, and others interested in social life and social change.

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For my family

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SOCIAL DYNAMICS I

Chains of activity

Chapters one, two, and three laid the ground for the study of the central topic of this book, social change. Chapter one examined, among other things, the nature of change, its relation to difference, and the connection of these to events and processes. The concepts of change, difference, event, and process, together with those of activity, practice, material entity, arrangement, and bundle, form the basic conceptual armature with which social dynamics is to be analyzed. Chapter two then explored the composition of the practice plenum, the overall nexus of practices and arrangements. Social phenomena are constituted, and social dynamics play out, in this plenum. And chapter three explained both that the material world forms a crucial dimension of the practice plenum and that the ecology of social life encompasses, not just the practice plenum, but also life trajectories, phenomena of broader and inner nature, and forsaken as well as decaying artifacts and hybrids.

The present and succeeding chapter analyze social dynamics, that is, directional motion, or more generally, change in social life. They are concerned with the nature, temporal features, and determinants of social change. The account that emerges over these chapters conceptualizes social changes as significant differences in social phenomena, treats these changes as features of the temporal course and phases of such phenomena, and maintains that changes in social phenomena arise from events and processes that befall them. Most important, because social phenomena consist in slices and aspects of the plenum of practices and arrangements, the account holds that the events and processes from which social changes arise befall or bear on practices, arrangements, and bundles.

The present chapter explores one of the two major generators of significant differences in the plenum: chains of activity. The discussion ranges over a series of topics. After general comments about the nature of social change, I address the import of human activity generally for change, the phenomenon of chains of

activity, the alternative accounts of action chains found in the work of Tarde and Latour, key properties and types of activity chains, the inflection of chains in individual lives, the ex post facto qualification of particular activities as originary, and the uneven front of change.

On social change

Chapter one claimed that change is significant difference and that differences and changes arise from events and processes. In particular, changes in phenomena of a given sort arise from events and processes that pertain or bear on phenomena of that sort. Chapter two explained that social phenomena consist in slices or aspects of the plenum of practices, thus in slices or aspects of bundles of practices and arrangements. This ontological thesis implies that changes in social phenomena consist in significant differences in practices, arrangements, and bundles. An evolution in the bourbon market, the development of new social associations through ICTs, the formation or demise of a sports league, the establishment of new government regulatory powers, changes in religious rites, new trends in parenting, and resurgences in overt prejudice—all these and further changes consist in changes to practices, to arrangements, to relations between practices and arrangements, or to relations among bundles. Changes of these sorts, moreover, arise from events and processes that befall practices, arrangements, bundles, and their components. That is to say, social changes emerge from the events, continuous unfoldings, complexes of continuous events, and sequences and nexuses of these occurrences that befall bundles and their components. In light of the facts that the world embraces endless events and processes and that sequences of events and unfoldings intersect, this formulation can be further amplified, to wit: social change is the emergence of significant differences in practice-arrangement bundles from the intersecting and connected events, processes, and sequences and nexuses thereof that happen to practices, arrangements, and bundles. Theoretical disquisitions about change, like concrete explanations of particular changes or complexes thereof, must refer, directly or indirectly, to these intersecting and connected events, processes, sequences, and nexuses. Keep in mind, moreover (see chapter one), that events, processes, and nexuses of these are responsible, not just for changes, but also for the persistence and stability of social affairs.

Social changes consist in significant configurations of differences in bundles. As a result, the basic components of bundles underwrite a typology of ingredients of change. Social changes usually embrace configurations, often complex configurations, of these. Significant differences can exist in activities, practice organizations, arrangements, relations among practices and arrangements, relations among bundles, and space or time. Since practices are composed of activities, differences in which activities compose practices can amount to changes in the latter. Differences in organization, too, can amount to changed practices. Differences, for example, in how given actions are bodily carried out implicate differences in practical understanding, thus in practice organizations. Organization differences

can also lie in reshufflings of both the rules that are upheld in a practice and its teleoaffective structure (acceptable and enjoined ends, projects, and emotions). Meanwhile, differences in which entities make up arrangements can constitute changes in arrangements, as can differences in material and other events and processes that befall or are captured, created, or controlled in arrangements. Differences of these sorts must be distinguished from alterations to material entities such as tattoos, wear and tear, and repairs, which far less often amount to change. Finally, differences in relations among practices and arrangements can constitute changes in bundles, just as differences in relations among bundles can amount to changes in constellations. And differences in space and time, that is, in spatial and temporal features of practices, arrangements, and bundles, can constitute spatial and temporal changes.

The centrality of activity

Boiled down to basics, the central kind of event bound up with social change is human activity: human activity is the principal generator of difference and change in social life. I will not seek to defend this proposition argumentatively. Indeed, I am not sure how one could win over doubters through argument. Instead, I will try over the remainder of the book to build on this conviction, showing how it anchors an insightful account of social change that is useful to investigators.

Human activity is an event. It is an event that befalls people. Another word for activity is "performance." Performing an action, accordingly, is an event that befalls people. This might sound counterintuitive since we normally think of performance as something people do, not something that happens to them. It is true that to perform (an action) is to do something. People, however, do not perform their performances. Rather, these performances happen to them. The activity-events that happen to people are performings of action (for discussion, see Schatzki 2010: chapt. 4).

The events that are performings happening to people happen in the world. Happening in the world, these activity-events can connect to further events or states of affairs there. In particular, many activities are interventions in the world that alter its setup. Intervening in the world, making alterations there, is a form of causality (of the bringing-about sort). I understand that the concept of causality is contentious and that some theorists of the physical or social worlds believe that the physical or social sciences can do perfectly well without it. I don't presently want to take up abstruse discussions of the nature of causality. It suffices for the purposes of this book to recall Aristotle's four types of cause and to appropriate Heidegger's (e.g., 1977) interpretation of the Greek word *aition*, of which "cause" is the standard translation, as: that which is responsible for something else, alternatively, that to which something else is indebted, that on which it depends. Aristotle (1941b: A3) identified four ways in which something can be responsible for something else: formally, materially, efficiently, and final-ly, that

is, teleologically. An act of intervening in the world, altering it, certainly bears responsibility for the resulting alteration; in this sense, the alteration depends on the intervention. It is in this straightforward sense that those activity-events that are interventions in the world bear a causal relationship to the alterations of the world that result.

Interventions directly alter material arrangements and material connections among arrangements. Indeed, many of the differences that interventions introduce in the world concern material arrangements and connections. Interventions do not directly reorganize practices or that often alter how practices and arrangements bundle or bundles connect. As we will see, the material alterations that interventions bring about can play important roles in the generation of social change. Of course, not all activities are interventions. Dance moves, expressions of anger, acts of imagination or thought, requests for help, indeed, sayings in general, are not—at least not in the first place—interventions: they do not in themselves alter the setup of the world. What, however, is true about activities generally—including interventions—is that their occurrence automatically generates differences—typically small, but sometimes larger—with other doings and sayings that compose the practices of which they are part. Differences in relations between practices and arrangements can likewise arise from activities of all sorts, not only vis-à-vis causality, as when people reorganize a workplace, but also vis-à-vis directedness toward, as when someone through discussion acquires a different attitude toward, thinks differently about, or uses material objects and arrangements differently, or vis-à-vis essentialness, as when alterations in repair practices frees these practices from their dependence on particular pieces of equipment. Similarly, activities of all sorts can institute spatial and temporal differences in where and when practices occur, as when shopping practices migrate to a new shopping center built at the intersection of two major roads. Through sayings, people can also, among other things, formulate new rules, discuss what ends and projects they should pursue, and argue about whether a given emotional display was appropriate, thereby setting into motion the reorganization of one or more practices.

Some activities are inventive or innovative. Practically all activities are inventive in the minimal sense that they are attuned to the situations in which people find themselves and do not simply repeat prior actions irrespective of the specifics of these situations ("mechanical reproduction"). Inventive activities in this sense are often simply adjustments and utterly trivial, as when a person has to hold her cell-phone at a cramped angle when talking because the rush-hour subway car is jammed full of people (though what makes this example trivial is that we who are imagining it simply suppose that nothing of consequence follows from her holding the phone at an odd angle; we can all come up with unlikely alternative scenarios). Some actions, however, are more overtly inventive or innovative. A new dance or football move, a twist on an existing bourbon recipe, a novel color combination, a creative combination of emojis—what makes these actions overtly inventive or innovative in comparison to omnipresent adjustments to

circumstances is that they introduce significant differences into the world. What makes the differences significant, moreover, can vary. In some cases, it lies in further differences that arise from these. Technological innovations are often like this—they lead to new ways of doing things, altered material arrangements and practices, and even, eventually, transformed constellations. In other cases, significance arises, less dramatically, from the fact that others can, and might be motivated to, adopt or imitate them. The aforementioned inventions or innovations are like this. In all cases, the significance of difference is tied to how the world reacts to it. Activities can generate differences, but it is how the world reacts to these differences that bestows significance on or accords them status as innovative or inventive. This includes the reactions of observers, commentators, and researchers, that is, their judgments and juxtapositions of the differences in question with other phenomena.

Even though many of the events through which social changes come about are activities, relatively few social changes are intentionally brought about by individuals. Human activity is the medium through which many changes come about, and human intentionality is an important feature of social life. But people do not aim to produce the bulk of the changes that arise through their activities, and they have limited knowledge of the chains of action starting in or passing through their lives that are responsible for these changes. Two of the promises of social research are greater knowledge of the generation of difference and change and an enhanced ability of people, individually or as associated, to control social affairs.

Chains of activity

Many activity-events, including many interventions in the world, are reactions. People's activities react, for example, to others' remarks or actions, to events in the circumjacent setting, to changes in social affairs, to new opportunities, and to natural events. Whenever a person responds to something, what she does is beholden to it. It may be true in each case that she could have acted otherwise, including not reacted to this thing at all. But if what does happen is that she reacts to it, then what she does reacts to *it*. Consequently, it bears some responsibility for her action: if it had not existed or occurred she likely would have proceeded differently. Whenever, therefore, someone reacts to something, the something qualifies as a cause of her activity. An alternative way of putting the matter is that whenever someone reacts to something, that something *leads to*, or *induces*, her action. This leading-to or inducing sort of causality differs from the bringing-about sort manifested in intervening in the world. But it is causality nonetheless. It is a way that one thing can be responsible for another, a way that the latter can be indebted to or depend on the former. It follows that activity qua event is often bound up with two sorts of causality: bringing about alterations to the world and events as well as states of the world leading to particular activities. Acting for an end is a third sort of causality involved (Aristotle's final

causality). I should point out, incidentally, that bringing about alterations and inducing activity are actual relations. They are not, as a result, subject to the sort of analysis of causal relations common in the qualitative social disciplines that construes such relations as combinations of necessary and sufficient conditions (see Mahoney and Goertz 2006). These analyses are Humean in character: they presume that causality is not an actual relation and that what there is in the world that answers to the concept of causality is regularities.

Causal relations of the intervention and leading-to sorts underwrite the existence of chains of actions. As noted, a chain of actions is a series of actions, each member of which reacts to the prior action in the chain or to a change in the world that that prior action brought about. An example of a chain is one person sending a text, to which a second person reacts by sending a text to someone else, to which that other person reacts by saying something to the friend next to her, to which the friend reacts ….and so on. Perhaps the person who sent the initial text was reacting to a car crash that she had witnessed, which itself arose from a driver looking down at his phone after receiving a text and not doing anything as the physical processes activated in the automobile moved the car along the pavement toward another car that had suddenly lurched into the road from a driveway—as a result of the physical processes at work in that other auto consequent on its driver suddenly stepping on the gas in reaction to being late to pick up his child from school. Most of the things that anyone does are reactions to events and states of affairs in the world. As a result, people continually extend chains of action through their activities, even though they are typically unaware that this is occurring: they are focused on whatever they react to and usually ignorant of the activities and other events or states of affairs that make up the chains that eventuated in this. In simply going about one's business over the course of a day, one extends a myriad of actions chains, which thereby pass through one's life.

Chains of action are composed of activities (among other things). Each of these activities is a component of some practice(s) or other. Chains of action, consequently, transpire within and across practices. Many practices are complex enough for chains to circulate within them. Examples are car repair practices, cooking practices, distilling practices, marketing practices, online gaming practices, and communication practices (online, offline, or combined). For a chain to circulate within a given practice is for the activities that compose it to be components of the practice, that is, for people to carry on the practice by reacting to one another's actions (or to changes in the world that these actions effect). What they do, and hence the chain formed by their actions, upholds the organization of the practice. Note that chains that circulate within given practices typically embrace a considerable dose of interaction. By contrast, chains cross practices when successive actions in them are components of different practices, that is, when someone carrying on one practice responds to someone else carrying on a different practice. When this occurs, an activity that upholds the organization of one practice reacts to an activity that upholds the organization of a different one. Someone who sees his neighbor next door cooking might call to ask whether he

can come over, thereby extending a chain from cooking practices to practices of communication and friendship. Note that in crossing practices, chains of action can pass through and, thus, link different bundles. Particular links in chains can also effect relations (e.g., of causality, constitution, and mind/action—see chapter two) between practices and material arrangements, thereby bundling them. To the extent that this occurs, the stability of bundles depends on the reoccurrence of particular chains.

How people extend chains of action, whether within specific or across different practices, can depend on the roles and positions they occupy in these and other practices. In the car crash example, for instance, how someone reacts to the crash is likely to differ if she is a police officer, a parent of one of the individuals involved in the accident, or someone who occupies no position or role relevant to the incident or those bound up in it. Roles and positions are often built into the organizations of practices: rules, like the enjoinment and acceptability of ends and actions, are often articulated by reference to roles or positions. Because of this, role-based divergences in how people react to given events and extend chains more generally typically reflect the circumscribing effect of practice organizations on activity. This circumscription often leaves space for individual idiosyncrasy or initiative.

Chains of action can be responsible for a wider range of differences in bundles than can single activities directly. Differences of many sorts result from people's reactions to others' actions and others', including the original actors', responses to these reactions (etc.). Reorganizations of practices, especially of the rules and teleoaffectivities that govern them, sometimes result from people responding to one another's actions: differences and changes in normativity arise from chains of action. Differences in which doings and sayings compose a practice can likewise arise from chains of action; a cooking innovation that rewrites the range of doings and saying that compose cooking practices can be a reaction to something the innovative cook saw on TV the month before. Indeed, the multiplicities of activities that make up chains of action can be responsible for accumulations of differences in bundles.

Similarly, chains of actions can be responsible for far more differences in (1) material layouts and (2) relations between practices and arrangements than can individual actions directly. Chains of action also cross, join, and form complexes that are responsible for multitudes of differences in practices, arrangements, and bundles. Because changes in constellations involve such multitudes, large nexuses of chains are needed to lead to and bring such changes about. Individual activities can directly alter practices, arrangements, and maybe simple bundles, but they are powerless to alter more complex bundles.

Tarde and Latour on chains of activity

The idea of chains of action has a history. Two illustrious exponents are Gabriel Tarde and Bruno Latour; Norbert Elias likewise makes crucial use of the notion

(see chapter eight). Chains of action are also an example of what Mahoney (2000: 526) calls "reactive sequences," which are sequences of "temporally ordered and causally connected events." According to Mahoney, sequences of this sort are central to historical sociology. Note that, despite linguistic similarities, Collins' (2004) interaction ritual chains are not chains of action. An interaction chain is the series of interactions that an individual person experiences. In principle it extends to the end of his or her life, and the only inherent connection among its links—the interactions—is that the same person lives through them. It is true that interactions are a type of action chain (see following section) and that a person can respond to an interaction or some component of it. These facts only imply, however, that action chains can coincide with interaction chains for short stretches.

According to Tarde (1899), the most basic relation in any of the three principle domains of reality he distinguished (the physical, the biological, and the social) is repetition. In the domain of the social, repetition takes the form of imitation: the imitation by one person of another person's use of a word, expression of an idea, use of some artifact, or way of behaving (etc.). For Tarde, however, repetition is not the mechanical replication of an use, expression, or behavior. Rather, each act of imitation is original. An imitative act takes over the use of a word or a way of behaving etc. from someone else. But as a performance it is sensitive both to the peculiarities of who acts and to the particular circumstances of performance (on this mix of passivity and activity in imitation, see Karsanti 2010). Tarde called a series of imitations, each link of which appropriates a word etc. from its predecessor, a "ray of imitations." The totality of imitation rays branching out from a single action is the imitative radiance of that action. By themselves, furthermore, imitation rays tend to infinity; that is, people, other things being equal, keep imitating predecessors. Imitative rays also make up the substance of tradition and custom, and the job of education is to initiate youth into their propagation. People who extend a given ray or partake of the same radiance are also thereby associated with one another, as when the circulation of beliefs and ways of behaving forms a religious community.

Of course, other things are not equal. The imitation rays branching out from a given action collide with the imitation rays branching out from other origins. These collisions take place in individual people, and the resulting moments of opposition are marked by hesitation—between two words, two ideas, two artifacts, or two ways of behaving. These moments can be resolved in two basic ways: the individual can either decide to continue one but not the other ray or, more interesting, combine the rays to create something new, an invention. If the first option is seized, one of the intersecting imitation rays continues. When the second option is seized, a new ray arises from the invention (also called an "adaptation") and joins the overall field of propagating rays. Other obstacles to the propagation of rays include the boundaries of families, tribes, nations, castes, and social classes.

Tarde does not describe imitation rays as causal phenomena. Because, however, people are so constituted and trained as to propagate rays, the rays have a

kind of momentum that is reminiscent of causality. At the same time, as indicated, imitation is an action and not mechanical reproduction.

Imitation is certainly an important feature of social life. Traditions in the sense of customs and folkways are imitative phenomena, and children to some extent imitate others as they mature. However, Tarde's idea that the social world is essentially intersecting lines of imitation wrongly accords omnipresence to the phenomenon. It also provides a rather narrow picture of what people do when they speak and act. Much human activity is not imitation in Tarde's sense. Although the relationship between earlier and later uses of the same word, expositions of the same idea, or enactments of the same way of acting is, strictly speaking, one of repetition, it might or might not be one of imitation. For encountering someone using a particular word or behaving in some way does not automatically grant any particular significance to that encounter vis-à-vis the encountering person's subsequent usage or performance: the encounter yields an imitation only when the encounterer's subsequent use of the word etc. specifically *takes over* that use from the other person, and this occurs only under certain circumstances. What's more, most uses of a word in speaking and writing are not illuminatingly conceptualized as imitations of a previous use: doing this ignores how circumstances, communicative intent, and lexical options inform usage.

Like Tarde, Latour views the social world as composed of chains of action. Unlike Tarde, he does not think that the actions that make up these chains are performed by actors. Latour (2005: 46, 216) rejects the word "actor" because, he claims, it suggests the idea of a source: actors as the source, or starting point, of actions. Much the same, he thinks, can be said about the term "doing:" it suggests that a doer initiates it. According to Latour, the problem with the notion of source is that it badly fits with the experience people have of being made to act by agencies outside themselves over which they have no control. When someone experiences this, her act is not a doing that she initiates, and it is not clear that it is she who acts. Latour generalizes this experience and claims that it is always fundamentally uncertain who is acting and why (ibid.: 45). Activity is, instead, an event (ibid.).

Making something else act, the experience of which Latour marshals to dismiss the notions of actor and doing, characterizes what he calls a "mediator:" the action of a mediator is to make something else act. The actions that compose the chains that Latour espies in the world are the work of mediators, not actors: each is an action of making something else act. In such chains, of course, the action of something that is made to act is to make some further thing act. As a result, a mediator chain is composed of one entity making another entity act, which makes a further entity act, which makes yet another entity act, and so on. The social world (like any other world, however worlds are demarcated) is populated by mediator chains, thus by chains of making act, not by chains of actors and doings. "[T]here is no society, no social realm, and no social ties [all of which would concern interrelated actors-TRS], *but there exist translations between mediators that may generate traceable associations*" (Latour 2005: 108, italics in original)

Most crucial, chains of mediation are not series of cause and effect. According to Latour, the cause-effect relation involves the faithful transmission of something and is thus predictable; nothing ever exists in the effect that was not already in the cause. Mediators, by contrast, "transform, translate, distort, and modify the meaning of elements they are supposed to carry" (ibid.: 39) Whereas in causal systems inputs fairly well predict outputs, in mediator systems unpredictability and uncertainty reign (ibid.: 58). Finally, although I have been speaking of human beings, Latour holds that there is no privileged form for mediators. Not only human beings, but also desires, statistics, governments, ghosts, animals, art works, storms, and imagined scenarios—indeed, anything that can make something act—can be mediators.

Latour's opposition to the notions of actor and doing rests on an overly substantial, even causal sense of source, starting point, and initiative. He also seems to treat this source as internal (the subject). Latour's argument ignores notions of performance that avoid construing actors as subsistent (internal) sources of initiative. An influential example is found in Butler (1990); many other versions exist. As explained, for example, my view is that activity is an event that happens to people. The activity events that happen to people are performances, or doings. As a result, the people to whom these events occur are performers of actions (actors), and as performers they can be held responsible for what they do. But people are not substantial sources or starting points of initiative: activity *befalls* them. As for causality, Latour, as noted, contrasts mediation with causality. It is not clear, however, what making X act amounts to if it is not some sort of causality. In the end, Latour needlessly handicaps himself. He is right that the past does not reliably determine present (and future) action. But the transmission sort of causality he criticizes is not the only sort that might be associated with activity. For example, Mead (1980, see also Schatzki 2010) held that activity itself determines what in the past causes it. In sum, the notions of actor and doing that Latour rejects form only one possible—and today widely rejected—pair of such notions, and he does not cleanse the notion of mediation of causality. There is no reason to substitute the notion of mediation for that of acting (doing, performing).

Despite these criticisms, I use the notion of action chains much as Tarde and Latour use the notions of imitation rays or mediator chains, namely, to envision the social world as filled with a myriad of linked, crisscrossing chains that generate a myriad of differences in practices, arrangements, and bundles and thereby are responsible or coresponsible for most social changes. These chains provide the energy that is responsible for change, to speak with Collins, or the movement that leaves change behind in its wake, to speak with process theorists. They dynamize bundles. This picture also updates my earlier (2002: 189) claim that "agency is the central motor of a constant becoming that sweeps" through social life. I now prefer to say that human activity is the central component of the labyrinthine nexuses of events and processes that permeate social life maintaining and transforming it. These activity-events, in continuously unfolding, are process-like in Bergson's sense.

Features and types of activity chain

Several feature of chains of action should be distinguished. To begin with, links in chains can be intentional or unintentional. What I mean is that an activity that reacts to and thereby creates a link to a prior activity can be the performance of an intentional or unintentional action. Most activities in chains are performances of intentional actions, but occasions occur when something leads a person unintentionally to do something, which in turn leads to others' responses. For example, if someone reacts to an upsetting personal text by writing a painfully personal reply and inadvertently sending it to everyone on some recipient list, and this blunder leads to consternation and conversations among the recipients, an unintentional action plays a key role in the nexus of action chains in the situation. Of course, although people usually extend action chains by performing intentional actions, and although they extend action chains and react to prior events in acting intentionally, they rarely intend to extend the chains involved or to react to the events concerned. The actions are intentional, but their being part of action chains is not.

A second feature of chains of action is that they are distributed through the plenum of practice. They can be denser in certain spatial-temporal locales or regions—small or large—and thinner in others, and happen quicker on some occasions or in some places than in others. Chains also, as intimated, join to form larger nexuses (see below) that pervade particular bundles and link them with others. In addition, chains en masse can funnel into or fan out from particular bundles. This phenomenon is nicely highlighted in Latour's (2005) notion of power centers, which are particular sites through which masses of consequential mediator chains pass. Latour distinguishes three sorts of power center: oligoptica, panoramas, and centers of calculation. Oligoptica are sites that are capable of seeing other particular sites in great detail. Examples are prisons and military command centers. Panoramas, by contrast, are sites that are capable of seeing many other sites but not in much detail or in only particular ways. Examples are state census bureaus, political headquarters, and board of trustee meetings. Centers of calculation, finally, are sites where calculations are made that either spawn or are carried along chains of mediation to other sites where they make a difference to what goes on there. The statistics and budget offices maintained by organizations such as governments, corporations, and universities are prime examples of such centers. The funneling of incoming, and fanning out of outgoing, action chains that characterize power centers is an important feature of the practice plenum; their existence illuminates what is going on in the sectors of the plenum connected with them. Pace Latour, however, power centers do not control what happens in the practice plenum. They certainly make a difference to what happens there. But not only does whatever control they exert depend—as Hegel pointed out—on the activities that compose the bundles they allegedly control, but much more of the plenum than these centers alone contributes to events and developments there. Their actions also can be drowned in the cascades and waves

of action chains that occur in fads, panics, consolidations of opinion, losing and winning streaks in sports, collective reactions to public events, and the like.

Actions chains have important temporal properties. Examples are speed, rhythm, and acceleration. The speed of chain is how quickly its links occur measured against a clock (or by reference to order of occurrence in an individual's experience), whereas the rhythm of a chain is the repetition of any sequences or patterns that help compose it. The rhythm of distillation, for instance, is the repetition of the sequence of phases that compose it—fermentation, preparation of the mash, distilling, barreling, storage etc. Action chains can affect temporal properties of things. The use of ICTs, for example, disrupts many rhythms while originating or anchoring relatively few new ones. The temporal properties of things can also lend themselves to a certain mystification. For example, the fact that action chains, bundles, and social phenomena exhibit different speeds and rhythms engenders the idea, pervasive today, that social life exhibits multiple times. This way of talking is a bit of a misnomer since the phenomenon it describes amounts simply to social phenomena displaying different temporal features. In this sense, social life, and individual bundles as well, automatically displays multiple times.

Another feature of chains of action is that they can form loops. Loops exist when a person at t_1 performs an action that is part of a chain that then continues beyond him and later at t_2 performs another action that is part of the same chain. Due to the time element involved, it might be better to call such chains spirals instead of loops. The social world is full of such loops, or rather spirals, many of which are insignificant. Spirals are important, however, because they can effectuate feedback. Feedback exists when an actor learns about ramifications of earlier acts of his and performs particular activities as a consequence, including activities that counteract or amplify these ramifications (negative and positive feedback, respectively). For a chain to constitute a feedback spiral, it must transmit information to actors about the ramifications of their actions, regardless of whether they realize that their actions are responsible for these ramifications. A distiller who samples the awful taste of his experimental recipe might be moved to change his recipe. So, too, might a distiller who learns about consumer evaluations through consumer surveys. Economic crashes also result from feedback loops since they involve economic actions leading to deleterious consequences (selling leading to a fall in prices), information that these consequences have occurred making its way back to the actors, and these people therewith being induced to perform the same actions again (sell further), thereby worsening the situation.

A key variable in spirals is whether actors are aware that the states of affairs to which they react are effects of their own (and maybe others') earlier actions. Even in a market crash people might not be aware that that the depressed prices that are inducing them to sell again are the results of their own earlier actions. In today's world, this example might seem a little fanciful. But many other spirals exist in which people are not aware of their responsibility for a situation that they

are making worse through their reactions to it. Often, for instance, people are unaware of the effects their remarks have on others. If the responses that these others make to the remarks lead the people who make them to say additional things that only amplify the original effects, thereby making the situation worse, a spiral emerges for which the original actors do not grasp their responsibility. The chances of not cognized interpsychic spirals are immensely increased by contemporary ICTs and the communication practices they support. Feedback spirals are potentially of great significance for social life because they facilitate strong directional change. When feedback loops proceed within particular practices, bundles, or constellations, they contribute to the making of what can be called "islands," "eddies," or "plumes." What I mean is that feedback loops can partly isolate bundles and constellations from others, cause rapid deteriorations in bundles and constellations, or quickly move these into new configurations.

Another important feature of actions chains is that they form nexuses. To say that they form nexuses is to say that they hang together. I do not want to canvas all the ways that action chains hang together. It is important, however, to give some sense of the phenomenon. One way chains connect is by virtue of the same individuals propagating them. For example, numerous action chains, encompassing the activity of diverse participants, pass through the activities of the moderator of an online discussion forum and thereby form a nexus. Another way chains hang together is by passing through or circulating within the same bundles. The large variety of chains that transpire as people carry on educational practices in settings such as classrooms, halls, and offices form nexuses by virtue of circulating within these bundles. A weak version of this kind of nexus embraces chains that proceed through the same settings but belong to different practices, as when drug selling takes place in a park where young children are playing, teenagers are skateboarding, and adults are having picnics. Chains, third, form nexuses when they bifurcate or coalesce. When two people react differently to the latest component of some chain of action, that chain bifurcates into two. Correspondingly, when someone, in acting, reacts to activities that are components of different chains, chains coalesce. It is obvious that social life is filled with multitudinous bifurcating and coalescing chains.

Indeed, social life embraces a veritable maze of action chains, whose details cannot be fully grasped, monitored, or registered. Patterns, however, emerge in this labyrinth. As discussed, for example, chains funnel into and fan out from choke points (Latour's power centers). Chains, like relations among bundles, can also form regions—small or large—of greater or lesser density, indicating regions of greater or lesser activity. Chains can also circulate within given bundles or constellations, forming islands. Teamwork, for instance, takes this form. It is not hard to imagine a morphology of action chains in the practice plenum that maps the forms or shapes assumed by nexuses of chains there.

Nexuses of action compose what many researchers and theorists call collective actions. The collectives to which such actions are attributed are many: gangs, political movements, employees, students, military units, sports teams, active

learning groups in large classrooms, digital associations, and rival distilleries (etc.). To speak of these social phenomenon as collectives that take action is to pick out particular sets of individuals—those, or a subset thereof, who form a group or are members of an organization or community—and to mark the fact that actions of these individuals, together with chains that their actions are part of, are organized around the pursuit of particular purposes (cf. Welch and Yates 2018). The chains involved circulate in the bundles that compose the group or organization or connect these bundles to others, for instance, those composing rival gangs, government authorities, management, university administration, political action committees, insurgencies, and other sports teams or active learning groups. Collective actions consist in such nexuses of chains.

Several types of action chain can be distinguished. These include interaction, dialogue, exchange, governance, and haphazardness. Interaction is a general category that encompasses some of these as subtypes. Interactions also exemplify the pervasively recognized category of relation discussed in chapter two: specific ties among individuals. Interactions exist when two or more people react reciprocally to one another's actions. Sequential reciprocal actions constitute chains of action that bounce back and forth among the individuals involved. The category of interaction as such, moreover, places no restrictions on which reciprocal actions can compose interactions. Interactions can involve people who are in the physical presence of one another; individuals who are physically separated but able to see or hear one another (over Skype, say, or cell phones); individuals who cannot directly communicate with one another but who send messages to others, who send them on to their recipients; individuals who do not know each other or even with whom they are interacting but who interact under the direction of organizational (i.e., military, corporate, criminal) authorities; and so on. Face-to-face interactions, direct or mediated, are ubiquitous, familiar, and paradigmatic for the category. Interactions, however, exist whenever people reciprocally respond to one another's activities.

As noted, interaction is a general category. Subtypes are demarcated according to the sort of thing going on in interactions. One important subtype comprises exchanges. Exchanges exist when one party gives something to another party and receives something from the other party in return. Gift giving is a prominent kind of exchange. Gift giving is a kind of action chain in which one party gives a gift to another. Gift giving often is not overtly reciprocal, as when parents give presents to children or visitors give gifts to hosts. An exchange, however, is still effected in these situations, not of gift for gift, but of gift for, say, thanks, appreciation, salutes, bows, promises, or services. Gift giving thus comprises action chains in which actions that either are of these sorts or that express these matters respond to acts of giving a gift. Indeed, an act of giving a gift almost never occurs independent of such a chain; when it does, it might be perceived as inappropriate. The concept of gift, moreover, is broad, embracing not just material things but pieces of information, fealty and support, opportunities and protection, thoughts and emotions, and so on. As anthropologists have long

explored, elaborate states of dependence among individuals and groups can be generated from gift-giving chains of action, more generally, from action chains of the exchange variety. These chains involve a gamut of emotions and attitudes and an entire range of bonds of attachment and indebtedness, often extending over long periods of time.

A given exchange, moreover, might involve a nexus of action chains instead of a single one. Exchanges between entities other than individuals, for instance, between governments, tribes, and cities, are like this. Such exchanges encompass nexuses of action chains that circulate within and cross bundles that compose the entities involved. A prisoner swap between states is an example, as are commercial arrangements between companies and trading relations between nations as well as the highly ritualized exchanges between groups that are documented in the annals of traditional anthropology. This observation about exchanges applies to other types of chains mentioned below, as well as to the more general category of interaction.

Not all exchanges, of course, are instances of gift giving. Another paradigmatic kind of exchange comprises those that are economic in character, in which items of roughly the same or commensurate value are exchanged. Barter and sale/purchase are two prime forms of economic exchange; exchanges of the latter sort build markets. Barter and sale/purchase are interactions in which an exchange occurs between two parties, respectively, of goods or labor for goods or labor or of goods or labor for money. Such relations can occur face-to-face. They can also embrace elaborate nexuses of action chains: barters or sales/purchases to which groups and organizations are party often require extensive chains. Even when barters or sales/purchases among individuals are consummated in particular identifiable activities, these activities are components of extended chains that lead to and away from them and that are part of broader nexuses of chains.

A second important type of interaction is dialogue or conversation. In such interactions, sayings dominate what people do. Nondiscursive doings often transpire, too, but sayings are what qualify an interaction as a dialogue or conversation. Dialogue is a crucial element of social life, and it is often part of the nexuses of action chains through which exchanges are executed. Particular stretches or phases of action chains can also take the form of dialogue, as when a discussion at headquarters leads to the nexuses of action chains that implement a new ad campaign or a new maneuver at the front.

The ever-growing import of the (social) interactionist literature writ large means that many analysts are wont to see interactions whenever people react to other's activities. It is important, consequently, to emphasize that not all chains of action are interactions. A recent, very interesting example of action chains that are not interactions is found in contemporary international finance markets. International finance markets are mediated by computer systems and computer monitors that, in displaying the same continuously updated information the world over (lists of large trades, purchase offers, price quotes, market directions), conspire with trading practices to establish "scopic" (Knorr Cetina 2003)

"regimes of attention" (Knorr Cetina and Bruegger 2002) to which traders and managers are subject. Participating in or observing such markets places people in dynamic "synthetic situations" (Knorr Cetina 2009) that require continuous monitoring and preparedness: traders and observers attend continuously to their monitors and react to the events and information scopically presented there. Moreover, the computer software that supports such markets makes a given trader's actions part of the information available to everyone on the system. Other traders react to this information, just as it was other traders' reactions to information earlier made available on their screens that became information to which that trader responded.

Knorr Cetina (2009) claims that an interactionist analysis should be undertaken of the action chains that are mediated by such computer systems and of the scopic regimes of attention that these systems, in conjunction with the trading practices in which they are employed, underwrite. However, apart from side communications that take place over electronic systems that link traders separately from (or as part of) the software that displays trading and market information, no interactions occur. No interactions occur (in the market) when traders watch the market. No interactions occur even when traders accept the sell offers of other traders or sell to them. For no back and forth transpires between them; there isn't even any communication between them. Accepting the offer (1) simply adds a link to a chain of actions that the seller's posting of an offer is an element of and (2) initiates the exchange of currency (or of shares for money) that is effected by the computer system. The process is the same regardless of whether the buyer knows who posted the sell order or only that there is an offer to sell at a given price but has no idea who posted it. I am more sympathetic with Knorr Cetina's claim that synthetic trading situations should be analyzed "microsociologically," though I would drop any reference to micro (see chapter three and Schatzki 2016b) and say instead that analyses of electronic trading should capture pertinent details of the specific nexus of bundles involved (for an example, see Jarzabkowski et al. 2015). The more that the activities of different people are linked through scopic information systems, the less do those linked activities compose interactions.

A type of action chain that, depending on circumstances, might or might not involve interactions is governance. In using the term "governance" I do not mean, as does recent work in political science (e.g., Stoker 1998, Hajer and Wagenaar 2003), to call attention either to the proliferation of nonstate governing agencies in contemporary social life or to the demise of the state as the master governing agency. I mean something much simpler, namely, intentional shaping, directing, or making a difference. Individuals, groups, and organizations of all sorts aim to govern social life in the sense of intentionally shaping, directing, or making a difference to how others act, the practices they carry on, the bundles they are part of, and the emergence, evolution, and demise of social phenomena. Governance is found in basically all walks of life and domains of society and is pursued by almost all individuals, groups, and organizations found there, not

just those in positions of authority or dominance. Indeed, governance is nearly inherent in social life and in how people are directed toward both one another and the practices and bundles they carry on. Of course, the ubiquity and vitalness of governance do not entail that attempts at it succeed. Indeed, such attempts probably fail at least as often as they succeed. The effects, moreover, that people's actions have on others and their practices and bundles are often unintended: how people react to attempts at governance can be quite varied and labile, and the action chains that arise from these attempts can quickly exceed the awareness and intentions of their performers. None of these facts, however, entail that governance is an unimportant feature of social life. Quite on the contrary: it is a never-ending pursuit. In any event, all cases and attempts at governance work through chains of action, which can be short (as when a superior orders an inferior to do something) or long (as when a distiller seeks to affect the bourbon market by introducing a new brand). Chains of action form what can be called "avenues of access" by which activities that aim at governance connect, if they do connect, to what their perpetrators aim to effect or alter. These chains can involve considerable interaction, exchange, and dialogue. (For a more extensive discussion of governance, see Schatzki 2015.)

It is characteristic of interactions, exchanges, dialogues, and governance that the people whose activities compose them have some awareness that they are participating in a chain of action, perhaps even a chain of a particular sort, regardless of whether they would use the concepts I am employing here to describe the situation (e.g., chain, interaction, exchange, governance). What I mean is that they have some sense that what they are doing is tied to others' activities, though this awareness might exhaust itself in the cognizance of responding to a specific person's action or to a change in the world that the actions of a specific other person brought about. There is a vast dominion of chains, however, of which this is not true. This domain contains chains that are haphazard, undirected, and circumstantial. Such chains typically occur when people respond to changes in the world that others have brought about, utterly ignorant of the others involved or even that what they are responding to is an effect of some person's or persons' actions. Suppose that someone who picks up a piece of trash on the sidewalk and throws it into a bin extends a chain of actions whose preceding component is the litterer throwing the trash out a car window in response to his companion complaining about a messy automobile, and whose succeeding component is a city employee emptying the overflowing bin. The good citizen and the city employee probably have no knowledge of who is responsible for the states of affairs to which they react. This would have equally been the case if the good citizen had initiated—as opposed to extended—a chain, for instance, if the litterer had just absent-mindedly thrown the trash on the ground, in response to nothing. People endlessly react to features of the world that others are responsible for and therewith unwittingly extend action chains, short or long; they also unwittingly initiate chains. It is haphazard or circumstantial which lives such chains connect, and participants have no specific knowledge of the other participants and

maybe also no inkling that their lives are interconnected. Social life is full of such chains, which are often trivial and irrelevant to the emerging state of the world but which can, under the right circumstances, lead to major developments.

Occasions also exist when someone responds to others' activities but the chain ends with her response: no further activities react to her's. Indeed, action chains can consist of as few as two activities. Different reasons can exist why no one reacts to a given action: it might be unwitnessed by others, unknown to them, fail to alter the world, or be too trivial for others to care (etc.). The world is presumably full of short (and long) action chains that have concluded. An interesting example is the communication of information leading a recipient of that information to do something like "make a mental note of something" or simply acknowledge its receipt without further reacting to the communication. Information can also be simply "taken up" without being noted or acknowledged. In cases of these sorts, chains end; the uptake of information simply subtends the person's future performances.

A response to an action can also in principle come any length of time after the action is performed. Offers, insults, and awkward or inspiring situations that are left hanging are sometimes responded to weeks, months, or years after they occur. A lifetime is the longest that the temporal gap can take between an event and an individual person's response. Gaps can also collectively persist over generations, a state of affairs that is effectuated through other chains of action among members of the family, organization, or nation involved.

As noted, action chains link bundles when successive components of chains are components of different bundles. This idea, which was discussed in chapter two in the section about relations among bundles, has broad application. Chains, for example, can link bundles that share a given setting; examples are TV entertainment and gaming bundles transpiring in a living room and distilling and business bundles transpiring in the production room that houses a particularly impressive still. Chains can also link physically dispersed bundles such as those of distilling, marketing, and distribution. Chains, furthermore, not only link, but also circulate within and propagate through bundles. And in practically all cases bundles inform, even shape, chains of action. For example, both that and how people extend particular chains can reflect facts about the material entities and arrangements amid which they act. Contemporary ICTs, for instance, are crucial to how people link to others' actions; indeed, the powers of ICTs in this regard make them potent shapers of interpersonal relations today. The spatial configuration of a room, building, or public space can likewise make a difference to how people extend or initiate chains of action. How, for instance, chains of action propagate through a distillery is tied to the organization of the facility into interconnected rooms (mash rooms, fermentation rooms, still rooms, equipment rooms, powerhouses, warehouses, bottling houses, mill houses, granaries, feeding pens, offices, loading docks, and train spurs etc.). In addition, material arrangements and their components prefigure, and also channel as well induce (see chapter two), how people react to prior activities and states of the world.

And the broader constellations of bundles to which the bundle that a particular chain is circulating in or passing through also prefigure the extension of the chain. The broader constellations that compose the distillery and the bourbon business, for instance, prefigure how the master distiller reacts to a bad whiskey that the operation had put effort into producing. Of course, practice organizations circumscribe what people do in reacting to others' actions, just as the antecedent, regularized, and patterned sayings and doings that have composed a practice up to any given point in time prefigure how people at that point extend or initiate chains. In short, chains of action do not proceed across a frictionless plane. They are informed and shaped by the bundles and constellations through which they pass. As a result, analyses of actions chains must keep track of the practice-arrangement bundles and constellations thereof as part of which social life plays out.

Individuals and inflection

Every link in a chain of actions is a component of some life or other. A chain, as a result, is made up of elements of different lives. Note that every component of a chain is at once an element of a life and a component of some practice. Activities compose all at once chains, lives, and practices. Facts such as this undergird the asseveration that action is a, if not the, central phenomenon in human existence.

Life trajectories do not themselves generate differences and changes in the practice plenum and, thus, in social affairs. For it is not life trajectories as such, but instead activities that make them up qua components of activity chains, that generate these differences and changes. Because, however, every activity composing a chain is an element of some life or other, the "reasons" (motives and ends) why individual links in chains occur are tied to the life trajectories of the people performing them; this holds equally of links that generate change and those that effectuate persistence or stasis. How, on a given occasion, someone reacts to others' actions or to a state of the world usually has something to do with his prior experiences and actions, what he has learned, the routines he has established, what he believes, and what he is willing to act for, as well as with how things had been standing with him just prior to the reaction and what he had been up to then. Such matters form a context in which he reacts as he does. Occasions exist, of course, when differential features of the lives of the people performing certain actions—for example, floor traders during a precipitous one-day market plunge or Shakers welcoming orphans to their villages—are secondary or even irrelevant to their actions. On those occasions, everyone has the same "reasons" for how they act. Usually, however, including on trading floor and in Shaker villages, differential features of people's lives make a difference to how they act.

When, consequently, a specific individual's actions contribute significantly to social change, the life trajectory of that individual bears on that action. The activities of specific individuals significantly contribute to change when (1) these

activities set significantly different headings for chains of action of which they are components—what people do significantly diverges from existing precedents, regularities, and patterns—and (2) significant differences in social life result. Activities that qualify can be called "originary" activities (see the next section). The extent to which these two conditions are met is an empirical question. The introduction of successful hardware or software is often tied to the efforts of specific individuals. Few people are involved, particular actions of theirs set significantly new headings for ongoing chains of action, and it turns out that the new headings result in change (the extensive appropriation of the new hardware or software). The actions of these individuals thereby qualify after the fact as originary. The evolution of social associations that follows the introduction of certain new hardware and software can also depend on a few people who do things differently (see chapter seven). But it need not, and even when it does it depends much more on the activities of people more widely, who follow, copy, are inspired by, in general, carry out possibilities opened up by the activities of the few. The activities of people more broadly set only minutely different headings for ongoing chains, and the resulting evolution in associations is built up cumulatively through them. These activities, unlike the activities of the few, do not qualify as originary.

The idea that individuals inflect the chains of which their activities are components is straightforward. How one person reacts to another person's action can make a difference to how a third person in turn reacts to her act. For example, two people's different reactions to a third person's scathing slight of a mutual friend might lead a fourth person to act very differently depending on which of the two reactions she responds to. An upset reaction might induce the fourth person to do something to repair the situation, whereas an expression of sympathy with the slight might lead the fourth person to ignore the situation and leave the slighted person to her own devices. The two reactions to the slight thus have divergent implications for the collective and personal friendships involved. In ways such as this, different reactions to the same thing can lead to quite different sequels: the different reactions give different headings to the chains they initiate or extend, and different headings can lead to different results.

Any activity automatically inflects a chain of which it is part by virtue of being its next component: the extension (or initiation) of the chain it effects is ipso facto the chain's latest heading. Inflection in this sense bears some resemblance to Lucretius' notion of the clinamen, which has been resurrected lately by Gilles Deleuze (1990) and Michel Serres (2001). For Lucretius, the clinamen is the infinitesimal, spontaneous, and thus unpredictable swerve of an atom from its previous path of fall. This swerve enables atoms to collide and changes to occur and also allows for free will. Similarly, each link in a chain establishes its latest heading. Inflection is not the same as the clinamen, however, because Lucretius conceptualized the clinamen as a swerve from a previous trajectory, whereas chains of action have trajectories only after the fact. It is not the case that each further link in a chain swerves from the chain's previous trajectory; each further

link instead establishes the chain's latest heading and *hence* the trajectory of the chain up to that point. A chain's trajectory thus constantly shifts as new links are added: activity chains have no "intrinsic sequentiality" (Griffin and Ragin 1994: 13) or "inherent logic" (Abbott 1992). The latest heading established by the most recent link in a chain, moreover, can deviate more or less from previous (latest) headings. Each further link in a chain thus establishes a more, less, or infinitesimally different direction for it.

Due to inflection, practices and bundles are subject to a drift that arises from people's responses both to others' actions and to changes that others' actions bring about in the world (the same conclusion follows from Bourdieu's conception of habitus as a spontaneity; see chapter six). Drift affixes not just the doings and sayings that help compose given practices, but the organizations of practices and the material arrangements amid which people proceed as well. Drift is an omnipresent but often insignificant feature of the world, one facet of the endless production of differences that is characteristic of the dynamic world in which humans live. At the same time, the steady generation of ever more differences affords endless opportunities for change to arise; some of the endlessly accumulating divergences might prove to be significant, as determined by people's reactions to them in conjunction with observers' judgments and juxtapositions of them with other differences (see chapter one). In particular, endless differences offer endless opportunities for reactions to occur that ramify over time into changes, small or large. The more distillers there are, or the more users of cell phones or of electronic devices there are, the more opportunities there are for significant changes in distillation or in the use of electronic devices to arise from humdrum adjustments to circumstances or micro innovations. As a result, the endless production of differences through drift in practices and bundles can be a highly significant feature of social life. It can, over time, lead to change.

As noted, some latest headings diverge much more from predecessors than others do. Larger deviations can instigate drift (though most drift results from smaller or miniscule deviations). But larger deviations can also quickly precipitate unfolding or larger complexes of difference and change. Inventions and ingenious fixes in problematic situations are obvious examples of larger deviations that often lead to larger changes. James Crow, for instance, revolutionized the Kentucky whiskey business in the 1820s by applying scientific principles to it and vastly improving and regularizing the quality of its products. In addition to new methods, he introduced the continuous still (around 1830), which was much more efficient than the pot stills that had exclusively been used up to then. Use of this still was quickly adopted by other distillers and soon became standard, thereby drastically changing the business (and setting it up for industrialization). Other examples of larger deviations leading to larger changes are found in the lives of "world-historical individuals," as Hegel (1975) called them, such as Jesus Christ, Julius Caesar, and Napoleon; the lives of many less rarified individuals whose actions send chains of actions in new directions furnish examples, too. Of course, most inflections are minimal or infinitesimal. Still, some latest

headings eventuate in consequential differences in bundles and, thus, generate social change.

As noted, the fact that the activities that make up action chains are components of individual lives implies that individual people form a kind of link between chains of action: chains link by virtue of the same person or people extending them. Indeed, any given person links indefinitely many chains in this way. To the extent that social changes arise from the chains involved, he also links changes in the sense of his activities contributing to their etiologies. And if his activities also significantly inflect the chains involved, he also links changes in the stronger sense of having a hand in bringing them about. For example, the moderator of an online discussion forum connects many of the changes of action and opinion that befall users of the forum through their use of it, and he helps bring these changes about if his interventions in their interactions are partly responsible for them. The etiologies of social changes sometimes include the concentrated, dispersed, or persistent efforts of certain people (or groups), whose activities make significant contributions to the chains of action yielding the changes. Successful collective action is one example.

A topic that is not immediately pertinent to the present book rears its head here, namely, changes in particular lives, that is, in individual people. This is an important matter studied generally by psychologists, philosophers, and social scientists and in specific cases by biographers and historians. Examples of changes—noteworthy differences—in individual lives are performing actions one has never performed before, switching routines, carrying out quite different combinations of practices, and new (for the individual) desires, beliefs, thoughts, and emotions. The causes of changes such as these are the object of much thought and research. Of equal interest is continuity, or lack of change, in actions, routines, practices, and mental states, a phenomenon that is often captured with such concepts as character, personality, habit, and disposition. As I will touch on in chapter six, changes and continuities of these sorts can be pertinent to explaining social affairs when they bear on those activities of individuals that generate social changes.

As a bridge to the following chapter, recall—as mentioned in chapter three—that material things, events, and processes are crucial components of and supports for chains of action. Material properties and movements of the human body, for example, are essential to the performance of bodily activities. They thereby underlie the performance of actions and, as a result, the occurrence of chains. Material entities, moreover, mediate chains in multiple ways. Sometimes, as noted, changes in the material world, brought about by activity, are that to which subsequent activities react. Whenever this occurs, a material object, event, process, or state of affairs helps form a chain of actions. Material and biological events and processes also regularly mediate chains by inducing people to act: lava flows, infestations, and equipment breakdowns do this as much as do beautiful sunny days, the antics of pets, and signals that equipment has completed tasks. Material and biological arrangements, moreover, often subtend the flow of information

through which people learn about actions and states of affairs to which they subsequently react. As noted in chapter three, finally, material and biological states of affair subconsciously bring about human activity—including reactions to others and interactions between people—by affecting bodily systems. Examples are quality of voice or release of smells subconsciously determining people's responses to someone. This is a third way materiality can mediate reactions and chains.

Finally, it is important to emphasize that chains of action amount to a kind of causal thread in social life. As discussed, at least two sorts of causality imbue such chains: intervening in the world and inducing people to act. Any chain of action comprises a series of causal relations of these types. These processes, moreover, are linked. Chains, consequently, are spatial-temporal threads of causal relation that meander through the practice plenum. Since a myriad of linked, crisscrossing action chains peregrinate through the plenum over any period of time, the plenum is always marked by an elaborate lattice of propagating causal threads, through which differences and changes in practices and bundles arise. Intervening in the world and inducing people to act are not the only sorts of causal relation at work in the plenum (see chapter five). They are, however, crucial. A researcher interested in ascertaining how or why social affairs came about as they did needs to attend to chains of action.

I wrote at the beginning of this chapter that changes in social phenomena arise from events and processes that befall the practices, arrangements, and bundles in which such phenomena consist. I am now suggesting that actions and chains of action are the most crucial events and Abbot-like processes involved; they constitute much of the energy that pervades and transforms the practice plenum. Chains of action accomplish much in social life. Among other things, they can embrace or result in (1) novel extensions of practices (as when a master distiller responds to an assistant's comment by creating a new and successful recipe), (2) reorganizations of practices (as when a discussion of what ends and tasks are acceptable alters the matter), (3) altered arrangements, (4) newly or rebundled practices and arrangements (as when a district manager of a distribution company implements the company's plan to set up an affiliate in a new city, a process that involves, among other things, moving nexuses of practices to new arrangements), and (5) altering relations among bundles (as when new bourbon products upend competition between distillers). Chains of action can also (a) effect the hybridization of two or more bundles (as when one distiller buys out another), (b) effect the bifurcation of a bundle (as when a dance teacher leaves one studio to start another, taking most of her students with her), (c) constitute a line of flight (cf. Deleuze and Guattari 1984) as when someone is so put off by being locatable by others in her social network that she closes her account in the network, and (d) effect additions to existing bundles (as when a dance studio buys the next door storefront to open a smoothie bar). In all these and more ways, change centrally embraces or results from chains of action. As suggested at the beginning of this chapter, changes of all the just mentioned sorts also can be ingredients in more complex social changes. I return to this topic in chapter seven.

The uneven front of change

In a previous book (2010), I discussed the indeterminacy of activity: how, before a person acts, nothing about the world can determine, settle, or fix what she does. Whatever she does is motivated and done for some end, but what motivates activity and what activity aims to realize are dimensions of the activity event itself and thus open until activity occurs—at which point, as dimensions of something that has occurred, they are settled affairs. All human activities are indeterminate in this sense.

One implication of indeterminacy is that what someone does on any occasion can deviate from extant regularities and patterns and confound expectations, both those at work in people's everyday lives and interactions and those taking the form of professional judgments or the generalizations of the human sciences. People do act regularly and in line with expectations much of the time; it is hard to imagine how social life would be possible if this were not the case. Occasions exist, however, when people deviate from regularities and patterns and confound expectations. No one, including the actors themselves, can know ahead of time which occasions these will be. Social life, accordingly, proceeds in profound, ineradicable uncertainty about people's life trajectories. Luckily, this uncertainty can be usually ignored: because people are somewhat regular, expectations—especially general ones—work well enough. Of course, some people's expectations and generalizations work better than others'.

Social life widely relies on expectations and generalizations. As a result, exceptions can induce, even "require," responses from people. Sometimes these responses reign in the divergent, irregular, or surprising activity, deflecting or domesticating it in some way that restores or extends the status quo ante. When this occurs, nothing changes. Occasions, however, when divergent, surprising, or irregular activities happen can be disturbing, turbulent, or agitating. Not for this reason alone can such activities solicit different, even new, or familiar but distorted responses, only serendipitously expectable or anticipatable, even by their performers. These are moments from which social change can grow.

Every occasion of activity is potentially an originating moment of change. For people can act irregularly, divergently, or surprisingly anytime. Change, consequently, can originate in any practice and any bundle at any moment. In order for activity to originate change, moreover, it is not enough that it deviate from existing regularities and patterns. As discussed, no activity can originate change on its own. An activity can be the germ of change only if the world reacts to it in a way that constitutes or leads to the world being significantly different than it was prior to the activity. An utterly original, unparalleled activity (though this is not really possible) that no one ever learns about dissipates when it concludes. Nothing follows from it, and the world proceeds on its way. The invention, for example, of a new type of still will fail to cause change if it is kept in a cave and only discovered 300 years later when its relevance to human life—apart from being a historical curiosity—has likely vanished. Similarly, an original dance move

hatched alone in a studio and then forgotten—or whose originality is lost on the performer—makes no difference to the development of dance. It is others' responses to an activity, responses that in turn lead to further responses, including possibly from the performer of the initial action, that eventually lead to significant differences in practices, arrangements, bundles, or constellations.

The magnitude of the differences that are generated via the chains of action that fan out from originary activities is utterly variable. If, for instance, the inventor had brought the new still to his workplace at a distillery, it might—or might not—have led to considerable change at the distillery. If it did lead to considerable change there, this might have in turn led to similar changes at other distilleries, eventually "revolutionizing" the industry. This is how inventions such as the continuous still, the cotton threshing machine, the telegraph, or the microscope came to be revolutionary. These examples, however, are possibly misleading. Activities do not lead to change only when they are inventive: in principle they can do so whenever they diverge from extant regularities, patterns, and expectations. What's more, any action can be something *to which* a divergent activity reacts; chains of activity that eventuate in change can arise from or pass through *any activity whatsoever.*

Originary activities are not origins in any standard sense of the word. One reason for this was just mentioned, namely, that activities cannot originate change on their own: their status as origins depends on how the world reacts to them. A second reason is that an originating activity is not an origin in the sense of the moment when novelty enters the world. An activity is an origin in the less impressive sense of the start of change, the event when the world begins to change. Novelty might not occur until later, after sufficient or the right changes take place. A final reason why originary activities are origins of a nonstandard sort is that such activities can be mundane in character. Origins, by contrast, are often thought to be rarefied and unusual.

The magnitude of the social changes that follow from an originary activity (1) rests on people's responses over time to it and to the activities and alterations that compose the action chains that arise from it, as well as on the material and other events and processes that all these activities set off, and (2) embraces the entirety of the different doings, sayings, organizations, arrangements, and bundles that result from these chains. The more that practices, organizations, arrangements, and bundles are altered, and the more of them that are altered, the larger are the changes involved. Note that changes often arise from multiple origins and not a single activity alone. For the sake of simplicity of formulation, I bracket this fact in what I write. I do not mean to suggest, moreover, that difference and change can be quantified: differences are too numerous, and significant differences too relative to judgment and choice of juxtaposition (see chapter one), for counting either to make sense. "Smaller" and "larger" differences and changes are, instead, qualitative judgments that researchers can discuss and disagree about. Still, the magnitude of the social change(s) that results from an originary activity (1) rests on the volume and reach of the bundle-altering chains

and events/processes that arise from it and (2) lies in an entirety of changes that thereby befall the bundles involved.

Of course, not all social changes are like this. An earthquake seizes large swaths of bundles and potentially alters social life there profoundly. Other natural "disasters" have similar reach. Still, many social changes arise through nexuses of activity chains that include single or multiple retroactively originary activities, in conjunction with material events and processes. Other changes arise through drift. Relevant social changes in this context include (1) those that are spatially-temporally scattered (such as widespread changes in how associations or groups are formed), (2) those that mark different bundles (such as layoffs at different retail outlets or factories of a company), and (3) changes that seemingly happen all the time (such as changes in interpersonal relations), thereby giving rise to the sense that social life is always changing. What sometimes masks this situation is that many originary activities are themselves responses to prior activities or states of the world, hence elements of *existing* chains of action that pass through them only to multiply and floriate afterwards. Being elements of chains that emerge from the past can obscure their originary qualities (see the discussion of inflection in the previous section).

Change is rarely an instantaneous affair and instead typically needs time to gather. It depends on responses to activities that at the time they occur cannot be grasped as originary, by people who might or might not being carrying on practices at the moment of response that are pertinent to the changes that eventually result. At other times change depends on drift. So long, moreover, as something is known or remembered, responses to it can occur, and at any pace. These facts underpin great variability in the speeds at which chains propagate (as measured by the occurrence of activities composing them per unit time). The rates at which significant differences in practices and bundles arise also, as a result, vary. Since larger changes embrace numerous smaller ones, and the speeds at which chains of action propagate, material events and processes unfold, and changes in practices and bundles arise are variable, larger changes in social affairs transpire at quite different rates. A revolution in the distillation industry can take months, years, or decades depending on the pace at which distillery bundles change, which itself depends on the chains of action (and material events/processes) that pass through, circulate in, and constitute or bring about changes to these bundles. Situations do exist, of course, that "require" swift response. Emergencies form one important class of such situation. A second comprises situations that arise in practices or social phenomena in which success requires swift response, for example, sporting events, game shows, debates, and warfare. Since responding swiftly is part and parcel of successfully carrying out the practices involved, such responses do not typically lead to change but instead merely perpetuate the practices.

Like its speed or rate, the spatial distribution of change is variable. Any occasion of activity is potentially an originating moment, but only certain activities actually originate change. Originary activities can occur in all sorts of practices and bundles. Although reasons exist when such activities happen in certain places

and not in others, or when they cluster in certain locales, it is clear that the geographical spread of originary activities is uneven and itself changes over time: today Menlo Park, tomorrow Shanghai (maybe)!

The uneven front of change consists in the differential distribution of originary activities through the plenum and the differential rates at which the changes, small or large, that arise from these origins (or from drift), unfold. The concept joins the uneven scatter of the particular events and processes that eventuate in change, the different, sometimes multiple speeds at which changes arise, and the different sizes of the resulting changes. The fact that change forms an uneven front suggests that it is utterly contingent. It is indeterminate at any particular moment whether divergent or irregular activities occur and whether and how others react to these activities if they do occur. It is likewise indeterminate, as a result, whether these activities lead to change and whether any changes they do lead to are small or large. The same holds of the slightly deviating activities that constitute drift. If divergent or irregular activities occur and other activities react to them, there are reasons why. But the fact that there are reasons why reactions, if they occur, do occur, does not imply that they will occur. Change—minute, small, or large—is thoroughly contingent. The precise form that the uneven front of change assumes in a certain period of time is a contingent matter, whose explanation lies in the details of social life at that time.

The present chapter has explored what is arguably the chief dynamo in social life, namely, chains of activity. The following chapter turns to the other such dynamo: material events and processes.

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