
Part I

Pasts

Cause, the Persistence of Teleology, and the Origins of the Philosophy of Social Science

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The subject of this chapter will be the history of the problem of cause and teleology in the social sciences up to the early years of the twentieth century, especially as it appears in the thinking of several of the major founding figures of disciplinary social science. The topic is muddled. But the later history of social science is unintelligible without an understanding of the issues, which have never been fully resolved. The history of the problem is driven by the fact that overtly teleological forms of explanation have often been replaced by problematic or ambiguous forms. Older terminology was sometimes replaced with new (e.g., “function” or “meaning” for “purpose” and “self-organizing systems” for “organisms”), turning the issues into terminological disputes, and sometimes making the different positions difficult to distinguish. Whether the new forms are free of the problems of the old forms is a matter of continued controversy. I will begin with a brief introduction to this history, told largely from the point of view of problems that arose for those who made the history, and conclude with a discussion of the present status of the technical issues for the project of eliminating teleology and the (perhaps insurmountable) difficulties in carrying it through.

Teleology and the Scientific Revolution

The social sciences emerged over a long period, against the background of, and in opposition to, an inheritance from Aristotle and the natural law tradition. The inheritance was noisily rejected by some thinkers, and partly rejected and partly absorbed by others. The tradition was a teleological or purposive mode of

theorizing about the order of the world, including the social world, that considered all beings to be governed by law in a purposeful hierarchy. At the beginning of this revolution Richard Hooker formulated the idea of natural law thus: By “the law of nature . . . we sometimes mean that manner of working that which God has set for each created thing to keep” (1888:206–8). Both people and things were supposed to have an essence that reflected the purposes of nature or of God. The term “destiny” was used to characterize the process by which the ends were contained in the nature of a thing. “Every thing both in small or in great fulfilleth the task which destiny hath set down,” as Hooker quoted Hippocrates. “Natural agents” do this “unwittingly”; for voluntary agents, the law is “a solemn injunction” to fulfill the tasks for which they are created (1888:206–8). This distinction marked the divide between the human and the physical.

Natural law theory held the world to consist of a variety of beings and objects whose essence disposed them toward the fulfillment of higher purposes. The larger hierarchy of purpose answered the question “why does thing x exist?” – the manifest “natures” of things were evidence of the purposiveness of creation. The model could be applied both to the physical and the human world, taking into account the differences in the essential character of humans and things, and the ways in which they were governed by natural law.

The key technical feature of these explanations was asymmetry. Charles Taylor formulated the issue in a way which has been influential by contrasting the law of inertia to the teleological conception of motion.

The [Newtonian] Principle of Inertia does not single out any particular direction in which bodies “naturally” tend to move. . . . And thus it may be said to be neutral between the different states of any system of which it may be invoked to explain the behavior. But this cannot be said of a principle of asymmetry, whose function is precisely to distinguish a privileged state or result . . . that, in other words, this result will be brought about unless countervailing factors arise. (Taylor 1964:23–4)

The teleological account of motion thus involves a “notion of ‘tendency towards’ a given condition which involves more than just the universal and exceptionless movement of events” in a certain direction. It involves the idea of “a bent or pressure of events towards a certain consummation, one that can only be checked by some countervailing force” (Taylor 1964:24). In Hooker’s language, this “bent” is the “manner of working” that leads to the destiny set down for the being by God; for others this becomes the notion of powers and essential natures, and such asymmetries as those between the “normal” and the “pathological.”

Natural law thinkers were not naive, and it was of course evident that this way of solving intellectual problems could go wrong, even badly wrong. But they believed that there was a solution to the problem of arbitrariness in what might be called nesting: the fact that an end toward which something “tended” at one level served an end at a higher level, and was, from this higher point of view,

nonarbitrary. So the salvation of the conception was its hierarchical character and the fact that natural ends were arranged in a determinate and knowable sequence of higher purposes, leading up to the purposes of God.

A more stubborn problem, however, was circularity. “Natures” or inner purposes were theoretical properties of things that could only be understood by inferring them from their effects. Were these inferences bogus, and if so why? The *locus classicus* for the sense that these were bogus explanations that depended on linguistic flummery to conceal their emptiness is the ridicule heaped upon medics by Molière. He targeted the practice of physicians (which continues to this day) of giving a Latin name for a disease which is nothing more than the name of the unknown condition that is supposed to be the cause of the “disease,” thus giving the illusion of explanatory knowledge. Molière’s most famous example of this kind of humbuggery concerned the “dormitive powers” of opium. He has a bachelor of medicine recite the following: “*Mihi à docto doctore/ Domandatur causam et rationem quare/ Opium facit dormire/ A quoi respondeo;/ Quia est in eo/ Virtus dormitiva/ Cujus est natura/ Sensus assoupire*” ([1673] 1987: ‘The Third Interlude’). Why does opium induce sleep? Because of its nature, its dormitive power. And sleeping, indeed, was an effect of opium. But to explain this effect by referring to the sleep-inducing powers of opium was merely to move in a circle. To say that “x has dormitive power” is to say nothing more than that x has the effect of inducing sleep.

So the parody had a powerful point. But as Leo Strauss later remarked, if opium did not have dormitive powers it would not have been able to produce sleep. The claim is not arbitrary. At best, it is classificatory. Such classifications pointed to what, for the most part, were genuine explanatory problems. They employed, and depended on, causal analysis, in the form of the theory that the effects in terms of which they ascribed powers or intrinsic natures to things were the result of something in the thing itself. What was missing was the actual mechanism, or any idea of what property of opium induced sleep, or what mechanisms produced the effect. To be sure, mechanisms and properties should be discovered. But, in many of the relevant cases, problems posed in these terms could not be solved by science. And in the numerous cases where intrinsic natures and the like could not be identified except in terms of their effects, this causal theory was circular.

The problem of circularity and the problem of the arbitrariness of the asymmetries are distinct problems, and they arise in different ways in the later history. To these may be added a third: the natures, powers, and the like which are mysterious inner properties, unobservable, and irreducible to ordinary material features of things. They are, as Descartes put it, “attached to substances, like so many little souls to their bodies” (1991:216), and their role in explanation is problematic in many of the ways that the operations of the soul in the material universe is problematic. “Philosophers,” he said, “posited [them] only because they did not think they could otherwise explain all the phenomena . . .” (1991:217). They are, in short, believed to exist because they are needed to explain something. And this

reason, explanatory necessity, amounts to an open challenge to construct an explanation that can do without them.

The idea that these problematic accounts of “natures” could be replaced, either by an account of a mechanism (or property that is not arrived at merely by circular reasoning) or by a predictive law, is central to the long revolution against natural law. But in the social sciences mechanisms and predictive laws were elusive, and the replacement concepts were often themselves problematic. Such dispositional ideas as Adam Smith’s notion of a “natural propensity to truck and barter” (Smith [1776] 1976:25) were difficult to distinguish from teleological explanations: trucking and bartering is, after all, a kind of end, and the truth content of statements about a “propensity” of this sort is difficult to distinguish from the content of simple descriptions, such as “people who are free to do so, trade.”

Aristotle thought of the relations between causal and teleological explanations in a way that made teleology dependent on causality. For him, causal explanations formed a necessary *part* of teleological explanations and needed to be *completed* by teleological explanations. This nagging idea that knowing the purpose served by the causal phenomena persisted, and in some ways knowledge of purposes seems to be *required*, in order to make sense of the “laws” that a causal explanation appeals to. Consider the case of rational actions. We can account for them “causally” in the sense that we can give an analysis of explanations like “I went to the store to buy milk” which breaks the explanation down into a pro-attitude toward milk and the causal fact of our “rational” practical knowledge that it can be obtained by going to the store.

But if we then ask “why do people act rationally?” we pose an apparently legitimate question that is difficult to answer without reverting to teleology at least in the form of the idea that there is a tropism to the rational. We could appeal to the (asymmetric) principle: people tend to behave rationally when there is nothing to keep them from doing so, for example. But this is a characterization of an inner tendency whose effects we can observe, and which shows the nature or essence of people. In the early stage of this revolution resolutions of this kind were typical. Thomas Hobbes, for example, attempts to account for state authority in a nonteleological way, that is to say not by reference to the supposed purposes and nature of state power but in terms of the individuals who make up the state and authorize it.¹ When he does so, however, he runs into difficulties, such as the question of why people keep and are bound to keep the promises that they make when they contract to produce the state, which he can only resolve by attributing an inner promise-keeping *nature* to these individuals: its formulation is suspiciously ambiguous (Hobbes [1651] 1965:74). Is promise-keeping causal and directionless, or is promise-keeping an essentially purposive notion, and thus just as teleological as the account of the state he sought to replace? Dispositions of these kinds remained troublesome. They seemed to be incomplete or feeble explanations, that, when improved upon, either turned into causal laws or to directional teleological claims, a point which we will consider later.²

Teleology in the Enlightenment

Both the teleological explanation and the hierarchical teleological worldview came under increasing pressure during the eighteenth century. In large part this was a result of the proliferation and “abuse” of the concept of final causes. In Germany, especially, as theology became possible outside the control of the church, speculative teleological thinking was carried to conclusions that were logical, but even more ludicrous than anything Molière dreamed of. The philosopher Christian Wolff, for example, argued at some length that the sun shone so that people could more easily go about their work in the street or the fields (Wolff 1962, part I, vol. 7:74–5).³ Voltaire mocked an unnamed contemporary work which held that “the tides are given to the ocean so that vessels may enter port more easily” (Voltaire 1924:133–5). The “so that” in the sentences was meant to be explanatory – the ends explained the facts of sunshine and tides.

Enlightenment thinkers nevertheless were torn in several directions in the face of these problematic arguments. They generally agreed that teleology had been abused in the past. But they were impressed with the idea that organisms seemed to be understandable only teleologically, in terms of some internal principle or nature that could not be reduced to mechanism. Moreover, they relied freely on the idea of human nature, characterized by inherent purposes, in their political reasoning. Even the most naturalistic Enlightenment *philosophes*, especially when they wrote about the inevitable course of history, wrote routinely and unself-consciously in teleological ways. They spoke of the “forces” that assured this inevitability, forces that often seemed difficult to distinguish from “dormitive powers.” And when they insisted on the fundamental similarity of laws of social science to laws of physics or biology, they slipped into teleological language unself-consciously.⁴ They nevertheless grasped that there were unsolved problems with these usages.

Questions about origins were particularly baffling puzzles for them. If the world was a clock-like mechanism, it seemed that it needed a maker, and a winder, and this created not only a role but a necessary role for God. Voltaire wrote that “If a clock is not made to tell the hour, I will then admit that final causes are chimeras” (1924:133), and he regarded as absurd the claim that “the mouth is not made for speaking, for eating, the stomach for digesting,” and so forth. He pointed out that even those who denied final causes in nature “avow nevertheless that tailors make them coats to clothe them,” and thus “deny to nature, to the great Being, to the universal intelligence, what they accord to the least of their workmen” (1924:133).

For these reasons, Voltaire, for one, refused to give up final causes, and sought to draw a line between acceptable uses of the concept and abuses. Voltaire’s answer to the teleological account of tides was to say that “to be certain of the true end for which a cause functions, it is essential that the effect shall exist at all times and in all places. There were not ships at all times and on all the seas; hence

one cannot say that the ocean was made for the ships” (Voltaire 1924:133–4). But this is just to say that nothing can be a final cause unless it is universally a cause of its effect, which is to say that it is a causal consequence. It does not tell us how to pick out the “true end” from the various universal effects of a cause. To say that all humans exhale CO₂, for example, is not to say that humans exist for this purpose. So the problem of drawing a line proved difficult to solve in these terms. A new approach was needed.

The philosopher who provided it was Immanuel Kant, and the solution was different in kind. Kant began his career as an enthusiastic proponent of a teleological physics, but eventually rejected it.⁵ His position on social science, which figures in his essay on universal history (Kant 1963), was novel. He refused to commit to the *reality* of teleological forces, but urged nevertheless that history had to be *understood* as a teleological process. How could Kant have it both ways? He had articulated in his mature writings an argument that teleological explanations were always circular and therefore different in cognitive status from mechanical laws. In his *Critique of Judgement*, he posed the question of whether an organism as a whole can be explained in an entirely causal way, as a mechanical system can. He denied that it can. This “insufficiency” argument was then, and continued to be, the basic argument in favor of teleological accounts. But he then argued that the notion of purpose can, properly speaking, apply only to the free actions of intelligent beings. So when we apply it to organisms we can do so only in a metaphorical or analogical sense, that is to say *as if* they had purposes. He then introduced the notion that “an organized natural product is one in which every part is reciprocally both means and ends” (1988:24–6).⁶ But means and ends can only serve as analogical terms here.

Kant’s solution to the conflict between cause (in the sense of mechanical causality) and teleology reflects a core problem. There is, he acknowledges, something spooky about teleology, but also something compelling, and the compulsion needs to be explained. To identify purposes in nature requires us to go beyond the sensible world, the world we can subject to observation or experiment. The need to think purposively about the world is ours. Purposes are matters of *our* concern, as intelligent beings, and the need we feel for them is our need. Comte radicalized this insight by historicizing it: he relegated teleological thinking to a stage in the historical development of thought, a “need” which would wither away.

The Replacement of Teleology

Comte’s project

Auguste Comte was a self-conscious revolutionary: “The Positive philosophy is distinguished from the ancient . . . by nothing so much as its rejection of all inquiring into causes, first and final; and its confining research to the invariable

relations which constitute natural laws” (Martineau 1858:799). By this he meant the thorough-going elimination from all of science of “theological” and “metaphysical” notions, notably the notion of a purposive universe, in all its forms, manifest and hidden. Comte’s project was unprecedented in scope, and relentlessly pursued. He distinguished himself as a thinker in ferreting out hidden teleological usages.

Comte’s core sociological idea, his “law of the three stages,” contained within itself the idea of the elimination of final causes. According to the law, each scientific area went successively through three stages. The first was one of superstition and animism, which he called “theological,” marked by the appeal to “fictitious entities.” There followed an intermediate stage, which he called “metaphysical,” in which explanations appealed to abstract entities or forces, such as “momentum” (and “cause” itself, in any sense other than the strict sense of invariable relations). In the final stage, these ideas were eliminated, and purely predictive laws constituted the whole of what was taken to be scientific in that domain. Physics had, for the most part, arrived at the positive stage: one no longer asked what “caused” gravitation, for example, precisely because one recognized that the only answer to such a question would be either theological or metaphysical. Biology had not quite reached this stage. Final causes and other pseudo-explanations abounded, often in concealed form. Social science was more distant yet from liberation from pseudo-explanation. Comte took this as his own task.

The notion of the positive stage was a powerful critical tool, and produced a large number of questions about scientific concepts in the sciences that had not yet reached this stage. Were “life” and “organism” metaphysical notions? Could such notions be replaced, or rather be freed of their metaphysical connotations? These were problems that concerned Comte greatly in his accounts of the development of these fields, which occupy much of his major work, the *Cours de philosophie positive* (cf. Scharff 1995:73–91, Schmaus 1982:248–53). The ideas of fictions and hypotheses especially interested Comte, in part because of the contemporary controversy over the wave theory of light, in which he was an active disputant. He argued that the use of hypotheses, and even fictions, is often necessary in science at certain stages of inquiry, but he insisted that in the end hypotheses had to be supported by sensory evidence. Claims about “natures” and the like, by definition, cannot (cf. Laudan 1981:111–62).

The troubles with causality

The devil, for social science, was in the details, and the rather large detail that remained was to produce a collection of laws, auxiliary hypotheses, and so forth, that could replace metaphysical thinking. Comte made an effort to provide them, at least in the form of the law of the three stages and a sophisticated discussion of the conditions for intellectual progress, which were his auxiliary hypotheses. Comte also sought to restate what he thought was usable in the notion of the social

organism in causal rather than teleological terms, as well as to suggest ways in which “life” could be thought of nonteleologically. The strategy here anticipated the later approach of logical positivism – to criticize and reject previous philosophical ideas ruthlessly, but to accept and attempt to reinterpret existing “scientific” thinking. Comte did not do this consistently – he rejected “psychology” as a science and abominated statistics, while accepting the need to replace ideas about the organic character of social life. John Stuart Mill, whom Comte profoundly influenced, followed his strategy of selective appropriation, but selected different things to save, including economics, statistics, and psychology (which he located at the base of the social sciences and to whose laws he ascribed the true explanatory force of the other social sciences).

These differences reflected the basic problem with their position: there simply were no laws of social science, beyond the problematic case of the sociological laws of the three stages. There were statistical relations; actions could be and were explained “causally” in accordance with the model of human action employed in courts of law, and there were various secular trends in history. Economics had developed an impressive deductive structure, but it was questionable whether it was genuinely causal: to the extent that the structure rested on the fiction of the wealth-seeking agent it was apparently teleological, and operated to explain the teleology of the market by reference to the teleology of individuals, whose nature and ends had been attributed to them circularly on the basis of their actions.

The philosophical argument had its own troubles: troubles about causality. As we have seen, the case against teleology rested on the idea that there is something spooky about ends, things that lie in the future, pulling events in the direction of their culmination. Comte, however, recognized that the idea of causes pushing to an outcome was equally spooky, and for much the same reasons. Each notion points to something *permanently* hidden from empirical study and not merely a temporary “fiction.” Comte made prediction on the basis of law the true mark of developed science in place of this metaphysical notion of causation. But this was open to objections, particularly from those, like Émile Durkheim, who were realists and argued that the point of experiment in such sciences as chemistry was not simply to predict but to reveal the underlying chemical reality that allowed one to account for the validity of the predictions (Durkheim 1982:199).

Apart from these philosophical objections there was a more painful problem. The social sciences could make predictions, but they were statistical predictions: the only results that resembled the quantitative laws of physics were curves fit to statistical results, like suicide rates, which were probabilities. But Comte rejected these. Medical statistics, he argued, were not laws at all, at least not in the sense of a fully developed positive science. And contemporary experience had borne this out. The great cholera epidemics of the middle part of the nineteenth century were studied by the best statisticians of the day and produced many predictive “results.” But they proved to be misleading about the mechanism. The mystery of cholera was solved by John Snow, who focused, not on statistics, but on the substance that transmitted the disease.⁷

There was an easy way out of this unhappy choice between prediction and law – on the philosophical level. An admirer of Comte, the statistician Karl Pearson, at the end of the century thought these issues through and proposed, in his philosophical work *The Grammar of Science* ([1892] 1911), the following solution. In place of invariant succession Pearson argued that variation was the law of nature, that even the laws of physics were idealizations of relationships that, empirically, contained genuine and ineliminable empirical variation, and that, accordingly, there was no difference in principle between correlation and “predictive law.” This line of argument exorcized the spooks and made data the determiner, in an especially direct way, of the predictive law. But it had quite a price of its own. If every correlation were equal in the eyes of science, and if there were no distinction, in principle, between correlation and cause, social science had plenty of scientific results: far too many to make sense of, in fact.

Pearson’s argument could be accepted in the abstract, without being satisfying in concrete cases where one is nagged by the question of whether a given statistical association is accidental or represents something genuine, meaningful, or, in a word, causal. The intuitions (intuitions that a Comtist would say were conditioned by the metaphysics of causality), even of the social scientists who attempted to implement this program, conflicted with the idea that there was nothing but prediction at stake. So figures such as the early quantitative sociologist W. F. Ogburn, who accepted Pearson’s arguments in principle, nevertheless acknowledged that it was necessary to place some additional sort of interpretation on the results to make them meaningful. But, Ogburn argued, in good Pearsonian fashion, these interpretations had no scientific status and were akin to the interpretations that could be placed on an editorial cartoon (Ogburn 1934:17). This line of reasoning was unpersuasive: the distinctions between cause and correlation were too difficult to let go of. The current form of Pearson’s problem is the question of causal models, the subject of Paul Humphrey’s chapter in this volume. The difficulties are similar: are there purely mathematical criteria for distinguishing between causal and noncausal statistical models composed of statistical correlations? Or do we need some sort of additional information, which adds the “causality” from another source, such as an independently grounded theory, “background knowledge,” or hypothesis about “causal mechanisms”? It is not clear that these sources are free from the infirmities that Comte’s and Pearson’s austerity programs were designed to cure, including teleological usages.⁸

The Rest of Social Science

The organic analogy and function

If one did not choose to accept the implications of Pearson’s austere empirical route – and few social scientists did – there were alternatives. Many of the

alternatives represented a compromise with teleology – an attempt to make the two compatible, the acceptance of particular kinds of teleology, or an attempt to make causal sense of teleological arguments, and two arguments in particular: the idea that society was like an organism and the idea of historical processes with an inevitable outcome. One philosophical solution to the problem of compatibility is particularly appealing: to treat teleological systems as causal systems, to thus make teleological explanation a subtype of causal explanation. This amounts to reducing teleological explanations to causal explanations, to the extent that they are legitimate, and making their legitimacy depend on their reducibility to claims about causal systems.

“System” is a usage with deep potential for ambiguity. In these approaches the arbitrariness of the choice of the favored outcome in teleological explanations may in some instances be overcome by causally explaining why this outcome is favored. Thus an explanation of the teleological structure of a thermostat can be accounted for and made nonarbitrary by reference to the causal mechanisms making up the thermostat and the causal act of setting the thermostat. Human nature, a teleological notion, might be explained as a product of biological or evolutionary processes that are understood to be causal. “Collective” results, such as the spontaneous order that results from the signaling of information in a market, may result causally from the goal-seeking activities of individuals, without the “order” itself being teleological or goal-directed. But in the case of artificial systems the mechanisms are real, understood, and causal. Applying these ideas to human agents or social systems is analogical.

The explanatory language employed by the “organic analogy” in sociology was open to interpretation either causally or teleologically. As has been noted, Comte’s struggle against teleology included many attempts to absorb and explain, in nonteleological terms, phenomena such as life. Life was the battleground that the defenders of teleology in the nineteenth century chose to take a stand on: the inadequacy of mechanical accounts of life was held to be proof positive of the ineliminability of purposes from natural science explanation. Against this Comte and Mill attempted to show how such notions as consensus between parts could be understood causally, and to substitute notions like harmony, a physical term, for teleological conceptions (Turner 1986:22–7, 53). One effect of these efforts was to turn organic analogies and talk of “function” into the common property of both sides. Another effect was to muddle the distinction sufficiently that some important thinkers in the next period, such as Herbert Spencer and Durkheim, are in the end difficult to classify. Both vigorously rejected teleology, but employed many terms also used by teleologists and suggested that they could be understood causally.

Spencer remarked of his own book *Social Statics* ([1892] 1954), that “there is everywhere manifested a dominant belief in the evolution of man and society. There is also manifested the belief that this evolution is . . . determined by the incidence of conditions – the actions of circumstances. And there is further . . . a recognition of the fact that organic and social evolutions, conform to the same

law” (Spencer 1901:137). But his discussions of the law have little to do with the incidence of conditions, and much to do with “general laws of force” (1901:138). These undergird the general principle that progress is “the evolution of the simple into the complex, through successive differentiations” (1972:40).

“Evolution” is a highly ambiguous usage in this context: is it teleological or causal? The question is similar for the “general laws of force.” Are they symmetric, or teleological? They seem to state a disposition. But is it a directional disposition toward a particular end, or merely a stable but directionless causal feature, like Newtonian inertia? There is good reason to be confused. As his expositors have said, “In *Social Statics*, Spencer almost seems to see the social state as a fulfillment of a preexisting disposition, and he continually asserts an identity between processes in which the outcome is predetermined (like an embryo’s maturation) and those in which it is not (like socialization or social evolution)” (Peel 1972:xxxviii). He freely employs the language of “essences” and “natures” (though apparently without regarding such usages as anything more than commonsensical), and even appears to fall into the teleologists’ problem of circularity, as when he treats empirical exceptions to his generalizations as “incidental” facts which do not relate to the “nature” of society (Peel 1972:xxxviii–xxix).⁹

These confusions were not resolved by other writers who employed the analogy. The founding figure of French sociology, Émile Durkheim, was a careful reader of Comte and Spencer, as well as of German psychological and legal theorists who were concerned with issues of cause and teleology, and was philosophically tutored by a thinker who had sought to preserve a version of the teleological character of the physical universe, one in which physical law had – and was nested in – an ultimate purpose (Boutroux 1920:159–60, 193–4). Not surprisingly, Durkheim was sensitive to the implications of teleological usages, and especially to the issues of the reducibility of apparently purposive holistic phenomena to mechanistic explanation. His commitment to cause was clear, and he was more careful than Spencer had been. But he also attempted to account for collective phenomena, and intermittently employed an analogy between society and organisms. The meaning he *intended* for these “organic” usages should be clear from a comment he made about the “maintenance” of social institutions. He employed a notion we can recognize from Kant, who spoke of the reciprocity of means and ends. He suggested that “if more profoundly analyzed, [the] reciprocity of cause and effect might furnish a means of reconciliation which the existence, and especially the persistence, of life implies” (Durkheim 1982:144). Thus Durkheim promoted a causal interpretation of the social organism. And he expended considerable effort in redefining such concepts as normal and pathological in non-teleological ways, as well as using words like “function” rather than “purpose,” and in construing these words causally.

But intending to be purely causal and fully succeeding are two different things. Durkheim’s teacher had his doubts about the explanation in *The Division of Labor in Society*. Boutroux analyzed the argument thus: Durkheim says that the division of labor is necessary to bring about the cessation of the struggle for life. But the

problem “admits of other solutions, the simplest of which is the eating of one another. That is really the law of nature, and division of labor is instituted for the very purpose of impeding the fulfilment of this law” (Jones 1999:160, cited in Boutroux 1914:199). As Robert Jones explains,

The division of labor is “necessary,” only in the sense of being *preferable* – i.e., more in conformity with the idea of humanity, responding more completely to that sympathy with the weak which we assume to exist in man. What can this mean, Boutroux asked, except that “what we took to be a crude law of causality involves a relation of finality [i.e. of teleology], and that we are assuming the intervention of the human intellect and will. . . .” (Jones 1999:160, citing Boutroux 1914:199–200)

In short, among the causes and causal connections on which Durkheim’s account depended were some which could not be readily understood nonteleologically.

Decision and intentionality: Weber and the marginalists

Classical economics was largely unconcerned with choice and decision, or for that matter “rationality.” The focus was on “factors” of production and commodities, and on the constraints imposed by the physical difficulties of production or by Malthusian forces governing demand for food.¹⁰ These are readily construed as “causes.” The effect of the marginalist revolution was to shift attention to individual choices – an intentional term that is most easily understood teleologically: choices are made in order to achieve ends – and the purposive rationality of the individual.

The marginalists posited individual rational agents, pursuing self-selected purposes, whose separate decisions led to aggregate patterns of equilibrium. Thus they assumed a particular abstracted teleology at the individual level to explain the teleological properties of the market. The strategy raised the question of circularity, and indeed the question of whether these models had any empirical content at all. Contemporary critics, such as Thorstein Veblen, who had written his own dissertation on Kant’s *Critique of Judgement* (cf. Veblen 1884), recognized that this amounted to a reversion to teleological thinking, and thus went against the general tide of the nineteenth century, which flowed against teleology in science.

There was, however, a very different methodological direction in which a focus on choice and intentionality could lead. Choices, after all, are made by people who conceive of the choices, and their concepts are not irrelevant to the outcomes of decisions. Indeed, in every domain other than the narrowly economic domain of price comparisons, understanding and explaining actions depends on understanding ways in which people conceive situations. Such conceptions vary culturally and historically. Even the questions of basic social science and history come in human terms, human terms that vary culturally and historically. Max

Weber raised the question of whether, even if one could have “a sort of ‘chemistry’ if not mechanics of the psychic foundations of social life,” its results would have significance “for our knowledge of the historically given culture or any phase thereof, such as capitalism, in its development and cultural significance?” (Weber [1904] 1949:75). His answer was that it would not, because terms like “capitalism” are cultural.

Weber understood “culture” as “a finite segment of the infinity of the world process, a segment on which human beings confer meaning and significance.” Different cultures or epochs confer different “meaning and significance” on different finite segments. The social sciences, he argued, are cultural sciences, and their questions, which begin with what is meaningful and significant for us, are in terms of the “language of life,” that is to say, human terms. This language culturally and historically varies, so the “knowledge of cultural reality” the social sciences seek “is always knowledge from particular points of view” (1949:81). But he also argued that the social sciences were causal, and that the fact of causality itself was not relative to viewpoints. He rejected teleological thinking and spared no effort at rooting it out, violently attacking the teleological formulations of the German historical school in economics as well as the kind of teleology that appeared in collective concepts of the state and law (1975:55–91). But at the same time he defended explanation of what he called meaningful social action in terms of human intentions. These considerations led him to a complex position, which was a kind of compatibilism not unlike Donald Davidson’s, which at present dominate the philosophy of action (Weber 1978:4–16).

Trained as a lawyer, Weber pointed out that legal reasoning about responsibility was causal, and argued that this kind of reasoning, properly understood, was relevant to and sufficient for the kinds of factual historical questions that arise within cultural points of view. The proper understanding of the causal character of these questions was this: determinations of causality or responsibility did not require scientific laws, but required a judgment that, in a class of similar cases, subtracting a given condition would have lowered the probability of the outcome. This kind of reasoning could be applied to such historical questions as the question of the contribution of Protestantism to the rise of capitalism, where of course it would necessarily be hypothetical. But the model also allowed explanations of ordinary intentional action as simultaneously intentional and causal. Attributing intentions was done by showing that the sequence of events of which the act was a part was intelligible or meaningful as an action of a particular kind (Weber 1978:8–9). Causal responsibility was shown by establishing that it would have some probability of producing the outcome (cf. Weber 1949:67–75).

Causal and “meaningful” or intentional considerations are coequal and compatible in Weber’s model of social science explanation, at least in principle. For Weber action explanations had to be both valid at the level of interpretation or understanding and valid at the level of cause, in the sense that “subtracting” a cause would alter the outcome to be explained. This allowed for low-probability causal relations to be genuinely explanatory.

What does this have to do with teleology? When Weber employed the term “meaning,” he did so in order to avoid using the teleological term “purpose,” which also could be used in many of the same contexts. Eliminating “purpose” and using “meaning” is one approach to the problem of characterizing intentional action. In Weber’s case there was no pretense that “meanings” were causes. Meaning attributions, as he understood, were like purpose attributions in that they were not arbitrary, but nevertheless had to be imputed indirectly, on the basis of, among other things, their consequences in the form of actions. Like the attribution of dormitive powers, this was circular. But, as Weber formulated it, the relevant evidence included the “course of events” around an act, which is to say more than the bare fact of the effect.

Because Weber did not rely exclusively on this circular reasoning, and did not pretend that this reasoning could do the work of causal explanation, he avoided the problem of circularity. But this solution to the problem of compatibility works because he allowed probabilistic relations between classes of “causes” and “effects” described in the language of life (including intentions or “meanings”). The price of this solution is that these explanations, unlike those involving laws, cannot be derived from and thus explained by other, broader or more basic laws. They are causal but with respect to causality they are an explanatory dead end. With respect to “meaning,” however, they are not a dead end. Meanings can be further explained. For example, they can be explained historically, in terms of varying beliefs and values, using the same basic framework and type of explanation. The “causal” content taken alone has no more empirical significance than Pearsonian correlations arbitrarily selected between variables. What makes them different is that considerations of “meaning adequacy” introduce a nonarbitrary method of selection from the huge class of actual probabilistic relations.

The Persistence of Teleology

Causal systems that are composed of or involve human action and social objects, such as institutions, practices, and societies, have continued to be the subject of disputes. But the discussions of human objects and social objects have different trajectories. In the remainder of the chapter I will concentrate on the problems of teleology in relation to social objects. But the domains are not independent, and one of the central problems with “social objects” is this: to what extent are they “real,” or, put differently, do they possess any explanatory force beyond the elements of human action and physical causality that compose them? One view, also associated with Weber, is that they do not. Similar conclusions can be reached from rational choice premises. But these arguments depend on intentional explanation. So what is intentional explanation? Cause, teleology, or something else? Whatever the answer, it cannot be generalized to the problem of social objects.

Intentions require minds and, although talk of group minds or social intelligence was not uncommon a century ago, it is rare today. But it is not clear that the concepts that have been proposed to explain the social phenomenon that group minds formerly “explained” are free of the problems of group minds.

A *causal system* is a set of interlocking causal mechanisms with certain features. *Teleological causal systems* include feedback mechanisms (which produce adjustment or equilibration such that the system maintains itself or progresses toward a goal that is built into the system). These systems can be characterized as purposive or end-seeking or teleological. But “teleology” does not, so to speak, reside in the mechanisms, as social purposes were once thought to reside in the group mind or in a collective “intelligence.” End-seeking is a property that adds no explanatory content – everything that happens does so because of the arrangement of causal mechanisms such as the feedback mechanisms that do the work of directing the system toward the end state. The “ends” are a consequence of the arrangement of mechanisms, rather than something that adds predictive power or explanatory force to the explanation. If social objects could be analyzed as systems of this kind, two of the problems of teleology – the issues of arbitrariness and circularity – would not arise.

The requirement of specifying feedback mechanisms, however, is a high standard, and defenders of particular collective social science concepts have generally dismissed or ignored this standard. Consequently they become entangled with the traditional problems of teleology. Consider the notions of racism, sexism, and oppression. These notions are not on the surface teleological. Sexism and racism are understood as features of individual attitudes, beliefs, and so forth, as well as of institutional practices that have oppressive consequences. The persistence of oppressive structures and practices, and their resistance to reform, seems like a depressingly familiar empirical fact that demands explanation, not an artifact of a medieval explanatory strategy. But matters are not so simple. The phenomena of “racism” and “sexism” are theoretical entities, underlying causes of the attitudes or practices. And they are identifiable *as* racist, sexist, or oppressive not because they are on their face racist, sexist, or oppressive, but because they produce these particular kinds of outcomes. The outcomes are very closely connected to our understanding of the phenomena itself. Perhaps they are related in the circular way that teleological “natures” were connected to “ends.”¹¹ Suppose that any practice that results in any gender or racial difference or inequality is understood and characterized as sexist or racist. If an attitude or practice is defined as racist because of its effects, the explanation becomes circular, or true by definition: racism is whatever produces racist effects.

An influential defense of these kinds of arguments is found in Gerald Cohen’s *Karl Marx’s Theory of History* (1978:285, 289–96). Cohen defends these as *functional* arguments. But whether functional arguments avoid the traditional difficulties of teleology is controversial. Ernest Nagel attempted to restate teleological terms in nonteleological language.

Consider, for example, the teleological statement: “The function of the leucocytes in human blood is to defend the body against foreign micro-organisms.” Now whatever may be the evidence that warrants this statement, that evidence also confirms the non-teleological statement: “Unless human blood contains a sufficient number of leucocytes, certain normal activities of the body are impaired,” and conversely. (Nagel 1961:405)

But *is* this language nonteleological? As Victor Gourevitch, commenting on this passage asks:

In what possible sense are such terms as “sufficient,” “normal activities,” and “impaired” less teleological than the terms “function” and “defend” which they replace? Taken in and by itself alone a blood-count is a mere number. As such, it is wholly meaningless and uninformative. It yields information only when it is compared to a normal blood-count, that is to say to the blood-count of persons who are known to be healthy and whose bodies are *therefore* said to exhibit “normal activities.” The knowledge that someone is healthy precedes and is independent of our taking their blood-count as a standard. It is pre-scientific, or first for us. (Gourevitch 1968:293, emphasis in original)

“The only real difference between Nagel’s two statements,” Gourevitch concludes, “is that the so-called nonteleological statement takes for granted what the teleological statement renders explicit” (1968:293).

As it happens, this is a commonplace feature of many arguments that do not present themselves as teleological arguments, or even as “functionalist” arguments. Consider a usage of the sociologist Pierre Bourdieu, “reproduction.” Bourdieu believes that the social practices that produce the domination of one group by another are not only passed on in the course of education, but preserve an underlying logic of domination over time. All that such a “logic” could be, if it is not simply a nonexplanatory description of the effects of practices, is a kind of self-perpetuating force whose end is the preservation of domination. Is this a teleological usage? Clearly it is. Perpetuation is not a fact that depends on the intentional preservation of the “logic.” Indeed, the logic necessarily operates behind the back of social actors, who must “misrecognize” its significance in order to carry out the practice. If the persistence of the practices that secure domination was wholly a result of particular causal conditions, there would be no point in appealing to the notion of a hidden logic. The system would be causal, but while the causes would produce and sustain the practices and the practices would have the effects, the effects would not be purposes. For Bourdieu, however, the effects are purposes.¹² Cohen’s defense of Marx’s functional explanations is designed to avoid these obscurities. He observes that “a benefit-statement assigns beneficial consequences to some item.” He then says, let us generalize the question “What makes benefit-statements explanatory?” by asking instead: “what makes citation of consequences, be they beneficial or not, explanatory? What are the truth conditions of what we may call a *consequence explanation*?” (1978:259).

His answer is that they must depend on an empirical “law” governing the relation between consequences and the preceding things that they explain, a *consequence law*, which can be understood through “an analogy between ‘*e* occurred because *f* occurred, since whenever *F* occurs, *E* occurs’ and ‘*e* occurred because of its propensity to cause *F*, since whenever *E* would cause *F*, *E* occurs’” (1978:261).

An example of such a consequence law can be drawn from anthropological functionalism. “Whenever performance of rain dance *R* would bring about, shortly thereafter, a rise in social cohesion, rain dance *R* is performed” (1978:261). Cohen thus overcomes the spookiness of future events causing past events by saying that there *is* a prior fact, a disposition:

It is false that, in an explanation relying on such a generalization, the resulting social cohesion is put forth as explaining the performance of the rain dance. Instead, the performance is explained by this dispositional fact about the society: that if it were to engage in a rain dance, its social adhesion would be increased. . . . *It can be explanatory to cite the effect of the rain dance, not because its effect explains it, but because the fact that it had that effect allows us to infer that the condition of the society was such that a rain dance would have increased its social cohesion, and it is implied that the inferrable condition occasioned the performance of the dance.* (Cohen 1978:261–2)

Claims about this disposition can be stated as true generalizations.

One difficulty with all such arguments is familiar: circularity – they involve processes or dispositional facts that are accessible only by inferring their existence from their effects. The means by which the society’s dispositions produce intentional actions, for example, are deeply mysterious. Do they enter into the heads of the dancers as individual mental causes or urges? And if so, how? If such questions are unanswerable, these explanations cannot easily respond to the charge that they result only in analogies. Moreover, because the relations in question are not particularly strict, they are open to alternative explanations. It must be said that Voltaire would have recognized these problems as close kin to his own, and Molière would have recognized these explanations as subject to the same weaknesses as “dormitive powers.” And Cohen, like Strauss, can make the same response: If there were no law-governed disposition of this sort, there would be no predictable consequences of this kind. Cohen thus solves the problem of teleology by making teleological explanations dispositional, which is a weak form of explanation in part because of underdetermination: typically many alternative explanations of a dispositional kind also fit the facts. In the case of Marxian explanations there are some other difficult problems to handle. Are Marxian “predictions” readily falsifiable if they are flexible with respect to the time at which the predictions are to be fulfilled? (Elster 1982:478 n.8). Can any amount of present evidence disconfirm a prediction about the indefinite and perhaps infinite future?

Strengthening the explanations, by specifying their mechanisms, making them into “causal system” forms of teleology, faces other obstacles. “Dormitive powers” can be explained by mechanisms involving opium receptors in the brain. Similarly,

in the social sciences, “mechanisms,” such as the stylized intentional explanations of rational choice theory, used to represent aggregations of intentional acts, such as markets, are used to account for such things as the market’s disposition to seek price equilibrium. These intentional actions together compose an “invisible hand.” But other collective concepts used as explanations seem to be wholly analogical and incapable of being broken down into plausible mechanisms. Consider Bourdieu’s concept of practices (1977:59–60) or Mary Douglas’s defense of Fleck’s notion of “thought collectives” (1986:12–17, 32), the supposed common mental frameworks of thought in a community. Such explanations seem to require that the collective objects – such as practices and thought collectives – have effects on individuals, or operate causally within them. The mechanisms by which this is supposed to occur are mysterious. So one suspects that these explanations are dead ends, analogies that, unlike dormitive powers, cannot be made into something better. And, because they are weak, the results they “explain” are also open to many equally weak alternative explanations.

Notes

- 1 For a detailed discussion of Hobbes’ various struggles with teleology see R. S. Peters (1967:43–91, 129–77).
- 2 A standard discussion of the problem of circularity with respect to dispositional statements is Carl G. Hempel (1965). Hempel distinguishes a “narrow” human and a “broadly” dispositional approach. A “broadly” dispositional analysis of rationality, for example, is not circular since claims can rest on different grounds in addition to the evidence given by instances of rational action, which assume rationality by definition and would, taken alone, produce a circularity (1965:473). This reasoning was later revised by Donald Davidson (1976), who abandons dispositions in favor of probabilities, which are independent facts and thus avoid circularity.
- 3 Kant critiqued such arguments in *The Critique of Judgement* (1988:257–61).
- 4 For an example of the unself-conscious reliance on teleological usages even in thinkers who prided themselves on “the purity of their empirical method,” freedom from the “*esprit de système*” of the Scholastics and the natural law thinkers of the seventeenth century, and insisted that “they looked only at facts,” see Manuel and Manuel (1979:464–5).
- 5 Schönfeld 2000:ch. 5.
- 6 As Jon Elster points out with respect to Pierre Bourdieu, the “as if” is instantly used in these texts. But Bourdieu, unlike Kant, uses this language in contexts that are not limited to “subjective understanding” (cf. Elster 1982:453–82, esp. 456).
- 7 Cf. McKim and Turner (1997), Freedman (1999).
- 8 Pearson’s competitor G. U. Yule refined an alternative manner of reasoning about causality that operated in terms of estimating effects on the basis of a given set of variables minus the variable to be assessed, and attributing the difference between the observed and estimated effects to the included variables (Turner 1997:23–45). The statistical sources used by Max Weber, who will be discussed shortly, used analogous reasoning, but applied it to dependent probabilities rather than correlations.

- 9 It is striking that the method of inverse deductions deals with exceptions in a similar way.
- 10 Cf. Mill (1929).
- 11 These need not be teleological or dispositional concepts. Some thinkers about “white privilege” have managed to specify what privilege consists in by reference to such considerations as the likelihood that other *individuals* will not judge my actions as representative of my race or as a result of racial characteristics. These are not circular (McIntosh 1988) But they are at the level of individual action rather than that of social objects.
- 12 Elster discusses many similar examples from Marxist social science (1982), and considers Marx in detail (1985).

References

- Bourdieu, Pierre 1977: *Outline of a Theory of Practice*, trans. Richard Nice. Cambridge, UK: Cambridge University Press.
- Boutroux, Émile 1914: *Natural Law in Science and Philosophy*. London: D. Nutt; New York: Macmillan.
- Boutroux, Émile 1920: *The Contingency of the Laws of Nature*, trans. Fred Rothwell. Chicago and London: Open Court.
- Cohen, G. A. 1978: *Karl Marx's Theory of History: A Defence*. Princeton, NJ: Princeton University Press.
- Davidson, Donald 1976: Hempel on explaining action. Reprinted in Davidson 1980: *Essays on Actions and Events*. New York and Oxford: Oxford University Press, 261–75.
- Descartes, René 1991: *The Philosophical Writings of Descartes: The Correspondence*, vol. III, trans. John Cottingham et al. Cambridge, UK and New York: Cambridge University Press.
- Douglas, Mary 1986: *How Institutions Think*. Syracuse, NY: Syracuse University Press.
- Durkheim, Émile 1982: *The Rules of Sociological Method*, ed. Steven Lukes, trans. W. D. Halls. New York: Free Press.
- Elster, Jon 1982: Marxism, functionalism and game theory: The case for methodological individualism. *Theory and Society* 11, 453–82.
- Elster, Jon 1985: *Making Sense of Marx*. Cambridge, UK: Cambridge University Press; New York: Maison des Sciences de l'Homme.
- Freedman, David 1999: From association to causation: Some remarks on the history of statistics. *Statistical Science* 14 (3), 243–58.
- Gourevitch, Victor 1968: Philosophy and politics. *Review of Metaphysics* 22, 282–328.
- Hempel, Carl G. 1965: *Aspects of Scientific Explanation and Other Essays in the Philosophy of Science*. New York: The Free Press.
- Hobbes, Thomas [1651] 1965: *Leviathan*. London: J. M. Dent & Sons.
- Hooker, Richard 1888: *Laws in The Works of Mr. Richard Hooker with an Account of His Life and Death by Isaac Walton*, vol. I, 7th edn., arranged by Rev. John Keble, revised by Rev. R. W. Church and Rev. F. Paget. Oxford: The Clarendon Press.
- Jones, Robert Alun 1999: *The Development of Durkheim's Social Realism*. Cambridge, UK and New York: Cambridge University Press.

- Kant, Immanuel 1963: Idea for a universal history from a cosmopolitan point of view. In Lewis White Beck (ed.), *On History*, trans. Lewis White Beck, Robert E. Anchor, and Emile L. Fackenheim. Indianapolis, IN: Bobbs-Merrill Educational Publishing, 11–26.
- Kant, Immanuel 1988: *Critique of Judgement*, trans. Werner S. Pluhar. Indianapolis, IN: Hackett Publishing Company.
- Laudan, Larry 1981: *Science and Hypothesis*. Dordrecht, Boston, and London: D. Reidel Publishing.
- McIntosh, Peggy 1988: White privilege and male privilege: A personal account of coming to see correspondences through work in women's studies, Working Paper No.189. Wellesley, MA: Center for Research on Women, Wellesley College.
- McKim, Vaughn R. and Stephen P. Turner 1997: *Causality in Crisis?: Statistical Methods and the Search for Causal Knowledge in the Social Sciences*. Notre Dame, IN: University of Notre Dame Press.
- Manuel, Frank E. and Fritzie P. Manuel 1979: *Utopian Thought in the Western World*. Cambridge, MA: Harvard University Press.
- Martineau, Harriet 1858: *The Positive Philosophy of Auguste Comte*. New York: Calvin Blanchard.
- Mill, John Stuart 1929: *Principles of Political Economy: With Some of Their Applications to Social Philosophy*, ed. W. J. Ashley. London: Longmans, Green and Co.
- Molière, Jean Baptiste Poquelin [1673] 1987 *The Imaginary Invalid*, trans. Miles Malleston. New York: Samuel French.
- Nagel, Ernest 1961: *The Structure of Science: Problems in the Logic of Scientific Explanation*. New York: Harcourt, Brace and World.
- Ogburn, William F. 1934: Limitations of statistics. *American Journal of Sociology* 40, 12–20.
- Pearson, Karl [1892] 1911: *The Grammar of Science*, 3rd edn. London, A & C. Black.
- Peel, J. D. Y. 1972: Introduction. In Herbert Spencer 1972: *Selected Writings*. Chicago: University of Chicago Press.
- Peters, Richard 1967: *Hobbes*. Harmondsworth, UK and Baltimore, MD: Penguin Books.
- Scharff, Robert C. 1995: *Comte After Positivism*. Cambridge, UK and New York: Cambridge University Press.
- Schmaus, Warren 1982: A reappraisal of Comte's three-state law. *History and Theory* XXI (2), 248–66.
- Schönfeld, Martin 2000: *The Philosophy of the Young Kant: The Precritical Project*. New York and Oxford: Oxford University Press.
- Smith, Adam [1776] 1976: *The Wealth of Nations*. An inquiry into the nature and causes of the wealth of nations. Oxford: Clarendon Press.
- Spencer, Herbert 1901: *Essays Scientific, Political and Speculative*, vol. II. New York: D. Appleton and Company.
- Spencer, Herbert [1892] 1954: *Social Statics*. New York: Robert Schalkenbach Foundation.
- Spencer, Herbert 1972: *Selected Writings*, ed. J. D. Y. Peel. Chicago: The University of Chicago Press.
- Taylor, Charles 1964: *The Explanation of Behavior*. New York: Humanities.
- Turner, Stephen P. 1986: *The Search for a Methodology of Social Science: Durkheim, Weber, and the Nineteenth-Century Problem of Cause, Probability, and Action*. Dordrecht: D. Reidel.
- Turner, Stephen P. 1997: Bad practices: A reply. *Human Studies* 20 (3), 345–56.

- Veblen, Thorstein 1884: 'Kant's *Critique of Judgment*.' *The Journal of Speculative Philosophy*. XVIII, July. Reprinted in Leon Ardzrooni (ed.), 1964: *Essays in Our Changing Order*. New York: Augustus M. Kelley, Bookseller, 175–93.
- Veblen, Thorstein 1898: Why is economics not an evolutionary science? *The Quarterly Journal of Economics* XII, July, 373–97. Reprinted in Max Lerner (ed.), 1948: *The Portable Veblen*. New York: The Viking Press, 215–41.
- Voltaire 1924: *Voltaire's Philosophical Dictionary*. New York: Alfred A. Knopf.
- Weber, Max [1904] 1949: "Objectivity" in social science. In *The Methodology of the Social Sciences*, trans. and ed. Edward A. Shils and Henry A. Finch. New York: The Free Press, 49–112.
- Weber, Max 1975: *Roscher and Knies*. New York: The Free Press.
- Weber, Max 1978: *Economy and Society: An Outline of Interpretive Sociology*, 3 vols., Guenther Roth and Claus Wittich (eds.), Berkeley and Los Angeles: University of California Press.
- Wolff, Christian Freiherr von 1962: Deutsche Teleology. In *Gesammelte Werke* I, vol. 7, J. École, H. W. Arndt, Ch. A. Corr, J. E. Hoffmann, and M. Thomann (eds.), Hildesheim and New York: G. Olms, 74–5.