

## Paulin J. Hountondji on Philosophy, Science, and Technology

*From Husserl and Althusser to a Synthesis of the  
Hessen-Grossmann Thesis and Dependency Theory*

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To explain Paulin J. Hountondji's intellectual trajectory, I offer a critical account of his conception of the relationship between science and philosophy. Mapping the shift from his well-known critical writings on ethnophilosophy to his later work on scientific dependency is possible only if we recognize that Hountondji conceives of philosophy as essentially a theory of science (*Wissenschaftslehre*). Adequately characterizing Hountondji's metaphilosophical orientation, however, requires greater specificity. The two most influential philosophers on Hountondji's conception of the relationship between science and philosophy, Edmund Husserl and Louis Althusser, would both have assented to the claim that philosophy is fundamentally a *Wissenschaftslehre*. However, they each adhered to different (and indeed contradictory) understandings of this claim. While Hountondji explicitly recognizes the dual influence of Husserl and Althusser on his conception of philosophy as a theory of science, he does not attempt to resolve the contradictions between Husserl's understanding of the relationship between philosophy and science and Althusser's conception of that relationship. In fact, Anglophone scholarly work on Hountondji's writings, produced in the 2010s, does not explicitly attempt to resolve this tension.

By examining Hountondji's relatively neglected later writings on scientific dependency, it becomes clear that his emphasis on the significance of the history and sociology of science points toward an Althusserian conception of philosophy qua theory of science rather than a Husserlian conception of what it is for philosophy to be a *Wissenschaftslehre*. However, Hountondji is mis-

taken in his reliance on Althusser's arguments for the claim that philosophy is essentially a second-order discourse that is parasitic on first-order scientific discourse. Althusser, in analyzing the mutual historical interactions between the sciences and philosophy in order to provide evidence for his claim, merely gestures toward such connections without engaging in any rigorous examination of the history of science in relation to the history of philosophy. Unfortunately, Hountondji, through his excessive reliance on Althusser, falls into the same error. Nonetheless, this chapter provides evidentiary support for Althusser's claims (and therefore for Hountondji's) about the relationship between science and philosophy by drawing on the work of contemporary historians of philosophy, historians of science, and historians of philosophy of science. I show how Hountondji's later work on scientific dependency can be situated in the context of a transnational tradition of Marxist scientific philosophy, through the reconstruction of his claims about the relationship among philosophy, science, and technology, as a version of the Hessen-Grossmann thesis in the context of his embrace of a version of dependency theory. (According to the Hessen-Grossmann thesis, technology was developed to facilitate capitalist economic development, and early modern science was able to make the advances that it did by studying the technology that was developed to facilitate capitalist economic development.)

## Hountondji's Critique of Ethnophilosophy's Metaphysics of Difference

Because Hountondji is best known for his critique of ethnophilosophy, as well as for his concern with the development of African philosophy as an academic discipline, it is important to recognize the connections between his early work on the limits of ethnophilosophy qua African philosophy and his later work on scientific dependency on the African continent. Hountondji criticizes attempts at reconstructing a philosophical system through the ethnographic study of the worldview of a specific African people—for example, Placide Tempels's *Bantu Philosophy* (2021).<sup>1</sup> Hountondji argues that such projects are ill conceived for several reasons. First, the researcher almost always projects “a philosophical discourse on to products of language which expressly offer themselves as something other than philosophy” (Hountondji 1996, 43). Second, this ethnographic approach to “discovering” African philosophies presupposes the “myth of primitive unanimity,” as Hountondji terms it, “with its suggestion that in ‘primitive’ societies—that is to say, non-Western societies—everybody always agrees with everybody else. It follows that in such societies there can never be individual beliefs or philosophies but only collective systems of belief” (60).<sup>2</sup> Hountondji

argues that this approach underemphasizes the existence of conflicts in such societies, because according to him there are no societies in which everybody agrees with everyone else (165).<sup>3</sup>

Nobody would think of engaging in an ethnographic study of, say, the English conception of time (in a way that discounts the differentiation brought about by social stratification, regional differences, specific individual histories, etc.) and then attempt to pass off the results as philosophy, but it was not uncommon for ethnophilosophers to speak about the Yoruba conception of time or the Bantu philosophy of time, and so on.<sup>4</sup>

The third reason that Hountondji finds ethnophilosophy to be inadequate is that this discourse involves implicitly (and sometimes explicitly) a search for originality and distinctiveness that reaffirms the positing of an essential difference in kind between African peoples and Western peoples: “the generally tacit thesis that non-Western societies are absolutely specific, the silent postulate of a difference in *nature* (and not merely in the *evolutionary stage* attained with regard to particular types of achievement), of a difference in *quality* (not merely in quantity or *scale*) between so-called ‘primitive’ societies and developed ones” (Hountondji 1996, 61).<sup>5</sup> Hountondji is referring to what Olúfẹ́mi Táíwò (2013) has described as the “metaphysics of difference,” or the thesis that there is an essential *difference in kind* between Black African peoples and other peoples.<sup>6</sup> According to Táíwò, the metaphysics of difference was used to justify colonialism. In fact, as Mahmood Mamdani has pointed out, colonial rule, specifically the doctrine of indirect rule “aimed at the reproduction of difference as custom” (2013, 44). The anthropological discourse of “custom” led to the dehistoricization of differences in social structures and their representation as unchanging reified differences (in existence since “time immemorial”).<sup>7</sup> The reification of difference was central to the colonial discourse of tribalism (53). We can therefore understand Hountondji’s suspicion of any discourse that takes reified differences between Africans and non-Africans for granted.<sup>8</sup>

The fourth criticism that Hountondji levels at ethnophilosophy is perhaps the most important in relation to explaining his later turn to the sociology of scientific knowledge in the peripheries. Hountondji argues that the most debilitating limitation of ethnophilosophy is that it is fundamentally directed toward a non-African audience: “African philosophy, inasmuch as it remains an ethnophilosophy, has been built up essentially *for a European public*. The African ethnophilosopher’s discourse is not intended for Africans. It has not been produced for their benefit, and its authors understood that it would be challenged, if at all, not by Africans but by Europe alone” (1996, 45). For Hountondji, ethnophilosophy is essentially a performance produced to satisfy an Other who occupies a position of power vis-à-vis the performers. Hountondji thinks that the other faults of ethnophilosophy es-

entially stem from this extraversion (the structural fact of being directed toward an external audience). For example, according to Hountondji, extraversion is what explains the overemphasis on African originality: “The quest for originality is always bound up with a desire to show off. It has meaning only in relation to the Other, from whom one wishes to distinguish oneself at all costs. This is an ambiguous relationship, inasmuch as the assertion of one’s difference goes hand in hand with a passionate urge to have it recognized by the Other” (44).<sup>9</sup> According to Hountondji, this assertion of difference was even encouraged by the Other (former colonizing powers), especially when the assertion of cultural difference was used to mask political and economic dependency (159).<sup>10</sup>

Indeed, Hountondji even argues that “ethnophilosophy appears as a by-product of underdevelopment” (1996, xxiv). He thus posits a causal connection between a certain kind of intellectual discourse and equivalent socioeconomic structures. Ethnophilosophy is the by-product of a weak postcolonial petty bourgeoisie incapable of carrying out an economic and political struggle for real independence and that therefore seeks to transform the struggle for real independence into an exclusively cultural struggle centered on assertions of cultural authenticity and difference. This is what Hountondji means in writing, “Hypertrophy of cultural nationalism generally serves to compensate for the hypotrophy of political nationalism” (159). Convergence occurs between Hountondji’s analysis of the socioeconomic roots of ethnophilosophy and Dani Nabudere’s analysis of the socioeconomic roots of discourse around cultural uniqueness. The claim to cultural uniqueness was not in fact unique at all; it obtained all across those parts of the world dominated by neocolonialism. As Nabudere points out, the valorization of cultural uniqueness is the product of underdevelopment in the neocolonial world, which leads the ruling petty bourgeoisie to abandon the arena of political and economic struggle against imperialism and to struggle exclusively in the cultural field: “Neocolonial culture as expressed in the writings of the neocolonial intellectual reflected this depressed culture. Appeal to the past instead of the future dominated so-called ‘Black culture,’ ‘Arab culture’ or ‘Asian culture.’ This reflected generally backward conditions in the neocolony” (Nabudere 1979, 86). Thus, underlying the claims to uniqueness was a more or less uniform condition of underdevelopment and domination by finance capital. Hountondji’s suspicion of any discourse of cultural authenticity was reinforced by his experiences in Mobutu Sese Seko’s Zaire (Dübgen and Skupien 2019, 90).

The causal connection between economic structures and philosophical discourse, however, is not direct and unmediated. As we see later, for Hountondji this causal connection is mediated by science and technology. To this extent Hountondji adopts a version of historical materialism in his critique

of ethnophilosophy (offering both an argument against ethnophilosophy qua philosophy and an explanation that ties its development to certain economic, social, and political conditions). Hountondji is quite explicit about this: “In the pure domain of thought every mutation or revolution, every *event* in the strong sense, refers to some event in the material world and owes its own occurrence as an event to this relation” (1996, 91). He firmly locates his approach to the study of the history of philosophy within the context of the problematic of historical materialist modes of the study of the history of philosophy. According to this approach, the history of philosophy “is not autonomous and does not draw from itself the law of its own development, which is determined in the last analysis by the historical production of material goods and that of the social relations of production” (1996, 93).<sup>11</sup>

This approach is a “problematic” because Hountondji does not pretend that it provides indubitable answers to key questions arising in the historiography of philosophy. Instead, he emphasizes that its significance lies in developing a set of distinct research questions. For Hountondji the central questions are, “What, outside philosophy, determines the transitions which are the stuff of history? How, by what mediations, is philosophical practice finally determined by material practices?” (1996, 97). While Hountondji does not offer definitive answers to these questions, he does propose some hypotheses.

## Hountondji’s Conception of Philosophy as a Theory of Science and the Future of African Philosophy

According to Hountondji, philosophy is essentially a second-order discourse that is parasitic on first-order scientific discourse—that is, the theories and practices that constitute the natural sciences, along with mathematics. Hountondji takes Galileo’s mechanics as the paradigmatic exemplar of science. Philosophy, in this view, is essentially a theory of science. As he puts it, “[Philosophy] is no more than reflection on the aims of science” (Hountondji 1996, 73). Hountondji explicitly draws on Althusser’s conception of the relationship between science and philosophy to argue that “the great philosophical revolutions are always the sequel of great scientific revolutions, so that philosophy is organically linked, in its growth and evolution, with the birth and development of the sciences” (97). In his essay “Lenin and Philosophy,” Althusser supports Hegel’s claim that philosophy is parasitic on science: “Hegel was not wrong to say that philosophy takes wing at *dusk*: when science, born at dawn, has already lived the time of a long day. Philosophy is thus always a long day behind the science which induces the birth

of its first form and the rebirths of its revolutions, a long day which may last years, decades, a half-century or a century” (Althusser 1971a, 41). Thus, for Althusser, philosophy’s development is tied up with the development of science (to which, of course, it can sometimes contribute by clarifying certain conceptual issues that may block further scientific progress): “If philosophy is to be born, or reborn, one or more sciences must exist. Perhaps this is why philosophy in the strict sense only began with Plato, its birth induced by the existence of Greek Mathematics; was overhauled by Descartes, its modern revolution induced by Galilean physics; was recast by Kant under the influence of Newton’s discovery; and was remodelled by Husserl under the impetus of the first axiomatics, etc.” (41). This view does not imply, however, that philosophy cannot in principle contribute to the development of the sciences. For example, Althusser thought that Cartesianism offered a new conception of causality that further contributed to the development of Galilean physics, which had run into epistemological obstacles in relation to the deployment of the Aristotelean conception of causality: “But it is also true that in certain cases (to be precise, Plato, Descartes) what is called philosophy also serves as a theoretical laboratory in which the new categories required by the concepts of the new science are brought into focus. For example, was it not in Cartesianism that a new category of causality was worked out for Galilean physics, which had run up against Aristotelean cause as an ‘epistemological obstacle?’” (Althusser 1971a, 42).<sup>12</sup> Moreover, from the study of the history of science, we know that philosophical commitments often motivate scientists to develop new scientific theories (DeWitt 2010, 132).<sup>13</sup> Strictly speaking, to claim that philosophy draws its problems from the first-order discourses of the sciences does not imply that philosophy cannot shape the sciences by aiding (or even hindering) their progress.<sup>14</sup> Hountondji, in adhering to the claim that philosophy is a second-order discourse that is parasitic on first-order scientific discourse, need not logically commit himself to the claim that philosophy is somehow causally inert vis-à-vis the sciences.

However, Hountondji’s reliance on Althusser is problematic because Althusser, by his own admission, did not study the history of philosophy or the history of science in any rigorous or systematic fashion (Fraser 1976, 458). Speaking of his knowledge of the history of philosophy in 1962, Althusser makes the following confession: “I felt I had to get involved in philosophy for political and ideological reasons and therefore ‘accepted it’ as it was with the knowledge I had: a little Hegel, a lot of Descartes, not much Kant, a fair amount of Malebranche, a bit of Bachelard (*Le Nouvel Esprit scientifique*), a great deal of Pascal, a little Rousseau, Spinoza, and Bergson, and my bedside book, Bréhier’s *L’Histoire de la philosophie*” (Althusser 1993, 182). In 1965, the situation was not much better: “But then I became

obsessed with the terrifying thought that these texts [*Pour Marx* and *Lire 'le Capital'*] would expose me completely to the public at large as I really was, namely a trickster and a deceiver and nothing more, a philosopher who knew almost nothing about the history of philosophy or about Marx (though I had certainly made a close study of his early work, I had only seriously studied Book I of *Capital* in 1964 when I took a seminar which resulted in *Lire 'le Capital'*)” (148). Fortunately, despite Hountondji relying uncritically on Althusser and not offering independent evidence to support his claim, one need not rely on Althusser’s rather dubious knowledge of the history of science and philosophy to find evidentiary support for the claim that the development of the empirical sciences provided philosophy with both its problematic (i.e., the questions that it raised) and the tools by means of which philosophers have attempted to answer those questions. The thesis that the scientific revolution was a necessary condition for the development of modern philosophy is not unique to Althusser, and it was advanced by others whose historical knowledge was more reliable. For example, Hegel, who essentially founded the history of philosophy as a subdiscipline of academic philosophy in the modern research university (Collingwood 1994, 126; Höhle 2003, 186; Kaufmann 1972, 21; Lukács 1975, 265), claims that “without the working out of the empirical sciences on their own account, philosophy could not have reached further than with the ancients” (ohne die Ausbildung der Erfahrungswissenschaften für sich hätte die Philosophie nicht weiter kommen können als bei den Alten) (Hegel 1995, 176). In other words, without the modern scientific revolution, modern philosophy would have been impossible.<sup>15</sup> Other thinkers who put forward the claim that the problematic of modern philosophy is derived from the development of modern science include Otto Bauer. Speaking of Kant, Bauer claims that “in order for Kant to have accomplished his works, much had to precede it. The emergence of modern science: without a Newton, no Kant” (Bauer 2015, 301). Kant took Hume’s problem of induction to constitute a challenge to Newton’s mechanics, precisely because it undermined the epistemic warrant for attributing necessity to Newton’s three laws of motion. This was the primary motivation behind Kant’s attempt at deriving the three laws of motion, in his *Metaphysical Foundations of Natural Science* (1786), in such a way as to demonstrate their necessity.<sup>16</sup>

Alexandre Koyré is another key thinker who throughout his career attempted to emphasize the intimate connection that existed between developments in modern science (specifically, modern Galilean physics) and modern philosophy. Koyré contends that the history of scientific thought and the history of philosophy in the fifteenth and sixteenth centuries cannot be separated from one another (Koyré 1957, 2).<sup>17</sup> One can also point to contemporary scholarship using methodological approaches to the history of

early modern philosophy that recognize the importance of taking into account early modern science when attempting to understand early modern philosophy (Klein 2013, 157; J. Smith 2013, 42–43).

We also know that Thomas Hobbes set out to reconstruct philosophy not on the basis of Aristotle's categories but rather on the basis of categories derived from Galileo's new science, hence his attempt to reduce the concept of being to one of matter in motion (Foisneau 2011, 802). Furthermore, a key metaphor in early modern philosophical discourse, that of the universe as a clock (and later as a watch), clearly cannot be explained without an account of the development of late medieval and early modern mechanical technology.<sup>18</sup> Moving on to the nineteenth century, one can also point toward the manner in which Charles Sanders Peirce's philosophy was deeply influenced by his reflection on Darwin's theory of evolution (El Nabolsy 2020a).

The point is that, while Hountondji weakens his argument through his reliance on Althusser's rather dubious account of the history of philosophy and the history of science, the thesis that he adopts from Althusser gains independent support from the work of historians of philosophy and science who are more reliable than Althusser. Hountondji does not devote much space to an account that supports this thesis; however, the account provided above reflects his own self-understanding: "Nothing or not much is understood of Plato if you don't realize the development of Greek mathematics during his era. You don't understand at all Descartes if you do not see in his philosophy, as Judith Miller put it, a 'metaphysic of Galilean physics.' You underrate the stakes of Kantianism if you ignore Kant's admiration of Newton and the deep fascination exerted on his thinking by the new physics" (Hountondji 2011, 92). Given this claim, it is reasonable to believe that Hountondji would sympathize with the reconstruction of his views that is presented above.

Hountondji also draws on Edmund Husserl, whom he studied rigorously in the course of his philosophical formation (Hountondji 2002b, 3–25), in his formulation of the relationship between philosophy and science in general (and African philosophy and African science in particular). For Husserl, "philosophy in general is first of all reflection on science" (Hountondji 2002b, 31). Indeed, for Husserl, science is both the object of philosophical discourse and a model for philosophical thought. In this sense, Husserl belongs to what some philosophers and historians of the philosophy of science have referred to as the tradition of scientific philosophy. According to Alan Richardson (1997), "scientific philosophy" refers to a set of methodological and metaphilosophical theses that were held by philosophers from the 1860s to the 1930s who diverged widely in terms of their attitudes toward substantial philosophical questions (or first-order philosophical questions). The list of scientific philosophers includes Bertrand



Russell, Edmund Husserl, the members of the Vienna Circle, Richard Avenarius, and Alois Riehl. What unites this set of disparate philosophers is their emphasis on science as the subject matter of philosophy and on the need to model philosophy on the structure of modern science.

While all the philosophers who belong to the movement that historians of philosophy of science label scientific philosophy can be said to take the empirical sciences seriously, scientific philosophers differ among themselves as to the exact nature of the relationship between philosophy and the natural sciences. For example, Avenarius thinks that philosophy should deal with only an empirically given subject matter if it is to become scientific and if it is to make any kind of progress (Richardson 1997, 428). According to Avenarius, this subject matter is composed of the empirically given scientific disciplines, and philosophy is understood to be a general science of the sciences. By a general science of the science, Avenarius means that the aim of philosophy is to provide a methodology of the sciences by means of which it can demonstrate the unity of the different sciences (428). For Avenarius, philosophy qua general science of the sciences is itself an empirical science, since all it does is organize the different empirically given (at a certain historical moment) scientific disciplines in a manner that brings out their unity.

Husserl, in contrast, thinks that the subject matter of scientific philosophy (which in his case is identical with phenomenology) is pure consciousness, as opposed to empirical consciousness, which is the object of psychology (Richardson 1997, 433). Husserl does not think that philosophy is only a second-order discourse on existing empirical sciences. Instead, he conceives of it as justifying the empirical sciences. The empirical sciences cannot provide answers for epistemological questions, such as “How can experience as consciousness give or contact an object? How can experiences be mutually legitimated or corrected by means of each other, and not merely replace each other or confirm each other subjectively?” (Husserl 1965b, 87). Husserl is clear that philosophy cannot be based on the empirical sciences: “If certain riddles, are generally speaking, inherent in principle in natural science, then it is self-evident that the solution of these riddles according to premises and conclusion in principle transcends natural science [otherwise there would be a vicious circularity]” (88).<sup>19</sup> For Husserl the natural sciences cannot serve as a foundation for philosophy because they are methodologically naive insofar as they proceed by assuming the existence of their objects and our epistemic access to them: “All natural science is naïve in regard to its point of departure. The nature that it will investigate is for it simply there” (85). For Husserl the natural sciences are epistemically naive insofar as they simply assume that they can grasp their objects. Indeed, for him the empirical sciences require epistemic justification from philosophy since it is

only philosophy that can validate their methods (Lauer 1965, 44). Husserl's understanding of philosophy as a "strict science" (*als strenge Wissenschaft*) is thus not continuous with that of the more naturalistically inclined philosophers (who did not think that the task of philosophy is to justify the procedures of the empirical sciences).

That Husserl describes philosophy as a *Wissenschaft* does not by itself imply that he conceived of philosophy as an intellectual enterprise that is continuous with the natural sciences; the German word *Wissenschaft* can be used to refer to organized bodies of knowledge in general (Beiser 2011, 6). That is, it does not necessarily carry the connotations of a body of knowledge that deals with natural phenomena and that seeks to describe them in terms of quantitative relations (which I take to be the connotations of the English word "science" today). In fact, for Husserl, philosophy is more scientific than the natural sciences because it is able to attain the classical ideal of science: a system of necessary truths derived from self-evident first principles (Hardy 2014). The self-evident first principles are to function as axioms (the classical ideal being instantiated in Euclidean geometry). The empirical sciences cannot attain this classical ideal (although according to Husserl they strive to attain it), because the laws of the empirical sciences are only contingent and cannot be known to be certainly true. Husserl clearly thinks that, whatever ultimate reality is (presumably the intuitively given reality that phenomenology is supposed to study), it is not revealed by the natural sciences: "The natural sciences have not in a single instance unraveled for us actual reality, the reality in which we live, move, and are" (Husserl 1965b, 140). Moreover, while Hountondji notes that for Husserl "philosophy in general is first of all reflection on science" (Hountondji 2002b, 31), we should recognize that, for Husserl, phenomenology qua eidetic science that dealt with idealities is not dependent on any sciences that deal with factual existence (Kusch 1995, 183). In fact, it is an a priori science that would provide the foundation for all the other sciences (Friedman 2000, 44).

This leads us to an important problem for Hountondji—namely, the incompatibility between the concept of philosophy as theory of science as it is found in Althusser and the conception of philosophy as theory of science as it is found in Husserl. For Althusser, philosophy is dependent on the empirical sciences, on sciences that deal with factual existence. According to Althusser, philosophy can contribute to organizing the empirical sciences, but it does not aim at justifying them (N. Smith 1980, 67). We may, then, say that the empirical sciences are epistemically self-sufficient for Althusser (Schwartzman 1975, 323). Hountondji himself adopts this interpretation; he writes that Althusser abandons "philosophy's earlier and bizarre pretensions to 'founding' science" and limits his conception of philosophy "only

to recognizing and identifying retrospectively [empirical science's] real procedures in order to give them conceptual clarity" (Hountondji 2002b, 11).<sup>20</sup> Now it is clear that this conception of philosophy as a theory of science is radically different from Husserl's conception of philosophy as a theory of science. Hountondji himself acknowledges "the enormous distance separating the author of *Formal and Transcendental Logic* from that of *For Marx*" (11). However, to speak of an "enormous distance" is to understate the problem, for they hold *logically contradictory* conceptions of philosophy as a theory of science (to uphold both the claim that the empirical sciences do not require epistemic justification from philosophy and the claim that philosophy is tasked with providing the empirical sciences with epistemic justification is to fall into contradiction). In their book on Hountondji, Franziska Dübgen and Stefan Skupien register the dual influence of Althusser and Husserl on Hountondji's conception of philosophy as science (Dübgen and Skupien 2019, 33). However, they do not recognize that, strictly speaking, Althusser and Husserl hold contradictory conceptions of philosophy as science, and Dübgen and Skupien do not point this out as a problem for interpreters of Hountondji (El Nabolsy 2020c). This problem is not recognized in Sanya Osha's engagement with Dübgen and Skupien's book (Osha 2019). Hountondji himself is aware that those two thinkers cannot be easily reconciled. On the basis of Hountondji's later work, it seems that, regarding the sociology of scientific knowledge, the influence of Althusser prevailed on this point (even though Althusser did not really devote himself to the study of the empirical sciences), because Husserl's understanding of philosophy as a theory of science does not seem to imply that a philosopher should study the history of science and the actual development of the different empirical sciences under different social conditions (Hardy 2014).

This is not to suggest that Hountondji's work is unmarked by his formative engagement with Husserl. It is clear that Husserl's strict distinction between philosophy proper as a strict science (in the aforementioned sense) and pseudophilosophy (philosophy as mere wisdom or a worldview [*Weltanschauung*]; Husserl 1965b, 143–144), influenced Hountondji's rejection of ethnophilosophy (which equated a given people's worldview with philosophy proper).<sup>21</sup> Husserl's paradigm of the science on which philosophy should reflect is the modern mathematical physics associated with Galileo: "With regard to the knowledge of external nature, the decisive step from naïve to scientific experience, from vague everyday concepts to scientific concepts in full clarity, was, as is known, first realized by Galileo" (Husserl 1965b, 100). Hountondji agrees with Husserl. Galileo represents to Hountondji a "turning point in the history of thought in Italy and in Europe" (Hountondji 2002a, 27). The emphasis on the significance of Galileo's mathematical physics is also evident in a comment he made on a paper presented by

Albert Bienvenu Akoha in which Hountondji refers to Joseph Needham's work on Chinese science and asks, "According to Needham, until the seventeenth century at least, Chinese science was considerably more advanced than Western science and technology ['Western' has only a geographic referent in this context]. . . . What happened, then, in the sixteenth and seventeenth centuries? The new development is Galileo's science" (Akoha 1997, 335). Modern science is characterized, according to Hountondji, by an underlying hypothesis—namely, that "reality could be hypothetically structured as a mathematical model" (Akoha 1997, 335).<sup>22</sup> When Hountondji speaks of philosophy as a theory of science, the paradigmatic science that he has in mind is modern mathematical physics. This represents a point of contrast with Althusser. While Althusser speaks of philosophy as a theory of science, the sciences that he has in mind include not only geometry and Galilean physics but also historical materialism qua science of history. Althusser is primarily concerned with developing a Marxist philosophy that would be the product of a reflection on the Marxist science of history: "Historical materialism thus means: science of history. If the birth of something like a Marxist philosophy is ever to be possible, it would seem that it must be from the very gestation of this science . . . after the long interval which always divides a philosophical reorganization from the scientific revolution which induced it" (Althusser 1971a, 40–41). Hountondji does not explicitly deny that the science that philosophy should be a theory of need not be natural science, he simply shows very little interest in that discussion.<sup>23</sup> Instead he focuses on modern mathematical physics as the paradigm of science, and in this we can detect the influence of Husserl.

Husserl's modernist attitude in relation to the relentless demand for rational justification and the suspicion of whatever is inherited from the past is carried forward (toward an emancipative project) in Hountondji's own work. Hountondji would doubtless agree with Husserl that "most essential to the theoretical attitude of philosophical man is the characteristic universality of the critical standpoint, which [is] its determination not to accept without question any pregiven opinion, any tradition, and thus to seek out, with regard to the entire universe handed down in tradition, the true in itself" (Husserl 1965a, 174). In other words, philosophy proper presupposes individual autonomy. This Cartesian aspect of Husserl's project appeals to Hountondji, who is above all concerned with establishing the necessity of the individual autonomy of the thinker. Hountondji seeks to demonstrate that anybody who wishes to see African philosophy flourish must also work toward the institutionalization of guarantees for individual autonomy. Only a fully autonomous subject can dare to "raze everything to the ground and begin again from the original foundations" (Descartes 1998, 59). Hountondji is very clear about the political stakes in his critique

of ethnophilosophy: “In relation to this intellectual responsibility [of the autonomous subject], it was easy to see ‘the political danger of ethnophilosophy’: ‘speaking through it is the ideology of group supremacy’” (Hountondji 2002b, 188–189).

Despite this, we cannot say that Hountondji’s research program for a sociology of scientific knowledge in the peripheries can be located in a Husserlian paradigm.<sup>24</sup> Husserl’s analysis of modern science (with Galileo as spokesman for modern science) almost completely neglects the technological underpinnings of modern science. Husserl’s account of Galileo proceeds without any mention of the importance of the telescope for Galileo’s discoveries (Ihde 2016, 50). In contrast to Husserl, Hountondji emphasizes the importance of the interactions between technology and science.

It is possible to object that Hountondji’s definition of philosophy is too narrow, because to define philosophy as a theory of science is to constrain philosophy by leaving out the axiological subfields of philosophy (ethics, political philosophy, and aesthetics), which cannot be adequately understood as reflections on science.<sup>25</sup> In response to criticism by Lansana Keita to this effect, Hountondji seems to have acknowledged that his definition of philosophy is restrictive, conceding that philosophy is not exclusively a theory of science, but he still maintains that the *core of philosophy* is a theory of science: “While science theory [i.e., theory of science] is not all what philosophy is about, it remains an essential component and in some way the hardest nucleus, the specific concern of a genuine philosophical thinking as distinguished from the other forms of discourse” (Hountondji 2011, 92). He thus recognizes the limitations of his conception of philosophy, but he does not recant. Since my aim is to reconstruct his turn to the sociology of scientific knowledge through an analysis of his metaphilosophical views, I am primarily concerned with providing an interpretation of those views rather than defending them (which would require a much longer discussion).

We are now well placed to make sense of Hountondji’s transition from a critique of ethnophilosophy to the sociology of scientific knowledge in the peripheries (especially on the African continent). If philosophy is dependent on science, it follows that philosophy “will not really take off in Africa until the other disciplines have done so. In any case, it seems to [Hountondji] a serious mistake to consider the problem of philosophy separately from the more general problem of science” (Hountondji 1996, 155). If philosophical discourse is parasitic on scientific discourse, it follows that “it is not philosophy but science that Africa needs first” (98). For if a robust tradition of modern scientific discourse does not exist on the continent, then African philosophy, insofar as it must reflect on science to generate problems (just like any other philosophical discourse), will replicate the primary failing of ethnophilosophy, its “extraversion” (its orientation to an intellectual dis-

course that primarily takes place outside the continent and that does not reflect the interests of Africans). Strictly speaking, the claim that philosophy is parasitic on the sciences, in that they provide it with its subject matter, does not imply that African philosophy cannot exist and develop without the existence of an institutionalized modern scientific discourse on the continent. Presumably, African philosophy can proceed by reflecting on modern scientific discourse that takes place elsewhere in the world. However, Hountondji is concerned not only with the existence of African philosophy; he is interested in identifying the conditions that would allow for the flourishing of African philosophy as a nonextraverted discourse on the African continent.

## A Synthesis between the Hessen-Grossmann Thesis and Dependency Theory

For Hountondji, science and technology are the mediating links in the causal nexus that connects philosophical discourse with economic structures. Following Althusser, Hountondji claims that philosophical revolutions are dependent on scientific revolutions. Such scientific revolutions are in turn dependent on experimental breakthroughs that in turn depend on technological advances, which are ultimately a function of the level of development of the productive forces of a given society: “These breaks [i.e., scientific revolutions] are not, of course, in themselves purely discursive events but rather theoretical effects in the field of discourse, of experimental practices which inform science throughout, practices organically linked to human material practices as a whole, employing various technical processes and hence dependent on the development of technology and therefore of the productive forces” (Hountondji 1996, 98). It is important to preempt the objection that Hountondji is somehow engaged in a reductivist economic project here. Hountondji does not claim anything like a one-to-one correspondence between specific kinds of philosophical discourse and specific kinds of economic structures. Nor is he arguing that science develops to meet demands for technological improvement that are put forward by those who own the means of production. Instead, it seems quite reasonable to interpret Hountondji as adhering to a version of the thesis advanced by Boris Hessen and Henryk Grossmann as reconstructed by Gideon Freudenthal and Peter McLaughlin. According to this thesis, technology was developed to facilitate economic development, and early modern (seventeenth century) science was able to make the advances that it did by studying that technology (Freudenthal and McLaughlin 2009, 4). Further, the purpose of early modern science was *not* the development of technology per se (let

alone contributing to economic development) but rather the analysis of idealized structures (16).<sup>26</sup> Early modern physics dealt with idealized structures by relying on models that abstracted from reality—for example, modeling canon balls as point masses and assuming that projectiles were launched in a vacuum and not in a medium that offers resistance (air). Early modern science was not developed with immediate application in mind: “Scientific knowledge developed only when it was not required to give immediate solutions to existing problems” (17).

Hessen advanced two more specific theses. The first is that theoretical mechanics developed through the study of existing machine technology during the seventeenth century. The point here is that, according to Hessen, a study of the relationship between technology and science in the seventeenth century shows that existing technology was not developed by way of the application of theoretical mechanics (the common view being that technology was applied science). Hessen argues instead that theoretical mechanics developed through the study of existing technology (Freudenthal and McLaughlin 2009, 11). He points out that if one looks at, for example, mining, the ventilation and draining of the mines were accomplished by air and water pumps. Those air and water pumps were not the products of technology conceived of as an application of a preexisting theoretical science; rather, historically speaking, aerostatics and hydrostatics developed as fields of research through the study of existing air and water pumps (4). Even historians of science who are hostile to the Hessen-Grossmann approach to the study of early modern science admit that the study of ballistics led to the development of Galileo’s mechanics, albeit via an indirect path (Pyenson and Sheets-Pyenson 1999, 306). A key point made by Hessen and Grossmann is that the abstract idea of motion, which was central to the development of mechanics, was derived from the study of actual machines that transform rectilinear motion into circular motion and vice versa (Freudenthal and McLaughlin 2009, 21).

The second thesis is that we can refer to technology (or its lack) to explain why a science of heat and its transformation into mechanical forms of energy did not develop in the seventeenth century (Freudenthal and McLaughlin 2009, 20). In short, Hessen argues that because steam technology was underdeveloped in the seventeenth century, a science of heat and its relation to other forms of energy could not be developed (22). It is well known that the science of thermodynamics emerged from the study of the steam engine and the internal combustion engine and not the other way around: “Thermodynamics not only received an impetus to its development from the steam engine, but in fact developed from the study of that engine” (Hessen 2009, 79). As the historians of science Lewis Pyenson and Susan Sheets-Pyenson (1999, 269) put it, “The steam engine did more for science

than science did for the steam engine.<sup>27</sup> Thinking of technology as merely applied science (with science developing independently) is far too simplistic and ahistorical. As the philosopher of technology Barry Allen (2008, 120) notes, “A characteristic of an advanced technoscientific economy is that problems arising at the technological frontier prime the research agenda of the sciences.”<sup>28</sup>

Hountondji does not explicitly refer to the Hessen-Grossmann thesis; however, he is drawing on a tradition of thought in which it is embedded, Marxist theorizing of the relationship among technology, science, and capitalism inflected through Althusser’s influence.<sup>29</sup> Hountondji presents the preceding formulation (which is essentially a recapitulation of the Hessen-Grossmann thesis) as a hypothesis that requires further empirical historical research.<sup>30</sup> Specifically, he notes that it would involve answering some difficult questions, such as the possibility of discovering an experimental basis for calculus. Freudenthal and McLaughlin recognize the centrality of this question. They claim that “it can be shown at least for some cases that the conceptualization of the infinitesimal in mathematics and of the mathematical concept of motion in mechanics were developed in one and the same argument and were dependent on the same experience with mechanical devices” (Freudenthal and McLaughlin 2009, 20). With respect to the infinitesimal calculus, its conceptualization in terms of motions, or “fluxions” (20), points to how the development of the mechanical notion of motion (which in turn was derived from the study of existing machines) was key to mathematical progress.

Key here is that Hountondji thinks that the development of technology is a necessary condition for the development of modern science. Modern science is in turn, according to Hountondji, a necessary condition for the development of modern philosophy. The question becomes, is it possible to formulate a thesis that would, in general terms, describe the causal relations between technology and capitalism as a mode of production? Hountondji’s answer, and that of other African theorists who were influenced by dependency theory and helped develop it as a research paradigm, is no. For them, there is an important distinction between capitalism in the metropolitan countries and capitalism in the colonies (and ex-colonies). This is not to say that two different capitalisms are in operation here. Rather, in the world-capitalist system, the effects of capitalism on social formations in the metropole are quantitatively and even qualitatively different from the effects of capitalism on social formations in the periphery and semiperiphery. Thus, it is not possible to speak of the relationship between capitalism and technology in general; one must further specify the question. One must pose two questions: one about the causal relationship between capitalism and technology in the metropolitan countries, and another about the relation-



ship between capitalism and technology in the peripheries. According to Hountondji, the form of capitalism that was introduced in the colonies (and specifically in African colonies) was a stunted form of capitalism that lacked the inner dynamism of capitalism as it existed in the metropolitan countries: “The capitalist mode of production was basically new with respect to the traditional one, but it was deprived of the industrial activity, the sense of initiative, the propensity to incur risk, that made this form of economic organization productive in the colonizer’s own country” (Hountondji 1990, 9).<sup>31</sup> For Hountondji the form of capitalism introduced in the peripheries (and specifically in African countries) was a dependent form that lacked any internal dynamism and that slowed down the rate of development of the productive forces. Hountondji argues that the scientific dependency that characterizes African countries today is essentially “a side-effect of economic domination, of forced integration into the world capitalist market, but within a subordinate sphere” (9).<sup>32</sup> Hountondji presents his claim as an application of Samir Amin’s work on dependency to the sociology of scientific knowledge, as he admits in an interview with Franziska Dübgen and Stefan Skupien (2019, 175): “All my reflection and writings on scientific dependence owe much to my reading of Samir Amin.”

Marx and Engels may have been right in thinking that capitalism, at a certain stage of its development, massively contributed to the development of the productive forces of metropolitan societies and therefore to the development of science insofar as its development is dependent on the growth of the productive forces. But they were mistaken in thinking that this was a global phenomenon. For example, in their ode to the marvelous creative powers of the capitalist mode of production, *The Communist Manifesto*, they claim that the “bourgeoisie during its rule of scarce one hundred years has created more massive and more colossal productive forces than have all preceding generations together” (Marx and Engels 1948, 13–14). They also argue that the bourgeoisie in its incessant search for markets, cheap labor power, and raw materials essentially “creates a world after its own image” (13).<sup>33</sup> For Hountondji, as well as Claude Ake (1978) and Amílcar Cabral (1979), this is not exactly correct, because what are created in the peripheries are extraverted economies, as opposed to internally cohesive economies (such as those that were created in the metropolitan countries), or what might be described as disarticulated economies.<sup>34</sup> This caused African economies in the colonial period to be responsive to external demands but not to internal needs. African economies are export oriented and internally disarticulated. They lack complementarity between different sectors of their national economies—for example, agricultural production does not serve the needs of industrial development in most African countries because agricultural production remains oriented toward the cultivation of cash crops

for export: “Our economies are rendered always responsive only to what the Western world is prepared to buy and sell, and hardly responsive to our internal development needs” (Babu 2002, 5). This pattern characterizes not only the colonial period but also the neocolonial period. For example, in postindependence East African countries, the agriculture sector, geared as it was toward the production of crops that could be exported, was articulated with the industrial sectors of Europe, the United States, and Japan and not with local industrial sectors (Nabudere 1981, 129).

The form of capitalism introduced to the African colonies not only provided little incentive for technological development; it led to deindustrialization in some instances.<sup>35</sup> Alexis B. A. Adande (1997, 71) has argued that the collapse of primary metallurgy in West Africa can be attributed to both the Atlantic slave trade, which led to the decline of iron metallurgy on the coast of Benin between the seventeenth and eighteenth centuries, and explicit colonial policies under formal colonialism.<sup>36</sup> The suppression of *sodabi*, an alcoholic drink made in Benin by distilling palm wine, by French colonial authorities during the 1930s is documented by Goudjinou P. Metinhoue (1997, 60). To substantiate Hountondji’s more general claim, of course, one needs to provide more empirical evidence, and while I cannot provide an account of deindustrialization across the African continent during the colonial period in this chapter, I can point to a very well-studied example of the deindustrialization of an African country—the deindustrialization of Egypt during the nineteenth century (Al Sherbiny 2007, 28; Amin 1978, 31; 1984; 2016; Al-Dāly 2007; Ayubi 1995, 99–108; Batou 1993; Clawson 1981; Marlowe 1974, 81). After the British invasion of 1882, Sir Evelyn Baring (who later became Lord Cromer) made it very clear that British policy would be focused on ensuring that Egypt would be deindustrialized and maintained as an agricultural country: “The policy of the government may be summed up thus: 1) export of cotton to Europe subject to 1 percent export duty; 2) imports of textile products manufactured abroad subject to 8 percent import duty; nothing else enters into the government’s intentions, *nor will it protect the Egyptian cotton industry*, because of the danger and evils that arise from such measures. . . . *Since Egypt is by nature an agricultural country, it follows logically that industrial training could lead only to the neglect of agriculture while diverting the Egyptian from the land, and both these things would be disasters for the nation*” (Abdel-Malek 1968, 7–8; emphasis added).

Combining the Hessen-Grossmann thesis with dependency theory allows for the reconstruction of Hountondji’s argument regarding the relationship between science, technology, capitalism, and colonialism on the African continent. First, there is the premise, derived from the Hessen-Grossmann thesis, that social forms that impede the development of productive forces impede the development of science. As Hessen puts it,

“science develops out of production, and those social forms that become fetters upon the productive forces likewise become fetters upon science” (Hessen 2009, 87). The second premise is that the form of capitalism that was introduced in African social formations through colonialism impeded the development of productive forces (and in some cases led to deindustrialization). This premise is derived from some versions of dependency theory. From these two premises we arrive at the conclusion that colonialism was a social form that fettered the development of science. This synthesis of the Hessen-Grossmann thesis and dependency theory while not explicitly identified as such by Hountondji is an adequate reconstruction of his argument. Drawing on the Hessen-Grossmann thesis allows for a response to critiques (often not well placed) of dependency theory that say it has no theoretical account of superstructural elements such as science.<sup>37</sup>

Finally, I preempt one possible misinterpretation. One must distinguish between two claims. The first claim is that colonialism, by slowing down the rate of development of the productive forces in African societies, contributed to the technological and scientific gap between Western countries and African countries. The second claim, which is much stronger than the first, is that colonialism is *sufficient* to explain the technological and scientific gap between Western countries and African countries.<sup>38</sup> Hountondji is arguing for the first claim; there is nothing in his writings that compels us to think that he is arguing for the second claim. Logically, no contradiction is involved in holding that colonialism contributed to the widening of the technological and scientific gap between Western countries and African countries and affirming that colonialism alone cannot account for this technological and scientific gap. For instance, adherents of the first claim might also recognize that the technological basis of agricultural production in most African societies was different from that in European societies (and Eurasian societies more generally). The plow formed the technological basis of agricultural production in the latter (from the Bronze Age onward), and the technological basis of agricultural production was the hoe in the former (specifically in African societies south of the Sudan, with the exception of Ethiopia) (Goody 1971, 25–27).<sup>39</sup> Jack Goody also points to a technological gap in military equipment by the fifteenth century (28). The point is that one can concede all this and still maintain the claim that colonialism contributed to the widening of the technological and scientific gap between Western countries and African countries.

## NOTES

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1. Tempels's significance lies in explicitly rejecting prior ethnophilosophical theories that depicted Africans, qua "primitive peoples," as unable to engage in theoretical thinking: "to declare on *a priori* grounds that primitive peoples have no ideas on the nature of beings, that they have no ontology and that they are completely lacking in logic, is simply to turn one's back on reality" (Tempels 2021, 22). However, for Hountondji, Tempels initiated a pernicious trend insofar as he presented worldviews as philosophical systems. Of course, the Belgian missionary is not the only target of Hountondji's critique of ethnophilosophy. For a list of African philosophers who engaged in ethnophilosophy and who are the targets of Hountondji's criticism, see Hountondji 1996, 44.

2. Hountondji later conceded that he did not pay sufficient attention to the critical thrust of Placide Tempels's writings (which eventually led to clashes with the Belgian colonial authorities), but Hountondji still maintained that despite Tempels's intentions, Tempels's essentialist attitude is evident in his contempt for the *évolués*, whom he considered to be "inauthentic" (Dübgen and Skupien 2019, 17; Hountondji 2002b, 214). Tempels was worried about "deracinated Africans" who could potentially revolt against colonial rule: "one runs the risk, while believing that one is 'civilizing' the individual, of in fact corrupting him, working to increase the numbers of the deracinated and to become the architects of revolt" (Tempels 2021, 22). This places Tempels in a line of colonial thinking that pathologized "detrribalized" Africans, e.g., the Belgian colonial officials' well-documented contempt for *évolués* (Bouwer 2010, 59–60), H. L. Gordon's claim that only Africans who received a European education exhibited schizophrenia (Tilley 2011, 236), and the manner in which Western-educated Africans were often referred to as "half-educated" to denigrate them (Fyfe 1972, 94).

3. We can find literary illustrations of Hountondji's point in Chinua Achebe's *Things Fall Apart* and *Arrow of God* (Achebe 2009, 2010). In both novels internal conflicts and disagreements are primary plot movers.

4. Hountondji's critique cannot be leveled at attempts that do not presuppose unanimity. For example, Kwasi Wiredu explicitly distances himself from the myth of unanimity: "In talking of Akan traditional thought I do not mean to imply that there is a monolithic corpus of ideas entertained by all traditional Akans" (1995, 126). Wiredu points to internal differentiation in Akan thought—e.g., several solutions to the problem of evil (2006, 323–326). Wiredu also stresses the importance of attributing philosophical positions to individual thinkers (1996, 116).

5. Not all the philosophers who are identified by Hountondji as adherents to ethnophilosophy as a research program adhered to the goal of searching for African uniqueness, however. For example, William Abraham is quite explicit in his rejection of this pursuit: "The question of the existence of an African philosophy is not a 'uniqueness' question. There is no reason why, in order that there should be an African

philosophy, it has to be different from every other philosophy” (1962, 104). Abraham makes a distinction between the claim that there is a unity to African cultures and the claim that African cultures are unique. He adheres to the former but not to the latter claim: “When one speaks of the unity of African cultures, one does not thereby imply any uniqueness” (115). In light of this, to what extent can we even speak of Abraham as an ethnophilosopher in Hountondji’s sense? First, while Abraham sometimes explicitly denies that he thinks of all members of Akan society as adhering to the same set of beliefs, he nevertheless proceeds in his analysis by speaking of an undifferentiated “Akan mind” (48), an error that Wiredu, for example, is careful to avoid. Second, there is also the manner in which he allows Akan culture to stand in as a paradigm for all African cultures (49). Third, there is a marked lack of historicization in his account of Akan society, in the sense that in his structuralist discussion of Akan culture we hardly encounter any dates; instead we are presented with a thoroughly synchronic picture of Akan culture even though, for example, gender relations among the Asante were transformed dramatically after 1900. The relative independence that characterized the position of married women in Asante in relation to their husbands was increasingly undermined after 1900 (Tashjian and Allman 2002, 237).

6. This point was also raised in the 1950s by the historian Thomas Lionel Hodgkin: “There is some advantage in ceasing to regard Africa, as it has sometimes been regarded in the past, as a kind of ‘thing-in-itself,’ the private preserve of *Africanistes*” (1957, 16).

7. Although Tempels did recognize that Bantu customs changed over time: “The Bantu among whom we live are not completely primitive people. They have evolved. It is certain that their religion, especially, has done so. Their customs, habits, and behaviour must also have developed” (Tempels 2021, 34). To this extent Hountondji’s characterization of Tempels is perhaps unfair. Moreover, Tempels was also concerned with showing that Bantu philosophy is fundamentally compatible with Christianity: “That which for rationalistic Western science remains just a hypothesis, an unproved theory, to wit, the internal and intrinsic growth of being, in the way in which the Bantu teach it, is precisely what is taught by the Christian doctrine of Grace, founded on the assured rock of Revelation” (Tempels 2021, 185). Hence, strictly speaking, it is inaccurate to say that Tempels was concerned with emphasizing difference. However, Hountondji is correct insofar as Tempels strives to show that the Bantu of whom he speaks are fundamentally different from modern, secular Europeans (even if they are not essentially different from Catholic Europeans) and that they do not need a secularized morality: “They are not yet so civilized as to lend a new lease of life to our dead-alive rationalism of ‘lay morality’” (Tempels 2021, 116). Hence, Tempels does indeed construct Bantu philosophy as the essential other of modern secular philosophy. The positive axiological judgment that he passes on it is irrelevant for Hountondji’s critique.

8. In colonial legal systems the fundamental distinction was not between colonizers and colonized but rather between those who were deemed native and those who were deemed non-native: “*Non-natives* were tagged as *races*, whereas *natives* were said to belong to *tribes*. *Races* were said to comprise all those officially categorized as not indigenous to Africa, whether they were indisputably foreign (Europeans, Asians) or whether their foreignness was the result of an official designation (Arabs, Colored, Tutsi). *Tribes*, in contrast, were all those defined as indigenous in origin” (Mamdani 2013, 47).

9. Hountondji is essentially asking, for whom does the African philosopher write? And for whom should the African philosopher write?

10. Hountondji's thinking converged with African Marxists who criticized African socialism as an attempt to sidestep the issue of economic and political dependency by way of redefining the struggle between formerly colonized and former colonizing countries as a cultural struggle. Abdelrahman Mohammed Babu implicitly argued that by claiming that the trajectory of African history was so completely different from the history of all other societies and thus that it was not possible to study African societies using the conceptual tools developed to study other societies, the proponents of African socialism were essentially adopting a version of the metaphysics of difference and therefore reinforcing colonial misperceptions about African societies and African history. Babu does not deny the existence of strong bonds of solidarity in many African societies at various points in African history. However, he argues that such bonds of solidarity were a characteristic of *all human societies that were at a similar level with respect to the development of their productive forces*: "The qualities which our petty-bourgeois intellectuals describe as essentially African are really *human* qualities which find expression when a community is at a certain level of productive capacity. When a community does not have the capacity to produce *social surplus*, there is simply no means of becoming unequal" (1981, 57). For instance, the claim advanced by some African socialists to the effect that rule through consensus was a unique feature of many African societies neglects rule through consensus (as opposed to majority rule) also being characteristic of many indigenous societies in North America (Dunbar-Ortiz 2014, 25). With respect to communal solidarity, Babu claims that the emergence of individuals capable of asserting themselves in relation to their communities in a manner that can undermine communal ties of solidarity is contingent on the existence of sufficient levels of surplus that would allow for the emergence of inequality. Babu's point is that when we adopt a historical materialist approach to the study of African history, we do not need to rely on the metaphysics of difference to explain African realities.

11. To deny full autonomy to the history of philosophy (or the history of science for that matter) is not the same thing as denying the relative autonomy thesis (even if it has been notoriously difficult to spell out this thesis in a convincing manner). According to the relative autonomy thesis, while the social relations of production exercise a causally determining effect on intellectual discourses (science, religion, philosophy, etc.), those discourses also have their own internal logics that cannot be ignored when attempting to understand, for example, the relationship between science and capitalism. The most well-known formulation of the relative autonomy thesis was made by Engels in a letter to Conrad Schmidt dated October 27, 1890 (Engels 1934, 81).

12. We do not need to rely on Althusser's judgment in relation to this point. We can point to recent work on the history of philosophy of science. Thus, for example, Schelling's *Naturphilosophie* has generally had a poor reputation, but Michael Friedman has attempted to show its influence on Hans Christian Oersted's discovery of electromagnetism (Friedman 2006).

13. For example, Copernicus was influenced by Plato and the Pythagoreans (at least as he thought he understood them) in his formulation of his heliocentric astronomical system (Koyré 1957, 29).

14. Hindering is a possible outcome because philosophers have sometimes expressed opposition to new scientific discoveries, e.g., the Aristotelean philosophers who opposed Galileo (Drake 1977). However, this incident must not be depicted simplistically, for there were also significant problems with Galileo's arguments; Galileo had no optical theory that could explain his telescope's magnifying properties (Chalmers 2013, 91).

15. A common misconception is that Hegel essentially knew nothing about the empirical sciences and their history. But his competence in the empirical sciences of his day has been established by many Hegel scholars (Burbidge 1996, 2006; Engelhardt 1984, 1993; Pinkard 2005; Posch 2011; Wandschneider 2013, 105; Westphal 2008, 284; Zuckert 2017). During his so-called Jena period (1801–1806), Hegel was actively involved in scientific research himself: he did research in botany, chemistry, optics, medicine, and geology (Ferrini 2009, 94). Hegel was deeply committed to ensuring that the contents of philosophy do not contradict the results obtained through empirical sciences. In the philosophy of nature section of the *Encyclopaedia* he writes, “It is not only that philosophy must accord with the experience nature gives rise to; in its formation and in its development, philosophic science presupposes and is conditioned by empirical physics” (Hegel 1970, 197). Thus, Althusser is entirely wrong to claim that “for Hegel, science, meaning the science of the scientists (which remains in the Intellect [*Verstand*]), has no primacy; since in Hegel it is subject to the primacy of Religion and Philosophy, which is the Truth of Religion” (Althusser 1971b, 119–120).

16. Kant thought that the concept of laws of nature implies necessity: “The word nature already carries with it the concept of laws, and the latter carries with it the concept of the *necessity* of all determinations of a thing belonging to its existence” (Kant 2004, 4).

17. Some scholars argue that, unlike Marxist historians of science, Koyré does not emphasize the technological or experimental underpinnings of scientific developments (Cohen and Clagett 1966, 160). While it is true that Koyré does not highlight the technological or experimental underpinnings of scientific developments to the same extent as Marxist historians of science, he also does not neglect them. He underlines the decisive importance of Galileo’s telescope: “From now on [the development of astronomy] became so closely linked together with that of its instruments that every progress of the one implies and involved the progress of the other. One could even say that not only astronomy, but science as such, began, with Galileo’s invention, a new phase of its development, the phase that we might call the instrumental one” (Koyré 1957, 90).

18. The first philosopher to use the clockwork metaphor as a description of the heavens was Nicholas Oresme during the fourteenth century (Casey 1996, 221). Note, however, that Oresme did not think of clocks as machines in the modern sense, and he was not propounding a mechanical philosophy (Wootton 2015, 436).

19. Heidegger criticizes Husserl’s “pure consciousness” for essentially being exclusively concerned with ideal essences and therefore unable to bridge the gap between the ideal and concrete existence, i.e., reproducing the epistemological problems that Husserl identified as inherent in natural science (Friedman 2000, 46). Thus, Heidegger’s analysis does not depart from pure consciousness but rather from *Dasein* qua concrete historical subject.

20. Here I also note the existence of a significant metaphilosophical disagreement between Hountondji and Tempels. Tempels, qua Catholic philosopher, thinks of philosophy as entirely independent of the natural sciences: “natural sciences can no more refute a system of philosophy than they can create one. Our elders used to possess a systematized philosophy which the most advanced modern sciences have not broken down” (Tempels 2021, 78). It is clear that Hountondji disagrees with this conception of philosophy.

21. Tempels is clear that this is what he is doing: “We have set down only the popular wisdom of the common man” (Tempels 2021, 76).

22. The common characterization of Galileo as a thinker who bracketed our immediate sensory experience is also found in Husserl. Husserl is critical of this abstraction, however, or at least of interpretations of it that deny our lifeworld. Husserl claims that, while the Copernican worldview involves a denial of our experience (nobody experiences earth as a body), the viewpoint of phenomenology, a viewpoint that does not deny our experience in this manner, is more fundamental than the viewpoint of the natural sciences (Himanka 2005, 640–641). Hountondji, as far as I know, does not comment on Husserl's critique of Galilean science.

Furthermore, Hountondji, in the passages quoted above, does not emphasize the other feature that is also distinctive of modern science, the institutionalization of an emphasis on experimentation (Pyenson and Sheets-Pyenson 1999, 74). This is especially startling given his professed commitment to the technological and instrumental basis of scientific discovery. This may be explained by those passages being transcriptions of extemporaneous comments.

23. Neither does Hountondji, despite employing historical materialism, explicitly define himself as a Marxist (Hountondji 2002b, 183). I suspect that this is because of the connotations of the word "Marxist" in Benin during the time in which he was writing, especially the connotations implying dogmatism. For his analysis and critique of the Dahomey Communist Party, see Hountondji 2002b, 181–184.

24. Neglect of Hountondji's work on the sociology of scientific knowledge is evident in Omedi Ochieng's account of Hountondji's philosophy. Ochieng overemphasizes Hountondji's commitment to individualistic epistemological orientations (specifically, Cartesian and Husserlian orientations) because he completely neglects Hountondji's writings on the sociology of knowledge (Ochieng 2010, 28).

25. Dübgen and Skupien (2019, 54) point out that Hountondji's definition of philosophy excludes several canonical texts that we would consider to be philosophy.

26. Misinterpretations of the Hessen-Grossmann thesis on this specific point are quite common (see, e.g., Pyenson and Sheets-Pyenson 1999, 89).

27. Nor should we discount the fact that many of the experimenters of the eighteenth century would not have been able to carry out their experiments or make their observations without the artisans who provided them with the necessary instruments. Without polishing and grinding techniques developed by artisans, the natural philosophers would not have been able to use their telescopes (Werrett 2019, 90).

28. The role of technology in the development of science has been discounted in some discussions of the place of science and technology on the African continent (see, e.g., Táíwò 2014, 80–90). Táíwò is of course correct in saying that theoretical inquiry has a different aim than technology (i.e., a physicist need not be concerned with producing anything at all). However, he does not seem to recognize the manner in which technology in many cases served as a necessary condition for the development of theoretical scientific enterprises.

29. This approach is also more subtle than thinking of science as a branch of the productive forces in a social formation that is dominated by the capitalist mode of production; such a view has been ascribed to Marx by some interpreters (Rose and Rose 1976).

30. It is unclear whether Hountondji ever read the work of Hessen or Grossmann. As far as I know, he never explicitly cites them. He may have learned of their work through Althusser or through direct contact with French Marxist historians and philosophers of science.



31. Under colonial French rule in West Africa, for example, a local African bourgeoisie was not allowed to develop. Entrepreneurial functions were instead allocated to Lebanese and Syrian immigrants (Arrighi 2002).

32. Some critics of Hountondji completely neglect his engagement with dependency theory while implicitly drawing on it in formulating their critiques of him (e.g., Ochieng 2010, 33–35).

33. For a counter to the charge of Eurocentrism that has been leveled at Marx by excavating his relatively unknown writings on the non-Western world, see Anderson 2010. For an attempt that focuses on Marx's scattered references to the African continent, see Kalmring and Nowak 2017.

34. For a critique of disarticulation being unique to colonial economies, see the work of Sandra Halperin (2004, 2013). Halperin's basic contention is that all the features that dependency theorists have identified as unique to the disarticulated economies of the peripheries obtained in the metropolitan core areas until the post-World War II period. Halperin's model, however, underemphasizes the significance of imperialism (El Nabolsy 2020b).

35. This was especially true of the large concession companies of the Congo, which accumulated through systematic pillage: "Abir, the largest rubber concession company in the Congo Free State founded with Belgian and British capital, created no long-lasting entrepreneurial structures, introduced no new technology, no new market relations, no new indigenous elite" (Mavhunga 2013, 13).

36. In other parts of the continent the decline of metallurgy was due to internal processes—for example, the decline of metallurgy in Kordofan in Sudan by the eighteenth century (Spaulding 2016, 204).

37. An example of such a critique is found in Nabudere (2011, 34). I think that most such critiques are misplaced. They assume a monolithic entity is their referent in dependency theory, but dependency theorists display tremendous diversity. Often, critiques like those of Nabudere are really just references to Andre Gunder Frank's work (Frank 1994), which is then assumed (without argument) to stand for all dependency theory. Furthermore, the superstructure's role in contributing to social revolutionary transformations held much interest for many dependency theorists, and they were deeply influenced by Maoist China's Cultural Revolution. These points were brought to my attention by Max Ajl.

38. An example of somebody who has this view is Albert Mosley, who argues that "instead of science making possible Europe's exploitation of other cultures, it is equally plausible that Europe's exploitation of non-Western cultures allowed [Europeans] to develop the technological base we now attribute to science" (Mosley 2000, 29).

39. Jack Goody argues that this technological difference led to different forms of land tenure, which implies that it is not appropriate to use the concept of feudalism in analyzing African history (Goody 1971, 73).

## WORKS CITED

- Abdel-Malek, Anouar. 1968. *Egypt: Military Society: The Army Regime, the Left, and Social Change under Nasser*, translated by Charles Lam Markmann. New York: Random House.
- Abraham, William E. 1962. *The Mind of Africa*. Chicago: University of Chicago Press.
- Achebe, Chinua. 2009. *Things Fall Apart*. Toronto: Anchor Canada.

- . 2010. *Arrow of God*. London: Penguin.
- Adande, Alexis B. A. 1997. “Traditional’ Iron Metallurgy in West Africa.” In *Endogenous Knowledge: Research Trails*, edited by Paulin J. Hountondji, 63–81. Dakar: CODESRIA.
- Ake, Claude. 1978. *Revolutionary Pressures in Africa*. London: Zed Press.
- Akoha, Albert Bienvenu. 1997. “Graphic Representational Systems in Postcolonial Africa.” In *Endogenous Knowledge: Research Trails*, edited by Paulin J. Hountondji, 281–308. Dakar: CODESRIA.
- Al-Dāly, Muḥammad Ṣabry. 2007. “Jadal al-siyāsa wa al-iqtisād fi’azma Mehmed Ali Pasha bal sham: derāsa fi mawqif’ ingilterā 1831–1838” [The dialectic of politics and economy in the crisis of Mehmed Ali Pasha in the Levant: A study of the position of England 1831–1838]. *Miṣr al-ḥadītha* [Modern Egypt] 6:19–68.
- Allen, Barry. 2008. *Artifice and Design: Art and Technology in Human Experience*. Ithaca, NY: Cornell University Press.
- Al-Sherbiny, Aḥmad. 2007. *Al-iqtisād al-miṣrī: bayn al-tab’aia wa al-istiqlāl* [The Egyptian economy: Between dependency and independence]. Cairo: Dar El Shorouk.
- Althusser, Louis. 1971a. “Lenin and Philosophy.” In *Lenin and Philosophy and Other Essays*, translated by Ben Brewster, 23–70. New York: Monthly Review Press.
- . 1971b. “Lenin before Hegel.” In *Lenin and Philosophy and Other Essays*, 107–125.
- . 1993. *The Future Lasts Forever: A Memoir*. Edited by Oliver Corpet and Yann Moulrier Boutang. Translated by Richard Veasey. New York: New Press.
- Amin, Samir. 1978. *The Arab Nation: Nationalism and Class Struggle*. Translated by Michael Pallis. London: Zed Press.
- . 1984. “Contradictions in the Capitalist Development of Egypt: A Review Essay.” *Monthly Review* 36 (4): 13–21.
- . 2016. “Egypt: Failed Emergence, Conniving Capitalism, Fall of the Muslim Brothers—A Possible Popular Alternative.” In *Development Challenges and Solutions after the Arab Spring*, edited by Ali Kadri, 19–38. London: Palgrave Macmillan.
- Anderson, Kevin B. 2010. *Marx at the Margins: On Nationalism, Ethnicity, and Non-Western Societies*. Chicago: University of Chicago Press.
- Arrighi, Giovanni. 2002. “The African Crisis: World Systemic and Regional Aspects.” *New Left Review* 15:5–36.
- Ayubi, Nazih N. 1995. *Over-stating the Arab State: Politics and Society in the Middle East*. London: I. B. Tauris.
- Babu, A. M. 1981. *African Socialism or Socialist Africa?* London: Zed Press.
- . 2002. “Postscript to *How Europe Underdeveloped Africa*.” In *The Future That Works: Selected Writings of A.M. Babu*, edited by Salma Babu and Amrit Wilson, 3–9. Asmara, Eritrea: Africa World Press.
- Batou, Jean. 1993. “Nineteenth-Century Attempted Escapes from the Periphery: The Cases of Egypt and Paraguay.” *Review (Ferdinand Braudel Center)* 16 (3): 279–318.
- Bauer, Otto. 2015. “Marxism and Ethics.” In *Austro-Marxism: The Ideology of Unity*. Vol. 1, *Austro-Marxist Theory and Strategy*, edited by Mark E. Blum and William Smaldone, 295–314. Leiden, Netherlands: Brill Academic.
- Beiser, Fredrick. 2011. *The German Historicist Tradition*. Oxford: Oxford University Press.
- Bouwer, Karen. 2010. *Gender and Decolonization in the Congo: The Legacy of Patrice Lumumba*. London: Palgrave Macmillan.

- Burbidge, John. 1993. "Chemistry and Hegel's Logic." In *Hegel and Newtonianism*, edited by Michael J. Petry, 609–617. Dordrecht, Netherlands: Kluwer Academic.
- . 2006. "New Directions in Hegel's Philosophy of Nature." In *Hegel: New Directions*, edited by Katerina Deligiorgi, 177–192. Montreal: McGill-Queen's University Press.
- Cabral, Amílcar. 1979. "The Weapon of Theory." In *Unity and Struggle: Speeches and Writings of Amílcar*, translated by Michael Wolfers, 119–137. New York: Monthly Review Press.
- Casey, Timothy. 1996. "Medieval Technology and the Husserlian Critique of Galilean Science." *Proceedings of the American Catholic Philosophical Association* 70:219–227.
- Chalmers, A. F. 2013. *What Is This Thing Called Science?* 4th ed. Indianapolis, IN: Hackett.
- Clawson, Patrick. 1981. "The Development of Capitalism in Egypt." *Khamsin* 9:77–116.
- Cohen, I. Bernard, and Marshall Clagett. 1966. "Alexandre Koyré (1892–1964): Commemoration." *Isis* 57 (2): 157–166.
- Collingwood, R. G. 1994. *The Idea of History*. Revised edition with lectures 1926–1928, edited by Jan Van Der Dussen. Oxford: Oxford University Press.
- Descartes, René. 1998. "Meditations on First Philosophy." In *Discourse on Method and Meditations on First Philosophy*, edited and translated by Donald A. Cress, 47–103. Indianapolis, IN: Hackett.
- DeWitt, Richard. 2010. *Worldviews: An Introduction to the History and Philosophy of Science*. 2nd ed. Hoboken, NJ: Wiley-Blackwell.
- Drake, Stillman. 1977. "Galileo and the Career of Philosophy." *Journal of the History of Ideas* 38 (1): 19–32.
- Dübgen, Franziska, and Stefan Skupien. 2019. *Paulin Hountondji: African Philosophy as Critical Universalism*. London: Palgrave Macmillan.
- Dunbar-Ortiz, Roxanne. 2014. *An Indigenous Peoples' History of the United States*. Boston: Beacon Press.
- El Nabolsy, Zeyad. 2020a. "Freedom Giving Birth to Order: Philosophical Reflections on Peirce's Evolutionary Cosmology and Its Contemporary Resurrections." *Cosmos and History: Journal of Natural and Social Philosophy* 16 (1): 1–23.
- . 2020b. "Is the World of the Elites Really Flat? The View from Egypt: Critical Remarks on Sandra Halperin's *Re-Envisioning Global Development*." *Jadaliyya*. <https://www.jadaliyya.com/Details/40763>.
- . 2020c. "Review of *Paulin Hountondji: African Philosophy as Critical Universalism* by Franziska Dübgen and Stefan Skupien." *Marx and Philosophy Review of Books*. [https://marxandphilosophy.org.uk/reviews/18110\\_paulin-hountondji-african-philosophy-as-critical-universalism-by-franziska-dubgen-and-stefan-skupien-reviewed-by-zeyad-el-nabolsy/](https://marxandphilosophy.org.uk/reviews/18110_paulin-hountondji-african-philosophy-as-critical-universalism-by-franziska-dubgen-and-stefan-skupien-reviewed-by-zeyad-el-nabolsy/).
- Engelhardt, Dietrich von. 1984. "The Chemical System of Substances, Forces and Processes in Hegel's Philosophy of Nature and the Science of His Time." In *Hegel and the Sciences*, edited by Robert S. Cohen and Marx Wartofsky, 41–54. Dordrecht, Netherlands: D. Reidel.
- . 1993. "Hegel on Chemistry and the Organic Sciences." In *Hegel and Newtonianism*, edited by Michael J. Petry, 657–665. Dordrecht, Netherlands: Kluwer Academic.
- Engels, Friedrich. 1934. "Four Letters on Historical Materialism." *New International* 1 (3): 81–85. <https://www.marxists.org/history/etol/newspape/ni/vol01/no03/engels.htm>.

- Ferrini, Cinzia. 2009. "Reason Observing Nature." In *The Blackwell Guide to Hegel's Phenomenology of Spirit*, edited by Kenneth Westphal, 92–135. Oxford: Blackwell.
- Foisneau, Luc. 2011. "Hobbes's First Philosophy and Galilean Science." *British Journal for the History of Philosophy* 19 (4): 795–809.
- Frank, Andre Gunder. 1994. "The Development of Underdevelopment." In *Paradigms in Economic Development*, edited by Rajani Kanth, 149–159. Armonk, NY: M. E. Sharpe.
- Fraser, John. 1976. "Louis Althusser on Science, Marxism and Politics." *Science and Society* 40 (4): 438–464.
- Freudenthal, Gideon, and Peter McLaughlin. 2009. "Classical Marxist Historiography of Science: The Hessen-Grossmann-Thesis." In *The Social and Economic Roots of the Scientific Revolution: Texts by Boris Hessen and Henryk Grossmann*, edited by Gideon Freudenthal and Peter McLaughlin, 1–40. Berlin: Springer.
- Friedman, Michael. 2000. *A Parting of the Ways: Carnap, Cassirer, and Heidegger*. Chicago: Open Court.
- . 2006. "Kant—Naturphilosophie—Electromagnetism." In *The Kantian Legacy in Nineteenth-Century Science*, edited by Michael Friedman and Alfred Nordmann, 51–80. Cambridge, MA: MIT Press.
- Fyfe, Christopher. 1972. *Africanus Horton, 1835–1883: West African Scientist and Patriot*. New York: Oxford University Press.
- Goody, Jack. 1971. *Technology, Tradition and the State in Africa*. New York: Cambridge University Press.
- Halperin, Sandra. 2004. *War and Social Change in Modern Europe: The Great Transformation Revisited*. Cambridge: Cambridge University Press.
- . 2013. *Re-Envisioning Global Development: A Horizontal Perspective*. London: Routledge.
- Hardy, Lee. 2014. *Nature's Suit: Husserl's Phenomenological Philosophy of the Physical Sciences*. Athens: Ohio University Press.
- Hegel, G.W.F. 1970. *Philosophy of Nature*. Vol. 1. Edited and translated by Michael John Petry. London: George Allen and Unwin.
- . 1995. *Lectures on the History of Philosophy*. Vol. 3, *Medieval and Modern Philosophy*. Translated by E. S. Haldane and Frances H. Simson. Lincoln: University of Nebraska Press.
- Hessen, Boris. 2009. "The Social and Economic Roots of Newton's *Principia*." In *The Social and Economic Roots of the Scientific Revolution: Texts by Boris Hessen and Henryk Grossmann*, edited by Gideon Freudenthal and Peter McLaughlin, 41–102. Berlin: Springer.
- Himanka, Juha. 2005. "Husserl's Argumentation for the Pre-Copernican View of the Earth." *Review of Metaphysics* 58 (3): 621–644.
- Hodgkin, Thomas L. 1957. *Nationalism in Colonial Africa*. New York: New York University Press.
- Hösle, Vittorio. 2003. "Is There Progress in the History of Philosophy?" *Hegel's History of Philosophy: New Interpretations*, edited by David A. Duquette, 185–204. Albany, NY: SUNY Press.
- Hountondji, Paulin J. 1990. "Scientific Dependence in Africa Today." *Research in African Literatures* 21 (3): 5–15.
- . 1996. *African Philosophy: Myth and Reality*. 2nd ed. Translated by Henri Evans with the collaboration of Jonathan Rée. Bloomington: Indiana University Press.

- . 2002a. “Knowledge Appropriation in a Post-Colonial Context.” In *Indigenous Knowledge and the Integration of Knowledge Systems: Towards a Philosophy of Articulation*, edited by Catherine A. Odora Hoppers, 23–38. Cape Town: New Africa Education.
- . 2002b. *The Struggle for Meaning: Reflections on Philosophy, Culture, and Democracy in Africa*. Translated by John Conteh-Morgan. Athens: Ohio University Press.
- . 2011. “Dialogue with Lansana Keita: Reflections on African Development.” In *Philosophy and African Development: Theory and Practice*, edited by Lansana Keita, 87–96. Dakar: CODESRIA.
- Husserl, Edmund. 1965a. “Philosophy and the Crisis of European Man.” In *Phenomenology and the Crisis of Philosophy*, translated by Quentin Lauer, 149–192. New York: Harper and Row.
- . 1965b. “Philosophy as Rigorous Science.” In *Phenomenology and the Crisis of Philosophy*, translated by Quentin Lauer, 71–147. New York: Harper and Row.
- Ihde, Don. 2016. *Husserl’s Missing Technologies*. New York: Fordham University Press.
- Kalming, Stefan, and Andreas Nowak. 2017. “Viewing Africa with Marx: Remarks on Marx’s Fragmented Engagement with the African Continent.” *Science and Society* 81 (3): 331–347.
- Kant, Immanuel. 2004. *Metaphysical Foundations of Natural Science*. Translated and edited by Michael Friedman. Cambridge: Cambridge University Press.
- Kaufmann, Walter. 1972. “The Hegel Myth and Its Method.” In *Hegel: A Collection of Critical Essays*, edited by Alasdair MacIntyre, 21–60. Garden City, NY: Doubleday.
- Klein, Julie R. 2013. “Philosophizing Historically/Historicizing Philosophy: Some Spinozistic Reflections.” In *Philosophy and Its History: Aims and Methods in the Study of Early Modern Philosophy*, edited by Mogens Laerke, Justin E. H. Smith, and Eric Schliesser, 134–158. Oxford: Oxford University Press.
- Koyré, Alexandre. 1957. *From the Closed World to the Infinite Universe*. Baltimore: Johns Hopkins University Press.
- Kusch, Martin. 1995. *Psychologism: A Case Study in the Sociology of Philosophical Knowledge*. London: Routledge.
- Lauer, Quentin. 1965. Introduction to *Phenomenology and the Crisis of Philosophy*, by Edmund Husserl. Translated by Quentin Lauer, 1–68. New York: Harper and Row.
- Lukács, Georg. 1975. *The Young Hegel: Studies in the Relations between Dialectics and Economics*. Translated by Rodney Livingstone. London: Merlin Press.
- Mamdani, Mahmood. 2013. *Define and Rule: Native as Political Identity*. Kampala: Makerere Institute of Social Research.
- Marlowe, John. 1974. *Spoiling the Egyptians*. London: Andre Deutsch.
- Marx, Karl, and Frederick Engels. 1948. *The Communist Manifesto*. New York: International Publishers.
- Mavhunga, Clapperton Chakanetsa. 2013. “Introduction: What Do Science, Technology, and Innovation Mean from Africa?” In *What Do Science, Technology, and Innovation Mean from Africa?* edited by Clapperton Chakanetsa Mavhunga, 1–27. Cambridge, MA: MIT Press.
- Metinhoue, Goudjinou P. 1997. “Methodological Issues in the Study of ‘Traditional’ Techniques and Know-How.” In *Endogenous Knowledge: Research Trails*, edited by Paulin J. Hountondji, 43–62. Dakar: CODESRIA.
- Mosley, Albert. 2000. “Science, Technology and Tradition in Contemporary African Philosophy.” *African Philosophy* 13 (1): 25–32.

- Nabudere, Dani. 1979. *Essays on the Theory and Practice of Imperialism*. London: Onyx Press.
- . 1981. *Imperialism in East Africa*. Vol. 1, *Imperialism and Exploitation*. London: Zed Press.
- . 2011. *Archie Mafeje: Scholar, Activist and Thinker*. Pretoria: Africa Institute of South Africa.
- Ochieng, Omedi. 2010. "The African Intellectual: Hountondji and After." *Radical Philosophy* 164: 25–37.
- Osha, Sanya. 2019. "Critical Universalism." *Radical Philosophy* 206: 105–107.
- Pinkard, Terry. 2005. "Speculative *Naturphilosophie* and the Development of the Empirical Sciences: Hegel's Perspective." In *Continental Philosophy of Science*, edited by Gary Gutting, 19–34. Oxford: Blackwell.
- Posch, Thomas. 2011. "Hegel and the Sciences." In *A Companion to Hegel*, edited by Stephen Houlgate and Michael Baur, 177–202. Oxford: Blackwell.
- Pyenson, Lewis, and Susan Sheets-Pyenson. 1999. *Servants of Nature: A History of Scientific Institutions, Enterprises and Sensibilities*. New York: W. W. Norton.
- Richardson, Alan. 1997. "Toward a History of Scientific Philosophy." *Perspectives on Science* 5 (3): 418–451.
- Rose, Hilary, and Stephen Rose. 1976. "The Problematic Inheritance: Marx and Engels on the Natural Sciences." In *The Political Economy of Science: Ideology of/in the Natural Sciences*, edited by Hilary Rose and Stephen Rose, 1–13. London: Macmillan.
- Schwartzman, Daniel W. 1975. "Althusser, Dialectical Materialism and the Philosophy of Science." *Science and Society* 39 (3): 318–330.
- Smith, Justin E. H. 2013. "The History of Philosophy as Past and as Process." In *Philosophy and Its History: Aims and Methods in the Study of Early Modern Philosophy*, edited by Mogens Laerke, Justin E. H. Smith, and Eric Schliesser, 30–49. Oxford: Oxford University Press.
- Smith, Neil. 1980. "Symptomatic Silence in Althusser: The Concept of Nature and the Unity of Science." *Science and Society* 44 (1): 58–81.
- Spaulding, Jay. 2016. "Iron Metallurgy in Ancient Sudan." In *African Indigenous Knowledge and the Sciences*, edited by Gloria Emeagwali and Edward Shizha, 199–206. Boston: Brill.
- Táiwò, Olúfẹ̀mi. 2013. "Cabral, Culture, Progress, and the Metaphysics of Difference." In *Claim No Easy Victories: The Legacy of Amílcar Cabral*, edited by Firoze Manji and Bill Fletcher Jr., 355–364. Dakar: CODESRIA and Daraja Press.
- . 2014. *Africa Must Be Modern: A Manifesto*. Bloomington: Indiana University Press.
- Tashjian, Victoria B., and Jean Allman. 2002. "Marrying and Marriage on a Shifting Terrain: Reconfigurations of Power and Authority in Early Colonial Asante." In *Women in African Colonial Histories*, edited by Jean Allman, Susan Geiger, and Nakanyike Musisi, 237–259. Bloomington: Indiana University Press.
- Tempels, Placide. 2021. *Bantu Philosophy*. Orlando, FL: HBC Publishing.
- Tilley, Helen. 2011. *Africa as a Living Laboratory: Empire, Development, and the Problem of Scientific Knowledge, 1870–1950*. Chicago: University of Chicago Press.
- Wandschneider, Dieter. 2013. "Philosophy of Nature." In *The Bloomsbury Companion to Hegel*, edited by Allegrade Laurentiis and Jeffrey Edwards, 103–126. London: Bloomsbury.

- Werrett, Simon. 2019. *Thrifty Science: Making the Most of Materials in the History of Experiment*. Chicago: University of Chicago Press.
- Westphal, Kenneth. 2008. "Philosophizing about Nature: Hegel's Philosophical Project." In *The Cambridge Companion to Hegel and Nineteenth-Century Philosophy*, edited by Frederick Beiser, 281–310. Cambridge: Cambridge University Press.
- Wiredu, Kwasi. 1995. "The Concept of Mind with Particular Reference to the Language and Thought of the Akan." In *Readings in African Philosophy: An Akan Collection*, edited by Safro Kwame, 123–150. Lanham, MD: University of America Press.
- . 1996. *Cultural Universals and Particulars: An African Perspective*. Bloomington: Indiana University Press.
- . 2006. "Toward Decolonizing African Philosophy and Religion." In *Inculturation and Postcolonial Discourse in African Theology*, edited by Edward P. Antonio, 291–331. New York: Peter Lang.
- Wootton, David. 2015. *The Invention of Science: A New History of the Scientific Revolution*. New York: Harper.
- Zuckert, Rachel. 2017. "Organism and System in German Idealism." In *The Cambridge Companion to German Philosophy*. 2nd ed., edited by Karl Ameriks, 271–291. Cambridge: Cambridge University Press.