

HEGEL'S IDEA OF LIFE IN LOGIC AND NATURE

by

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(Under the Direction of Richard Dien Winfield)

ABSTRACT

Hegel offers an original theory of life that does justice both to the purposive subjectivity and to the self-organizing objectivity of living things, and which demonstrates that these are not incompatible. This dissertation provides a comprehensive and critical commentary on Hegel's theory of life, and aims to show that it is not only an outstanding attempt at a philosophical comprehension of life but also a serious challenge to accounts that conflate life with what it enables or what it requires. The first part focuses on Hegel's logical categorization of life in the *Science of Logic*, which explicates the Idea of life as a logical category that is laid out irrespective of the kinds of living things there actually are. It first shows why the living individual is irreducible to mechanical and chemical processes, distinguishable from artifacts, and intelligible without bringing in any alien principle. Next, it elaborates on how the living individual as an internally purposive, self-sustaining, and self-driven process develops and maintains the collective unity of its objectivity, sustains and regenerates itself in the face of its other, and, through reproduction, raises its universal identity beyond its particular existence. The first part also investigates the extent to which Hegel's characterization of the fundamental features of life allows for a distinction between merely organic unity and truly subjective unity that exhibits inner determinacy. The second part of the dissertation explores Hegel's treatment of life in his *Philosophy of Nature*. In this work, he explicates plant and animal life as the two universal forms

of life, whose universal features are enabled by similarly universal structures and processes of nature. In parallel with the three moments of the logical categorization of life, this part compares the organic unity, metabolism, and reproduction of the plant and the animal. It discusses the extent to which these forms reflect the logical categorization, and explains how the animal's centralized sensitivity and responsiveness, along with its capacity for inner determinacy, affect the nature of its life processes in such a way that the animal realizes subjectivity, individuality, and self-determination at a higher level than does the plant.

INDEX WORDS: Hegel, Life, Logic, Nature, Idea, Biology, Living Individual, Organic Unity, Life-process, Assimilation, Genus-process, Reproduction, Plant, Animal, Subjectivity, Soul, Self-determination, Teleology

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DEDICATION

To my mother.

Annem için.

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INTRODUCTION

HEGEL AND THE PHILOSOPHY OF LIFE

A. The Place of Life In Hegel's System of Philosophy

The perennial question of what life is has been pushing natural science toward philosophy more visibly than any other question ever since their separation in the early modern age. It was the lure of mechanics that pioneered their divorce. With his beast-machine hypothesis, Descartes surrendered life to mechanics. In effect, his was an attempt, at least in part, to save the domain of the mind and pure thought for philosophy itself. However, mechanics was not late to claim the knowledge of the mind.

Today, there are still those who endorse the view that both life and the mind are nothing but the motion of subatomic particles. Nonetheless, many others have long been discussing the impossibility of speaking about the phenomena of life in those terms only. After all, it is hard for biology to make sense without distinguishing its basic object, the organism, from inanimate units of matter. Some who came to acknowledge that biological phenomena cannot be understood without recourse to functions and purposes turned back to Kant and used his idea of natural purpose as a heuristic tool to investigate life. This and similar moves let teleology into scientific debates, often in the guise of teleonomy, and at least highlighted the theory-laden character of the knowledge of life. But, like Kant, most advocates of the teleonomic approach were reluctant to ascribe objectivity to their theories.

There was a similar reluctance to grant subjectivity to organisms, which was surmounted by philosophical figures such as Hans Jonas and Maurice Merleau-Ponty. These philosophers emphasized the role of individuality and embodied subjectivity in the domain of

life against the Cartesian position that denies an inner world to all but men, and influenced latter-day theories of self-organization introduced by philosophically-oriented biologists.

As the variant theories of self-organization or autopoiesis abound, the knowledge of life remains less dependent on approaches that distinguish the form and the content of life and treat the living being as an artifact. These theories also suggest that the alternative to reductionist and mechanistic approaches need not dispense with the objective processes that figure in life and instead introduce totally incommensurable principles.

In the writings of Georg Wilhelm Friedrich Hegel, the early nineteenth-century philosopher, one already finds an original theory of life that does justice to both the purposive subjectivity and self-organizing objectivity of living things demonstrating that they are not necessarily incompatible. Hegel's account characterizes the living thing as an internally purposive and self-sustaining being that is irreducible to mechanical and chemical processes, distinguishable from artifacts, and intelligible without bringing in any merely postulated alien principle. With its arguments and embedded criticisms, alongside the valuable insights it offers, Hegel's explication of life and living things still represents an outstanding guide to a philosophical comprehension of life and a serious challenge for accounts that conflate life with things and processes that it requires or enables.

The following study is a construal of and critical inquiry into Hegel's theory of life, which has not yet received the attention it deserves. By providing a comprehensive commentary to the parts of Hegel's system that directly address life and living things, we hope to draw attention to Hegel's theory and bring its resources and problems to light as clearly as possible.

The inquiry consists of two main parts in which we respectively explore how Hegel treats life first as a logical category then as a natural determinacy. The first part of this study focuses on the logical categorization of life, which is to be found mainly in the section "The Idea"

in Hegel's *Science of Logic*, but also in the first part of his *Encyclopedia of the Philosophical Sciences*, which is sometimes referred to as "the lesser logic" or "the shorter logic." The second part investigates Hegel's account of natural forms of life, which he presents under the heading of "Organics" in the second part of the *Encyclopedia of the Philosophical Sciences*, also known as Hegel's *Philosophy of Nature*. In this introduction, we will provide a basic description of these two parts and a brief outline of the chapters they contain.

One can think of different possible approaches to Hegel's theory of life viewed through contemporary lenses. A merely historical approach is one of them. This is not a major concern of this study, which is evident from the fact that it focuses on the most complete versions of Hegel's discussion of life, without getting involved in the historical development of his thoughts on the subject.¹ Another possible approach is to consider life and organics only with respect to its place in and connection with the rest of Hegel's system. With respect to life in the logical explication and in the philosophy of nature, this would mean respectively a particular focus on life in connection with Hegel's concept of the Idea and self-determination, and an account of how the intrinsic limits of the organism move us to the domain of the mind and spirit. These are among the goals of this study. However, we aim to provide an understanding of these connections without eclipsing anything about the inner substance and dynamics of the particular passages on life. In other words, this work attempts to make Hegel's theory of life as intelligible as possible in its own right. The reason is not only that as a general rule each constituent of the system needs to be adequately comprehended by itself, but also that Hegel's conception of life is a rigorous philosophical account that gives life its due by pointing at the limitations of other approaches to life and surmounting them.

¹ For a treatment of this development, see Annette Sell's *Der lebendige Begriff: Leben und Logik bei G.W.F. Hegel*, 2nd ed. (Freiburg: Verlag Karl Alber, 2013).

However, one major reason why Hegel's theory has not received sufficient attention is the idiosyncratic language of his system and the difficulty of comprehending its particular elements in isolation from the rest of the system. Because we would like to make Hegel's account of life an intelligible option for the consideration of those who would like to lay hold of the truth of life, we do not wish to limit the scope of its intelligibility to a circle of scholars interested in Hegel's philosophy or history of philosophy in general. To this end, this inquiry tries to strike a balance between rendering Hegel's theory accessible as a philosophy of life and living things and adhering to the intrinsic terminology and ends of his system in general.

Hegel argues that philosophy can only succeed in its pursuit of knowledge as a system.² Hegel's philosophical system consists of three interconnected philosophical domains: first, the system of thought determinacies, second, the philosophy of nature, and finally, the philosophy of mind. In keeping with this tripartite structure of this system, Hegel tells us that philosophical science can consider life in three major respects: first, as a logical category or general thought determinacy, second, as a determinacy of nature, and third, as it pertains to spirit or to the activity of interconnected minds.³

A consistent use of concepts is one of the requisites of systematic philosophy, including that of Hegel. Throughout his system, 'life' conveys a certain shared meaning irrespective of the different forms it characterizes. This commonality is not an upshot of an abstraction from

² "A philosophizing *without a system* can be nothing scientific. Apart from the fact that such philosophizing expresses by itself more of a subjective outlook, it is also random in terms of its content. A particular content is justified solely as a moment of the whole. When separated from it, it represents an unjustified presupposition or a subjective certainty." Hegel, G. W. F. *Encyclopedia of the Philosophical Sciences in Basic Outline, Part 1, Science of Logic*, ed. Klaus Brinkmann and Daniel O. Dahlstrom (Cambridge: Cambridge University Press, 2010) [hereafter cited as *EL*], 43 (§14 *Remark*); G.W.F. Hegel, *Werke in zwanzig Bänden*, ed. Eva Moldenhauer and Karl Markus Michel (Frankfurt am Main: Suhrkamp, 1986) [hereafter cited as *Werke* followed by volume and page number], 8:59–60.

³ G. W. F. Hegel, *The Science of Logic*, trans. Georgia Di Giovanni (Cambridge: Cambridge University Press, 2010) [hereafter cited as *SL*], 677; *Werke*, 6:470–71.

experience, nor is it merely carried over from one concept to another through a figurative relation. Life is, first of all, a determinacy that articulates a distinct way of being. Every living thing, in some way and to different extents, exhibits the characteristics embedded in and communicated by that shared meaning. On the other hand, it should go without saying that consistency in the use of terms *by itself* is not the goal of Hegel's system. It rather aims at elucidating the wide variety of things without reducing them to simples that are incapable of laying hold of the richness of their content. The life of an amoeba is not merely analogous to the civic life of Athens, nor is the nature of either exhaustible by a simple adjective 'living.' The unity of meaning should be counterbalanced by its differentiation in such a way that the enterprise of systematic knowledge is itself not a stock-still inventory of words. The bare concept of life must be shown to have bonds with a multiplicity of living forms.

In his system of logic, Hegel first presents a conceptual framework according to which something can be considered as a living individual regardless of its particular instantiations in the domains of reality. In the second and third parts of his philosophical science, however, Hegel shows that nature and mind are the two domains of reality that contain forms that express the fundamental determinacy of life in different ways. Nature is the domain where life first emerges as a real determinacy. In his *Philosophy of Nature*, Hegel allocates a whole section to explicate two main forms of living things, the plant and the animal. This study aims to show that both the logical and natural characterization of life have claims to universality. While the logical account lays out the general features of being alive, the natural account attempts to expound the universal, that is, conceptually determinable nature of different forms of living individuality in a way that expresses the necessity inherent in the concrete structures and functions of life in nature irrespective of the vast array of contingent features specifying individuals.

B. Outline of Chapters

In the following two parts of the dissertation, we will first elucidate Hegel's logical account of life and then investigate his explication of the plant and the animal as the two universal forms of natural organisms.

In Part I, we focus on Hegel's logical categorization of life. After briefly introducing the general character of Hegel's system of logic and describing the motives of the first part of the dissertation, we examine in three chapters the three moments of the logic of life: the living individual, the life-process, and the genus.

Chapter One focuses on the organic unity and internal process of life. We first elucidate why Hegel thinks that the inner constitution of life integrates but cannot be reduced to mechanical and chemical processes and how the purposiveness of the living individual is still different from the purposiveness of artifacts. Next, we provide a comprehensive analysis of the logic of the living individual, and critically examine Hegel's characterization of living subjectivity.

Chapter Two proceeds to examine life with respect to its relation to its other, nonlife. After first discussing the necessity of this relation and then distinguishing it from the character of merely mechanical, chemical, and teleological processes, we attempt to illuminate and develop Hegel's explication of the living individual's process of assimilation.

Chapter Three concerns Hegel's logical account of the reproductive process and the genus. In this chapter, we first discuss why reproduction is the only interorganic process that the logical account articulates. After showing that reproduction is irreducible to mechanical, chemical, and teleological processes, we construe Hegel's explication of the genus, and try to address whether and why the logic of reproduction necessarily expresses a relation between different living individuals.

In Part II, we turn to Hegel's account of natural forms of life in his *Philosophy of Nature*. We first distinguish life as a natural determinacy from the logic of life, and then briefly lay out the universal, enabling conditions of life in nature. In the succeeding chapters that comprise Part II, we elucidate the internal constitution and the metabolic and reproductive processes of the plant and the animal organism.

Chapter Four discusses how and to what extent the organic unity and the internal process of the living individual are exhibited by the plant and animal forms of life. The crux of the chapter lies in understanding what is limited and superficial about the organic unity and differentiation of the plant in comparison with that of the animal, and how their structural differences are reflected in the level and nature of their subjectivity. This comparative examination will give an idea of the preconditions and the activity of the soul, the simplest mode of mind in nature, as well as the character of inner determinacy in nature.

The focus of Chapter Five is on the nature of and differences between the assimilative activities of the plant and the animal. Here we explain how the relation between the internal and external processes is associated with the structure, subjectivity, and the physical and mental capabilities of the organism. We will examine the different ways through which the animal appropriates its biosphere into a factor of its life-process.

Chapter Six compares plant and animal life with respect to the nature of their reproductive processes. In parallel with the previous chapters, we will see how little plant propagation, in contrast to animal reproduction, is distinguished from the other two fundamental life processes. In connection with this, we will address why Hegel argues, against popular opinion, that the plant does not undergo sexual reproduction, yet still points out that the reproductive structures of the plant imply a further level of living subjectivity and individuality. In distinguishing the plant and animal forms of reproduction, a specific emphasis

will be given to the role of centralized subjectivity in reproduction, which is something Hegel does not adequately highlight.

After providing detailed accounts of the logic and nature of life, the concluding chapter makes direct connections between those two accounts, and spells out our conclusions. The dissertation ends with an explanation of why and to what extent life demonstrates self-determination.

PART I

THE LOGIC OF LIFE

The first part of the dissertation will offer an expository analysis of the concept of life as presented in Hegel's account of logical determinacies in the *Science of Logic*. As any other category that finds its place in the order of the systematic derivation, the concept of life is characterized by determinacies the content and organization of which distinguish it from all the preceding concepts. As such, these characteristics explicate what is necessarily involved in the logical category of life, and therefore, how that which is alive is determined. However, since life is here treated as a purely logical concept, that is, a concept that expresses a fundamental determinacy, the logical account lays out its content regardless of the possibility of its application and irrespective of the kinds of living things there are. Starting off with life's most basic determinacy, the logical account articulates how this simple determinacy develops itself into a concept that expresses the necessary conditions of being alive.

A. Hegel's System of Logic

The first and innermost constituent of Hegel's tripartite system consists in a subsystem of fundamental determinacies that are incorporated into the character of all things that exist and can be thought. These thought determinations in their entirety comprise a system of logic. While a concise version of this logical system is presented in the first part of Hegel's *Encyclopaedia of the Philosophical Sciences*, he offers a much more elaborated exposition in the *Science of Logic*. Hegel's logical account of life occurs in both of these works, although in a far more detailed way in the latter. Thus 'life' in Hegel's philosophy, is also, or perhaps primarily, a logical concept. Yet how can life, the green of which is so often set up against the grey of the

theory, be understood in logical terms? Even Hegel himself notes that it seems as if we are overstepping the boundaries of logic by trying to make such a concrete subject matter into the mold of the logical. But this seeming absurdity in fact stems from the entrenched opinion concerning what logic is and does. Hegel's logic, on the other hand, sets out with the very suspension of all unjustified opinion concerning the nature of logic and its subject matter, namely, thought.

Although Hegel's system of thought determinations is named the *Science of Logic*, it is unlike formal systems of logic in that it is not an axiomatic system that takes for granted the truth or legitimacy of specific statements and truth functional operations. Although there seems to be unequivocal agreement that philosophy is an activity of thought, many thinkers, either implicitly or explicitly, proceed from such an axiomatic set of rules of allegedly correct reasoning that they find ready at hand without undertaking further attempt to justify their choice. Such an attitude towards knowing regards thinking as a tool or standard that can be applied externally to the objects of knowledge irrespective of their specific character. In this regard, it underlies the formal study of the principles of thinking in abstraction from the content of what is being thought. As an external tool or yardstick, formal logic helps decide whether the form of an argument is valid or consistent with reference to the presumed rules of a stipulated logical system. Since it is indifferent to the actual content of thought, assessing the truth or soundness of an argument is delegated to an utterly independent task of determining the truth of its specific premises. Thus a formal system of logic does not have any claim to conceive what life or living means. The most it can do is assess whether the claims of a certain account of life are coherent or whether its conclusions follow validly from its premises, given their presumed truth or falsity. Nevertheless, it can never justifiably test its own legitimacy with reference to its own

set of principles, as that would be nothing but confirming its own self-consistency as a tautological system.

From within Hegel's own attitude to philosophical knowing, the unjustified employment of an instrument in the pursuit of knowledge is at great odds with a genuine attempt to avoid dogmatism. Thus, philosophy as a system cannot start with first principles the legitimacy of which is contingent on some authority from outside philosophy itself. Philosophy calls for a presuppositionless beginning that does not take for granted any foundational principle or method.⁴ It further follows from the presuppositionless attitude that a prior extraction of content from the form of thought which renders prescriptions of formal logic possible are equally dogmatic and should be set aside. In the absence of, on the one hand, any initial framework of premises from which conclusions would deductively follow, and, on the other, a form-content distinction that would have to import content from some external source, a presuppositionless system of logic has no other legitimate source to spring from than the activity of thinking. Furthermore, since as an examination of thinking, logic cannot presuppose anything concerning the form or content of thinking itself, what thinking is can only be determined as a consequence of the thought process. The system of logic is thus the self-determining, self-producing activity of thought that exhibits the coalescence of form and content: Thinking systematically generates its own content from within, whereas the systematicity of this determining that issues from the self-determined content unfolds as its form. Although the entirety of the system of logic ends up being the totality of determinacies

⁴ "[P]resuppositions or prejudices must be surrendered at the entry to science, whether they be taken from representation or from thought. For it is in science that all such determinations must first be examined and the status of them and their oppositions recognized. ... The demand for such a consummate scepticism is the same as the demand that science ought to be preceded by *doubting everything*, i.e. by the complete *absence of any presupposition*. This demand is actually fulfilled in the resolve to *engage in pure thinking* and through the freedom that abstracts from everything and grasps its pure abstraction, the simplicity of thinking." *EL*, 125 (§78 and §78 Remark); *Werke*, 8:167–168.

that figure in the being and thought of every natural or spiritual existence, those determinacies do not function as Platonic forms from which natural or spiritual beings derive their truth. Thus, even as a product, the self-determined system of logic seems unlike an external tool or standard that can be applied to some further concrete content in order to assess the truth of the latter.

One of the major promises of every systematic philosophy that deserves the name is to preclude circularity and appeals to unjustified givens or presupposed truths. Hegel's philosophical system as a whole is remarkably ambitious in implementing this promise, by developing and defining each concept in such a way that any further concept that incorporates or presupposes former ones can consistently be conceived with reference to them, without being reducible to or exhaustible by them. No doubt, the subsystem of logic assumes the most crucial role in keeping this promise, not only by its sticking to a presuppositionless and self-determining procession, but also ending up with a comprehensive array of categories that take part in the constitution of the determinacies of nature and mind later explicated in the succeeding subsystems. The science of logic stands for the endeavor of philosophical thinking to generate from within itself its own substance without relying on any external or unwarranted ground. While supplying the two other philosophical sciences with conceptual determinacy that is ingredient in a multitude of natural and spiritual forms, it claims to have no recourse to anything that exists in nature or in some particular consciousness.

To this end, Hegel's logic abstracts from all content established or given by various determining structures. In order to derive its presuppositionless content, it sets out with the thought of indeterminacy, that is, with the purely indeterminate itself, which, for Hegel, is addressed by the concept of being as such with no further qualification. Yet it is shown in the course of this act of thinking that the very thought of indeterminacy leads the way to further content, starting with the thought of determinacy itself. In the end, the whole enterprise of

logical thinking reveals itself to be a systematic derivation of categories or determinacies, from the least determinate to the most, and consummating with a living totality of all determinations called the Absolute Idea, which, as a totality, is equally the self-determined form and content of logical thought itself.

B. The Idea of Life

‘Life’ is one of the concepts that constitute the totality of logical determinacy. Thus, it is also, or primarily, a logical concept. Building upon all the logical categories it presupposes, the concept of life develops as a further determinacy that is explicated independently of the kinds of living things there actually are, whereas its fundamental structure is exhibited by natural or spiritual forms of existence insofar as they deserve the adjective living. The content of the concept of life as a logical category is explicated in the third main section of the system of logic, called “The Science of Subjective Logic or The Doctrine of the Concept.”

Notwithstanding the concept of life’s restriction to the logical domain, what Hegel offers in his systematic logic promises to overcome the shortcomings that undermine other major accounts of life. When fully laid out, the characteristic features that pertain to the logical concept of life will show that there should be more in life than mechanical and chemical relations. Nevertheless, this ‘more’ in life will not be a supplementary principle of vitality added from without on to the inert indifference of a mechanism, nor will it make reference to a representing mind or overseeing intelligence, either as actual or as a provisional epistemic tool. The logical concept of life will rather demonstrate the possibility of a purposive process in which the means and the end coincide. It will thus involve a subject that actively sustains itself through an objective being that it immediately permeates, the manifold constitution of which is the living thing’s own production. In so doing, life will be distinguished from what Hegel calls

‘external teleology,’ that is, the purposive process in which a merely subjective purpose is realized by putting some external means to use.

In its going beyond the separation of the end from the process that realizes it, life will constitute the first form of what Hegel calls the Idea. The Idea refers to the subject’s process of unification with its objectivity. The logical forms of the domain of the Idea are objective concepts, or concepts that are in conformity with their corresponding objectivity. The first of these forms, “[t]he concept of life or universal life is the immediate idea, the concept that has an objectivity corresponding to it.”⁵ Thus, life involves both subjectivity and objectivity, but being its first and simplest form, it signifies their immediate unity. However, because life is also a process, it consist in a unity of objective process that perpetuates itself, and therefore, that always and immediately realizes itself as a subject.

Despite the initial immediacy of the unity of the self-realizing objective process, the demonstration of life as a self-determining determinacy comprises a developmental sequence that expounds the moments of this self-realizing process in three sections: The living individual, the life-process, and the genus-process. Each of these sections develops a necessary feature of life along with the process that is tied to it. On the other hand, all of these fundamental features of life are in important ways bound up with one another. Indeed, they are not absolutely distinguishable from one another given their necessary connection, without which each would merely be an abstract process. The developmental sequence will address how and in what sense the determinacy that comprises an earlier moment will have to lead to the succeeding moment. We will start with laying out each feature on its own, and try to explain how they are connected, and how each one implies the succeeding one in the course of the development of the logic of

⁵ *SL*, 679; *Werke*, 6:474.

life. At the end, we hope to have a grasp of how these processes come together to constitute the fully developed concept of life as the Idea's first and simplest form.

Life, before all else, is the basic determinacy that spells out the possibility and nature of objectively self-determining individuality. Therefore, a considerably greater space will be devoted to the first chapter on the living individual where life will be examined with respect to this fundamental determinacy that all the further features of life are built upon, and that distinguishes the living individual from what is not living. We will argue that the living individual is characterized by organic unity, which involves an internal process that accounts for how the living individual internally differentiates its constituents and then brings them back into its unity. In order to account for this process, the first chapter will be structured in three main sections. First we will throw light on the living individual by comparing its characterizing features with those of other categories and processes that prove inadequate to account for life. More specifically, we will clarify how and to what extent the living objectivity is irreducible to part-whole relation and mechanical, chemical, and teleological processes. This will require a general account of each of these objective processes. In this comparative and preliminary examination, the focus will be on the unity, inner constitution, and the process of life mostly in contrast to objective processes that are not self-constitutive. In the second section, we will put our hands to the plow and begin a closer examination of Hegel's account of the living individual in the *Science of Logic*. We will lay out how Hegel accounts for the logic of inner purposiveness, and how the living individual, having a purposive and self-constituting character, generates, diversifies, and unifies its objective existence in accordance with an intrinsic purpose. This will require, on the one hand, coming to grips with the subjectivity of life, which Hegel conceives as the initiating, differentiating yet unifying drive, *the soul*, and on the other, explicating the character of the internal process, which consists in organic differentiation. In the third and last main section of

the first chapter, we will examine the three fundamental capacities of the living subject, which are generally considered to be the key determinacies that figure in the constitution of anything living. We will present Hegel's brief account of each of the capacities of sensibility, irritability, and reproduction, and will critically examine in what sense they can be considered to characterize all life.

The chapter on the life-process will go beyond the living individual's being and internal process in abstraction from its other, namely, the inorganic world, and examine life in relation to it. We will address how and why such a relationship with what is inorganic is necessary for the organic unity to maintain itself. Once the inorganic world is brought into the equation, it will turn out that the living individual has the means to prevail over this world instead of being utterly at its mercy. Accordingly, this chapter will also lay out the different forms or stages of assimilative activity through which the living thing copes with its environment. The preliminary discussion of the organism's relationship with its environment will clarify how the life-process incorporates mechanical, chemical, and teleological processes to preserve itself, but is nevertheless not reducible to their terms. We will argue with Hegel that the living individual's dealings with its surroundings is determined by its universal and purposive character, reflected in its selectively receptive and discriminatively responsive interactions. In our closer look at Hegel's logic of assimilation, we will focus on construing the logical meaning of the concepts of need, pain, lack, and feeling, which are, on the face of it, terms that appear ill-suited to a purely logical exposition. Once the logical characterization of assimilation is clear, we will see how the life-process is bound up with the internal process, together closing a full-circle that stands for the self-production of the living individual.

The third chapter will turn to the concept of genus, which first emerges as the unity of the internal and external processes of the living individual. The genus will unfold as a process

that involves the living individual's relation to other individuals of the same kind, but more particularly, the activity that procreates a new living individual that is of the same kind as its parent organisms. Again, with a preliminary reflection on the implications of a plurality of living individuals and their propagation from the viewpoint of the system of determinacies, we will try to prepare a smooth transition to the logical account. We will explore why Hegel focuses on the logical characterization of the propagative relation at the expense of other ecological relationships between living individuals. As we do in the previous two chapters, we will clarify why reproduction in particular is not a mechanical or chemical, but a living process. Both in the preliminary discussion and the textual analysis, the chapter will critically evaluate the reason why Hegel restricts the genus-process or its logical account to the form of sexual reproduction. In our attempt to illuminate Hegel's explication, we will discuss how the genus-process brings something new to the table by raising the process of life beyond the level of individual, and bestowing its universality a relatively independent status. As we lay out the dynamics of the reproductive relation, we will examine the extent to which the role of sexual differentiation plays for this new achievement of the Idea, whether it is necessary and pertinent in a logical account of life.

CHAPTER ONE

THE INTERNAL PROCESS OF THE LIVING INDIVIDUAL

Life is first to be considered as a living individual, says Hegel, in the outline he gives at the beginning of the logical exposition of life.⁶ In the section "The Living Individual," he lays out the logical structure of the internal process that makes organic unity and living individuality conceivable. It is little wonder that he starts off with the composition of the unity of the living individual. Any other feature life exhibits would presume a unity without which it would not be possible to speak of the individual identity of anything living. Yet even if the same might hold trivially true for all kinds of individuals, the individuality of the living, either as a logical category or a natural entity, is profoundly different by virtue of the way it unifies or continuously produces its own content and sustains itself therein.

The peculiar organization and functioning of life through which it sustains itself rests on a distinctive internal unity and structure that can be called its organic unity. It is because of this unique character that organic unity serves as a model for the constitution of things that are more or less self-sustaining. The terms 'unity' and 'structure' should not mislead one to overlook that life is a process rather than a static configuration of parts. But more importantly, in distinction to many other individual entities, life is a process the unity and individuality of which is its own doing.⁷ In this respect, life is self-determining. This is the basic reason why Hegel

⁶ *SL*, 678; *Werke*, 6:471.

⁷ This sounds very close to how Hans Jonas defines individuality: "Only those entities are individuals whose being is their own doing (and thus, in a sense, their task): entities, in other words, that are delivered up to their being for their being, so that their being is committed to them, and they are committed to keeping up this being by ever renewed acts of it." Jonas, "Biological Foundations of Individuality," *International Philosophical Quarterly* 8, no. 2 (1968): 233. Jonas ultimately argues that living

thinks that life involves subjectivity, or as he puts it, it is primarily a subjective totality.⁸ The living individual is a subject, not in the sense of a subject that stands over against an object of experience, or in the sense of a substrate of predication, but in the sense of a subject that determines and unifies its own constitution through a continuous and self-initiated process.

The immediate constituent of the living subject, on the other hand, is its organic body, or the *organism*.⁹ In the *Science of Logic*, Hegel describes this body or corporeity as the objectivity or externality that corresponds to the subject, rather than a spatiotemporal entity.¹⁰ The unity and the individuality of the organic body is by virtue of its subjectivity, and insofar as it comprises the objective content of the *living*, the externality unified by the subject does not come to existence as a real, self-subsistent being independently of or separately from the subject that unifies it. As the content of the living individual that is unified and determined by its subjectivity, that is, as organism, this objectivity is in fact not some content apart from its form. It is the objective being *of the subject*, i.e., its embodiment. Since this objective content, unlike that of a matter externally formed by a separate subject, does not have an existence independently of its immanent form, and is what it is only by virtue of it, the organism is itself already subjective. As it is presented in Hegel's logical account that we will closely examine in the second section, life emerges as the subjectivity that is immediately bound up with the

things are the only entities that exhibit individuality: "My contention will be that, on the evidence penetrable to us, the proposed conditions are exhibited by organisms and organisms only, but in some measure by *all* organisms: that they are integral to organic being as such; and that therefore the realm of individuality, in all its grades, is coextensive with the biological realm as a whole." Ibid. For Hegel, objects are also individuals, but not to the same degree that living things are.

⁸ *SL*, 678; *Werke*, 6:471.

⁹ *SL*, 681; *Werke*, 6:476. Nonetheless, it is worth noting that Hegel uses two different words for 'body': *Leib* and *Körper*. Hegel notes that the logical life is considered in the *Science of Logic* not as a living body (ein lebendiger Leib), but as a corporeality (*Körper*). I don't see any problem in using 'body' to refer to both.

¹⁰ *SL*, 680; *Werke*, 6:475.

objectivity it possesses and that thoroughly permeates it.¹¹ Once again, in the terminology of Hegel's system, this is the basic *structure* of the immediate Idea, or the Idea in its immediacy, which signifies the form of being in which the objectivity is united and thoroughly permeated by the subject. Hegel implies that this identity designates the subject-object after which Fichte aspired.¹² But the *process* that accounts for Hegel's version of unification is yet to be elucidated.

Despite the historical baggage it carries, the *soul* is still the most economical way to express the distinctive subjectivity of the living individual. And it is the very concept Hegel uses in the logical exposition, where he maintains that the living individual is the soul before all else. More precisely, the soul is the subjectivity of life that is immediately diffused and is omnipresent in the body, that is, in its objectivity.¹³ This subjective element does not externally transform a given content through some means in a way reminiscent of a form or blueprint that exists separately from its possible embodiments. The soul always already has an external presence; it is always embodied. In fact, it exists only by virtue of being the very principle of activity and unification of this self-realizing process in objectivity. Hegel says, the soul is "the initiating, self-moving *principle*,"¹⁴ a *drive* (*Trieb*) that immediately and continuously realizes itself as external and self-subsistent. This drive does not play the role of an external subject that operates on an independently given objectivity. It is the intrinsic character of a process that is internally determined to realize itself as what it already and always is: an Idea, which is to say, a self-maintaining subject-object. In other words, it is not distinct from what it is driven to realize.

To the extent that this living process is self-determining, it is the determiner of the manifold that constitutes its objectivity. But as self-determining, it does not only differentiate

¹¹ *SL*, 678; *Werke*, 6:472.

¹² *SL*, 673; *Werke*, 6:466.

¹³ *SL*, 678; *Werke*, 6:472.

¹⁴ *SL*, 680; *Werke*, 6:475.

itself as a multiplicity of objectivity; it also actively holds this multiplicity together.¹⁵ The self-propelling drive of life consists in the activity of an objective process that keeps sustaining its unity. This drive is accordingly not a blind creative force, but a purposive drive whose end is determined by the internal process that brings itself into this unity. The organic unity can thus be considered as the immediate outcome of this internally and purposively driven process in and through which the organism is developed and its manifold elements are unified. As such, it stands for the *simplest* form that exhibits this dynamic unity of the Idea, where subjectivity is one with the objectivity that it permeates. In what follows, we will elucidate the constitution of this self-realizing unity of subjectively differentiated objectivity.

1.1. THE LIVING INDIVIDUAL: A PRELIMINARY EXAMINATION

It is crucial to account for this process that constitutes the living individual, as it would lay bare not only the possibility of the Idea, i.e., the unity of subjectivity with objectivity, but also the ontological character of the simplest process upon which all kinds of living individuals are built. Nonetheless, what has hitherto been said of this unity, including its being best expressed by the concept of the soul, neither demonstrates its possibility nor lays out its essential nature. Indeed, Hegel points out that it is the difficulty in conceiving this immediate unity that plagued other attempts to lay hold of life while also distinguishing it from artifacts, which are objects externally manufactured and operated by subjective ends that can exist independently of their concrete realizations. The idea of a living *body* suggests a self-sustaining, self-organizing objectivity. But once it is acknowledged that the totality of objectivity is mutually external components subject to laws that are utterly indifferent to their unity, it may seem

¹⁵ *SL*, 681; *Werke*, 6:476–77: “it is *impulse* [*drive*], more precisely the *specific impulse of particular* difference, and no less essentially the one and universal impulse of the specific that leads its particularization back to unity and holds it there.” Giovanni uses the term ‘impulse’, whereas Miller translation chooses ‘urge’. Miller’s translation: G. W. F. Hegel, *The Science of Logic*, trans. A. V. Miller (Atlantic Highlands, NJ: Humanities Press International, 1993)

hopeless to comprehend how any object can organize its constituents in such a way that it preserves itself and actively retains its unity through the complementary workings of these constituents.

In a nutshell, the living individual exhibits normativity, whereas objects standing in mutual externality are indifferent to such norms. The normativity of life should not be confused with ethical normativity that pertains to the realm of rational agents. Life is normative not because living individuals willingly and knowingly pursue a principle that exists independently of their activity, but because the very nature of their continuing existence dictates them goals that are unique to their own constitution. This is closer to the sense that Georges Canguilhem or Maurice Merleau-Ponty uses the term 'norm.' Life does not conform to externally given norms, but its very activity is that which establishes its own norms.¹⁶ The ultimate norm of life is the perpetuation of this activity, which means the living being's self-preservation. The constituents of the organism therefore cannot be indifferent to this norm, as their existence is contingent on their cooperation with one another and their capability to modify themselves in accordance with the rest of the organism.

The inability to account for how physical constituents would develop in such a way to comply with such norms, or modify themselves to adapt to them, explains why, in some way or other, mechanistic accounts often end up making recourse to some sort of subjectivity or selfhood that predetermines or oversees the inanimate matter in a purposive manner, thus

¹⁶ Canguilhem, *The Normal and the Pathological*, trans. Carolyn Fawcett in collaboration with Robert Cohen (New York: Zone Books, 1989), 126-127. Similarly, Maurice Merleau-Ponty, who distinguishes such norms from laws that express regular relations between inorganic objects, argues that an organism is able to modify its milieu "according to the internal norms of its activity." Merleau-Ponty, Maurice. *The Structure of Behavior*, trans. A. L. Fisher (Pittsburgh: Duquesne University Press, 1963), 154. Xabier Barandiaran and Alvaro Moreno define normativity more broadly as a systemic "fact that a set of processes that constitute the system *must* happen as they do in order for the very system to exist." Barandiaran and Moreno, "Adaptivity: From Metabolism to Behavior," *Adaptive Behavior* 16, no. 5 (2008): 329. The problem with this definition is that it does not distinguish mechanical systems from organic ones, although the authors do try to distinguish normativity from regulation.

rendering the living thing an artifact. The self-sustaining and self-developing unity of a multiplicity of parts, especially in the face of the inorganic world's continuous and indifferent impingement upon objects, calls for the involvement of some form of subjectivity which can maintain these parts in a unity, determine its distinctive composition, and thereby distinguish this individual being from its externality. But when mechanistic accounts bring in the subjective element that sets life apart from the inanimate nature, it serves rather as an external factor that is disengaged and independent of its objective counterpart. Since mechanistic explanation relies on efficient causes, which affect objects only externally and operate indifferently to norms such as self-preservation and self-organization, it cannot find a ground for such purposive activity in the organisms themselves, and often pronounce it to be in itself philosophically incomprehensible. Since they are accustomed to think in terms of external causation, they often presume external acts of fashioning of objectivity, mostly in accordance with some kind of preformed representation. That is to say, the most they can offer is an *ad hoc* explanation for the seemingly purposeful activity or nonrandom configuration of living things, leave aside the fact that they thereby come to reduce them to artifacts mainly by means of abstracting their form from their activity.

Some of these problems are evident in the works of the early modern pioneers of mechanism such as René Descartes and Thomas Hobbes. Descartes tries his best to avoid normative descriptions of the animal, even though he construes it as a machine-like entity. In the *Treatise on Man*, where he explores the human being vis-à-vis its having an animal body, he describes his object of study as an imaginary statue, a machine made of earth that is intentionally formed by God in a way that resembles or imitates our body in the most perfect way. With the supposedly hypothetical nature of his construct, Descartes attempts to play down the significance of his presupposition of a designer. Allegedly, what Descartes is concerned with

is not how this “animal-machine” is originally put to work, but rather how it actually operates. Given his anti-scholastic agenda that aims at doing away with teleological accounts, he tries to account for the operations of animal machines in terms of their physical configuration, which he calls ‘dispositions’. He explains all physiological processes through preordained dispositions of the parts of the animal-machines that are set in motion by efficient causes. The physical parts of living bodies are configured in such a way that they necessarily react to a particular stimulus in specific ways that lead to *seemingly* purposive behaviors.¹⁷

Nonetheless, by his emphasis on dispositions, Descartes comes to admit that the unity of machines depends upon something more than the arbitrary attachment of things such as two marble slabs. Machines carry out functions and serve particular purposes and without taking these into consideration, one cannot adequately understand their operation. It is again with reference to these functions and ends that one is able to speak of malfunctions/dysfunctions. If the animal is to be construed as a machine-like entity, its unity and function must likewise be comprehended and assessed in connection with its end.

Thus Descartes is troubled by his own attempt to give a mechanistic account of life devoid of teleology, while speaking of the animal-machine as if it is an artifact. On the one hand, he voices the mechanist’s perspective, and argues that the purposiveness we attribute to the animal is merely apparent. Even though he speaks of preordained dispositions, he expects us to ignore the appearance of purposiveness on the grounds that we cannot know God’s purposes

¹⁷ “I desire, I say, you should consider that these functions follow in this machine simply from the disposition of the organs as wholly naturally as the movements of a clock or other automaton follow from the disposition of its counterweights and wheels. To explain these functions, then, it is not necessary to conceive of any vegetative or sensitive soul, or any other principle of movement or life, other than its blood and spirits which are agitated by the heat of the fire that burns continuously in its heart, and which is of the same nature as those fires that occur in inanimate bodies.” Descartes, *The World and Other Writings*, trans. Stephen Gaukroger (Cambridge: Cambridge University Press, 1998), 169.

and that these purposes cannot be the subject matter of the pursuit of scientific knowledge.¹⁸ Along these lines, he argues that sickness is an extraneous description, as a healthy and a sick man both behave in accordance with the same mechanical laws of nature, which are indifferent to purposes.¹⁹ On the other hand, Descartes does perceive that the unity of the machine needs to be addressed. He thinks that the animal-machine is distinguished from what it is not primarily by virtue of operating as a unity of diverse mechanisms. Although these constituent mechanisms have different motions with respect to one another, they change place or stay at rest altogether with respect to other things. But Descartes must have been aware of the fact that the unity in motion cannot be a sufficient criterion even for the unity of a machine either; he would not be willing to go as far as to argue that children riding a carousel could be considered as mechanisms that belong to a machine.²⁰ Indeed, he also explicitly maintains that self-preservation is precisely what the animal functions and the animal-machine as a whole are disposed to do.²¹ But since he thinks that the animal-machine cannot but be indifferent to ends, he explains this disposition towards self-preservation only by a recourse to God's setting up the initial configuration of matter in motion by way of creating parts of different shapes and magnitudes, irrespective of what God's ultimate purposes are in doing so.

¹⁸ "When dealing with natural things we will, then, never derive any explanations from the purposes which God or nature may have had in view when creating them <and we shall entirely banish from our philosophy the search for final causes>. For we should not be so arrogant as to suppose that we can share in God's plans" Descartes, *The Philosophical Writings of Descartes*, vol. 1, trans. John Cottingham, Robert Stoothoff, and Dugald Murdoch (Cambridge: Cambridge University Press, 1985), 202.

¹⁹ Descartes, *The Philosophical Writings of Descartes*, vol. 2, trans. John Cottingham, Robert Stoothoff, and Dugald Murdoch (Cambridge: Cambridge University Press, 1985), 84–5.

²⁰ For similar examples, see Dennis Des Chene, *Spirits and clocks: Machine and organism in Descartes* (Ithaca: Cornell University Press, 2001), 123–124.

²¹ "... the best system that could be devised is that it should produce the one sensation which, of all possible sensations, is most especially and most frequently conducive to the preservation of the healthy man. And experience shows that the sensations which nature has given us are all of this kind; and so there is absolutely nothing to be found in them that does not bear witness to the power and goodness of God." *The Philosophical Writings of Descartes*, vol. 2, 60.

Another pioneer of mechanism, Hobbes falls into a similar contradictory position. While he maintains that all natural phenomena including different sorts of animal activities can and should be explained in terms of real bodily properties, more specifically, those of motion, he has difficulty in explaining their unity and purposive character. Hobbes speaks of two characteristic motions that differentiate animals from all inanimate moving matter: vital motions, and voluntary or animal motions. Having origins in the drive or the *conatus* of the heart, vital motions comprise the internal process of the viscera.²² Hobbes acknowledges that the living thing which encompasses these processes is itself a unitary and self-perpetuating motion that is unlike other *circular motions* on the earth.²³ The difference stems not from the character of the vital motions themselves, but from the way these systems serve the survival of the living thing. The animal organism grows from the embryonic stage as a self-perpetuating motion which rests on an original drive that strives for what is good for the perpetuation of its vital motions.

Unless one is speaking of artifacts, appeals to such normative implications must be unacceptable from a mechanistic perspective. Hobbes tries hard to utilize his theory of *conatuses* in order to render his allusions to normativity only heuristic means for making the object of knowledge more intelligible. Notwithstanding the problems of disregarding insentient or non-animal forms of life, Hobbes explains the seemingly purposive unity of vital motions with reference to voluntary or animal motions, which are activities such as the motions of limbs as well as sensation, desire, and speech. What is common to all voluntary motions is that in one way or another they entail a precedent image or idea, which Hobbes calls a phantasm. He describes phantasms as outputs of bodily motions interacting with the external ones, although

²² Hobbes, *The English Works of Thomas Hobbes of Malmesbury, Vol. 1.* ed. William Molesworth (London: John Bohn, 1839), 407; *The English Works, Vol. 3.*, 38.

²³ Hobbes talks about the inorganic circles of motions in his *Decameron Physiologica* in *The English Works, Vol. 7.*

they belong to the animal as a whole. On the one hand, Hobbes refers to the feelings of pain and pleasure as phantasms that guide the animal organism in such a way that the animal pursues that which facilitates vital motions and shun what disrupts them. On the other hand, he comes to argue that these phantasms, which seem to have a role in prompting and regulating vital motions, are indeed causally impotent epiphenomena insofar as they are considered in isolation from motions.²⁴ But when he tries to account for the animal unity and activity through the motions or *conatuses* that underlie those phantasms, it becomes problematic to explain why organisms behave in ways that enable survival. That is why, Hobbes dodges the problem by occasionally implying that the original motions are a part of a deterministic divine plan in a way similar to the mathematical laws of nature.²⁵

As a result, Hobbes fails to offer a convincing alternative to Descartes's theory of dispositional unities. Although Hobbes's appeal to a language of feelings such as pleasure and pain conceals his requirement for an original blueprint of life and living things, insofar as these feelings themselves lack the causal power to organize and guide the animal body, Hobbes does not seem to have an alternative way out. Like Descartes, he ends up reducing organisms to artifacts, by replacing an internal teleology with an external one.²⁶

²⁴ Insofar as voluntary or animal motions are considered vis-à-vis their kinematic aspects *only*, they are not qualitatively different from vital motions. Nevertheless all animal motions, Hobbes argues, require a precedent idea or phantasm, as he refers to them. Speaking is a voluntary motion which requires words, which are for Hobbes also a form of images. Likewise, to walk or to raise a hand is different from being pushed and pulled by external objects in that they require an element of will, which Hobbes also traces back to images. That is why he postulates the imagination (retained sensation) in *Leviathan* as an infinitesimal *conatus*, "the first internal beginning of all voluntary motion." *The English Works*, 3:39.

²⁵ One runs into Hobbes's appeal to intelligent design in several passages. See *The English Works*, 1:132; 3:93; 7: 176.

²⁶ To be fair, although in the end, Hobbes makes a hesitant appeal to an initial design, his idea that the dynamic interaction of the animal with its environment leads to habituation is a significant advancement for an understanding of organic processes beyond mere mechanism.

By contrast, Immanuel Kant demonstrates significant success at identifying the limitations of mechanistic accounts of life and marking out the features of life that differentiates it from inorganic nature as well as from artifacts. Indeed, his analysis of life in the *Critique of the Power of Judgment* is a trailblazer for many succeeding philosophical theories of life including Hegel's. While the mechanistic philosophy of the early moderns tries to explain life in terms of material properties, Kant sees nothing in matter *per se* that would allow for processes that characterize life.²⁷ By actively striving to preserve their internal organization, living things exhibit a radically different concept of inertia.²⁸ Unlike mere matter in motion, this living activity is neither indifferent to functions, norms, or future states nor utterly subject to external determination by mechanical laws. It is governed by ends peculiar to the living thing, and even if there is no actual representation of that end in some mind, its coming into being and its self-organizing unity and activity can only be understood by an appeal to purposiveness.

However, a living thing is not purposive in the same way that artifacts are. The living thing is a *Naturzweck*, a natural end. In a nutshell, Kant maintains that something exists intrinsically as a natural end if it is both cause and effect of itself.²⁹ An artifact is not its own

²⁷ "[A]ll matter, as such, is lifeless," says Kant, in his remark on the principle of inertia. Life, he argues, "is the faculty of a substance to determine itself to act from an internal principle," a principle that matter itself utterly lacks. Kant, *Metaphysical Foundations of Natural Science*, trans. Michael Friedman (New York: Cambridge University Press, 2004), 83; Immanuel Kant, *Gesammelte Schriften*, Bd 4, (Berlin: De Gruyter, 1963), 4:544.

²⁸ If this difference between material substance and life is ignored, it will lead to hylozoism, or as Kant puts dramatically in the *Metaphysical Foundations of Natural Science*, the death of natural philosophy: "The opposite of this, and thus also the death of all natural philosophy, would be hylozoism. From this very same concept of inertia, as mere lifelessness, it follows at once that it does not mean a positive striving to conserve its state. Only living beings are called inert in this latter sense, because they have a representation of another state, which they abhor, and against which they exert their power." *Metaphysical Foundations*, 84; *Gesammelte Schriften*, 4:544). It is nevertheless worth noting that this reference to representation of ends is not as emphasized in the *Critique of Judgment*.

²⁹ Kant, *Critique of the Power of Judgment*, trans. Paul Guyer and Eric Matthews (Cambridge: Cambridge University Press, 2000), 242; Immanuel Kant, *Gesammelte Schriften*, Bd.5, (Berlin: De Gruyter, 1963), 5:370.

cause, as its purpose prefigures as an idea or representation that exists in some mind before the artifact comes into being. Since matter as such lacks the resources to represent ends, the idea is imposed on to the material substance from without. Since the representation cannot come into being from nothing, the form and existence of an artifact are still contingent on there being a rational mind that has the concept of the whole, thereby rendering it the cause of the artifact.

According to Kant, the same cannot be maintained as regards the forms of life unless we attribute intelligence to nature; a tempting way of explanation that nevertheless cannot be justified on the basis of what we objectively know about nature.³⁰ That is why we feel the need to assume a different sort of causality, one that is “not analogous with any causality that we know,” is at work in the domain of life. If forms of life were not already represented in some mind, there should be another way to conceive of their apparently purposive nature.³¹ It is, for Kant, not the causality of the concept, which for him exists apart from its effect, and is an abstract idea that lacks objectivity. Kant thinks that the possibility of natural purposiveness calls for a conception of causality according to which causes do not operate from without as ends. Hence an entity can be conceived as a natural purpose only if we *think of* it as its own cause.

Kant argues that although the need for the concept of natural ends is derived from systematic observation of organisms, if this concept is to provide universal and necessary knowledge of living things, it must ultimately rely on “some sort of a priori principle.” Kant’s

³⁰ “But inner natural perfection, as is possessed by those things that are possible only as natural ends and hence as organized beings, is not thinkable and explicable in accordance with any analogy to any physical, i.e., natural capacity that is known to us; indeed, since we ourselves belong to nature in the widest sense, it is not thinkable and explicable even through an exact analogy with human art.” *Critique of the Power of Judgment*, 247; *Gesammelte Schriften*, 5:375.

³¹ Despite the regulative idea of internal purposiveness we will talk about, Kant ultimately invokes the idea of intelligent design in order to make the purposiveness of the entire world intelligible to moral agents, even though any claim to the knowledge of such purposiveness would have a subjective character rather than an objectivity validity. See *Critique of the Power of Judgment*, 285–331; *Gesammelte Schriften*, 5:416–467.

formulation of the principle of internal purposiveness states that "[a]n organized product of nature is that in which everything is an end and reciprocally a means as well."³² As we will see, the gist of Hegel's concept of the living individual as an organic unity echoes this principle. However, unlike Hegel, Kant refuses to maintain that this constitutes an objectively valid judgment as regards the nature of living things. He states that although the sort of self-causation presumed to be at work in life "can be conceived without contradiction" it "cannot be comprehended."³³ According to his philosophy, the possible domain of objectivity and objective knowledge is demarcated by the structure of cognition of the knowing subject. For Kant, the natural end is not a concept of the understanding or reason that is constitutive of the necessary structure of cognition that makes experience possible and establishes objectivity. It is rather "a regulative concept for the reflecting power of judgment" which resides merely in the judging person. Regulative concepts such as the natural end cannot be *demonstrated a priori* and do not hold objectively.³⁴ Even if we cannot really conceive of or have an *a priori* insight into the sort of causality it entails, its use can be justified if it can guide the scientific study of organisms by helping us understand organic constituents and their combinations without taking intentions and intelligent designers into account.³⁵

³² *Critique of the Power of Judgment*, 247–248; *Gesammelte Schriften*, 5:376.

³³ *Critique of the Power of Judgment*, 243; *Gesammelte Schriften*, 5:371.

³⁴ See Immanuel Kant, *Opus Postumum*, ed. Eckart Förster and Michael Rosen (Cambridge: Cambridge University Press, 1995), 64; Immanuel Kant, *Gesammelte Schriften, Band 21*, (Berlin: De Gruyter, 1995), 21:210. "The definition of an organic body is that it is a body, every part of which is there for the sake of the other (reciprocally as end and, at the same time, means). It is easily seen that this is a mere idea, which is not assured of reality *a priori* (i.e., that such a thing could exist)." Also see *Opus Postumum*, 100; 146.

³⁵ "The concept of a thing as in itself a natural end is therefore not a constitutive concept of the understanding or of reason, but it can still be a regulative concept for the reflecting power of judgment, for guiding research into objects of this kind and thinking over their highest ground in accordance with a remote analogy with our own causality in accordance with ends; not, of course, for the sake of knowledge of nature or of its original ground, but rather for the sake of the very same practical faculty of reason in us

As a result, Kant, who does recognize the subjective element exhibited by the self-organization of life, ascribes this subjectivity to the eye of the beholder that attempts to make sense out of life. This way, he deprives the knowledge of living things of necessity, and renders subjectivity and purposiveness of organisms a mere heuristic assumption that may not objectively hold.

Thus, although neither the mechanistic nor the Kantian approaches to life can unequivocally deny that living things are seemingly purposive and self-perpetuating unities that are radically different from inanimate objects, they are not as much capable or willing to acknowledge the subjectivity that is active and immanent in the objectivity of life. In his preliminary remarks to the chapter on life, Hegel points out the nature of the faculty of understanding as the main culprit behind the failure. The habitual ways of understanding simply defy the thought of objectivity that also has subjectivity bound up with it. The two, they think, cannot be united.³⁶ In general terms, as customarily considered, subjectivity is simple, and therefore, it cannot both be omnipresent in a multiplicity of parts and also form their self-sustaining unity.³⁷ It can only work on or unify parts from without as an agent or principle that remains external to the bodily process, even though it is often left unclear how such an external unification and administration is itself possible. Interestingly, this approach shows itself in various forms such as an intelligent designer, a vital principle, or a specific part, be it a brain or a genome, no matter how disparate these forms may seem at first sight.

in analogy with which we consider the cause of that purposiveness" *Critique of the Power of Judgment*, 247; *Gesammelte Schriften*, 5:375.

³⁶ "The understanding shows that the idea is self-contradictory because, for example, the subjective dimension is only subjective and the objective dimension, by contrast, is opposed to it." *EL*, 285 (§214 *Remark*).

³⁷ *SL*, 678; *Werke*, 6:471.

The categories Hegel associates with the faculty of understanding all have in common a major shortcoming that undermines those attempts to capture the peculiar nature of life in which the unity of the living individual dwells. According to Hegel, life cannot be conceived in terms of a simple part-whole relation, nor is it a mechanical or a chemical product, nor an artifact that is operated as a means to some other end. Unlike life or its unity, those categories are rigid in that they neither generate their own content nor account for the unity and individuality of that which possesses a self-differentiating multiplicity.³⁸ In spite of the contrary evidence provided by experience through which the unity of life is directly appreciated, those who stick to those categories pronounce the idea of life an unfathomable mystery, instead of acknowledging the need to go beyond them.

Of course, philosophical knowing cannot be content with the immediacy of experience, and it has to give an account of what life consists in *by explicating its concept*. Accordingly, if life signifies a self-determining, self-generating, and self-maintaining form of individuality, going beyond those rigid categories would entail laying out the concept of life such that the constitution of the concept itself would both reflect that character of life, and also prove the intelligibility of all living things *qua* living. If the organic unity and individuality of life is fundamental, the relation between the constituents of the concept of life will have to be shown to form a unity which cannot be demonstrated by those categories only.

Even though Hegel speaks of the failure of the understanding to get hold of life in quite general terms, there are differences in the extent to which different categories fail to do so. Before he explicates the unique structure of life Hegel lays out in detail other forms or relations such as the whole-part relation, mechanical and chemical processes, and the teleological process, all of which exhibit a peculiar kind of unity that is not self-determining. Therefore,

³⁸ *SL*, 678; *Werke*, 6:471.

before examining the logical explication of the internal unity and structure of life, a careful reflection on the content of these categories would help clarify why they all fall short of the determinacy that life incorporates, and explain why it is a mistake to try to comprehend its organic unity in their terms only. Second, even though these categories by themselves fall short of the determinacy of self-determination, Hegel's systematic exposition shows that they are all necessarily incorporated into life and its processes. Accordingly, the elucidation of the concept of life must involve clarification as to how and to what extent each of these categories figures in life.

1.1.1. The Constitution of the Living Body: Beyond the Part-whole Relationship

The living individual has an objective being which it subjugates to an end that is no different than its own subsistence. This self-preserving subsistence that the living individual consists in is a self-initiating and self-renewing process. The objective being of the living individual is no more than its body, that is, the organism. Organic unity is primarily the unity of this organic body in the face of its ever changing constitution. As to this constitution, Hegel says that the body should be considered as a multiplicity of organs or articulations (*Gliedern*), rather than one of parts.³⁹

The unity in question is surely a unity of multiplicity. But the part-whole relation, which is one of the simplest and most common categories that are habitually imposed to every object of knowledge, falls short of expressing the constitution of the living individual. It seems quite natural to speak of at least a possible division of some individual thing into its parts, insofar as it is not an *atom* in its original sense, that is, an absolutely indivisible being, which Hegel would call *the one*. As Hegel admits, to the effect that a multiplicity is composed of such *ones* that are outside of one another, by virtue of its being a unity of exclusive ones, the living body can as

³⁹ *SL*, 681; *Werke*, 6:476.

well be separated into parts, even though this would rob it of its unity, and thus, of its living character. But more importantly, to give an account of the unity of an individual is different from analyzing it into its supposed parts. The part-whole relation is more readily applicable to inorganic natural conglomerations and artifacts. Nevertheless, even though the unity of living things appears at first sight to be more puzzling and in itself incomprehensible, knowledge of anything as a unity of parts is plagued with difficulties. As long as the thing in question does not bring and hold its parts together, or contain in itself the principle of its unity, the unity of a multiplicity of parts seems to be a matter of an external, subjective ascription or addition. If it is true, before explaining in greater depth, this much would imply why it should at least be equally problematic to consider life, as others often end up doing, as an inorganic object or an artifact, i.e., an external object of intelligent design.

In the case of inorganic things with parts, the unity is often considered in terms of the spatial proximity or common motion of parts, and therefore involves a considerable degree of arbitrariness. After all, parts do not bring themselves into a whole, nor are they dependent on the whole to be what they are specifically. As will be explained in the discussion of teleological process, in the case of artifacts, the unity is by virtue of the purposive configuration of parts and has to be maintained by an external agency. The parts preexist their wholes, and it is often left unexplained how purpose as a manifestation of subjectivity can affect and organize parts that are utterly different in character from what would be considered as subjective. The unity functions in the first case rather as a term that is introduced from without, and in the second, as a concept that exists independently of the parts that realize it in objectivity. In neither case is it an intrinsic characteristic that is definitive of the nature of its constituting parts. Nor is this unity their own doing, or in other words, a self-determining unity that the living individual is.

Nonetheless, instead of using these contrasts, it is possible to see why the part-whole relation as such would necessarily fall short of the structure of life solely by examining its fundamental nature, as Hegel does in his *Science of Logic*. The whole is known to be composed of parts. In its simplicity, it is understood to be something self-subsistent, although as such, it is reliant on the parts to be what it is. Therefore, *as the whole* it is not self-sustaining independently of the parts. Similarly, each part is considered to be equally self-subsistent. But *as parts*, they are what they are only by virtue of being altogether the constituents of the whole. Thus there is a reciprocal interdependence between the whole and its parts. Both the whole and its parts can sustain themselves in and through their relation only. As Hegel puts it, each has its subsistence in its other.⁴⁰ In this sense, the part-whole relation demonstrates a simple case of self-conditioning in which the parts of a unity immediately condition one another.

Life exhibits the part-whole relation to the extent that the terms of the latter relation are reciprocally conditioning, and not self-subsistent independently of their other. Each constituent organ of a living individual is what it is by virtue of the functioning of the entire organism of which it is a member, whereas there would not be such a thing as organism if it did not have organs. Then in what sense are organs not mere parts, and the organism not a mere whole?

Hegel thinks that the organic unity that life exhibits is its own doing, suggesting that it is actually objectively realized, the how of which is yet to be explicated. By contrast, the inadequacy of the part-whole relation stems from the abstract and external character of their unity. As each term of the part-whole relation requires the other to exist, Hegel argues that they are nothing but the moments of one identity, i.e., the part-whole relation itself. But oddly enough, these interdependent moments cannot maintain themselves in their togetherness.

⁴⁰ *SL*, 451; *Werke*, 6:167.

Even though the whole as such is nothing apart from its parts altogether, when one speaks of nothing but parts, the whole ceases to be. For the parts as parts are supposed to be separated and not united, and they by themselves lack that which would bring them to a unity in the whole. This is different in case of the unity of life. The peculiar unity that the living individual is depends on the very separation of its constituents, which carry out different functions. True, in the part-whole relationship, the whole may be taken as this very unity of parts, rather than just a stack of parts, and the parts are parts also in virtue of their common reference, that is, the whole. But when we think of the whole as a unity of parts, or in their togetherness, then parthood vanishes. Since when unified, parts lose their multiplicity and become one. They can only sustain themselves when there is some partitioning in place. By contrast, although organs as individuals exist in a mutual externality, their concept necessitates not only their separation, but also their conjunction. Unlike parts, organs cease to be what they are in the absence of their complementary yielding to one another.

When the understanding conceives of the whole and its parts, despite their interdependence, it cannot think of them at once or in their unity. When abstracted from one another and considered as self-subsistent entities, the whole as a unity excludes its division, whereas the multiplicity of parts is the very negation of unity. But since the whole is by definition composed of parts and the parts are always the parts of a whole, the whole-part relation shows itself to be one in which the relata are one-sided abstractions that immediately give way to their opposites. Thus the whole and its parts do not have the inherent means to retain unity and multiplicity together. It is rather their reciprocal relation that is the truth of these terms that maintain them as the moments of one identity.

As indicated above, organic unity, which is likewise the truth of its constituents, does incorporate such a reciprocal relation. But in its simplicity, the whole-part relation is an external

and formal ascription that lacks objectivity. Since the whole and its parts do not contain in themselves the principle of their unification, the unity of the terms of this relation is rather ascribed from without which gives it a merely formal or abstract character. More specifically, the deficit of the part-whole relation in comprehending life follows from this formal character in which the relata are indifferent to the content of one another. Insofar as divisibility is inherent in the concept of the part-whole relation, each part as such exists independently of its relations to the whole as well as to other parts. That is why Hegel writes that the unity through the whole is but an external reference to which parts are indifferent.⁴¹ Although parts are parts only insofar as they are considered in relation to some whole, as long as their unity is an external reference, each part could be considered as part of any whole, and in relation to any number of other parts.

The same indifference holds for the relation of the whole to its parts. The whole is a whole irrespective of the quality or quantity of its parts. In this sense, the unity plays no role whatsoever with respect to the differences and relations among parts. In the whole-part relation, neither does the whole do anything to bring its parts together, nor do the parts do anything to sustain their unity. The whole just happens to have certain parts, and other than marking those parts as its constituents, the part-whole relationship does not specify anything about how these constituents are differentiated or characterized with respect to the whole. Moreover, since parts must be a multiplicity of parts, each part should be able to differentiate itself from others. But the mere determinacy of parthood provides nothing to distinguish a certain part from the rest. But if no part is distinguished, then each becomes the same and equally indistinguishable from the whole. But without having any part, the whole ceases to be what it is as well.

⁴¹ *SL*, 451; *Werke*, 6:168.

All these consequences that follow from the character of the part-whole relation show that it is a merely formal relation that has no influence on the content of the relata. Parts are indifferent to their unity as their unification in a whole is not intrinsic to their nature. That is why whenever something is thought in terms of a simple part-whole relation only, parts are ascribed an independent existence the nature of which is not determined by the unity whose part they are, except for the mere fact that they are parts of that whole.

The degree of externality and indifference that pertains to the part-whole relation sheds light on the contrasting nature of the organic unity. First of all, we cannot attribute the same degree of independence of parts to the organs. Since a mere part is not determined by the whole whose part it is, it does not lose its particular character when separated from that whole. Although the part-whole relation cannot even exhaust the character of inanimate objects, it is relatively more explanatory with regard to them. A mere part is still what it is apart from its presupposed whole, be it a designated portion of a given space, or a piece of stone. But the removal of an organ from its organism would deprive it of its character. As Hegel puts it, insofar as organs are external, they are separable, although when separated, they are rather dead than living.⁴²

Moreover, it is not only that organs cannot subsist as organs without some relation to an organism, but also they cannot be or be thought as parts of any random organism. Thus one cannot arbitrarily subsume them under a unity irrespective of the particular character of that unity. The unity of organs is thus intrinsic to their nature. Indeed, each organ is brought into being from within their unity, and in a way that is determined by the nature of that particular

⁴² *SL*, 681; *Werke*, 6:476. Here Hegel echoes Aristotle who writes that “it is not a hand in *any* state that is a part of man, but the hand which can fulfil its work, which therefore must be alive; if it is not alive it is not a part.” Aristotle, *The Complete Works of Aristotle: The Revised Oxford Translation*, Vol. 2, ed. Jonathan Barnes, 6th ed. edition (Princeton, NJ: Princeton University Press, 1984), 1637 (*Metaphysics* Z 11:1036b30-32.).

unity. Unlike the boundaries of a whole, the boundaries of the organism are not a matter of external reference either, but are rather delineated by the complementary workings of a diversity of organs. The organs, however, are not merely complementary in the sense that they together complete a whole. They are brought into being from within their unity in such a way that they perform different complementary functions. It is through this functional complementarity that organs sustain one another as well as the whole. Thus, since organs are generated and differentiated in accordance with the common nature of the organism as a whole, in distinction from parts of a whole, they are not indifferent to the relations they entertain with one another. That is why, life goes beyond a formal relation the terms of which are already given. As is to be explained further, life is a process that brings about the very terms of the set of relations it incorporates.

Of course, some of the differences spoken of above do not *only* characterize that which is living. Not all non-living unities are characterized by arbitrariness or the same degree or kind of external reference, just as not all non-living determinacies exhibit the same degree of indifference. Some non-living unities, such as machines, can just as well be considered as processes, while the unity of some are even actively maintained, albeit only externally, and ultimately by some living subject. Also, even if the failure to differentiate the peculiar structure of organs from a simple and fixed part-whole relation is a common symptom, philosophical treatments of the concept of life go beyond this relationship as they rightly conceive of life as a process. After all, mechanistic philosophy treats living things as if they are functioning machines rather than static entities, whereas vitalism focuses on how the process comes to be directed by some irreducible force. Nevertheless, it can be seen that the inadequacy of the formal framework of the part and the whole plays a major role in the failure of mechanistic or vitalist approaches to conceive of life. Furthermore, leaving aside the possibility of natural machines

which perform a preset function or of forces that control inorganic nature, Hegel suggests that even the true natures of mechanical or chemical interaction themselves as well as of the way in which they serve for a purpose are left rather obscure. When these points are elucidated, how and what life involves more than mechanical, chemical, and teleological processes will be seen in a clearer light.

1.1.2. The Organic Process: Beyond the Mechanical and Chemical process

The organic unity of the living individual is the unity of a self-initiating, self-recurring, and self-producing process where all the organs are in a continuous and complementary relationship with one another. It is quite common to try to explain this network of relationship in terms of causal-mechanical interactions and chemical transformations. Indeed, a reflection on the nature of mechanism would show that, on the basis of their mutually external character, the relationship between organs has to have a mechanical aspect. Likewise, since organs have individual characteristics that have a bearing on their interactions, it will be seen that the internal process of the living individual involves a chemical dimension, as chemical process occurs between individual objects that interact in specific ways on the basis of their given identities. As regards the internal process, not only does the cohesion of organs under certain circumstances is contingent on particular chemical properties, but also the organic collaboration and upkeep requires the selectiveness of chemical transformations. Nevertheless, Hegel's account of the mechanical and chemical processes suggests that organic relationships cannot be exhausted in terms of mechanical or chemical relations alone. If this is true, then the internal unity of organs cannot be considered merely as a network of causal-mechanical interactions and chemical transformations, and therefore, a living individual cannot just be a mechanism or a set of chemical processes.

The limits of the mechanical process

Concepts of mechanism or mechanical relation are almost always used with reference to systems whose constituents are in causal interaction. Accordingly, in mechanistic biology, a living thing is often considered to consist of causally interacting parts that happen to produce a certain behavior. Now although Hegel discusses natural and social forms of mechanism in the succeeding parts of his system, in the *Science of Logic*, mechanism figures as a logical category that precedes the concept of life and expresses a process that can be conceived irrespectively of its possible applications. Even as a purely logical category, mechanism has different forms which Hegel lays out in order of complexity. In all its forms, mechanism involves an external relationship among objects that operates with indifference to their individual character. Nevertheless, depending on the particular form of mechanism, this indifference comes by degrees, and the complexity of the process is a function of the extent to which mechanical objects are differentiated from one another.

It is common to speak of mechanical *parts*, that is, parts that comprise a mechanism. The failure of mechanism to exhaust the determinacy of life has in fact much in common with the inadequacy of the part-whole relation. Externality and mutual indifference of parts as well the whole is also a fundamental aspect of mechanical objects. This is why the part-whole relation is more applicable to inorganic objects, which are governed by mechanical laws, or to artifacts, which are designed to function in accordance with those laws. Nevertheless, Hegel has a reason to characterize the mechanical relation as a relation between objects as opposed to mere parts, which calls for a brief explanation of what Hegel means by 'object.'

Even though 'object' or 'objectivity' is among the most fundamental concepts of philosophy, its use varies significantly. Often 'object' refers to that which is confronted or

represented by consciousness. This is not the fundamental meaning of 'object' for Hegel.⁴³ It is also quite common to see that 'object' is used interchangeably with other concepts such as 'something,' 'entity,' 'substance,' 'individual,' or 'unit,' and even as 'subject' as the subject of predication. For Hegel, however, any determinate being is *something* merely by being different from some other thing, whereas the object is determined in a specific way. Objectivity in general signifies self-subsisting individual totality.⁴⁴ Yet unlike the subsistence of a substance which has necessary aspects that can be held in separation from those that are accidental, or a substratum that happens to *have* certain properties, an object is an individual totality in one with its particular determinate content.⁴⁵ Unlike a quality or accident, the determinacies constitute the object, which is nothing but their particular totality existing on its own right. A quality or accident is not a determinacy that is intrinsically tied to the thing or substance that contains it. The thing or substratum and the substance are supposed to be what they are irrespective of those qualities or accidents. Correspondingly, a quality or accident by itself cannot individuate the thing or the substance, as it can belong to any other thing or substance. Nonetheless, there is no other determinacy that can individuate the thing or the substance, rendering their determinate being totally dependent on those qualities and accidents to which they are totally indifferent.

⁴³ As a matter of fact, Hegel uses the German word '*Gegenstand*' to refer to the object of consciousness, while he chooses '*Objekt*' when he refers to that which is a self-subsisting external individuality.

⁴⁴ It is worth noting that at the very beginning of the logical exposition, objectivity is nothing but an *indeterminate* totality of determinateness. In that simple form, the object is a manifold that consists of further objects that are equally indeterminate. Other than its being a totality of some determinateness, this purely formal object has no further determination in it to demarcate itself as an individual. See *SL*, 632–33; *Werke*, 6:411–12.

⁴⁵ "One can just as well take it as a thing with properties, as a whole consisting of parts, as substance with accidents, or as determined by the other relations of reflection. But these are all past relations that in the concept have come to an end. The object, therefore, has neither properties nor accidents, for these are separable from the thing or the substance, whereas in the object particularity is absolutely reflected into the totality." *SL*, 632; *Werke*, 6:410–11.

By contrast, the determinacies of the object do not require a separate ground or existence through which they comprise the totality of differences that they together are. The object is the immediate unity of these differences, which can only be externally abstracted from this object's concrete individuality whose unique content they comprise. That is why a partition of the object can only yield other objects that are also in one with their manifold content and individual character.⁴⁶ Accordingly, unlike that of the part or the whole, the self-subsistence of the object is non-relative. Having no relation to the other, the object is a self-related unity. While the part and the whole are what they are by virtue of their other, and while a part cannot be a part in the absence of other parts, an object is a freestanding individual that exists independently of other objects, as well as any confronting subject or an external reflection, for that matter. In this minimum sense in which the determinacy of the object does not point to anything other than the totality of differences it incorporates, an individual object or the objectivity as an individual whole is self-determined rather than determined by contrast to something other or by a prior determiner.

Inasmuch as a multiplicity of objects exists as individuals independently of one another, their individuality is not an outcome of their relations. Insofar as an object's individual character is unaffected by other objects, it is an object *qua* mechanical, or as Hegel puts it, a mechanical object. Any relation an object *qua* mechanical has to others is external and indifferent to their individual nature, and is accordingly considered a mechanical relation. In other words,

⁴⁶ Cf. Hegel's *Lectures on the History of Philosophy*, where he writes "[a]lthough the flower has many qualities, such as smell, taste, form, colour, &c., yet it is one. None of these qualities could be absent in the particular leaf or flower: each individual part of the leaf shares alike all the qualities of the leaf entire. Gold, similarly contains in every particle all its qualities unseparated and entire." Georg Wilhelm Friedrich Hegel, *Lectures on the History of Philosophy, Vol. 1: Greek Philosophy to Plato*, trans. E. S. Haldane (Lincoln: University of Nebraska Press, 1995), 25. *Werke*, 18:44.

interactions between objects are mechanical in character *to the extent that* they are not affected by and they do not affect the individual character of those objects.⁴⁷

The simplest as well as the most comprehensive mechanical relation is one in which objects are merely aggregated. A set of objects combined, mixed, or ordered in a combination, mixture, or order are indifferent to their connection, and their connection is in turn external to them. The unity of merely mechanical objectivity, in other words, the unity of a multiplicity of objects qua mechanical, which Hegel describes as a “reflective semblance of unity” is still not intrinsic to these objects.⁴⁸ As Hegel notes, a similar relation is exhibited not only by physical bodies externally brought together, but also by mental objects, such as words rote memorized in an order without regard to their meaning.⁴⁹ Another good example is the way the rules of formal logic are applied to propositions irrespective of their actual meaning. What is common in all these examples is that the principle of the unity of objects connected mechanically does not follow from the nature or individual character of the partaking objects, which is an aspect of the mechanical unity that is comparable to the unity of parts of a whole. Similarly, the unity in question is not one that actively brings or holds those objects together. Neither is it an intrinsic characteristic that is definitive of the nature of its constituting objects. This is reflected in the fact that the process that brings together mechanical objects is distinct from the objects as well as from the subsequent aggregate.

Obviously, the determinacy of objects mechanically aggregated cannot account for the internal structure of what is alive. The constituents of the living individual are not simply

⁴⁷ “This is what constitutes the character of *mechanism*, namely, that whatever the connection that obtains between the things combined, the connection remains one that is *alien* to them, that does not affect their nature.” *SL*, 631; *Werke*, 6:409–10.

⁴⁸ *SL*, 631; *Werke*, 6:410.

⁴⁹ *SL*, 631; *Werke*, 6:410.

brought together, nor do they merely enjoy parallel existences in which they have no impact on one another. To the contrary, life is a process that is carried out by the complementary interaction of its factors, which do not just affect but produce and maintain one another. But similarly, mechanism in the more familiar sense of the term is not a mere aggregation of terms either; it involves interactions between objects. Even when the proponents of mechanism consider the living body as a peculiar combination or configuration of parts, they argue that the combination is one that allows for a recurrent cycle of interactions. From this perspective, it may seem difficult to think of how Hegel's logical concept of the mechanical object would be instantiated in nature, for instance, by things that seem to be in a perpetual reciprocally determining interaction with one another.

In fact, Hegel himself acknowledges that there is no natural phenomenon or relation that can be characterized only mechanically other than a material body in motion considered in abstraction from further features.⁵⁰ Yet, he also points out that this is precisely the idea behind classical mechanics, which attempts to explain the behavior of physical bodies irrespective of their individual characters. Laws of mechanics are indifferent to the content of the objects they govern. They are expected to apply equally to an asteroid, a can of nitroglycerin, or a chameleon as long as they are considered as merely material. While being an aggregate of matter is sufficient for an object to be subject to these laws, the qualitative properties of the matter do not play any role in the mechanical interaction. Physical, chemical, and biological properties are thus taken out of the account of any purely mechanical explanation. As a matter of fact, classical mechanics ignores even those properties that were regarded as primary by several early

⁵⁰ *EL*, 271 (§195 *Addition*); *Werke* 8:353. Hegel continues, "even the phenomena and processes of the so-called 'physical domain' in the narrower sense of the word (for example, the phenomena of light, heat, magnetism, electricity, and so forth) cannot be explained in a merely mechanical manner (i.e. through pressure, drive, displacement of parts, etc.)."

modern philosophers such as size, figure, or internal configuration. Instead, it simply presumes individual bodies regardless of their process of individuation, and regards them as moving masses represented by point-like particles or their aggregates, though again irrespective of how they are aggregated.⁵¹

The thought of an object that remains absolutely unaffected is thus quite abstract, especially in the presence of a multiplicity of objects that could be thought to have properties relative to one another. But the proponents of mechanism do not merely argue that objects act on one another, but that their interactions causally *determine* them. Indeed, mechanistic philosophy is often willing to speak of the causal-mechanical determination of objects to an extent that casts off other possible ways to conceive of determination, such as determination by

⁵¹ Hegel speaks of a more sophisticated example that he thinks is more pertinent to illustrate the concept of the mechanical object than a point-like moving mass: the monad of Leibniz's mature philosophy. See *SL*, 130; *Werke*, 5:179–80; *SL*, 137; *Werke*, 5:189; *SL*, 632; *Werke*, 6:411. A Leibnizian monad does nothing but mirror or represent the world as a totality of monads in a particular way, and the particularity of its representation is determined by the necessity of a presupposed pre-established harmony, even though Leibniz leaves it unclear how such a formal principle would actually individuate different monads. Since the content that a particular monad represents is already imprinted on and follows from its so-called complete concept, its representation has no effect on others. As a result, each monad has a freestanding existence the individual character of which has nothing to do with its relations. Hence, Leibniz thinks that the supposed relationships between monads are ideal as opposed to real. Gottfried Wilhelm Leibniz, *Philosophical Papers and Letters: A Selection*, ed. Leroy E. Loemker, (Dordrecht: Kluwer Academic Publishers, 1989), 643–653.

In this regard, the monadic relation can easily be associated with the mechanical relation Hegel conceives in broad terms, except that the latter does not restrict the nature of the mechanical relation to one of mirroring or representation. Even though such an illustration may sound at odds with that of the 'physical body' of classical mechanics, neither representation of the mechanical object is at much variance with Hegel's account of it. In a sense, the monad and the so-called physical body are two extreme illustrations of the same concept. Each one is characterized as a self-subsistent entity the individual character of which is unaffected by its relation to other monads or bodies. Whereas the monad cannot be determined by its relations as it is already completely determinate, and therefore, a determinate individual, the physical body in abstraction from further qualities does not have anything determinate about its individual character in the first place that would allow it to be affected by equally indeterminate bodies. Consequently, just as other monads' representations cannot account for the representative content of a particular monad, the individual properties of a physical body cannot be accounted for in terms of the laws of mechanics. Nevertheless, there remains a crucial difference between the monad and the physical body. Since their relationships are merely ideal, monads do not interact. If objects were absolutely external and supposedly independent individuals like monads, having no influence on one another's individual character, objects could not even act on one another. *SL*, 634; *Werke*, 6:413–14.

formal or final causes. But they ignore or fail to see that such causal-mechanical determination leave unaccounted for the individuality of objects. In fact, Hegel does not argue that objects are like Leibnizian monads which do not have any effect on one another. On the contrary, as we will see below, Hegel's exposition of the mechanism explicates the forms of process in which mechanical objects externally determine one another, although only in a limited way. After all, insofar as self-subsistent objects stand in a mutual externality, they still remain at least in a *relation* of externality which is supposed to have no influence on them.⁵² However, self-subsistence in the face of external relations to others implies a reaction in different possible forms such as mirroring or resistance. An object that retains its identity in and through its mechanical interactions either allows for the effect to go through it as in communication, or to rebound from it. To illustrate this in terms of the most visible mechanical interaction, that is, bodily motion, we can think of how the relative impenetrability of objects is bound up with their movability. When an object is impacted by the motion of another, it can maintain its self-subsistent existence either by moving or causing the other object to move. But in movement, or moving the other, the object itself continues to persist as it is. Bodies remain self-subsistent by allowing for external determination, which does not have any effect on their self-determined, intrinsic determinacy.

⁵² When we focus on the logical characterization of the object as a self-subsistent individual standing external to other objects, we see that it points beyond itself to other objects that are also characterized by externality to others and indifferent subjection to mechanical relations. On the one hand, precisely because all objects logically characterized in this pure form are determined likewise, objects *qua* mechanical are indistinguishable with respect to their determinacy as excluding other objects. On the other hand, because they are also self-subsistent individuals, this sharing of the determinacy of mutual externality is simply transmitted without affecting objects any further. Each object is thus equally determined by their relation to the rest, which would leave all of them separate individuals sharing the same universal determinacy. Accordingly, Hegel regards this transition as the first interaction between objects, and characterizes it as a continuous *communication* of a universal determinacy of one to the other. Hence Hegel says that the object's utter externality in the identity of their determinacy is a tautological back and forth movement in which objects remain self-standing in their mutual externality. This mutuality of externality is the very character that keeps objects apart in their identical determinacy, which Hegel calls "the negative unity of a plurality of objects." *SL*, 634; *Werke*, 6:413.

But here our main focus is on the fact that mechanical interactions determine objects only in a way that has no bearing on their objectivity, that is, concretely existing individuality. By virtue of comprising a mutually external multiplicity, objects do engage in mechanical interactions. But what changes in consequence of these relations is not their intrinsic qualities, but only relative ones that are themselves products of further mechanical exchanges. Accordingly, even though mechanistic accounts try to avoid appeals to formal or final causes, they cannot but leave unaccounted for the individuality of objects.

To be more specific, the causality in mechanism is efficient causality, which is supposed to operate externally and irrespective of the natures or kinds of objects. In that sense, mechanical process involving efficient causation is still characterized by its indifference to the individual nature of its terms, whereas mechanical objects are equally unaffected by their causal roles and to the relationships in which they participate. On the other hand, what is really determined through causal-mechanical relation is not the mechanical object *qua* individual, but its further mechanical relations to other objects, which is independent of the particular character of those objects. In fact, the individuality of the material object is merely formal. This sort of a causal-mechanical relation is therefore supposed to operate on individual objects the individuality of which is merely assumed, as the individuation itself cannot be an outcome of those relations. This character of causal-mechanical determination is another example of how the mechanical process is distinct from the objects that participate in it.

Hegel is surely not the first philosopher to point out this indifferent character of efficient causality. David Hume's famous argument concerning causality was a consequence of his recognition of its indifference. He saw that the terms of causal relation have no necessary connection to one another in terms of their content, and accordingly, the causal relationship

cannot be deduced by means of an analysis of the idea of the cause.⁵³ Similarly, causality is for Kant among the pure concepts of understanding which merely dictates that every change has an external cause rather than specifying anything about the content of the terms involved in causation. What follows from the character of efficient causality is that it is not only incapable of determining the character of organic constituents, but also of any object physically, chemically, or teleologically determined. It only has a say on features that follow from an object's being merely mechanical, that is, its externality to other objects, and its indifference to determination.

To illustrate, whereas material bodies do undergo change as a consequence of some external impact, those impacts do nothing to transform the individual character of the body in question. The things that change in and through mechanical interaction are the spatio-temporal location and the rate of this change, both of which are considered independently of any further quality of the body, no matter whether it is a particle or an aggregate. Accordingly, what is causally determined in mechanical relationship is the place and velocity of particles in relation to one another, which is itself a relation that is indifferent yet not intrinsic to its terms. Consequently, if a body changes its location due to an impact, it will still be the body it is. If it is broken into parts, each part would still be a body mechanically determinable. An object might cease to be a part of a particular mechanical relation due to some impact. But insofar as the mechanism is not determinative of the nature of its components, the object's participating in one or other mechanism would not affect its character either.

Nonetheless, Hegel's further exposition of mechanism shows that the extent to which mechanical determination operates independently of the nature of objects changes with respect

⁵³ David Hume, *An Enquiry Concerning Human Understanding*, ed. Tom L. Beauchamp, Underlining edition (Oxford ; New York: Oxford University Press, 1999). See Section 4 in particular. For a similar construal, see Richard Dien Winfield, *Hegel's Science of Logic: A Critical Rethinking in Thirty Lectures* (Rowman & Littlefield Publishers, 2012), 281.

to the kind of the mechanical process. The first kind of mechanical process he expounds is communication. It is a basic interaction that operates completely irrespective of the individuality of the objects, whereas the participating objects remain unaffected by what is being communicated. Also, that which is to be communicated between objects is not determined by those objects or their relations.⁵⁴ Since communication is the one least affected by the content of its participating objects, Hegel considers it a *formal mechanical process*.

The degree of indifference of the process to its terms decreases once we start considering objects with further specifications. What Hegel calls *the real mechanical process* involves objects that are specifically differentiated in a way that has an influence on how the mechanical relation operates. This is the point at which Hegel starts talking about the real individual object as opposed to the formal object that merely has a presupposed or indeterminate individuality. Hegel points out that the difference between objects can reveal itself in forms either quantitative, such as mass or intensity, or qualitative, as in the difference in intelligence or moral character, although the main criterion that affects the fate of the objects that are mechanically related can be subsumed under *resistance*.⁵⁵ Accordingly, the extent to which the objects are affected by the process, or the process by the objects, is determined by the degree to which objects are resistant to external influence.

⁵⁴ We should keep in mind that this is a logical characterization, which may not be perfectly exemplified in the realms of reality. Hegel speaks of several examples that instantiate this mechanical process, even though they do so to different extents. In nature, the transfer of motion, heat, magnetism, and electricity from one body to another leaves the objects that communicate them unaltered. Of course, it is worth noting that although in theory, mechanical communication would be indifferent to the individual character of the object, the further the object and what is being communicated is qualified, the less mechanical the actual communication will be. After all, the efficiency of thermal or electrical conductivity, for instance, depends on the conductor. Similarly, not all physical objects will remain unaltered after communicating, say, a high frequency electric current. What Hegel calls the real mechanism is a better fit for these examples. Real communication is always mediated by resistance, which has to do with the individual nature of the object.

⁵⁵ SL, 639; *Werke*, 6:420.

In the final form of mechanical process, which Hegel calls the *free-mechanism*, the objects participate in a mechanical *system* that has its own dynamic unity and lawfulness. When a set of mechanical relationships come to an equilibrium in which the objects reiterate their acts, the process in its entirety acquires a regular and orderly character that makes it a unity and system in the face of the impacts of the objects from without. The objects partaking in these relationships assume particular roles together with this equilibrium. Thus, in a sense, free-mechanism is a mechanical process that seems to have a say on the individuality of objects. Nevertheless, the individuality in question pertains only to the object's external relations with other objects, and thus has no influence on further features that individuate them. Even though their roles in that particular whole are determined by the system itself, neither are they generated by the system, nor is their character apart from the system affected by those roles. Centrality is one such role that certain objects acquire by virtue of their relation to other objects in a mechanical system. Although the central object has the greatest influence on the configuration of or interrelations among the participant objects, it is not a self or subjectivity the universal character of which is ingrained in the determinacies of the peripheral objects.

In all three forms of mechanism, the unity of the mechanical process remains extraneous to that which it unifies, which distinguishes it from the organic process of the living individual. Objects that participate in mechanical processes are not produced or transformed by those processes in a way that the process as a whole can be considered as a self-producing unity. Thus mechanism is in none of its forms able to differentiate or to account for the individuality of objects. By contrast, in order to perform complementary functions that would coproduce and sustain the organism as a whole, organs have to be intrinsically different. Thus these differences do not merely consist of extrinsic properties that can be determined and altered in and through mechanical interactions. Organs rather have permanent and purposive

characters that are necessitated by the functioning of the entire organism. The unity and the harmonious interaction between organs is not adventitious; it is a result of the identity of the organism that requires a concept that is determinative over the affinitive relations of its members. The internal process involves exchanges that are not limited to mechanical interactions. What one organ does to others is determined by its specific nature in a way in which the differences that factor go beyond gradations on a scale.

The living individual as a whole is a unity of specific and harmonious differences, not an aggregate of parts or indifferent objects. But it is not merely a mechanical system in equilibrium either. It exhibits, for sure, aspects of a mechanical equilibrium in the sense that its constitutive members do maintain mechanical interactions as well as an enabling overall configuration. However, in distinction to a mechanical equilibrium where the process does not produce its members, organs are produced from within the internal organic process. Likewise, organic differences are not simply determined relatively, that is, as a function of a momentary distribution of certain common properties, as is the case in gravitational systems where roles are determined with respect to varying forces of attraction. The living individual is a unity with an identity that is developed in conjunction with and thanks to its particular organs. The organic unity is the process in which the identity and its constituent differences are coproduced from within the organism. The unity is not maintained by virtue of a certain entity that has an influence on every constituent of the system from without. It is rather maintained by the collective process that is responsible for the form and existence of each of its constituents.

The limits of the chemical process

That life is more than objects pushing and pulling one another, transmitting some sort of material or energy, or conglomerated in such a way to create a mechanical equilibrium is a less controversial claim. One would more readily concede that life is in all its forms contingent on an

assortment of chemicals and involves, at the very least, a variety of chemical transformations. That is why one major debate among the devotees of physicalist explanations of life concerns whether or not chemical processes are reducible to mechanical pushes and pulls. While Hegel also admits that the chemical process is necessarily incorporated by the internal process of life, he thinks it is neither reducible to mechanical process, nor capable of accounting for life or organic unity in its own right.

In the *Science of Logic*, he exposes this irreducibility by considering the basic nature of the chemical relation. Similar to mechanism, the chemical process has its place as a logical category under the term 'chemism'. Accordingly, the logical determinacy that pertains to the chemical object is not restricted to the elements of the periodic table or their components, whereas the chemical process is not necessarily their transformations. Likewise, the logical account of the chemical object and its process should not be expected to mirror all the physicalities that pertain to the chemical world. It rather explicates the common nature of an objective process that is different from mechanical, teleological, and biological processes.

To start with, whereas the general character of mechanism is indifference to the individual character of objects, the chemical relationship is a function of the specific natures of its component elements. Any object that exhibits this determinacy has at least a chemical character. An object can participate in all sorts of mechanical relationships irrespective of the features that distinguish it from other objects. Although objects *qua* mechanical do have differences from one another, these differences do not have any bearing on the nature of the mechanical interaction, or on what they are as individuals.⁵⁶ The mechanical behavior of objects is simply governed by general laws that operate irrespective of their differences. Even in the

⁵⁶ "It contains difference, to be sure, but the diverse [elements] behave indifferently towards one another and the combination of them is only external to them." *EL*, 270 (§194 Addition 2); *Werke* 8:352.

real mechanical process where the extent to which objects are resistant to external determinacy matters, what really changes is not the nature of the process or of the objects, but the degree to which the determinacy is received or distributed.

On the contrary, chemical processes are dependent on differences that are intrinsic to individual objects. Chemical objects are already differentiated as members of universal kinds, and their interactions are determined with respect to these kinds. As a result of the contrast between their kinds, chemical objects are in tension with certain others, which Hegel calls their affinity. Since these polarized yet self-standing objects are characterized by the contrasts that determine the sorts of interactions they can engage in with one another, Hegel argues that chemical objects reveal what they are through their difference from and relation to one another, even though they can still exist on their own without engaging in any relation.⁵⁷ In this respect, chemical objects take what is still a relative determinacy in what Hegel calls the free-mechanism to a further level. Like the roles distributed by the lawful process of free-mechanism, chemical affinities are not determined from without. However, because they retain their characters independently of the chemical process in which those characters are revealed, the chemical object is still a more inherent and less relative determinacy than the terms of the free-mechanism.

As distinct individualities are accompanied by different affinities, unlike mechanical processes, chemical processes do vary qualitatively as a function of the objects' intrinsic determinacy. On the flip side, the chemical process does not leave chemical objects the same, which is not the case in mechanism. Mechanical objects that are externally brought together are

⁵⁷ *EL*, 274 (§200 *Addition*); *Werke*, 8:357. For Hegel, however, the chemical object is still different from the concept of "something" and from the concept of polar opposite in the sense that the difference it incorporates makes it a subsistent individual on its own right and not merely in relation to some other or to its opposite.

unaffected by the character of their assemblage. When objects communicate some determinacy such as motion or heat, they remain what they are. Also, changes brought about by the external impact of objects have nothing to do with the kinds of object they are. Even the roles that objects assume in a mechanical system that has its own dynamic unity and lawfulness are extrinsic to them. When an object is separated from a particular system of external connections and connected to another, it can assume some other role without its individual character being altered.⁵⁸ On the contrary, when chemical objects enter into a chemical process, they cease to be the objects they are. Together, the tensed chemicals transform into a product that is different from them both. In this sense, the relation between the chemical unity and its ingredients is not one of indifference. As the chemical objects are already susceptible to be combined in their product, they are implicitly this concrete unity of theirs. Hegel calls this unity a *neutral* one, since the tensed differences of the coalescing objects are reduced to it. Nevertheless, just as the chemical object's potential to coalesce with certain others is inherent, even though the objects and their opposition get reduced to a neutral unity, their differences are still implicitly retained in such a way that makes it possible for them to disintegrate.⁵⁹ In this sense the chemical object can maintain its self-subsistent character in and through various chemical processes it undergoes. As a result, Hegel argues that the chemical unity still has a formal aspect, which is to say, it is a unity the elements of which are not differentiated by and for the unity itself.

⁵⁸ Hegel illustrates this with an example from nature: "Thus, for example, in nature the various heavenly bodies that form the solar system are connected by their movements and, by this means, demonstrate that they are related to one another. Yet motion, as the unity of space and time, is nothing but an utterly external and abstract relation and so it seems as though the heavenly bodies, related in such an external manner to one another, would be and even remain what they are without this relation that they have to one another." *EL*, 274 (§200 *Addition*); *Werke*, 8:357.

⁵⁹ *SL*, 647; *Werke*, 6:631–32.

As in mechanism, there is a sense in which the chemical process remains distinct from and external to its starting and resulting objects. The fact that specific objects enter into a transformative relation implies that the chemical process presupposes their distinct existence. But although chemical objects are implicitly prone to coalescing with their complements, their conjunction is not their own doing. Hegel describes this propensity of the chemical object to combine with its other as a *striving* to overcome its one-sidedness or incompleteness, without giving any detail as to what striving consists in.⁶⁰ Nevertheless, those chemical objects enter into a chemical reaction only through an external factor that either brings them together or serve as a catalyst.⁶¹ Similarly, once their self-subsistence is demoted to implicitness in the neutral product, their disjunction into tensed extremes requires a third and negative factor to disintegrate their neutral unity. In other words, a particular chemical process does not initiate or sustain itself of its own accord, nor does it reinstate the elements' original condition.

The internal process of life differs from the chemical process by its self-initiating and constantly renewing character. It is a self-recurring process in which organs continuously produce and maintain one another. If certain organs require the mediation of a third factor, that factor is not necessarily external to the process, but can itself be another organ or product of the organism, which is produced from within to serve for that intermediating function. Furthermore, since the chemical process brings about either the tensed objects themselves or their unity, the product is still distinct from the process. Once the product is in place, the process is over. But in the internal process of life, there is no such difference between the product and the activity among the organs. An organ is already an activity inseparable from the

⁶⁰ *SL*, 646; *Werke*, 6:430.

⁶¹ The fact that there are spontaneous chemical reactions does not contradict Hegel's characterization of the chemical process. Even though spontaneous chemical reactions are considered as not driven by external forces, there are always external factors that enable the reaction. Reactants must somehow be brought together or connected together through some medium or instrument that is not their own doing.

entire process. That is why the organic unity, which is the overall product of the internal process, is itself this very activity of a multiplicity of organs that sustain the process. Similarly, the differences that enable a particular chemical process are given independently of the process itself.⁶² By contrast, organic unity is the process in and through which the organs differentiate themselves. And instead of merely dissolving as a consequence of their process, organs maintain their differences without bringing the process to a halt.

In the course of the logical exposition of the object in general, there is a gradual development of the object toward a self-determined character that has an increasingly internal and specific determinacy. In mechanism, the absolute externality and indifference of otherwise indeterminate objects gives way to an external interaction, which, in the law governed unity of free-mechanism, ends up ascribing specific yet still extrinsic roles to different objects. In the chemical object, this extrinsic role gets transformed into an intrinsic nature that is determinative of the object's further processes. In this sense, the unity of the chemical object with its complement has in it the principle of differentiation. Nonetheless, neither the object's internal constitution nor its coalescing with its opposite plays a direct role in the process of its own individuation. Chemical processes take place on the basis of affinities that are already given, and are not absolutely restricted to any particular interaction.⁶³ Likewise, these given differences are not connected to the existence of any particular and original chemical kinds. By contrast, the

⁶² In fact, at the beginning of the logical exposition, these differences are presupposed. Any coalescence of tensed factors presupposes the existence of those factors. Then, the interaction between the neutral product and an external negativity breaks apart the neutral product into abstract elements. The abstract elements themselves are to some extent self-differentiating, which allows for the chemical objects to acquire tensed characters.

⁶³ "The standpoint of chemistry presupposes the individuality of bodies and then seeks to tear apart this individuality, this point of unity which holds differences in itself, and to liberate the latter from the violence that has been done to them." G. W. F. Hegel, *Philosophy of Nature, Part II of the Encyclopaedia of the Philosophical Sciences* (1830), trans. A.V. Miller (Oxford: Oxford University Press, 2004) [hereafter cited as *PN*], 106 (§281 *Addition*); *Werke* 9:135.

concept of the living individual involves an internal activity that differentiates its own organs, which is the same process that maintains the unity of the organism as a whole. Furthermore, the chemical object, as well as its processes of composition or decomposition, is always contingent on the presence of an external third factor that is not the object's own doing. Since the process involves a third factor that remains unaffected by the reactants, the outcome of the process of decomposition is not definitively determined by the natures of the original chemicals. Even though Hegel speaks of the striving of the tensed chemicals, it still requires an exterior incitement that operates externally on the chemicals. As will be explained in detail, this is not the case in the internal process of the living individual, where organs, through their immanent drive, are self-producing units of activity. The internal process of life as a whole is a cycle that is continually perpetuated by the interaction of organs, and not one that comes to a close in the product.

Nonetheless, it is precisely in this latter sense that Hegel thinks the chemical process, when considered as a totality of different stages, comes closer to the character of the internal process of life. The chemical process does not only unite tensed objects into neutral products, but it also breaks neutral individuals into chemically differentiated elements. As the latter brings about what the former presupposes, the chemical process as a whole comes full circle. It is through this circle that chemism engenders the idea of self-realization. But it is not merely because the process comes back to its starting point, as in the case, for example, of a fountain that circulates water. The chemical process transforms objectivity in such a way that it creates anew the condition of its possibility, which at the beginning of the logical exposition had to be presumed or provided by something that is external to the process.

This is how, in Hegel's *Science of Logic*, the notion of a self-realizing process brings the logical exposition of the object to the threshold of the teleological process. Teleology designates

the purposive process, where purpose is that which consists in the process of the concept's realization in objectivity. Purposiveness goes beyond efficient causality; unlike the cause that gives way to an effect whose individual nature is different from its own, the purpose preserves itself in its product through which it attains an objective being.⁶⁴ We should note that, characterized in this way, purposiveness does not invoke the representations of any particular mind. Its emergence from the determinacy of the totality of chemical process presupposes much less than the reality of a representing mind. At the end of Hegel's logical exposition of chemism, the chemical process as a totality, which brings about what it presupposes to get under way, proves that it contains the recipe of its objective realization. Objectivity entails externality, and in the chemical process, objects still stand in a mutual externality. Nonetheless, the chemical process as a whole shows that this mutual externality can be incorporated in a closed system that reproduces those objects.⁶⁵ Thus from the vantage point that sees the entirety of the process, objectivity becomes subordinated as a means to an end, where the end is the chemical process itself. In other words, the chemical process preserves itself by means of the products it yields.

Nevertheless, even in its entirety, the chemical process spawns only the implicit idea of purposiveness. In the chemical process, there is no unity or subjectivity that subordinates an external objectivity. True, unlike a possible cycle of mechanical motions which presupposes its participating objects, the chemical process as a whole is productive of its ingredients. Even if what the process is going to produce is already determined by the nature of the presupposed starting elements, it is a process that produces its own content. Nevertheless, the elements of

⁶⁴ *EL*, 276–77 (§204 Remark); *Werke* 8:360–61.

⁶⁵ See also Kisner, *Ecological Ethics and Living Subjectivity in Hegel's Logic: The Middle Voice of Autopoietic Life* (New York: Palgrave Macmillan, 2014), 91, where he describes the externality of the chemical process as a whole as explicitly self-mediating instead of immediately given.

this recurrent cycle do not even exist together. Just as mechanical motions give way to further motions, tensed chemicals end up bringing about new chemical object, which is in turn reduced to its chemical components, making the entire process a rather linear process. In that sense, it is not a process that unifies a multiplicity without taking away the self-subsistence of its components. Indeed, it is hard to assign a concrete identity to this process, as in those transformations, other than their being chemicals in general, there is no common nature that preserves itself in and through different moments or products of this process.

The living individual, however, is a unity of a nonlinear process that reproduces and maintains its unity and individual character in and through the complementary workings of a plurality of organs that share this character, and that are not given to it but produced from within. Thus, in distinction to the chemical process, the constituents of the organic unity are themselves the process, not what the process is contingent upon.

Nonetheless, it is worth asking whether a chemical *network* of processes is *necessarily* a linear one in which the moments do not exist together and are still dissociated from one another. Studies in chemistry and biochemistry show the possibility of autocatalytic processes some examples of which raise questions concerning the distinction between the chemical process and the self-purposive or internally teleological unity.⁶⁶ Empirical research may still be far from bringing about the conditions that enable networks as complex as those that characterize single-celled life. However, a self-organizing and self-sustaining chemical reaction network of simpler constituents that together maintain a semipermeable boundary that encloses their network and distinguishes it from its environment is conceivable. The constituents of such an autocatalytic system are thus not necessarily transient as long as they

⁶⁶ A notable review of the research concerning autocatalytic systems in relation to the origin of life can be found in Kepa Ruiz-Mirazo, Carlos Briones, and Andrés de la Escosura, "Prebiotic Systems Chemistry: New Perspectives for the Origins of Life," *Chemical Reviews* 114, no. 1 (January 8, 2014): 285–366.

are self-subsisting structures, which are often considered to be amino acid compounds such as peptides or polypeptides. It is not evident to what extent such proto-cellular structures can be distinguished from organelles insofar as they coproduce one another in a collective network that dynamically distinguishes itself in the face of an environment. But this possibility of a chemical network that sustains its identity through its coproducing constituents within collectively enclosed boundaries already brings us to the threshold of life. Admittedly, the constituents of chemical networks are initially present at hand, rather than produced or individuated from within the system. However, as we will discuss in Section 1.2.3., this also holds for the emergence of life, which is one reason why life fails to be absolutely self-determining.

More interestingly, in the *Philosophy of Nature*, Hegel first describes life as “a chemical process made perpetual”⁶⁷ insofar as that chemical process comprises constituents that spontaneously renew their activity. Indeed, one of the major differences between Hegel’s accounts of life in logic and nature is that in Hegel’s logic, teleology intercedes between chemism and life, while in his philosophy of nature, life immediately follows the chemical process. Arguably, Hegel’s characterization of the planet earth as well as his brief mentions of non-reproductive proto-organisms smooth out the transition between the inorganic processes and complex forms of life, as they represent self-sustaining processes whose constituent structures are already present before the system perpetuates itself.⁶⁸ Thus, it remains a serious question whether the logical explication can also make a transition from chemism to life without the intercession of teleology. Indeed, as we will point out in our examination of the inner purposiveness of life, a further problem with Hegel’s explication of teleology also points to this

⁶⁷ *PN*, 269; (§335 Addition); *Werke* 9:333.

⁶⁸ See also Christian Spahn, *Lebendiger Begriff - Begriffenes Leben: Zur Grundlegung der Philosophie des Organischen bei G.W.F. Hegel*, (Würzburg: Königshausen u. Neumann, 2007), 153–155, where Spahn argues that life should have been explicated as the last objective process instead of teleology.

possibility. But first, we should proceed with a preliminary explanation of how the purposiveness of life should not be conflated with external teleology.

1.1.3. The Subjectivity of Life Beyond the Teleological Process

Life is a purposive process insofar as it involves a means-end relationship. But the purposiveness of life is different from the way the means and the end are related in what Hegel calls 'external' or 'finite teleology.' In the *Science of Logic*, both external teleology and internal teleology of life are explicated as different kinds of means-end relationship. External teleology is the logical category that precedes that of life, which similarly involves both subjectivity and objectivity in the sense that it involves a subjective purpose that is realized in objectivity. Since mechanism and teleology are typically seen as mutually exclusive and jointly exhaustive, and since life is correspondingly typically considered either as a complex mechanism or artifact, it is crucial to distinguish external teleology from internal teleology, that is, the purposiveness of life.

External teleology denotes the process through which a subjective end is realized in objectivity through certain objective means. The realization of the end consists in the activity that forms objectivity in accordance with the end's own concept, which amounts to an overcoming both of its mere subjectivity and the object's mere externality. The subjective end is a universal concept in that it can be realized in a variety of objects without losing its defining identity. The end has in itself the general principle or formula of its becoming individually realized in objectivity. As it already refers to its realization, this end presupposes an objectivity that can conform to its concept and realize it as an individual object. Thus the external teleological process involves a universal form becoming an individual through some particular object. Even though the individuality of objects cannot be determined in and through their mechanical or chemical interactions, the indifference and susceptibility of these processes to external determination makes possible their subjugation under an end. Mechanical and

chemical processes are driven by external factors that impinge upon objects from without. Owing to the external determinability of these processes, objectivity facilitates purposive transformation. Objects are indifferent to the content of the ends, and by way of mechanical or chemical processes which can transform the object from without, the end can be realized in the object. When the end attains concreteness in objectivity, it goes beyond its merely subjective character, whereas the transformed object acquires a kind of unity and function that it would otherwise lack as a merely external existence.

Nevertheless, unlike the living individual, which produces its own objective being, the teleological process, Hegel argues, is only formally self-determining.⁶⁹ The self-realization of the subjective end is contingent on there being given an objectivity that stands over against it. Thus the end figures more like a form that can be imposed upon an object that is not its own doing, but that exists independently of the purposive form. Moreover, the end cannot be immediately realized in objectivity. Since the object is given independently of the subjective purpose and embodies it indifferently, the realization cannot be immediate. If it were immediate, it would not be possible to speak of a subjective end that is to be realized in some externally given object. External teleology entails a process in which objectivity is transformed from without in accordance with a merely subjective end. Immediate realization would not involve such a process. If the subjective end is not going to be realized immediately and is therefore not itself objective, the subjective end needs a way to relate to objectivity and transform it mechanically and chemically. In order to do this and be realized in objectivity, the purposive subject requires some means to the end, both in the sense of other objects and a purposively transformative activity.⁷⁰ This also makes evident that the end is more like a form that can only be unified with

⁶⁹ *EL*, 278 (§205); *Werke* 8:362.

⁷⁰ See Winfield, *Hegel's Science of Logic*, Chapter Twenty-Five.

its matter from without. Furthermore, the means is not brought about by the teleological process, either. In external teleology, the objects used as the means are always different from the end, and they are not produced from within by that end. The purposive activity is likewise externally applied on the object to be transformed and remains exterior to the end that is realized.

Life is similarly teleological to the extent that it is a purposive process where one can think of a product and the means that produce it. The product or the end is the living thing and the process of its preservation, whereas the means are nothing but the totality and activity of its organs that comprise this process. So the crucial difference is that the living individual is a self-fulfilling end that always already has an objective embodiment. This objective embodiment consists in this totality of organs the complementary functioning of which preserve one another as well as the living thing as a whole. Accordingly, in life, the immediate means that realize the end is not essentially different or separable from that end. In other words, it is a self-realizing process where the being in question is both an end and also the means to that end. The living individual is for the sake of its own life, and the internal process of its organs is the very means to maintain itself. It exists as a living individual only as long as it continuously sustains itself through its own process.⁷¹ Thus there exists no end in the living individual as such that is external to its realization and imposed from without like a form that exists independently of its matter. Because it still involves an end that is perpetually realized in and through its own constitutive objective process, life entails universality that is expressed by its constituents. But unlike the universality of the merely subjective end, which exists independently of its particular materializations, the universality of the living individual consists in the dynamic interactivity of

⁷¹ "The living *is* only as this continually self-renewing process within itself." *EL*, 289 (§218 Addition); *Werke* 8: 375.

its particular constituents that continuously maintains the unity and identity of the system by virtue of which these constituents become what they are.

The difference should also be expressed in terms of the constituents of the living individual. Organs are the means not only for the organism as a whole, but also for one another. And in maintaining and reproducing others through their complementary functioning, each organ is equally being maintained and reproduced. In this sense, organs are both means and ends at the same time. Thus unlike the teleological process where the means are only employed to realize the end in some other object, in the living individual the end gets realized in the means as long as the means is also the end. Whereas in external teleological relationship, every end can be considered as the means to some further end *ad infinitum*, the internal process of life is one that closes with itself because of the inseparability of the means and end in the living individual. Since the product of a teleological process does not ordain itself but owes its governing principle to an extrinsic subject, it is always susceptible to being subordinated to further external ends. Artifacts are meant to be used for certain purposes, which are represented by agents independently of the actual means to be employed, and which are always for the sake of some further end. By contrast, although to different extents, every living individual is governed by its intrinsic unity and can be regarded as an end in itself on account of its active self-preservation.

These fundamental differences between the teleological process and the internal process of the living individual explain why the latter cannot be an artifact or a machine. Machines are built in accordance with a represented end or a given design. Although a machine serves for an end, ultimately this end exists beforehand in a subject and independently of the presence or operation of the machine. The living individual signifies an ongoing process of self-organization, as opposed to a functioning machine manufactured from without and according to

a design. It is not generated by something that remains external to the process of its generation. Nevertheless, with respect to the life forms in nature, it is common to argue that living individuals are similarly generated according to the nature of their species being encoded like a blueprint or a software in their genetic material or program. Before we point out why the analogy fails on several grounds, it is worth noting that with respect to the development of a systematic account, the attempt to explicate the nature and development of the living individual with reference to its species would beg the question unless one can show that the concept of species being does not presuppose living individuals.⁷²

The blueprint metaphor does not work because it would be paradoxical to think of the workings of the genetic material in isolation from the system it is supposed to generate. Genetic material carries out its role only within a self-organizing system and in cooperation with other constituents.⁷³ Indeed, when its function as a relatively stable information source is taken into

⁷² Also see Evan Thompson, *Mind in Life: Biology, Phenomenology, and the Sciences of Mind* (Cambridge, MA: Harvard University Press, 2007). Thompson agrees with Hegel on the logical priority of the living individual over the genus: "Modern molecular biology ... has neglected the individual characterization of life and adopted almost exclusively the genetic-population characterization. Yet the individual characterization has a certain logical priority over the reproductive one. The reason is that reproduction presupposes an individual and some process whereby that individual reproduces. Thus the individual logically and empirically precedes reproduction and the evolutionary process of selection." Ibid, 96.

⁷³ See Lenny Moss, "A Kernel of Truth? On the Reality of the Genetic Program," *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association* 1992, no. 1 (January 1, 1992): 345: "The cell as an organized three dimensional entity is the prior condition by which the template function of DNA "can make sense." Information is not indigenous to DNA, it is constituted in the specific conditions of a cellular environment which is always already there. And if it wasn't there, there is not an iota of evidence to think that the sequence of base pairs of nucleic acids in the DNA could provide the direction for reconstructing it." Likewise Thompson says "it is unacceptable to say that DNA contains the information for phenotypic design, because this statement attributes an intrinsic semantic-informational status to one particular type of component and thereby divests this component of its necessary embedding in the dynamics of the autopoietic network. It is this network in its entirety that specifies the phenotypic characteristics of a cell, not one of its components, and it is this network as a whole that serves as the precondition and causal basis of DNA replication ("writing") and protein synthesis ("reading")." Thompson, *Mind in Life*, 57. For similar remarks also see Enrico Coen, *The Art of Genes: How Organisms Make Themselves* (Oxford University Press, 2000); Evelyn Fox Keller, "Genes, Genomes, and Genomics," *Biological Theory* 6, no. 2 (June 1, 2011): 132–40; and Evelyn Fox Keller, "From Gene Action to Reactive Genomes," *The Journal of Physiology* 592, no. 11 (June 1, 2014): 2423–29.

consideration, DNA assumes a relatively passive role in the development of the organism.⁷⁴ The problem does not disappear when the genetic material is considered as the software of a computer rather than a blueprint of a machine. The hardware of a computer exists independently of the software that it runs and given a basic compatibility, it operates indifferently to it. Thus, the so-called software of the living thing cannot be generating the organism that runs it in the first place.⁷⁵

One might still want to argue that the genetic program is a form that comes prior to the organism which simply instantiates it with its particular matter. While it might be true that the so called genetic program has to do with the structure that enables a universal or species character that different individual members instantiate, genes or genome are neither that universality by themselves, nor they ever exist independently of some living individual. Again it is true that parent organisms transmit their own genetic material to their offspring, and that material takes part in the development of the offspring. But that which is produced by parent organisms and develop into a new individual is not merely a code or blueprint, but itself a living organism at every moment of its developmental process.

Another reason why the blueprint or software analogies are misleading concerns the way in which the embryo develops into a mature organism. Organisms are composed of a diversity of cells which share identical sequences of nucleotides throughout their stages of development. When considered as a form that shapes matter, a blueprint of an artifact is supposed to be embodied in different objects that function and are configured in the same way.

⁷⁴ "It is difficult to see how genes could be responsible for initiating and directing the execution of the developmental process given that DNA is not an inherently active molecule, but rather requires activation from without. Indeed, without the highly structured cellular environment, DNA is inert, relatively unstructured, and non-functional." Daniel J. Nicholson, "The Machine Conception of the Organism in Development and Evolution: A Critical Analysis," *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences* 48, Part B (December 2014), 165.

⁷⁵ Coen, *The Art of Genes*, 11. Also see Nicholson, "The Machine Conception," 165.

But the cells of an organism that are identical with respect to their genetic structure still assume different functions and exhibit different morphology.⁷⁶ Moreover, all these differences develop in such a way that facilitates the unity and perpetuation of the living individual whose differentiated constituents they are.⁷⁷

Admittedly, the idea of a genetic program is much more complex, especially in its more recent formulations that incorporate more activities and structures than a sequence of nucleobases.⁷⁸ Accordingly, it might allow one to argue that unlike a blueprint, the genetic program does not necessarily enable one particular form among many. Cells can express different behaviors when different parts of the genetic program are activated during their development.⁷⁹ However, besides the general problem of abstracting the set of instructions that merely express organic activity in its own language from the rest of the internal process that

⁷⁶ See also Richard Dien Winfield, *The Living Mind: From Psyche to Consciousness* (Rowman & Littlefield Publishers, 2011), 28–9; 240–241.

⁷⁷ “[T]hese cells are able to organize themselves into a functioning body of incredible complexity. If DNA were a blueprint, then development would be like giving a trillion copies of the same blueprint to a trillion people, and asking them to build a city out of their own bodies” Noah Moss Brender, “The Meaning of Life: A Merleau-Pontian Investigation of How Living Bodies Make Sense” (PhD diss., Boston College, 2012), 89.

⁷⁸ “More recently, the discovery of gene rearrangements, nested genes, alternative promoters, alternative splicing, RNA editing, frameshifting, alternate stop codons, and various other posttranscriptional and post-translational processing mechanisms have complicated the straightforward view of genes as ‘codescripts’ for phenotypic traits. This has prompted the extension of the program metaphor so as to encompass not only the DNA sequences that code for transcription and translation but also those that are recognized by binding factors during gene expression (i.e., enhancers, promoters, activator and repressor binding sites, etc.)” Nicholson, “The Machine Conception,” 164.

⁷⁹ Noah Brender summarizes the underlying idea neatly: “The concept of a genetic program is supposed to be able to account for the differential development of cells in embryogenesis, which the concept of a genetic blueprint could not explain. The idea is that the program contains many “modules” which can be turned on and off: one module contains the instructions that will lead a cell to develop into a white blood cell; another module will lead to the development of a muscle cell. Like a computer program, the genetic program is supposed to consist of a series of conditional statements: *if* protein *x* is present, start synthesizing protein *y*; *if* the concentration of hormone *z* exceeds threshold *r*, stop synthesizing protein *q*; and so on. This understanding of the genome attempts to account for the complexity and flexibility of development, without giving up the claim that the process of development is specified in advance in the organism’s genetic code.” “The Meaning of Life,” 45.

maintains it in the first place, the metaphor of genetic program falls short of addressing the question of harmonious development of organs and systems. To clarify, insofar as each cell is considered to be differentiated in isolation according to the particular expression of the genetic code, this metaphor leaves unexplained how they develop in coordination with each other.⁸⁰ There is no obvious explanation to how and why a certain undifferentiated cell develops in a specific way so as to constitute a self-differentiating whole. Even if one argues that their differential yet harmonious development requires activation through interaction with other cells, given that the genetic program is allegedly run by individual cells, one fails to explain how the unity and complementarity of those myriad of interactions are governed.

Thus, going back to the machine metaphor in general, the difference between the living individual and machines becomes more obvious when we consider their constituent elements. Although both organs and machine parts are susceptible to being externally determined, since the latter are merely objects lacking subjectivity, they are indifferent to the ends to which they are subordinated. Both internal and external teleological processes are normative in the sense that the extent to which their ends are objectively realized can be assessed with respect to a norm or an overall function. The difference is that the norm of the object that realizes the external or merely subjective end, namely the artifact, is determined by another factor, while life consists in the process that establishes its own continuity as its own norm.⁸¹ In the living individual, self-preservation is an end set by the internal process of the living thing itself, not by

⁸⁰ "The genetic program influences form, but only in being interpreted by the soma according to the actual needs of self-maintenance. Without the individuality of the living body the program is nothing—a fact that runs counter to the Dawkinian conception where bodies are machines acting teleonomically to unfold the underlying program and to maintain it (here the genome has the status of an idealistic principle of reason creating artifacts)" Andreas Weber and Francisco J. Varela, "Life after Kant: Natural Purposes and the Autopoietic Foundations of Biological Individuality," *Phenomenology and the Cognitive Sciences* 1, no. 2 (June 1, 2002), 117.

⁸¹ See Canguilhem, *The Normal and the Pathological*, 126–7: "Normative, in the fullest sense of the word, is that which establishes norms."

an external agent outside the process. But in the case of external teleology, the goal depends on the expectation of the craftsman or the user and it remains external to the parts as the latter are indifferent to the designed goal of the machine. Even if machine parts would not have been produced otherwise, they can continue existing when they malfunction or do not function. But organs would cease to exist when they stop functioning in a way that would also provide for other organs. For within the organic unity of the living individual, the maintenance of each and every organ also relies on the functioning of the rest. By serving other organs, each organ obtains its needs to operate in a way that it cannot provide for itself. Likewise, although machine parts can well remain intact when certain other components break down, given their complementarity, organs start to fail when any vital function is not carried out by the responsible organ. Also, while the product of the external teleological process is something that has no intrinsic relation to the means that produce it, the products of the internal process of life is those very means themselves.

Since machine parts serve different functions, they have to be differentiated objects. But unlike organs, their differentiation is not their own doing. Different organs develop from within the same internal process of the living individual, which is nothing but this development. Even if an organism as a germ is generated by other living individuals, it develops in and through an internal organic process in which its constituents coproduce one another. By contrast, machine parts must already be at hand before they can be assembled into a unity. This is why they are given or produced in accordance with a preexisting purpose and independently of the operation of the machine. Since they are not produced from within the operation of the machine, the existence of each mechanical part is independent of the existence of others. As parts of a machine are altogether nothing but a mere aggregate, they don't have the capacity to assemble and configure themselves into a purposive unity without the help of an external

agency. Even when they are assembled and configured, they cannot set themselves into motion, and thus require an external mover to operate. Also, since laws of mechanics and chemistry are indifferent to such norms as well-being or health, it is hard to conceive the process of repair or restoration without appeal to purposiveness intrinsic to the organism. In this respect, since parts of a machine are indifferent to ends and unable to move themselves, they can neither maintain nor repair nor renew themselves. Of course, a machine can be programmed to make certain modifications under specific circumstances. These modifications are utterly determined by prefigured mechanical-chemical interactions that are indifferent to their effects. But besides the fact that any programming would require a living individual in the first place, new parts to replace defective ones must be given separately and independently of the machine's operation. In the case of machines, we can at most speak of several mechanisms within a larger mechanism that are only extrinsically connected. In this sense, it does not matter whether the parts that do the repair are within or without the spatial boundaries of the machine. By contrast, in life, what performs the duty of repair is still developed from within the same organic unity, and it is not only a means to maintain the unity of the organism, but just like every other constituent, is itself an end. This is because unlike a machine, which is maintained to perform a certain function, self-production and self-preservation of life is an end that is not distinct from its maintenance and continuous replenishment. Indeed, repair is not a function carried out solely by a certain component designated for it. When the repair process is active, it is the entire organism that modulates its entire process and repairs itself. Even if there are constituents specialized for certain tasks of healing, those constituents are not sustained apart from the organism.

The preceding introductory discussion is meant to give an idea of Hegel's logical determinacy of the living individual. Because a complete treatment of the logical system from the beginning till the determinacy of life would have been infeasible for the purposes of this

project, we decided to provide a brief account of the determinacies that is embedded in the Idea of the living individual, rather than providing a thorough account of their systematic development in the *Science of Logic*.⁸² Interestingly and importantly, these determinacies that Hegel's concept of logical individual presupposes are the same ones that in terms of which many others attempt to lay hold of life. We tried to show why these terms fall short of the determinacy of the living individual as Hegel conceives of it. We have pointed out why construing the constitution of the living individual in terms of a part-whole relationship eclipses the dependence and complementarity of organic constituents. Similarly, we have discussed the general characteristic of mechanical and chemical processes to indicate that they cannot exhaust the purposive nature of organic unity. Finally, we explained why external teleology can at most render the living individual an artifact that is externally produced, organized, and maintained, which is at odds with the coincidence of the means and end in organic unity. Having laid out what the living individual is not, we can now proceed to have a closer look at Hegel's explication of the living individual and its constitutive internal process. However, although we have already attempted to familiarize the reader with the general idea of the living individual, we will try our best to keep a balance between sticking to Hegel's argument and providing an accessible account by clarifying or circumventing the baffling terminology and obscuring terseness whenever possible.

⁸² Among several others, Michael Spieker, Wendell Kisner, And Richard Winfield provides more detailed readings of those sections, to which this study owes much. Because they do so in a way that is by and large in conformity with what we take for granted here, it would be helpful to look at them to have a better grasp of the logical derivation. Spieker, *Wahres Leben denken: Über Sein, Leben und Wahrheit in Hegels Wissenschaft der Logik*, 1st ed. (Felix Meiner Verlag, 2009); Winfield, *Hegel's Science of Logic*, and Kisner, *Ecological Ethics and Living Subjectivity in Hegel's Logic*.

1.2. THE LOGIC OF THE LIVING INDIVIDUAL

It is worth recalling that the logical account of the living individual is *not* one that seeks to find a logical form to which the internal structure and the life-process of organisms *in nature* can be *reduced*. It rather explicates the logical form that the concept of life or the living individual is; the concept that is necessary, although not sufficient, to conceive of living things in nature. With the concept of life or the living individual, Hegel's exposition is marking out a distinct form of organization, or more truly, a process which has its own principle of activity, and which consists in a distinctive inner constitution and interrelations. The preceding examination addressed why the part-whole relation is insufficient to account for the organic unity and constitution by contrasting it with the necessarily complementary nature of organs without the need to fully explicate the logical structure that the latter presupposes. Similarly, we attempted to clarify why mechanical, chemical, and teleological processes are insufficient to exhaust the fundamental nature of the living individual's internal process by emphasizing how each of these objective processes consists in relations that remain, to differing extents, extraneous to their relata, and in processes that are unable to produce their constituents and determine their identity. However, we did not lay down with clarity the specific logical structure that Hegel thinks expresses a self-determining relationality that produces its factors and constitutes their inner nature.

1.2.1. The Living Individual as Self-determination of the Idea

In the *Science of Logic*, life comes first in the domain of the Idea, whose different forms are distinguished from one another by virtue of the specific way in which each form's subjectivity is in unity with its corresponding objectivity. To repeat, the Idea stands for processes in all of which the subjectivity comes into a unity with its objective counterpart. Hegel opposes the traditional uses of the term 'Idea' to designate a quality, impression, representation, or an

abstract universal. For Hegel, the Idea is not a matching up of a subjective and contingent content with an externally given phenomenon or appearance, which Hegel refers to as correctness. The idea is not an impression, a representation that relates only externally to the object it perceives or represents. It is rather the object that corresponds to its concept, namely, the objective concept, which Hegel calls the *truth* as opposed to mere correctness.⁸³ Thus the domain of the Idea is the domain of truth. That which is true is a concept that inheres in and determines its object rather than being determined by it. Life is in this sense the Idea in its immediacy, as it consists in objectivity that is thoroughly and always already determined by its concept, the import of which needs to be clarified.

Subjectivity, the concept and the structure of self-determination

To begin with, the fact that Hegel characterizes the Idea both as the concept that conforms to its object and also as the unification of objectivity with subjectivity implies that the concept is bound up with subjectivity. The subject as a category manifests itself first as the concept itself, which Hegel occasionally calls the subjective concept not only because it is not yet the concept that corresponds to its objectivity, but also because the basic character of subjectivity consists in the concept's fundamental determinacy.

The concept is the basic form or structure of self-determination. That which determines itself must obviously be a self. Any self would suggest an identity,⁸⁴ but the self that determines

⁸³ *SL*, 670; *Werke*, 6:462: "something has truth only in so far as it is *idea*." See also *EL*, 283 (§213 *Remark*); *Werke* 8:368: "The idea is the *truth*; for the truth is this, that objectivity corresponds to the concept,—not that external things correspond to my representations; these are only *correct* representations that *I*, *this person* [*Ich Dieser*], have. In the idea it is not a matter of an indexical this [*Diesen*], it is a matter neither of representations nor of external things."

⁸⁴ Strictly speaking, here identity is used, in Hegel's words, "not in any speculative sense, but in the sense that the something, as subject, persists in such a quality as an existent." *SL*, 355; *Werke*, 6:38. Thus it is not used in the sense of a category of essence which necessarily incorporates difference. In the systematic explication, even the category of *the one* is a self-relating being, or more truly, the being of self-relation as such, which implies the being of the self. Nevertheless, the one has no identity; being

itself retains an identity not as a simple self-identity or self-reference but rather in and through its self-determined differences. Self-determination entails a self that constitutes itself by giving itself determinacy, that is, by generating its own determinate content. This has to involve a process of self-modification as otherwise the self would merely be self-identical determinacy that is found given or externally determined. But in giving itself a determinacy, that which is self-determining does not cease to be what it is and become something else, but it retains its identity in difference. In this sense, self-determination is different from transformation, and it can more appropriately be conceived as development.

But how does the subject give itself determinacy and develop itself from within? The logic of the living individual explicates the fundamental form of the self-determination of the Idea, which is to say, self-determination of and through self-constituted objectivity. The determinacy wherein this form consists is incorporated by any further form that involves a self-determining subject with an objective existence.

As we will explain in detail below, in the case of external teleology, the subjective concept makes itself determinate in objectivity, although it requires some external means that is found given, and therefore, not produced by the subject. Thus the subjective end or the purposive subject is self-determining *to the extent that* it ultimately realizes itself in the given objectivity. However, it is *not* a self-determining Idea, as it does not constitute its own objectivity. Somewhat similarly, as we will see in the examination of the logic of what Hegel calls the life-process, the living individual converts external objectivity into its own form by negating the object's self-subsistence, an example of which we observe in the metabolic process of all living things. In the life-process the living individual *reconstitutes* itself through the world, while

deprived of any determinate content, it is self-related without mediation, and thus, not in and through any differentiation. *SL*, 132–34; *Werke* 5:182–84.

in external teleology, the subjective concept gets realized in objectivity. Even though both processes maintain their starting subject, and even if in the life-process, the living individual also determines itself in determining external objectivity, in both cases a subjective individual is already in place, determining something other than itself. By contrast, here in the logic of the living individual, the question is how the subject as objective renders itself determinate *on its own account* in the first place. This involves addressing how the subject with objectivity gets to be what it is, or how it constitutes itself as a subject that has self-determined objectivity, without rendering the body of the living individual an object that is fashioned from without like an artifact.

Nothing can be self-determined if it does not actively determine itself and before it has determined itself. Self-determination must involve a process. If self-determination is a process in which the self-determining subject remains itself in and through differences, it must be creating its own differences from within itself. In other words, the only way an individual can determine itself *without* integrating otherness is by virtue of internal differentiation.⁸⁵ Nevertheless, internal differentiation cannot merely consist in an indeterminate flux. If that which differentiates itself does not yield determinacy, then there is no genuine differentiation, no genuine identity, but only self-identity or sameness. Self-determining subjectivity is thus a self-differentiating process that negates or goes beyond its own determinacy by giving itself ever new determinacy. In its self-differentiation, the subject does not simply *become something else*, or it does not disclose its intrinsic differences in or through its reflection. Neither is the subject dispersed into an infinite particularization nor lost in the indeterminacy of multiplicity. It is one that constitutes an identity from its unity of its own differentiation. In this regard, the identity of

⁸⁵ Even in cases in which an assimilation of the other into one's own is in question, the subject is still differentiating its own determinacy.

the self-determining subject as such does not have any recourse to anything outside itself. Accordingly, howsoever the subject *further* determines itself becomes a function of its existing self-determined determinacy.

The difficulty is to comprehend the self-determination and internal differentiation of the Idea, namely, that which is both a subject and an object at the same time. Since the Idea of the living individual is a self-determining Idea that consists in a concept which has a corresponding objectivity, it is a self-constituting individual that internally differentiates itself *in objectivity* while still remaining in unity with its differences. Now before thoroughly explicating the self-determination *as Idea* including the specific challenge it poses, it might be worth addressing why Hegel thinks that the concept of the concept is the first form that exhibits the character of the unity of self-determined differences.

The concept, for Hegel, is that which maintains its identity in its internal differences. But most notably, the concept is the first form in the *Science of Logic* that exhibits subjectivity and self-determination. In other words, the concept must be *self-determination per se*. In line with the ordinary use of the term, Hegel's concept is *the* universal at the outset of the exposition. Yet it is *not only* the universal; it also incorporates particularity and individuality as its moments, while "each moment of the concept is itself the entire concept."⁸⁶ Universality and particularity imply each other insofar as the universal pertains to particularity and particulars, and a particular is always a particular of a universal. In other words, just as a particular is a particular

⁸⁶ *EL*, 237 (§163 Remark); *Werke* 8: 311. "This universal concept that we now have to consider contains the three moments of *universality*, *particularity*, and *singularity*. ... [E]ach of the moments is just as much the *whole* concept as it is *determinate concept* and a *determination* of the concept." *SL*, 529; *Werke*, 6:273. "The *particular*, for the same reason that makes it only a determinate universal, is also a *singular*, and conversely, because the singular is a determinate universal, it is equally a particular. If we stay at this abstract determinateness, then the concept has the three particular determinations of universal, particular, and singular. ... Only a way of thinking that is *merely representational*, for which abstraction has isolated them, is capable of holding the universal, the particular, and the singular rigidly apart." *SL*: 547–48; *Werke*, 6: 298–99. Note that George di Giovanni chooses 'singular' and 'singularity' to translate Hegel's use of 'das Einzelne' and 'die Einzelheit.'

only by virtue of the universal, the concept of the universal is bound up with particularity in the sense that the former cannot be spoken of without the possibility of the latter that can exhibit it. As the universal cannot be thought in isolation from its particular instances, so is the concept for Hegel not an abstract universal that stands apart from its particulars, but is the unity of the universal with its different instances. The concept is in other words not only the universal, but universal in unity with particulars. In this respect, it is the unity that pervades a multiplicity where the universal stands for the element of unity and the particularity for the difference.⁸⁷ Inasmuch as it refers to the *unity* of the universal with its particulars, or the unity of the identity and difference, rather than the relatively abstract aspects of identity and difference, the concept itself is individuated, that is, an individual.⁸⁸ In this relation of the unity of the identity with its differences, we see that the individual does not lose its identity, but quite the opposite; it rather becomes what it is through its internal differences. The individual is thus the totality in which the universal thoroughly encompasses its particulars.

More importantly, as is the case for self-determining subjectivity, different instances that Hegel's concept of the concept incorporates, namely the particulars of the universal, are not merely given or externally differentiated, or subsumed under an arbitrary blanket term. For

⁸⁷ Of course, that the universal is conceivable only relation to the particular is not what many other accounts of the concept fail to notice. But the universal is often construed as being in an external relation to the particular. Some represent the universal as a quality that is abstracted from it by an extraneous reflection, or an essence or form that underlies or transcends the particulars which reflect or partake in it. Leave alone several other problems, these conceptions of the universal leaves unaccounted for the individuation of those very "qualities," "forms," or "essences," and they do not address how different universals relate to one another or to their particulars.

⁸⁸ It is worth noting that in the *Science of Logic*, 'identity' and 'difference' are categories of reflection in the domain of *essence*, which do not have any truth in isolation from their opposition. In the domain of the *concept*, on the other hand, the categories of identity and difference are incorporated by the moments of the concept, universality and particularity, respectively, whereas the individual (which is translated in the following as 'the singular') is the negative unity of them both: "In the concept, identity has developed into universality, difference into particularity, opposition (which returns to the ground) into singularity. In these forms, those determinations of reflection are present as they are in their concept." *SL*, 543; *Werke*, 6:292.

Hegel, the universal does not only inhere in its particulars by virtue of providing them with their identity, but it generates those particulars from within itself.⁸⁹ Thus the concept as an individual totality is the unity of the universal with its *self-generated* particulars. To the extent that it retains its identity in those differences that derive from itself, the self-determining individual or concept is equally *the subject*.

As the concept itself is self-determination, it is not a static unity. It is rather a process that consists in the generation of these particulars as its distinctive determinacy. Since this self-generation is again not a matter of relation to externality, the concept constitutes itself by virtue of the self-differentiation of the universal into its particulars. Thus the universal's very particularization is what makes the concept and the individual the *unity* of multiplicity that it is. In this self-differentiation, the universal comes to constitute and individuate itself.⁹⁰

⁸⁹ In the logical exposition, Hegel shows that the thought of the concept of the universal necessarily leads to the concept of the particular of that universal, indicating that the universal necessarily particularizes itself. See *SL*, 529–49; *Werke*, 6: 273–301. In the same passage, Hegel derives the particular forms of universals, such as abstract concepts, classes, and genera from the self-differentiating universal, thereby showing that these forms are the very outcomes of the self-differentiation of the universal.

A detailed account of Hegel's explication is unfortunately beyond the scope of this study. For thorough yet alternative readings of Hegel's theory of the concept, see Gregory Moss, "The Being of the Concept" (PhD diss., University of Georgia, 2014); Ioannis Trisokkas, *Pyrrhonian Scepticism and Hegel's Theory of Judgement* (Leiden: Brill, 2012); and Winfield, *Hegel's Science of Logic*. Considering the purposes of this study, it is important to note that the concept is the fundamental logical form in which the unity is an essential characteristic of multiplicity because that multiplicity is its own differentiation. However, we should keep in mind that the way the subjectivity of life differentiates itself into a multiplicity of particular organs will be different from the way the concept of universal differentiates itself. Otherwise, Hegel's account would be another example of reductionism.

⁹⁰ The necessity of the concept's self-differentiation can still be thought in a simple way. The thought of the universal fails to sustain itself without differentiating into its particulars. Similarly, the particular establishes its unity in the form of the individual, without which it would be unable to differentiate itself from other particulars and in turn immediately revert back to the undifferentiated universal, which then ends up failing to fulfill self-determined determinacy. Accordingly the elements of the concept prove their own necessary interdependence in and through their differentiation, which equally comes to be the concept's own self-differentiating unity. In this way, for the first time in the course of the logical exposition, a logical category furnishes its own internal determinacy by providing itself with content that develops from within. See Richard Dien Winfield, *From Concept to Objectivity: Thinking Through Hegel's Subjective Logic* (Burlington, VT: Ashgate, 2006), 74–84.

The self-positing substance of the living individual

Given this characterization of the concept, it is not surprising that the concept is integrated as a crucial constituent of Hegel's exposition of the category of life and the living individual. Hegel writes that the concept is "the soul of life itself,"⁹¹ first in the sense that the unity of the living individual is universally pervading its multiplicity in a way similar to how the universal is embedded in its particulars, and second, because the organic unity of life is a self-constituting one that develops its constituents from within itself. The articulation of the living individual into organs is indeed the self-differentiation of its own self-driven process.

Nevertheless, even though the concept provides life with the basic structure of self-differentiation, the concept of the living individual, which is equally to say, the soul of the living individual as logically characterized, is different from the concept of the concept. In other words, the concept shows itself to be the logical form that the subjectivity of the living individual incorporates in a way peculiar to its own nature. After all, the concept and subjectivity of the living individual is one that unifies objectivity. It is this difference that we are going to explore in the following sections.

At the very outset of the section of the living individual, Hegel writes that the concept of life is "the negative unity of this externality," and "*posits* it as corresponding to it."⁹² Similarly, he says in the same passage that this objectivity "has proceeded only from the concept, so that its

Especially given the question of how the concept develops itself, the order of logical thinking may give the misleading impression that the universal comes before the particular in time. However, the self-differentiation of the universal is immediate, which is to say, the universal is already a particularizing process that does not disperse into indeterminacy, but is rather unified as a determinate individuality. At most, it can be thought as the co-institution of the universal together with its particulars. Nevertheless, concerning the order of the logical explication, the universal concept has a priority due to its initial indeterminacy.

⁹¹ *SL*, 677; *Werke*, 6:471.

⁹² *SL*, 679; *Werke*, 6: 474.

essence is positedness” and the concept is the only substance that pertains to this objectivity.⁹³ There is much to be clarified in this statement. It is worth starting with why Hegel thinks that the concept is the substance of life, and what he means by ‘positing’ here. After all, life is subjectivity before all, and subjectivity is traditionally set against substantiality. While the subject is self-determining, the substance is thought to be governed by necessity. The substance as such is a self-subsistent existence from which accidents follow necessarily. But although accidents exist by virtue of the substance, as regards their content, they are still unaccountable with reference to the substance, as the very name ‘accident’ suggests. In this respect, accidents are posits of the substance, where the substance is “the power that posits determinations and distinguishes them from itself.”⁹⁴ In this act of positing, the positor does not generate the content of that which it posits; it merely posits a relation between itself and some other content which depends on it to exist. In the *Logic of Essence*, in general, the categories are paired with their opposites in a way that there is always a chasm and an imparity between what posits and thereby determines and what is being posited and determined. In this act of positing, one term renders another dependent on itself, without generating its content.⁹⁵ Here the imparity consists in the dependency relation, whereas the chasm points out the lack of necessity between the specific *contents* of the terms. In a positing act where there is this chasm, the positor is rather postulated as the determiner of some given content without accounting for the specific relation between those contents.

⁹³ *SL*, 679; *Werke*, 6:474.

⁹⁴ *SL*, 492; *Werke*, 6:222.

⁹⁵ There is one important sense in which the derivation of one category from another is in fact a generation of content. The *Science of Logic* boasts an immanent deduction of categories without making recourse to anything that has not been derived in the course of this explication. Therefore, in each step, some new determinacy is generated from what comes before it. The underlying reason, however, is the very fact that all these categories are concepts, and the logic is the self-development of the concept itself.

If the living individual is truly self-determining, then the concept of life, the soul, cannot be a mere substance governed by an external necessity. Correspondingly, the positing of a truly self-determining subject cannot be governed by pure necessity and end up with a content that is indifferent to its own determinacy. The positing and substantiality of the living subject has to have a different nature. The living individual first needs to demonstrate that in its internal process the distinction between the determiner and the determined vanishes. Because a positing act is determinative, the activity of the living individual must be a self-positing act that closes with self-determination. It is only in a positing act in which there remains no disparity or chasm between the terms that we can speak of self-determination.

Since that which is a concept or is conceptual in general is its own articulation, whereby its universal nature explicates its individual character, it accommodates no such chasm between the contents of the determiner and the determined. Thus that which is conceptual posits itself *if and only if* it posits its other, and it already encapsulates the content of that which it posits just in case its very nature is the explication of that content. It is a positing in which the posited is in unity with the positor by virtue of participating in the same individuated nature. The *content* of the positor and the posited are therefore not indifferent to but intelligible in terms of one another.⁹⁶

⁹⁶ Hegel speaks of the distinction between the acts of positing in two different domains as follows: "This universal concept that we now have to consider contains the three moments of *universality*, *particularity*, and *singularity*. The difference and the determinations which the concept gives itself in its process of distinguishing constitute the sides formerly called *positedness*. Since this positedness is in the concept identical with being-in-and-for-itself, each of the moments is just as much the *whole* concept as it is *determinate concept* and a *determination* of the concept." *SL*, 529; *Werke*, 6:273. Here by comparing being-as-posited with being-in-and-for-itself, Hegel is pointing out how by virtue of its being the latter that the concept incorporates opposing elements, i.e., opposition or negativity is not external to the concept. In broad terms, the concept acquires this ideality as a result of the dialectic of the Logic of Essence, where it turns out that the positor acquires its determinacy principally from the fact that it posits, rendering the posited a positor of itself, i.e., the original positor.

Thus according to the theory of the concept, when the universal differentiates itself into its particulars, those “posited” differences do not fall outside of the universal, but becomes its internal determinacy without which it would merely be indeterminate. To this limited extent the relation between the soul and the living individual has its parallel in the relation between the universal and the concept: “the universal is also the *substance* of its determinations, but in such a way that what for the substance as such was an *accident*, is the concept’s own self *mediation*, its own *immanent* reflection.”⁹⁷ Admittedly, this analogy has its limits drawn by the fact life is not just a concept, but a form of the Idea. The living subject’s being does not just consist in a subjective process as it also involves objectivity.⁹⁸ However, characterized with regard to the domain of the concept, this merely subjective relation still prefigures the sense in which Hegel thinks that the concept or the soul of life is its substance. In the end, it needs to be shown that the soul cannot be spoken of as if it is an entity that can exist independently of its incidental body. Unlike the substance that still needs accidents to be a substance, the living individual does not merely require its objectivity but is also constituted by it. Whatever is developed or differentiated from within the common unity or concept of the living individual should also account for the concrete and explicit being of its soul. The living individual needs to prove itself to be the totality of its activity. In a way similar to how the universal is abstract without particularization, the explication has to make clear that without the process that encompasses its objectivity the soul would be dead.

⁹⁷ *SL*, 532; *Werke*, 6:276–77.

⁹⁸ “The determination of the opposition [between the universal life and its particulars] are the universal *determinations of the concept*, for the splitting into two is the affair of the concept; the *filling* of them, however, is the idea.” *SL*, 679; *Werke*, 6:474.

Life in its immediacy

In the logical account of the self-determination of both the concept and the living individual, we see that the process starts with an indeterminate, abstract subject, that is, an indeterminate universality in the first case, and a form of the Idea, namely a subject-object in its immediate form in the second. The underlying reason is that a logical account of self-determination cannot be presupposing that which is self-determining, as it would only beg the question. That which is self-determining needs to prove itself to be what it is by its own act. It cannot be self-determined before it has actually determined itself. Yet the difficulty is that the premises of the argument that explicates self-determination do not have or demonstrate their truth until after they are shown to be necessitated by the conclusion. If self-determination is grounded on something that it does not determine, it would rather be other-determined. The only way for a self-determining process to overcome this difficulty is to show how it can develop the moments that constitute it. Accordingly, that which is to determine itself has to demonstrate that what it presupposes does not undermine but rather facilitates its self-development.

To put it in another way, in the Logic of the Concept, premises do not entail the conclusion more than they are themselves entailed by it. Since the distinction between the ground and the grounded no more reigns in the domain of self-determination, we cannot properly speak of premises that support or ground a certain conclusion that proposes the truth of self-determining subjectivity, unless that which is grounded is shown to be one with its ground. The argument as a totality is therefore the self-determination of the concept whose moments can at most be *abstracted* from the process that it is. The truth of its particular

moments or premises is only an upshot of their function within that process.⁹⁹ Yet still, the logical exposition must take off from somewhere, and therefore, it starts out with that which is least determinate, which is to say, with a concept whose abstract determinacy does not presuppose what comes after it in the logical exposition.

Again, let us first consider the concept of the concept as regards its beginning. We have already noted that Hegel's exposition shows that each of the three moments or constituents of the concept, that is, each of the terms universality, particularity, and individuality, is equally the others. That is to say, the universal concept is also a particular concept, which is itself an individual. The particular concept and the individual also has universality, whereas the individual is a particular concept, and the particular concept is an individual. Thus each aspect of the concept is also the totality that the concept is. None of them can truly sustain its meaning in isolation from the rest. Nevertheless, the logical exposition starts with the universal without first bringing in the concept of the particular or the individual, and shows how the universal differentiates itself into those other aspects of the concept. The universal as such is a self-differentiating unity, but in its act of differentiating itself from itself, the universal already unfolds its different moments, namely, its particulars. Thus only as soon as it is conceived as self-differentiation without any appeal to particularity, the universal makes itself into a particular. And thus in differentiating itself into its particulars, the universal gives itself determinacy and therefore ceases to be indeterminate. But once it is differentiated, the universal shows itself to be the unity of its particulars, which shows that despite their immediate

⁹⁹ Notably, this is the very truth in which the organic unity also consists. The living individual is an account, a *logos*, a concept, but one that is united with its objectivity, and its moments have their truth only as self-differentiated constituents of its totality. Here we are trying to explicate this *logos*, the nature of which is also briefly expressed in Hegel's following words: "The process of the living being with itself is this same premise, but in so far as the premise is also the conclusion, in so far as the immediate reference of the subject to the objectivity, by virtue of which the latter becomes means and instrument, is at the same time the *negative unity* of the concept within itself." *SL*, 681; *Werke*, 6:477.

relation and reciprocal incorporation, the universal and the particular keep their distinctive meanings. But as the concept is the first form of the individual in which differences are in unity, both the universal and the particular *immediately* show themselves to be equally their opposites.

In a similar way, the logical exposition of the living individual sets out with the universal concept of life, that is, the concept of the subjectivity that pertains to life *in general* before it demonstrates its individuality. Just as the concept as such, or the subjective purpose of the teleological process, life in its immediate conception is thus the mere principle of its realization. However, life still goes beyond the subjective concept and purpose. On the one hand, it is not just a concept but an Idea; a concept that is objectively realized. On the other hand, it is not merely a subjective purpose, as the process of its realization is its own doing and not separate from what it is. Because it is not merely a universal concept, its determination of itself as an individual, which involves its differentiation into its particularity, will be different from the way the universal as such differentiates into its particulars. Since life is a form of the Idea, its concept, namely the soul is a concept that contains an objective counterpart. But furthermore, for that objectivity to be the soul's self-determined determinacy, it must turn out to be the soul's own doing, rather than something that is achieved *by means of* an already given determinacy, such as some external means.

The soul and the body

Because the exposition gets off the ground by the Idea in immediacy, the soul in abstraction from its objective realization is only the *implicit* positing of its objectivity as Hegel writes at the beginning of the logical explication of life.¹⁰⁰ If the living individual is a unity of manifold objectivity, the theoretical starting point is this implicit or indeterminate, that is to say,

¹⁰⁰ *SL*, 679; *Werke*, 6:474.

not yet self-explicated or self-differentiated concept. But as long as any concept is characterized by self-differentiation, and insofar as this concept, as the first concept in the form of the Idea, entails an objectivity as its counterpart and its distinguishing determinacy, then even in its indeterminacy, it is the “creative presupposing,” which is to say, the explication or particularization of what is in itself implicitly entailed.¹⁰¹

In order to see why the soul implicitly contains an objective counterpart, or in other words, why idea is immediately the unification of the two, we will need to consider the outcome of the teleological process as it is logically characterized. But to prevent misunderstanding, it is worth stating clearly that for all the necessity of the indeterminate onset of the logical exposition of life, the living individual is in its truth only the totality of its constituents, as is the case for the concept as such. Indeed, Hegel writes that even in its simplest form, the soul “contains determinate externality, *as a simple* moment enclosed within itself.”¹⁰² But more importantly, he adds that it is not just that it has this determinacy as an entailment it implicitly contains. The *soul of the living individual* is “*in its immediacy* immediately external, and has an objective being within it.”¹⁰³ In this regard, the concept of the living individual is already different from a merely subjective end. Since the latter is the concept of its realization, it makes reference to its realization in objectivity. But it is neither necessarily realized in nor bound up with any particular object that can realize it. On the flip side, this externality or objective being of life is “at the same time as the *simple determinateness* of its concept.”¹⁰⁴ Thus the soul exists by virtue of the objectivity it posits, whereas the existence of the objectivity is dependent on the individual unity that posits it. On the one hand, the soul or the concept of life is that which

¹⁰¹ SL, 679; *Werke*, 6:474.

¹⁰² SL, 680; *Werke*, 6:475.

¹⁰³ SL, 680; *Werke*, 6:475.

¹⁰⁴ SL, 678; *Werke*, 6:472.

posits its body, a totality of differentiated organs, by virtue of expressing its unification and character which determines them as organs of a specific individual. The body of the living individual is a kind of objectivity that can only exist as bound up with a subject. On the other hand, the being and activity of the soul which permeates its objectivity is nevertheless dependent on the specific process that constitutes its objective existence. It is in this sense that the positing act of that which is a form of Idea is indeed an act of self-positing. The soul is the unity that it is through and only through its posited objectivity, which makes the soul itself a positing of a totality of objectivity.

However, the identity of the soul with its objective constituency does not imply that they are indistinct either. Leave aside self-determination, being that is not somehow differentiated is not even something, that is, a determinate thing. By contrast, that which is self-differentiated must have self-generated differences as its constitutive moments, which can still be conceived in their abstraction. In broad terms, the subjective unity of life in abstraction consists in its individual identity over against the diversity of its objectivity. Given that its objectivity entails the constituents that are characterized by externality, the soul is, on the one hand, the *unity of externality*. On the other hand, Hegel calls the subjectivity of the living individual, namely the soul, a *negative unity*, and the living individual itself a negative self-identity.

According to content, this objectivity is the totality of the concept—a totality, however, that has the subjectivity of the concept, or its negative unity, standing over against it, and this subjectivity or negativity is what constitutes the true centrality, that is to say, the concept's free unity with itself. This *subject* is the idea in the form of *singularity*, as simple but negative self-identity—the *living individual*.¹⁰⁵

¹⁰⁵ *SL*, 680; *Werke*, 6: 475.

It is a *negative unity* in the sense that it is a unity of opposition of the subject with its corresponding manifold objectivity, where the particular constituents of this manifold are only *moments* that belong to their unity. The unity or subjectivity of the living individual coemerges with its self-realizing and self-differentiating externality. Nevertheless, as this unity in difference is tantamount to the individual identity of the living subject, it still stands over against the objectivity, which, because of its constant differentiation, is an ever transient constituent of the subject.¹⁰⁶ Thus, at its least, the soul is both a unity of a process constituted by a manifold objectivity that is its body, and also the universal principle of the being and activity of its particular constituents that would cease to be living independently of this self-realizing process.

Life's being a negative unity of its constituents still parallels the concept as such, which consists in the individual totality of self-differentiated particulars. Just as the concept as well as its constitutive elements would cease to be meaningful in absolute isolation from each another, neither the subjectivity of the living individual nor its objective constituents could sustain themselves when disengaged from the rest. Similar to the universal that is inherent in its particulars, the particular functions of the living individual are what they are by virtue of their universal identity, whereas this very identity is constituted through the workings of these particulars themselves. The soul is likewise omnipresent in multiplicity while itself remaining the same individual subject. To the extent that organs are objectively determined, the living individual is a unity of a manifold externality as any other unity of objectivity. But unlike the unity of externality that a mechanical or chemical unity exhibits, it is *a unity of externality that is*

¹⁰⁶ "Having proceeded from the idea, self-subsisting objectivity is therefore immediate being only as the *predicate* of the judgment of the concept's self-determination—a being that is indeed distinct from the subject but is at the same time essentially posited as a *moment* of the concept." *SL*, 680; *Werke*, 6: 475.

*not external to that externality.*¹⁰⁷ The unity of the living individual is in other words an intrinsic characteristic of that which is united rather than an external ascription to the whole. This is why Hegel states that “the objectivity which it possesses is throughout permeated by the concept.”¹⁰⁸ The externality of the living individual is in this sense determined by the soul. Accordingly, the objectivity of life has no longer the indifference that objectivity has when it is devoid of life: the interactions of the organs are a function of the individual nature that pervades them.

It is more precisely in this sense that life exhibits a character that seems an incomprehensible mystery to those who insist on understanding life in terms of mechanical, chemical, or teleological relations instead of acknowledging the true nature of the Idea, where the simple can be omnipresent in the manifold objectivity. As a subject that possesses objectivity, the living individual incorporates mechanical, chemical, and teleological processes, and its constituents exhibit aspects of mechanical and chemical objects. The objectivity of life is similar to all other objects in its being subject to mechanical laws that govern its possible alterations and having chemical properties that determine its possible molecular transformations. However, the living individual is a subject that presides over its objectivity, and its difference from merely objective processes resides in the nature of its ideality, that is, the unity of its subjectivity with objectivity.¹⁰⁹

As a reminder, in other forms of merely objective unity of multiplicity, the unity does not inhere in objects themselves as an essential characteristic, or as a universal characteristic

¹⁰⁷ *SL*, 681; *Werke*, 6:476.

¹⁰⁸ *SL*, 678; *Werke*, 6:472.

¹⁰⁹ *Ideality* can be thought in general to stand for the overcoming of opposition or difference by virtue of incorporating it as an internal moment. Ideality in the Idea is accordingly the overcoming the opposition of the subject with objectivity in and through their unity.

that defines the nature of its components. Likewise, in those forms, the merely objective unity does not bring its components together, but it rather has a relative character that has to do with how those extraneously congregated objects relate to one another. Even in the case of artifacts, where the unity of the components is a factor that plays a role in their production, it is still not an immanent unity. Artifacts have a unity of function, but the particular functions of its components are not indispensable to their existence. As any mechanical or chemical object without an intrinsic subjectivity, they would retain their existence when they are not put to work. Also, as long as the parts of the artifact remain indifferent to that which brings them into a unity, or to the individuality of the artifact they make up, their unity remains extrinsic. By contrast, the living individual is itself the simplest form of being in which the unity of objectivity is intrinsic to its constituents. This unity does not only play a role in the production of its manifold and external being in accordance with itself, but it also inheres in each objective constituent, for without it being present, there would be no such constituent existing. In the absence of the unity in which they participate, the constituents of the living individual are not what they are, but are simply objects at the mercy of mechanical and chemical forces.

It is true that in cases of a mechanical system or in a recurring chemical cycle, processes may form a unity that exhibits an individual character. Yet these processes are still not self-determining to the extent that a living individual is. A mechanical system does not bring about its components, and although it may need no further external impetus to preserve its current set of interactions, it does not initiate itself as a self-recurring cycle. A chemical cycle¹¹⁰ does produce its factoring elements, but only at the expense of the currently existing ones which either coalesce in the new product or disintegrate into components. Furthermore, not only the

¹¹⁰ This does not refer to geochemical or biogeochemical cycle which may involve more than what is connoted by the logic of the chemical process.

first but each and every reaction in a chemical cycle requires an external factor to get under way. The organic unity is, on the other hand, a self-initiating process that actively and simultaneously generates, differentiates, and maintains its constituents.

The living subject: diffused or punctiform?

There is still some ambiguity concerning Hegel's characterization of the living subject or the soul under the heading of "The Living Individual," which is worth attention before we elucidate the self-activating process of life. The living subject or the soul signifies the unity of a process that comprises a manifold objectivity, and even in its immediacy, it is bound up with its objectivity. As Hegel puts it in the *Encyclopedia*, the activity of these constituents, "is only one activity of the subject."¹¹¹ In a nutshell, the soul is the very process of life considered by itself or without reference to its other. But as we have also stated, insofar as the soul stands for the unity or process of a differentiated and transient multiplicity, it is distinguished from that which it unifies, i.e., the totality of its objectivity. All this will be further illuminated once we elucidate the self-active character and the special purposive character of its internal constitution. The problem is that, in the course of the explication, Hegel occasionally speaks of this subjectivity in a way that goes beyond a conception of a universal self that immediately permeates its constitutive process, and rather implies a unitary self that rises above the organic unity, that is, the immediate complementarity of that process.

It is worth noting that this problem does not occur until Hegel starts talking about the living individual. In other words, with respect to the "universal life" or the concept of life in general, the unity or subjectivity is simply immersed in its organic process. But as we have seen above, in the first paragraph that Hegel introduces the living individual, he refers to it as the "true centrality" as if it is an individual self that is not tantamount to the totality of its objective

¹¹¹ *EL*, 288 (§218); *Werke* 8:375.

existence, presides over its organic unity, and can distinctively relate to or determine its particular constituents.¹¹² This is further implied in the same passage in Hegel's characterization of the soul as self-initiating and self-moving. But the problem becomes more conspicuous when Hegel starts talking about the determinacies or capacities of the living individual, namely, sensibility, irritability, and reproduction, which we will discuss in Section 1.3. For sensibility and irritability, which are prevalent terms used in theories of life in Hegel's time, mostly refer to fundamental animal functions. Moreover, even more evident connotations to specifically animal functions also abound in Hegel's discussion of the life-process (assimilation) and the genus-process (reproduction). As we will see in the second part of this work, the main difference that distinguishes the animal from other forms of life is its centralized, unitary subjectivity, which can simply be conceived as the mind. We will discuss in detail how animal subjectivity and mindedness is distinguished from plant subjectivity, which for Hegel is not true subjectivity. There, a further related difficulty will be posed by the fact that Hegel argues that the plant does not have a soul, thereby casting doubt on the reading that identifies the soul with organic unity.

The ambiguity thus raises a general question that concerns the character of Hegel's logical explication of life in general. Is Hegel laying out the minimal features of life applicable to all things that are living in the domains of reality, or is he characterizing it in such a way that different forms exhibit these features to different extents? We will see that the natural determinacies are also universal determinacies and they are irreducible to logical categories. In that sense, they already express more than what is involved in the category of life. These determinacies themselves figure as standards against which individual living things can be assessed and conceived. Thus treating these natural determinacies as if they are phenomena would be misguided.

¹¹² *SL*, 680; *Werke*, 6:475.

Nonetheless, with respect to the logical explication of life, we can still ask whether it allows for a logical distinction between a living subject that is diffused in its organic unity and a living subject that presides over it. Although we may not provide a decisive answer on the basis of the text itself, in order to encourage a discussion, we can offer a way to characterize the difference that is also compatible with the plant-animal distinction. The difference cannot be expressed in terms of immediate permeation or subjugation of objectivity, or determinative power over it, as these also pertain to the more complex sense of living subjectivity, which presupposes merely organic unity. The additional characteristic of the living subject that presides over its organic unity is the character of its self-relation. The unitary living subject is in relation to itself not only by virtue of the self-differentiating process it immediately informs. It also has a relation to itself as an individual living *subject*. As long as this self-relation is beyond indeterminate self-identity, it relates to its determinate being, or its self-differentiated determinacy. Because this determinacy is not a determinacy that pertains to its externality, it can be considered as its inward or inner determinacy. In Hegelian terminology, the true living subject has not only an *in-itself* but also a *for-itself* existence. That is, the living subject that is over above its internal process of organic complementarity is the subject that makes it explicit to itself in and through its inward determinacy.

Regardless of whether such a distinction is compelling, and irrespective of Hegel's choice of terms or characterizations that invoke specifically animal nature, in what follows, we will treat Hegel's explication as if it lays out the necessary and sufficient conditions of all life. Accordingly, we will keep trying to construe Hegel's characterizations in a way that can be thought also with respect to the forms of life that do not realize unitary subjectivity. In what follows, we will do so with an encompassing account of the self-activity of life.

1.2.2. The Self-driven Internal Process

How does the living individual exhibit the self-active character that the external multiplicity of mechanically and chemically determined objects that it incorporates is lacking? A shortcut answer lies in the nature of the soul, which is defined from the outset as a self-moving, initiating principle.¹¹³ In addition to its being a principle of unity, the soul is also the principle of activity. Of course, this is not unexpected given that the unity in question is the unity of a self-determining process. But even if the soul is in truth always immediately externally determined, we should try to clarify how and in what sense a subjective unity has the power to generate objectivity, or equally, how an objective totality can activate itself. After all, objective development is not a feature of objects that do not have subjectivity as their explicit nature. Although objects are individuated in their own right, they do not change themselves, and are always susceptible to external determination. Mechanical objects move one another, but they do not move themselves. Likewise, mechanical and chemical processes are always initiated by some external cause, whereas artificial mechanisms that can subordinate these processes always rely on a minded agent or another machine to be set to work or to be maintained. In contrast the living thing is the cause of its own processes. That is why an account of the self-active character is necessary not only for the internal process or organic unity of the living individual, but also for the other living processes such as its metabolism and reproduction.

While the insight that life is self-activating is easy to maintain, it is also one of the hardest to demonstrate. The choice to discount the self-propulsion of the living thing in favor of mechanistic explanation fails to account for the production, internal differentiation, and maintenance of organic components because of the limited scope of mechanical determinacy. However, the alternative route is equally perilous inasmuch as it involves the risk of bringing in

¹¹³ *SL*, 680; *Werke*, 6:475.

an alien element to account for the self-activity of life. Needless to say, this alien element is customarily been referred to as the vital principle; a principle that is different in kind from mechanical and chemical forces, merely postulated to address the spontaneous self-activity of the living. With respect to the logical account that is currently being examined, the corresponding risk rests on two undesirable paths. The first involves making recourse to a determinacy that has not been explicated, and that cannot be shown to follow from what precedes it, and therefore, one that leads to vitalism. The second one consists in the reduction of life's self-activity to a determinacy that is common to various other categories that are not self-active, which would simply replace mechanistic reductionism with another reductionism.

The alternative path, which is the one that Hegel takes, is to account for the self-activity of the living individual from within this concept's own assets. Those assets in their own are certainly not altogether new, but they together attain a distinctive character as factors in the determinacy of the living individual. One important factor is the distinctive internal constitution of the living individual where there is reciprocity of instigation among its manifold objectivity. Yet this would have been no more than a cycle of a network of efficient causes if the living individual were not self-generating. Self-generation involves subjectivity that realizes itself, which in turn entails purposiveness. But given that in life it is also the objectivity that realizes itself, the self-activity of the purpose can only be thought in terms of subjectivity *in conjunction with* that manifold objectivity it immediately possesses. Finally, because self-generation from within the subject's own sources is equally a self-differentiation from within a unity, we need to account for how a truly self-determining unity can *initiate* its own activity. With respect to the living individual, it again amounts to no less than coming to grips with the nature of the soul,

considering that Hegel describes it as the self-initiating subjective *drive*.¹¹⁴ When we think all these factors in their connection, the task before us is to explain how a unity of manifold objectivity drives itself to activity in such a way that generates and differentiates itself as a self-determining individual. As we will see, this explanation will also end up laying out the internal teleology that characterizes the organic unity of the constituents of the living individual.

Hegel frequently associates the self-propelling character of the living individual to initiate its processes with the *drive* through which the organism generates and diversifies constituents. Since the process of life gets underway by virtue of this drive, it would be reasonable to start with its exploration. Life is not the first chapter where the concept of drive occurs; Hegel appeals to the cognates of the same concept several times throughout the *Science of Logic*. It is important to note that none of those cognates is reducible to one basic category. However, as they are all cognates, there is also something commonly incorporated by all these concepts. The concept of drive entails a change or a differentiation, a transition from one state to another. In all its occurrences, the drive is at least the drive through which some determinacy becomes what it immediately is not. But of course, it is not identical to becoming or change. No matter how rudimentary, it implies selfhood, or an immanent propensity with reference to which the change that occurs is at least partially explained. This is even evident in phenomena such as magnetism, electromagnetism, or animal locomotion where the behavior of the thing is determined not simply by the character of the external impact but, to differing extents, as a function of their characteristic tendency. And *to the extent* that the behavior of the thing is determined by its internal determinacy, and given that the change in question always involves locomotion, that thing can be considered to that same extent *self-moving*. Yet it is worth reminding ourselves that the logical exposition of the categories is carried out irrespectively of

¹¹⁴ *‘Trieb’* in German. Miller translates the term as ‘urge’ while Giovanni chooses ‘impulse.’

the material objects or physical processes that instantiate them in nature, just as the concept of life is explicated regardless of our knowledge of living things. In this respect, although self-activity or self-initiation forcefully evokes the concept of motion, we should keep in mind that here we are not yet talking about spatiotemporal bodies in motion. So in none of those occurrences of the concept of drive is motion a part of the explication.

Nonetheless, Hegel thinks there is something about motion that makes concretely evident what is common to various cognates of the concept of drive. Motion, he writes, is “contradiction as *existent*,” and argues that the contradiction is “the principle of all self-movement.”¹¹⁵ As Zeno exposed long ago, the attempts to explain motion in terms of the difference between bodies at rest are plagued by paradoxes. Hegel asserts, by contrast, that motion is the very fact of being in different places at the one and the same instant. Thus as long as motion of something is its being “here and not here” at the same time and in the same respect, motion incorporates contradiction, and thus contradiction is no less existent than motion.¹¹⁶ Then Hegel goes on to say that “internal self-movement, self-movement proper, *drive* in general” is similarly a contradiction *in esse*. The drive is being “itself and the lack of itself (*the negative*), in one and the same respect.”¹¹⁷ In the same passage, Hegel writes that something is alive only if it hosts an internal contradiction, and that its existence is driven by the force of this contradiction rather than destroyed by it.¹¹⁸ The contradiction that drives self-moving things into motion is the gulf between their facticity, or immediate state, and what they are supposed

¹¹⁵ *SL*, 382; *Werke*, 6:76.

¹¹⁶ *SL*, 382; *Werke*, 6:76.

¹¹⁷ *SL*, 382; *Werke*, 6:76.

¹¹⁸ “If, on the contrary, a concrete existent were not capable of overreaching its positive determination and grasping the negative one at the same time, holding the two firmly together; if it were not capable of harboring contradiction within it, it would not then be a living unity as such, not a ground, and in contradiction it would founder and sink to the ground.” *SL*, 382–83; *Werke*, 6:76.

to be. In cases such as animal motion or intentional acts, it is more readily observable that what sets the thing in motion is a deficiency that is felt or thought to be overcome through a corresponding activity. Yet the nature of this contradiction in general is stated not much differently in terms of Hegel's logic: the contradiction consists in the discrepancy between what the determinacy in question immediately is and what it ought to be. In that sense, the drive goes further than a mere change through which something ceases to be what it is. The drive is the overcoming of the limitation that prevents the thing from being what it is supposed to be.¹¹⁹ In positive terms, it is the striving for the realization of an *ought* that indicates what something can be when it overcomes the intrinsic limitation that defines its finitude.

Of course, different sorts of drives cannot all be reduced to the basic concept of striving or restriction described above.¹²⁰ Just because every something is determinate, it does not mean

¹¹⁹ Stephen Houlgate makes a similar distinction between change and the ought, although he brings the concept of drive later into his discussion when he talks about Hegel's examples to the *ought*. Stephen Houlgate, *The Opening of Hegel's Logic: From Being to Infinity* (West Lafayette: Purdue University Press, 2006), 383–393.

¹²⁰ Francesca Micheleni thinks similarly that Hegel's account of self-activity is not a vitalist one, and argues that in part by inspiration from Aristotle's conception of teleology, Hegel escapes the false dichotomy of mechanism vs. vitalism in order to pursue the "third way." Francesca Micheleni, "Hegel's Notion of Natural Purpose," *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences*, 43, no. 1 (March 2012), 136. What exactly does this third way consist of? Micheleni (137) points out that self-activity is what Hegel calls the "activity of deficiency" Living being has deficiency as a constitutive part of itself in virtue of which it acts, and argues that, for Hegel, the active unity that maintains itself in the face of internal deficiency is the "unity of need." Ibid. But need is a further determination within the concept of life, which pertains specifically to the *life process*, which presupposes a self-active internal process. Nonetheless, Micheleni perceives that the activity of deficiency must have a more fundamental conceptual background. She finds the "root" or "element" of the conceptual account of life in the concept of contradiction, or negativity in general. She indicates that in deficiency, the self is negated through the limit posited by its other. However, limit as such is too simple a determinacy that is common to every "something." That is presumably why Micheleni specifies the contradiction as being an interior one. That is to say, in case of the living thing, the limit as well as the other of the self fall within the self. But Micheleni overlooks the fact that an interior contradiction is common to all finitude—which contains an *ought* in itself—whereas not all finite things are self-active. Although Micheleni does not reconstruct the conceptual transition from finitude, she also says (137) in virtue of "its ability to comprise the contradiction in itself" the living thing has the determination of infinity. However, an examination of the living individual as a self-active self-determination is irreducible to categories that precede it.

that all are identical. Likewise, although the unity of anything requires oneness, it does not follow that its unity is exhaustible in terms of this oneness. The concept of one as such excludes multiplicity, whereas a unity can be a unity of multiplicity in which differences are preserved instead of simply being rendered null and void. Or the fact that a certain process is conceptually determined does not necessarily mean that it is merely subjective. Thus similarly, the concept of *drive* cannot be cast like a magic spell that would unravel the mystery of self-activity for each different case. Even if the organic drive is also a striving to resolve an inner restriction, it is not reducible to *drive* in its simplest form. In order to understand more specifically how the living individual as a logical concept is self-active, we need to conceive of the inner contradiction as well as the distinctive *ought* that characterizes its concept.

As we have mentioned above, Hegel thinks, for instance, that the chemical object also exhibits a striving through which it overcomes the restriction that keeps it from being the concept that it implicitly is. This implicit determinacy is the unity of the chemical with its complement, which would give both reactants an existence that is more objective to the extent that it is determined in its own right rather than by a reference to an other. Hegel thinks that the strength of this internally driven striving is evident from the extent of violence required to sunder chemically tensed objects or to keep them separate.¹²¹ However, the propensity of the chemically tensed object is still not as self-activating as that of a living thing to the extent that it requires a catalyst to bring it into a reaction with its counterpart. In that sense, the chemical drive is not exactly self-initiating, and the chemical object is not exactly the subject of the realization of its ought.

¹²¹ This is most tragically experienced by Charlotte, who tried to keep Eduard and Ottilie apart. See Goethe's *Wahlverwandtschaften*.

Subjective striving is manifest to a greater degree in the teleological process, where the subject is itself the purpose. Hence Hegel writes that the purpose “is the subjective concept as an essential striving and impulse to posit itself externally.”¹²² The restriction inherent in the purpose should be evident. It is the very concept of its realization in objectivity, implying that it is that which is not yet realized. As a universal concept that can be realized *as* different particulars, the purpose, as Hegel puts it, contains in its concept the moment of its particularity and externality, and thus it is the drive that “repel[s] itself from itself.”¹²³ The purpose makes itself an individual with objective reality once it gets embodied through particular means. Yet Hegel adds, by virtue of its overcoming its merely subjective status through its realization, the teleological process is an *activity* more than a mere drive or striving. And it is an activity that can manipulate otherwise indifferent objectivity in a way in which the latter serves the activity’s driving purpose.

Life, as well as the internal process that lies at its foundation, is similarly an activity, and considering that the teleological process requires external and independent means to get under way, the self-constituting activity of life is to a greater extent self-driven. As is argued above, the drive in general resides in the fact that there is a discrepancy between what something immediately is and what it is supposed to be. The reason why life is a curious as well as the first proper form of self-driven objective activity is the fact that it consists in a process that is immediately both this contradiction and its overcoming. The living individual as a self-initiating and self-renewing activity is a continuous and immediate transcending of its immediate determinacy. Thus life is the immediate transcending of its inherent contradiction. But given

¹²² *SL*, 657; *Werke*, 6:445.

¹²³ *SL*, 657; *Werke*, 6:445.

that the living individual is this transcending itself, one may ask, where exactly the contradiction is. To put it differently: what is the ought of life?

One can speak of two levels of contradiction inherent in life. The first consists simply in the fact that life as an internal purpose has to be a continuous self-realization. It becomes what it is *only insofar as* it is realized, and once and because it is what it is, it continues to realize itself. But this is not the case with the subjective purpose of the external teleology. When the purpose gets objectively realized in independently given objectivity, the process is either over, or continues with the subordination of the end product by some other process. In either case, the initial drive ceases to be in the external teleological process. This is why the living subjectivity is by contrast a *continuous drive* as long as it can hold in check the second level of contradiction: the contradiction between its unity and multiplicity.

If the living individual is to be a self-determining activity, it should be constituting itself as an individual unity. Thus it ought to be the unity of its activity. In its incessant realization as objective, there lies the discrepancy between its subjective unity and objective multiplicity, or equally between its integrity and externality. To the extent that the unity is in general opposed to multiplicity and externality, any unity of multiplicity is an opposition. But in forms such as aggregates of objects in which the unity is a mere external arrangement, the contradiction is not real or concretely manifest. By contrast, in the living individual where the unity pervades its multiplicity, the opposition of unity and multiplicity is an inner contradiction that is determinative of its nature. The living individual incorporates a multiplicity insofar as it constitutes itself as objective. As is explained above with respect to the nature of self-determination, and as will be further argued in the next section in terms of the inner constituency of the organic unity, the multiplicity is the product and presupposition of a self-differentiating unity. The living individual always already exists as manifold externality, yet one

informed by a unifying subjectivity. Since every constituent of this multiplicity is the immediate realization of the living individual's purposive subjectivity, and since unlike mere parts or mechanical objects they cannot exist apart from their unity, they all share the intrinsic determinacy that unites them.¹²⁴ This determinacy, however, cannot be thought independently of the very drive that makes the organism what it is. Thus in its immediate form, the drive of the living individual is equally the drive of its manifold constituents. Each constituent strives to realize itself as much as the entirety of the organism. This is why Hegel writes that the drive is "the *impulse of each singular, specific* moment to produce itself."¹²⁵ Each moment is itself a striving to realize itself, and for that reason self-articulated. But to the same extent, each is a negation of the unity of the organism. Such a negation is exhibited in every differentiation, where the differentiated is *not* that from which it is differentiated. That would have meant that in each case of differentiation, the constituents also disrupt the unity from within which they originate, or alternatively, that their particularization is a disintegrating process.¹²⁶ Indeed, as each constituent strives to be an individual differentiated from the rest, the striving of each seems to be at the expense of the rest.¹²⁷ However, the living individual is the striving that it is only insofar as it is equally the negative *unity* of its externality. In and through its striving, what each constituent ends up doing is to constitute the rest together with itself. In other words, in striving to make itself its own end, each constituent happens to serve as means to one

¹²⁴ To recall in Hegel's words, "[t]he unrest and the mutability of the external side of the living being is the manifestation in it of the concept, and the concept, as in itself negativity, has objectivity in so far as this objectivity's indifferent subsistence shows itself to be self-sublating." *SL*, 681; *Werke*, 6:477.

¹²⁵ *SL*, 681; *Werke*, 6:476.

¹²⁶ As Hegel puts it, each moment strives "to sublimate the other moments external to it and promote itself at their cost." *SL*, 681; *Werke*, 6:476–477.

¹²⁷ This, Paul Owen Johnson points out, is one of the differences of Hegel's conception of the internal process from Kant's. *The Critique of Thought: A Re-Examination of Hegel's Science of Logic* (Brookfield, VT: Gower Pub., 1989), 210.

another.¹²⁸ This is how the entire living organism is self-driven purposive activity, where means and end coincide: “Thus the concept produces itself through its impulse in such a way that the product, being its essence, is itself the producing factor: is product, in other words, only as an externality that equally posits itself negatively, or as the process of production.”¹²⁹

What Hegel refers to as the turning back of the particularity or specific difference of the living individual to its negative unity consists precisely in this necessity and peculiarity of the organic means-end relationship.¹³⁰ Nevertheless, to show why self-determining organization and process requires this complementarity of differences, we will have to further elucidate the purposiveness of the internal process.

1.2.3. The Inner Purposiveness and the Means that Produces Itself

Although the living individual, as a form of the Idea, incorporates the self-determining structure of the concept, we have emphasized that it has an objectivity bound up with it even in its simple characterization. Consequently it is not identical or reducible to the merely subjective concept. Furthermore, the concept of life is still an end, or more truly, a purposive process. Like the end of the teleological process, the concept of life also entails the necessity of objectivity in and through which it can realize itself. The difference is that while the merely subjective end of external teleology exists independently of the object that would realize it, the process of life consists in a realization in a sort of objectivity that cannot exist as it is independently of this self-unifying process.

¹²⁸ Again in Hegelian language, in sublating the other moments to promote itself, each is also striving “no less to sublate itself and make itself a means for the other.” *SL*, 681; *Werke*, 6:476–477.

¹²⁹ *SL*, 681–82; *Werke*, 6:477.

¹³⁰ The same return also wraps up the concept of the soul: “this simple life is not only omnipresent; it is the one and only *subsistence* and *immanent substance* of its objectivity; but as subjective substance it is *impulse*, more precisely the *specific impulse of particular* difference, and no less essentially the one and universal impulse of the specific that leads its particularization back to unity and holds it there. Only as this *negative unity* of its objectivity and particularization is life self-referring, life that exists for itself, a soul.” *SL*, 678; *Werke*, 6:473.

Thus, life is the concept of its own realization as an Idea, a subject-object; it constitutes its identity by generating its objective being from within its own determinacy. But 'generation' shall not create the impression that the subjective concept of the living individual is something like a disembodied soul that creates the body *ex nihilo* or a purpose that forms an object from without. As long as the determinacy of the living individual always already include its objective constitution, neither the living subject that generates its objective being nor that objectivity itself has a prior and independent existence. Here generation signifies the ongoing character of the internal process. As long as it is alive, the living individual has to be always actual and in the making, as it is nothing but the process of its own realization. But on the other hand, life's being an ongoing process should not signify its eternity in time. The living individual as a thought determinacy does not exist in time or space. Also, Hegel is here *not* talking specifically about life in nature, and therefore *not* giving an account of the emergence of life from the inorganic world.

Nonetheless, life does emerge in the course of the unfolding of the logical determinacies, which has a developmental sequence each further level of which signifies a more genuine self-determination. Life, as the first form of the Idea, emerges from what precedes it in the logical explication, namely, the teleological process. The teleological process results in two kinds of unifications both of which imply the determinacy of life. It brings about the unity of the subjective with the objective, which is the basic constitution of the Idea, and it demonstrates the coincidence of the means and the end, which characterizes the internal process of life.

In its most general terms, the logic of the teleological process expounds the realization of the subjective end in objectivity through some objective means. The subjective end involves the concept of its objective realization. In its externally formative activity, the end determines itself as objective by enlisting mechanical and chemical processes in such a way that the object that is the means transforms the object that is to embody the concept of the end and get

realized as the product of the process. In a sense, the realized end itself involves the unity of subjectivity with objectivity, although in a very limited way. It still retains an external and passive character in the sense that its unity does not sustain itself, and still requires an external subject to maintain it over against the indifference of objective processes.

Because the teleological process is essentially the activity that realizes the subjective concept in objectivity, even the employment of some object as a means is by itself a teleological process. True, the subjective concept realizes itself not in the means but in the object that the means is used to transform. That is to say, the original end entails realization in the product, while exploiting its means simply to relate to the object to be ultimately transformed. However, the subjective end's utilization of the means to transform the object is itself a purpose that determines the means in a way that the latter is not by itself.¹³¹ In other words, one can aim at transforming an object to use it as a means, and actually doing so would itself be a teleological process on its own. Moreover, given that the means is a means only by virtue of its actual activity of realizing the end, it itself becomes the process of the realization of the end.¹³² Finally, because the realized end exists in an object which is equally indifferent to external determination, it can further be considered or employed as the means to some further end. Just like the means, the product is "nothing but an object determined by a purpose that is external

¹³¹ "A determinateness such as an object possesses through purpose differs in general from one which is merely mechanical in that it is a moment of a *unity* and consequently, although external to the object, is yet not in itself something merely external. The object that exhibits such a unity is a whole with respect to which its parts, its own externality, are indifferent; it is a determinate, *concrete* unity that unites different connections and determinacies within itself. This unity, which cannot be comprehended from the specific nature of the object and, as regards determinate content, is of another content than the object's own, is *for itself* not a mechanical determinateness, yet still is in the object mechanically." *SL*, 665; *Werke*, 6:455.

¹³² "In a nutshell, the means is not really a means unless it realizes the end. So the means is in a sense the realization of the product, because it is not a means unless it is actually doing what it should be doing, which is realizing the end. In this respect, the means really is the product." Winfield, *Hegel's Science of Logic*, 303.

to it; *thus it is the same as what the means is.*"¹³³ Accordingly, the teleological process logically characterized annuls the breach between the means and the end, as they cannot sustain their initial distinction from one another. The external teleological process rather proves itself to be the activity of objective transformation in accordance with the concept, which is present at every moment of the process. This is how the external teleology paves the way for the concept of internal purposiveness. The Idea of life is implied as the outcome of the teleological process. It is a foregoing activity according to a concept of an end, where the means and the end coincide.

However, as we have mentioned in our discussion of the chemical process in Section 1.1.2, Hegel's account of external teleology raises a serious question concerning the place of the teleological process in the order of the logical exposition. We stated above that in realizing the subjective end, the subject has to employ some means. But the employment of the means is possible only if the subjective end can relate to its means. As Richard Winfield points out, in order to relate to its means, the subjective end requires some other means, and this creates an infinite regress, unless the subject can immediately get hold of its means.¹³⁴ Thus, the subject's immediate appropriation of objectivity to its end or concept is the condition that makes the teleological process possible. This immediate appropriation of the object by a subject implies an immediate unity of the Idea that is first demonstrated by life. However, this inference resembles a transcendental deduction where that which is to be deduced is shown to be the condition, a grounding determinacy, of the possibility of some other. If external teleology is possible, so the argument goes, the subject must be immediately united with its objectivity, and this latter

¹³³ *SL*, 666; *Werke*, 6:456–57: "It is therefore entirely a matter of indifference whether we consider an object determined by external purpose as realized purpose or only as means."

¹³⁴ Winfield, *Hegel's Science of Logic*, 294–297; 302.

points to the initial determinacy of life. But that is not the way the categories are derived in the logic of the concept in Hegel's *Science of Logic*. On the contrary, each concept or process proves to be an enabling condition of what follows it. The mechanical process enables chemical process, whereas they together facilitate both internal and external teleological processes. By contrast, neither teleological process nor life is necessary to conceive of mechanism and chemism.

But can Hegel account for the subject's immediate appropriation of the means from within the account of the teleological process without postulating life as the transcendental condition of teleology? Hegel does speak of the necessity of such immediate relation to objectivity. Indeed, he uses this immediate subjugation of the means in order to argue that the extremes of the process, the end and its realization, overlap in their middle term, namely, the means that is doing the realization, and thereby imply life. But how exactly does the subjective end immediately relate to an object? In the *Encyclopedia Logic*, Hegel argues that the end seizes its means immediately "because it is the power over the object, because in it the particularity is contained and, in the latter, the objectivity is also contained."¹³⁵ In the *Science of Logic*, he offers a somewhat more detailed justification:

the first object becomes by virtue of communication a means, for it implicitly is the totality of the concept, and its determinateness, which is none other than the externality itself, is posited *as* something only external and unessential—is posited in purpose itself, therefore, as the latter's own moment, not as anything that stands on its own over against it. As a result, the determination of the object as a means is altogether immediate. ... [T]his determination of itself, is the *only posited* externality of the object, which is therein immediately subjected to purpose.¹³⁶

¹³⁵ *EL*, 280 (208 Addition); *Werke* 8:364–65.

¹³⁶ *SL*, 667; *Werke*, 6:458.

Unfortunately, both justifications seem to be presupposing the subject's power of immediate appropriation rather than accounting for it. If this is right and Hegel's justification fails, it would cast further doubt on the particular place of the teleological process in the system of logic. Certainly, life requires the subordination of objective processes to its end. Indeed, the internal process of life in its immediacy is but the network of synergetic processes rendering its objective constituents the means to sustain itself as an individual totality. But this may itself suggest the possibility of the teleological process and not the other way round. Admittedly, this is what Hegel calls internal teleology. Here the question is whether the internal or the external teleology is logically prior. If in the internal process the organism's end is *immediately* realized in its body, it is likely for internal teleology to be a simpler determinacy. Furthermore, as we will see in the next chapter, the living individual demonstrates external teleology in its relationship with the inorganic world, which however presupposes an internal process in the first place.

All this points to the need for a different ordering in Hegel's logical exposition, which also concurs with our former suggestion with regard to the possibility of bypassing teleology for a direct passage from chemism to life in its immediacy in the *Science of Logic*. The systematic order of the natural determinacies laid out in the *Philosophy of Nature* can have no authority over the sequence of logical determinacies. There is no one-to-one correspondence between the logical categories and natural determinacies as explicated in Hegel's system. However, the direct transition from chemism to organics, or from the self-sustaining totality of the geological organism to the plant organism in the *Philosophy of Nature* may still prompt us to consider a parallel transition in the logical exposition. After all, like the beginning of the living individual in its immediacy, chemism results in the production of its presuppositions.

In any case, it is certain that the teleological process by itself is bound to fall short of the determinacy of life insofar as it takes as given both the means and the object that embodies the

end rather than producing it in its own process. Even if the process is considered as an ongoing activity that involves the alternation of means and ends, at every moment of the process the concept remains external to the object insofar it does not produce it from within itself. Accordingly, if life is a process that goes beyond this external teleological process, it has to demonstrate that it can produce its own objective being.

From the very beginning, we have been arguing that life is a self-realizing process. Unlike the merely subjective purpose of the external teleological process, the living individual is not a unity that can exist independently of the multiplicity that realizes it, and its content does not exist independently of its self-realization. *Provided that* we identify the soul with the organic unity, it is not realized in objectivity through some objective means that is different from the objectivity that realizes the soul. The body is not just any body found given next to other bodies and then germinated by the subject. It is the immediate means unique to the soul, and subjugated to it to the effect that it is the process of the soul's realization. But since the objectivity is at the same time itself the realization of the end, it is also the end "in which the subjective purpose thus immediately closes in upon itself."¹³⁷ Thus at the basis, the nature of the living individuality consists in its being always already realized in its objectivity, whereas this objectivity is by virtue of which the living individual *as a subject* can be the unity that it is.

However, the transition from teleology to life raises a crucial question concerning the possibility of the Idea's self-realization as a subject-object. Together with the end of the teleological process, we see that the fundamental character of life, the coincidence of the means and the end, is an outcome of what precedes it. This seems to leave life with a given determinacy that it has not determined. Indeed, if the subjectivity of life does not produce its corresponding objectivity *ex nihilo*, then life must have a given yet a self-organizing objectivity.

¹³⁷ *SL*, 681; *Werke*, 6:476.

Although this shows that life is not absolutely self-determining, or its self-determination is still limited, it also suggests how a process can still be self-determining by comprising a unity of multiplicity that sustains itself. Now we can finally explore the inner purposiveness through which this manifold objectivity continually maintains the unity of their process by actually *producing* its presupposition.

In the preliminary comparison with objective processes, we have repeatedly pointed out that the coincidence of the means and ends in the living individual does not only express the nature of the living individual as a whole, but also its particular constituents. Since the concept of inner purposiveness permeates the entirety of the externality of life, each constituent is equally the means and the realization of the end. The concept of life involves a process that is for its own sake, and as each constituent is determined by this concept, each is thus an activity that is characterized by inner purposiveness, that is, an end that seeks its own perseverance. Nevertheless, since this particular end of each constituent is in indispensable connection with its universal, they cannot be self-sustaining processes unless each is equally a means to preserve the entire unity.

In the teleological process, the subjective end is a universal form that can be particularized in different objects by externally determining them through other means. As both the end and the object in which the form realizes itself have given and self-subsistent existence, after the object is determined by the subjective end, the subjective end will remain unaffected and the object may serve as a means to a completely different purpose. By contrast, in the living individual, the intrinsic character shared by the particular constituents does not exist apart from their own realization. Organs owe their common identity to the unity in which they participate, whereas their unity can only exist in and through the workings of its particular constituents. Because the constituents comprise the *objectivity* of the living individual, they are not only the

manifold externality of the soul, but also mutually external to one another. On the other hand, as each constituent is by virtue of its determining concept an actively realized end, and since the externality is in its entirety a means to the realization of its concept, the realization of each constituent is contingent on the realization of this self-realizing whole. Thus the instrumental character of the organs is not distinct from their self-sustaining character more than each organ is separable from the organism. This is why Hegel speaks of the totality of this objectivity as “the *semblance* of self-sufficient subsistence” that cannot subsist without the permeating unity of purposive activity.¹³⁸

The same necessity explains why the internal process of life consists in a *complementarity* and necessary differentiation of constituents, by virtue of which they are not parts but organs serving each other in a way they cannot serve themselves. Since the living individual realizes itself through its particular constituents, then every constituent becomes an external means for every other constituent. Indeed when a particular constituent fails to correspond to its concept, that is, the self-determination of a unity of manifold externality, then it would be an indication of the fact that the unity of the entire organism is at stake.

A further consideration would also make evident the reason why complementarity entails differentiation, that is to say, why the objective constituents of the living individual must be *different* from one another. In the external teleological process, the subjective end employs some external means for the reason that it cannot become the immediate realization of itself in the objectivity.¹³⁹ Even though the object is determined by the subjective end, it does something that the subjective end cannot do on its own account. The subjective end has to determine the

¹³⁸ *EL*, 287 (§216) (italics are my emphasis); *Werke* 8:373.

¹³⁹ That it can immediately subordinate *some* objectivity as a means for the end, or that by subordinating the means, some other end (the end of using the means) is also objectified does not affect the fact that the objectification of the original subjective end is not thereby accomplished in the means.

means in such a way that the latter can transform the objectivity in which the end is to be realized. The means is in this sense different from the end. This relation cannot be exactly the same in the living individual. After all, if the soul is the unity of a self-realizing externality, then its concept cannot be independent of its particulars, that is, the organic constituents. That is why, whatever a particular organ is doing would be in one sense the doing of the organism as a whole, as it would be reflected in its concept. Yet on the other hand, the organism is in its entirety an internally self-differentiating unity. That which is realizing itself on its own account needs to be thereby different from the state of its immediate constituents abstracted from their activity. On the flip side, as each constituent employs every other one as its means to realize itself, they are constituents differentiated not only from within but also from one another. After all, to the extent that they are self-realizing without the support of some distinct means, each constituent would itself be a self-determining living individual with its own internal process.¹⁴⁰ By contrast, a truly self-differentiating unity demands that every constituent organ assumes a particular function in such a way that each provides for the others what they cannot provide for themselves.

This complementarity of organs the logical character of which we have finally laid out comprises the crux of the internal process of life. Even in the immediacy of life, where the differentiation of the organs are given by nature, its complementary unity and activity is able to sustain itself and reproduce its differences on its own. It is in this sense that Hegel thinks that the premise of the syllogism of life is also its conclusion. The objectivity or the body is the living

¹⁴⁰ For example, we will see in the examination of the natural forms of life, that the extent of this differentiation is relatively constrained in plant life. It is hard to differentiate in plant life what Hegel speaks of as the difference functions of internal process, external process, and the genus-process, as they seem to be one and the only process in simple plants. With respect to the structure of the plant, the major constituents such as branches and leaves all do the same thing or are at least capable of performing one another's function given suitable conditions. Nonetheless, even plant cells are unities of differentiated functions.

subject's inseparable predicate which functions as the latter's means only to realize the very process that sustains it. This syllogism of the internal process signifies the sense in which the universality/organic unity of the living subject is self-related in and through its own particularity/body.

1.3. INTERNAL FUNCTIONS OF THE LIVING SUBJECT

In the preceding section, we explicated the internal process of the living individual where constituents differentiate themselves from one another yet still “return into this negative unity of the purpose” that the living individual is.¹⁴¹ When there is no such return in place by any means, it is not possible to speak of the organic unity of manifold constituents. As is argued above, self-differentiation is not an utterly indeterminate flux but a unity. Furthermore, it is a unity not *despite* the plurality of its constituents, but in and through their complementary workings. This complementary and self-driven means-end relationship of objectively determined constituents through which the living individual continuously sustains itself frames its fundamental structure. Accordingly the living individual and its organic unity is the basis and the presupposition of all further processes that are associated with life.

After laying out the fundamental structure that realizes the living being as a self-relating *individual*, Hegel moves on to speak about the main capacities or functions that this objective structure realizes and that follow from the self-determining unity of externality. These capacities of the living individual as explicated in the *Science of Logic* are *sensibility*, *irritability*, and *reproduction*. They do not only refer to the capabilities of the living individual, but also stand for the distinctive kinds of relations that it has to itself or to other things, living or non-living. In the *Organics* section of the *Philosophy of Nature* Hegel uses the same terms to characterize fundamental living functions of the animal body, which are thus realized by the latter's peculiar

¹⁴¹ *SL*, 681; *Werke*, 6:477.

internal structure. It may sound strange to the ear to hear the same terms in a logical investigation, and may raise questions as to their relevance here, both because they seem to refer to bodily traits, and because they are specifically animal.

To address the first worry, we should note that Hegel is not reluctant to use terms that are familiar from the philosophical tradition or ordinary language to designate concepts that are devoid of empirical content. What really matters is whether the concepts that these terms designate within the logical investigation are intelligible on their own accord as categories that specify characteristic ways of being.¹⁴² Accordingly, in this context, the meaning of the three capacities of sensibility, irritability, and reproduction must be explicated independently of how they figure in the life in nature.

If this could be achieved, then the second worry would be rendered irrelevant. The task of demonstrating that these faculties are the necessary determinacies of life is not affected by what kinds of beings realize them in nature. However, the fact that only animals can genuinely exhibit these functions already implies something about their main character. Even though Hegel speaks about the faculties of sensibility, irritability, and reproduction within the section that explicates the organic unity of the living objectivity, he construes them as the capabilities of

¹⁴² In fact, Hegel notes that, in the course of the exposition, the attempt to categorically avoid such terms in order to attain absolute purity in presentation is futile and must be renounced:

The presentation would demand that at no stage of the development should any thought determination or reflection occur that does not directly emerge at that specific stage and does not proceed in it from the preceding determinations. ... But I must admit that such an abstract perfection of presentation must generally be renounced; the very fact that the logic must begin with the purely simple, and therefore the most general and empty, restricts it to expressions of this simple that are themselves absolutely simple, without the further addition of a single word; only allowed, as the matter at hand requires, would be negative reflections intended to ward off and keep at bay whatever the imagination or an undisciplined thinking might otherwise adventitiously bring in. However, such intrusive elements in the otherwise simple immanent course of the development are essentially accidental, and the effort to ward them off would, therefore, be itself tainted with this accidentality; and besides, it would be futile to try to deal with them *all*, precisely because they lie outside the essence of the subject matter, and incompleteness is at best what would have to do to satisfy systematic expectations. *SL*, 19–20; *Werke* 5: 30–31.

this objectivity by virtue of its having a conceptual determination that corresponds to its living subjectivity. The problem, the analogue of which we have already brought up in the discussion of the soul, is that the subjectivity Hegel has in mind in his characterization of these capabilities is that of the unitary self which has a purely internal or inward being in addition to its objective being, and therefore, which does not exhibit the sort of immediate subjectivity that is nothing but the dynamic unity of its objectivity. In this regard, they are capabilities exhibited only by living individuals that are more than the totality of their objectivity.

This allusion to exclusively animal faculties is connected with the general question as to whether the logic of life presents the minimal features of life common to all forms or whether it carries them to completion, thereby articulating the full extent to which the category of life is self-determining. One might want to take Hegel's characterization of these three capabilities to be in line with his claim that the features of less developed organisms can only be ascertained by considering their "fullest and clearest" realization exhibited by the animal.¹⁴³ However, as we have noted above, in a way that is not incompatible with this claim, we will argue below that the specification of these functions can still be helpful in identifying the analogous capabilities that pertain to the organic unity or immediate subjectivity of the less developed forms of living. We will construe the faculties that are analogous to sensibility, irritability, and reproduction, but which pertain to organic unity by itself in terms of sensitivity, responsiveness, and self-production. Especially because in this case the less developed forms of the capacities in question are indeed presupposed by the more developed ones, we will try to characterize these capabilities in accordance with the main outlines of the logical characterization. However, as we will see, this attempt will be curbed by the bare extent to which sensitivity, responsiveness, and self-reproduction can be logically distinguished from one another.

¹⁴³ *PN*, 357 (§352 Addition); *Werke* 9:436.

To understand why sensibility, irritability, and reproduction, and perhaps also their lesser forms, are logically explicable, it is important to remember that Hegel grounds his explication of these capabilities on the ideality of the living individual. Since the living individual is “the concept that has an objectivity corresponding to it,”¹⁴⁴ its objectivity should be conceptually determined. Or as Hegel puts it before his brief explication of these functions, because the living individual has the *concept* as its substance the main features or functions of its objectivity or structure has to correspond to the moments that are constitutive of the concept.¹⁴⁵

To recall, the concept is the totality that incorporates the universal, the particular, and the individual. Universality signifies the unity and the unification of the concept’s determinacy on the basis of that which is common to its particularity, whereas the particularity stands for the moment of difference or mutual differentiation that renders the concept determinate rather than an indifferent whole. The individuality, on the other hand, is the moment of self-mediation; the process of return without which the unity cannot be the unity of its own particularization. Now that the living individual is the subject objectively and externally embodied, Hegel argues that it also incorporates a trifold determinacy that corresponds to the three constitutive moments of the concept of the concept. Accordingly, sensibility, irritability, and reproduction correspond, respectively, to universality, particularity, and individuality of the conceptual determinacy. Because the living individual is the idea in its immediacy, these determinacies or moments are equally the features of self-determining externality. Insofar as these features

¹⁴⁴ *SL*, 679; *Werke*, 6: 474.

¹⁴⁵ See *SL*, 682; *Werke*, 6:478: “the living *objectivity* of the individual, since as objectivity it is ensouled by the concept and has the latter for its substance, has also in it, for its essential difference, such determinations as pertain to the concept, *universality, particularity, and singularity*; hence the *shape* in which the determinations in it are *externally* differentiated is divided or incised (*insectum*) in accordance with these.”

indicate what the living subject is capable of doing by virtue of its organic unity, they can be considered as organic capacities in general.

What is further puzzling about this categorization of capacities of the living individual is that it is also used to distinguish the character of the three main moments of the logic of life in general, namely the living individual, the life-process, and the genus. This indicates a sort of parallel between the living individual and its internal structure, or equally, a modified recurrence of the features of the subjectivity that pertains to the organic unity on a wider scope that involves the living individual's outward relations. Although each of the three capacities figures in all vital processes, sensibility is the main feature that characterizes the living individual's relation to its organic unity, irritability is more specifically identified with its metabolic process, and reproduction represents the species-level reproductive process. Here we will start with the exposition of these capacities as they pertain to the organic unity or internal structure by itself. Then in the following chapters on the life-process and the genus, we will again have particular recourse to these capacities. And later in Part II, the recurrence of the same form, but more importantly the difference between the scopes in which this form is manifest will prove useful in the examination of different forms that embody the concept of life.

1.3.1. Sensibility

Sensibility is the capacity of the living individual to relate to itself by registering internal or external modifications in a way that is specific to its own constitution. It thus serves for the simple kind of self-relation that a living individual has by virtue of being an individual subject. As is explained above, towards the end of his account of the living individual, Hegel lists sensibility as a determinacy of the living subject. Among the trifold determinacy of the concept that the living subject features, sensibility corresponds to the universal aspect, as it renders every difference or impression the living individual registers as a determinacy of one and the same

individual self. But further, since this determinacy Hegel has in mind in his construal of sensibility does not pertain to “anything manifold and external” but is purely internal,¹⁴⁶ sensibility consists in the living individual’s distinctive capacity for *inward* or *inner determinacy*.

The possibility and realization of such inward determinacy gives the living individual its basic determinateness as a unitary sentient self, and makes its unity and individuality explicit to itself. Merely organic unity is also self-relating insofar as it is a universal unity that is always in relation to itself through its constitutive particulars. Yet this unity is still implicit in the sense that whatever determinacy it has by virtue of being a unity belongs to the totality of those members that are still in a mutual externality with one another. But sensibility allows a living individual to have a determinacy that pertains to *itself* as a subject even though that determinate content does not belong to any of its members in particular. To put it differently, the organic unity relates to itself through the interaction of its particulars, whereas the sentient subject relates to its own self directly as a subject that has a determinacy of its own kind. And even though the subject is thus inwardly determined thanks to its objective being that enables its sensibility, that inward determinacy is on a different level than corporeal determinacy.

Sensibility can be considered as a capacity of the living individual to get into a specific kind of relation, either to its own objectivity or to another. But in consequence of its relations, the sensible individual only ends up relating to its own determinacy as an individual self. That is to say, even in this relatively more complicated form that Hegel has in mind, which only pertains to a unitary self that more definitely demarcates itself from the inorganic world, the registration

¹⁴⁶ *SL*, 682; *Werke*, 6:478. Here ‘purely’ has to qualify ‘internality,’ because every organism also has an external-internality by virtue of being an individual that has an objective existence distinguished from its outside. On the other hand, only some organisms have pure internality, an inwardness or inner determinacy, which we clarify in what follows.

of modifications takes place without the living individual's being able to discriminate between what is itself as an individual whole and what is another.

Because sensibility involves registering modifications, it can be conceived as a form of receptivity, but one belongs to the living individual as a unitary subject. Although Hegel discusses sensibility within the section on the living individual in general, instead of trying to define it as the receptive faculty of the organic unity as such, he chooses to identify this capacity as a faculty of the ideal unity whose unitary self can relate to its particular registrations as an individual subject. To be exact, by sensibility Hegel refers to the kind of activity exhibited not by organic sensitivity, but by a psychological unity at its minimum. On the other hand, because the living individual's relation to what is outside is not yet explicated, he seems to limit this receptivity to its simplest form, that is, to the living subject's receptivity to itself.¹⁴⁷

This explains why Hegel identifies the receptive universality with *self-feeling* into which the manifold impressions immediately fall.¹⁴⁸ Feeling is the minimal sense in which Hegel seems to construe sensibility. It is the way in which the living individual can relate to its own content, which, as we explained above, consists in an inner determinacy that states what the living individual immediately and universally is at a moment. Feelings can be instigated by internal or

¹⁴⁷ In his painstaking construal of Hegel's account of sensibility, Wendell Kisner refers to this receptivity as organic receptivity, which I believe is as an appropriate designation. Kisner, *Ecological Ethics and Living Subjectivity in Hegel's Logic*, 113–115. Although my account has several and significant parallels with Kisner's, he seems to think that this organic receptivity is already what Hegel is trying to articulate in that brief passage. By contrast, I argue that in that passage Hegel explicates sensibility as the faculty of a sentient, unitary subject, even though organic receptivity is a cognate faculty that can be conceived in a way that is in agreement with Hegel's account of sensibility. In connection with this, there seems to be another divergence. While equating sensibility with organic receptivity, Kisner regards the identity of the organic unity as explicit to itself in distinction to objective processes which are not. But I argue above that merely organic unity is not yet explicit to itself as it is in the sensibility of a unitary self. But this difference is not much of consequence as Kisner (115) also notes that there is an "increasing development" of the subject's being explicit to itself.

¹⁴⁸ "*Determinateness* is present in this universality as simple *principle*; the singular external determinateness, the so-called *impression*, goes back from its external and manifold determination into this simplicity of *self-feeling*." *SL*, 682; *Werke*, 6:478.

external sources, but this capacity as such does not allow for distinctions such as subject and object, cause and effect, or inner and outer. Regardless of the source of instigation, the living subject feels its own feeling.

On the other hand, although we should better try to avoid making reference to the living individual's relationship with the outside world at this point, it is difficult to provide examples of feeling that are not bound up with some sort of outwardly activity, metabolic or reproductive. But instead of choosing to talk about external sensations stimulated by objects, we can illustrate feeling by examples of "internal sensation" such as that of hunger, pleasure, pain, sexual desire in as much as these are universally pervasive contents which cannot be *felt* as locally occurring. As we will talk about later on, this capacity of immediately registering its own states allows the living individual to modify itself or its biosphere in a way that facilitates its perpetuation or reproduction.

Feeling as well as sensation and perception may all provide more easily accessible examples to the capacity that allows for some manifold to be taken up into the universal identity of the subject as its unified determinate content. However, as we will see in our examination of the natural forms of life, those specific examples are exclusively animal capacities that require not only the immediate unity of complementary constituents, but also a *centralized* or *unitary* subjectivity, which is not observable in the vegetative form of life. But irrespective of Hegel's examples, sensibility seems, from the very beginning, to be characterized as the capability for inward determinacy of a unitary subject, which solely points to the animal nature. This would be less of a problem if one thinks that the *Science of Logic* explicates the necessary determinacies of life not minimally or only in its immediacy, but in accordance with the fullest extent to which those determinacies realize self-determination in the pertinent domain. Because an individual organism with centralized agency is more concretely a self-

determining idea, the argument would go, sensibility as Hegel construes it is a necessary aspect of life as more genuinely self-determining.

On the other hand, as we will discuss in more detail in the second part of this work, life with unitary subjectivity is the life with a mind, however undeveloped. But if the logic of life is considered as an account of the necessary and sufficient features that characterize all things that are living, it has to express the minimal determinacy of the lives without a mind. Perhaps, these two approaches to the logical account of life are not necessarily conflicting. Although Hegel's certain word choices such as 'feeling,' and the curtness of his explication is a challenge, to some extent, the text allows for room that would accommodate both. From this perspective, sensibility characterized as above cannot be necessary for all life forms. Otherwise, Hegel would be contradicting himself by presenting the plant as a form of life. Accordingly, whenever an exclusively "animal" determinacy seems to be offered as a necessary one, there might be a way to formulate it in other, yet cognate, terms that would allow us to see the reason why, for instance, Hegel considers the plant as alive.

Put another way, if "sensibility" is to have a universal application in the domain of life, it has to incorporate the possibility of a simpler determinacy than that of feeling; a determinacy that even an organic unity that lacks a feeling mind can also exhibit. As stated above, sensibility consists in a distinct kind of receptivity of the self to the modifications of its organism. Because Hegel characterizes this receptivity as the dissolution of difference into the self-related simplicity of universality,¹⁴⁹ with a slight modification, we can paraphrase it in such a way that accounts for all kinds of organic receptivity in general. Sensitivity, which Hegel later attributes to plants, is an appropriate term to meet this need. To the extent that a process hinges on a capacity through which a self-determining negative unity of externality relates to that which is a

¹⁴⁹ *SL*, 682; *Werke*, 6:478.

concrete difference, that is, particularity, and in that relation, reduces the latter's difference to its own universal identity, that capacity can be regarded as organic receptivity or sensitivity as opposed to merely mechanical or chemical alteration.¹⁵⁰ More simply put, sensitivity can be construed as the capability of the subjective *body* to register and appropriate difference as a particular of its own universal determinacy. By appropriating modifications as its own determinacy, the sensitive unity thus constitutes a substantial identity for itself.

Owing to its logical character, this general construal can be applied to a variety of vital activities that involve registering modifications that are internally or externally instigated insofar as we recall in what sense an organic body has a universal and pervasive determinacy. As we will see in our examination of plant life, this includes the sensitivity of plants, even though it operates only locally. But since here Hegel is accounting for the capabilities that directly follow from the internal process of the living individual, we should elaborate on the sense in which an organic unity as such can exhibit sensitivity. Furthermore, this would allow us to see whether the characterization of this capacity can be restricted to a self-relation that is not mediated by a relation to the external world, given that the concept of the living individual is laid out independently of the living individual's relation to what is other than itself. Finally, it will also shed light on the extent to which sensitivity can be distinguished from irritability insofar as we consider these two as the capabilities of the organic unity rather than of a unitary or centralized subject.

¹⁵⁰ Organic receptivity is significantly different from other sorts of interactions we have so far examined. The return of the externality of the body into its unity is not a mechanical relation. As long as there is no trace of subjective unity, mechanical interaction is between point-like particles that affect one another only externally and irrespectively of any intrinsic character. Mechanical objects do not derive non-relative determinacy in and through their interactions. Nor is receptivity a chemical process in the neutral product of which the differences are reduced to mere implicity. In the chemical relation *both sides* are reduced to the simplicity of neutrality where they preserve their differences only implicitly. Although in the organic forms of receptivity the moment of difference is reduced to universal identity, it is at the same time immediately reproduced, as the difference must concretely be manifested anew for there to be a self-determining unity in the first place.

Just as we describe sensibility as a capability of the living subject, we can construe sensitivity as the organism's capacity to relate to its own constituents. Since the organic unity consists by and large of a specific means-end relationship where every constituent ends up maintaining the totality in its striving for itself, in a certain regard, the internal process itself already discloses how the living individual as a unity or totality is in relation to its constituents.

Regardless of whether or not it has a centralized subjectivity, namely mind, the living individual is a self-determining process constituted out of interrelations of organs that share the universal character of that which they together constitute. As argued above, universality cannot be what it is in isolation from its particularity, whereas in conjunction with it, it amounts to an *individual* unity. The living individual's objectivity is the organism, which is a unity of its internally generated and differentiated constituents. But the organic constituents have to maintain their roots in the unity for there to be a living individual in the first place. In other words, they must be well-integrated to their unity, despite, or indeed, thanks to their differences. Hegel describes the process of reunification of what is differentiated or generated in general as the return of the difference or negativity to its universality or simplicity. With regard to the organic unity of the living individual, we can argue that as long as that which is differentiated does not break apart from its inceptive unity,¹⁵¹ the process of return is always in the making. This return is in Hegel's terms, immediate, or more truly, given that it is a process continuously facilitated by self-generated organs, it is immediately self-mediated. It is the self-relation of the organic unity, that is, of a universal process that continuously relates to itself through the workings of its particular organs.

¹⁵¹ Given the logical form of explication, "breaking apart" should not be taken literally. According to Hegel's conception of ideality, or the unity of a subject-object in this context, a certain member would cease to be an integral part of the unity once its existence is not contingent on its being a member.

The universality of the organic unity is thus intrinsic to its self-realizing character, which is itself a consequence of the complementarity and concord among organic members. A unitary subject can relate to itself in feeling. In this sense, feeling is an evident demonstration and continuous assertion of the unity and individuality of the organism, despite the diversity of the felt content or the multiplicity and the mutual externality of its constituent objectivity. But when the living individual is considered only with regard to its being an organic unity, we cannot speak of a centrality that can relate to its constituents, as is the case with the mind that presides over its body. Here the unity is the unity of the process, and the dissolution or return of the difference to simplicity is merely the outcome of the internal process whereby the complementary as a whole sustains itself as a unitary process. What is common to all organs is the fact that their own preservation and form is dependent on the unity of all that continuously strives to preserve itself.

The relative scarcity of content in the logical account in general, and our being at an early stage of the explication of life in particular, prevent us from further specifying the universal determinacy into which all the organic diversity dissolves. But we can argue that insofar as the unity of the living individual does not inhere in a unitary subject but coincides with the organic unity of its body, the “sensitivity” that unifies the difference would be nothing but the sensitivity of the organic members to internal and external stimulation. Further, even if a living individual is a centralized subject that can unitarily relate to its own self or constituents, its organic unity can still exhibit the same sort of internal and external sensitivity. Internal sensitivity is immediately constitutive of the living individual considering that the cooperation of organic members is contingent on their concordant interaction. The parts of a functioning machine are similarly in concord, although they are totally indifferent rather than sensitive to one another. The main difference that requires sensitivity of organs is that the latter are not static or already formed

matter, but co-developing members of an organic unity, which is in turn a consequence of their dynamic and adaptive relations with one another. Without being sensitive to modifications, organs cannot interact with one another, cannot acquire their duly differentiated form, and therefore would fail to serve for the one and the same end they together form and maintain. Of course, their mechanical configuration and chemical composition are factors that play a part and enable in their relating to one another. But it is the individual character of the self-generating system that pervades the nature of interactions between members.

Because the organic unity as such lacks a unitary self and its individuality consists in a self-realizing objective process, sensitivity can only be indirectly ascribed to the whole. Each member is sensitive to stimuli, while the nature of its response is determined by the identity of the organism as a whole. But although we have spoken of organic sensitivity as internal sensitivity, because members stand in a mutual externality to one another, each member can in one sense be considered as sensitive to external modifications. Indeed, with reference to organic unity, it is hard to distinguish internal and external sensitivity, given that each member is receptive to that which the organism needs in general. That is to say, whether they are internally or externally instigated, the nature of their interactions is determined by one and the same overarching end.

More importantly, because the unification of members through their sensitivity to one another hinges on their complementary differences, unification is immediately bound up with the drive that each member has to differentiate itself. We have already examined the dialectical relationship of organic members in which universality and particularity are the dynamic moments of the living individual's self-realizing process. Interestingly, while Hegel characterizes sensibility as that which allows for the reduction of the difference into simplicity, he refers to that which enables the moment of differentiation as irritability. Now although irritability can be

more articulately explicated as the capability of a unitary self, we can already see how, with respect to the organic unity as such, it is barely distinct from sensitivity. For what enables the moment of unification in each and every organic interaction, is each member's positing their particular character. It is thanks to the perpetuation of this differentiation that all the members have a universal determinacy. In its purest expression, the universal determinacy they all share is nothing but their complementary particularity. In this regard, as we will see, the coupling of sensibility and irritability as they pertain to organic unity as such brings about the continuous self-reproduction of the living individual.

1.3.2. Irritability

While sensibility exhibits the universality of the living subject, irritability corresponds to the particularity of conceptual determinacy. In other words, while sensibility allows for a unified determinacy, irritability is the negative or difference-making moment. In the *Science of Logic*, Hegel starts off his account of irritability in connection with particularity, although what follows in his account is too brief to be illuminating on its own accord. Here we will try to rework the main idea without losing contact with Hegel's logical exposition in general. Because Hegel similarly ascribes irritability to the living individual as a unitary subject, afterwards we will try to paraphrase it as a capacity of the organic unity as such.

However disputable, Hegel chooses to describe irritability again in terms of feeling. Feeling is a self-relation that provides the living subject with its simplest determinacy. To avoid referring to a natural form of sensibility, we can construe this self-relation as the living subject's positing of and immediate relation to its inward or inner determinacy. Although it is defined as a simple self-relation in which all differences are dissolved, it is still not a simple or formal self-identity or self-reference. Referring to sensibility as a mere form is misleading in that it never stays as an abstract capacity, but is always immediately determinate. Because it rests on an

objective process, the inward determinacy is not static. It continuously acquires particular content to which it owes its universal identity. Because sensibility consists in a special kind of receptivity to modifications which the living subject registers as its inward determinacy in accordance with the individual character of its constitution, it is rather a simple kind of self-modification. Its ceasing to have a differentiating content would amount to insensibility—or rather insensitivity—which is the negation of life; its reversion back to the mechanico-chemical process. By continuously having a determinate content, the living subject is the negation of its universality, namely, it is particularity.

But why is irritability designated by the particularity of the living subject's inward determinacy? Although it does not seem to be the way Hegel construes irritability, one explanation is that since sensibility or feeling is immediately self-differentiating inward determinacy, it is a positing of difference inasmuch as it is the unification of determinacy. Accordingly, feeling is not only sensibility but also irritability, insofar as the feeling subject is immediately an identity-in-difference. It is both the passivity and activity of the organism in one and the same respect. However, as Hegel notes, once the living subject determines itself, that is to say, once it has determinacy that differentiates itself from the rest, then it distinguishes itself from the world of externality.¹⁵² Needless to say, at the stage of feeling, the living subject is not aware of such a distinction. Nevertheless, given the progression of the logical development, this divergence brings about a determinate opposition between the subject and its objectivity, or between the inner and the outer. On the other hand, insofar the inward determinacy of the living subject can still be instigated by externality, it has its own externality through which it can receive modifications. But since this latter externality is its own objectivity, it is determined in

¹⁵² Later on, feeling as irritability also shows itself as an outward drive that rests on a feeling of a lack, which can be overcome by a relation to outside.

accordance with the determinacy of the living subject. This determinacy suggests how the body of the living subject differentiates it from the rest of the external world. This so to speak objective expression of the living subject can be considered as its basic irritability beyond the content of feeling. The organism is the living subject's objectively determinate being, which is always being modified in accordance with its inward determinacy or feeling.

However, although this interpretation would provide a gradual transition to a more developed concept of irritability, Hegel's own explication as well as his account of the life-process implies that in that passage by irritability Hegel has in mind a specific kind of feeling or determination, which makes reference to externality. He associates irritability with an impulsive feeling, and writes that, by virtue of this feeling, the living subject determines itself in such a way that it refers to "the outside as to a *presupposed* objectivity with which it is in reciprocal activity."¹⁵³ This anticipates Hegel's account of pain, which he provides in his exposition of the life-process. In its minimum, pain is a felt contradiction that results from the intrinsic opposition that constitutes the organic unity of the living individual. While it is a unity or a self, it is also a multiplicity of external members, each of which strives for its own production. But why is this feeling a reference to "a presupposed objectivity"? Apparently here the felt pain more specifically refers to the one triggered by the needs of the organism, which can only be overcome by means of an engagement with that *presupposed* objectivity. This seems to be why the organism is outwardly driven. On the one hand, this drive is the living subject's inner determinacy: it feels itself as this urge to overcome the pain. On the other hand, the drive acquires an objective existence through the very externality of the living subject, for the living subject relates to the external world and overcomes its pain *by means of* its body. In other words, the living subject's response to its own feeling becomes its bodily determination. In

¹⁵³ *SL*, 683; *Werke*, 6: 479.

addition to the opposition of the inwardness and the externality of the living individual, through this further determination, the living subject makes explicit the distinction between its own objectivity and the external world, even though the distinction is not necessarily explicit to itself as a conscious subject.

Whether these moves are compelling, or even derivable from the text or from what is already at hand is open to discussion. In any case, it is helpful to think of irritability as the living subject's responsiveness to those modifications that are registered (and felt) by means of its sensibility. The living individual is not merely receptive, but also responsive, as otherwise its receptivity would not differ from external determinability. How this responsiveness both incorporates sensibility as well as the utilization of the living individual's objectivity might get clearer once we start dealing with its life-process, which consists in its metabolic relation to what is outside of it. Furthermore, we will talk about the relation between the feeling and the animal's animation of its body in response to them in our examination of the animal life.

However, given that feeling is not generic to all life, one can raise the question of whether irritability can be attributed to merely organic unity. Although the richer meaning of these capacities reveals itself in the presence of centralized subjectivity, where the organism in question is able to apprehend modifications and respond as a whole, even cells, bacteria, or plants exhibit a certain degree of receptivity and responsiveness simply by virtue of demonstrating organic unity. In consistency with what we did in the previous section as regards sensibility, we can try to offer a formulation of irritability in a way that accounts for all kinds of organic responsiveness in general.

As a matter of fact, even though we did not mention responsiveness, we have already offered such a characterization at the very end of our examination of sensibility. There we construed sensitivity as the capability of organic members through which they render one

another as the moments of the universal character of the whole. But if interacting members were absolutely identical, their mutually receptive interaction would not be any different from a pointless self-relation. If this were true for the whole organism, then there would not be any process. For there to be the specific means-end relation that constitutes an organic unity, members should be differentiated from the rest. The unification of sensitive members is not possible or meaningful without their complementary differences. Irritability can thus be considered as the moment of organic differentiation. A differentiating responsiveness is nothing but the repetition or renewal of the living individual's objective existence from within its inceptive unity. Every response to received modification is the living individual's self-positing, and this self-positing vis-à-vis the organic unity, is nothing but the differentiation and maintenance of each member. In this regard, as is the case with organic sensitivity, which emphasizes the unity of differences, irritability as organic responsiveness does not add much to the determinacy of the organic unity considered vis-à-vis its propensity to self-differentiate. Within the framework of the internal process of the living individual, organic sensitivity and responsiveness together correspond to the coupling that accounts for the self-constitution and self-maintenance of the organic unity.¹⁵⁴ In other words, the unity of sensitivity and responsiveness is the self-production of the organic unity.

Most of the things we have said of sensitivity applies to basic responsiveness as well.

We cannot further specify the particular determinacy that members of an organic unity would

¹⁵⁴ Wendell Kisner does an excellent job in elucidating the necessity of this reciprocity: "If the mutual externality of organic articulations were simply annihilated there would be no externality, and hence there would be nothing there to be self-related, which means there would be no life. For this reason sensibility cannot come to rest in a quiescent positive identity—it cannot live without the differences it has dissolved into organic unity. Hence it must, as it were, resuscitate that very external multiplicity out of its dissolution. It must dissolve those differences and at the same time preserve them." Kisner, *Ecological Ethics and Living Subjectivity in Hegel's Logic*, 116. Nevertheless, once again Kisner seems to interpret Hegel's exposition of irritability as if it pertains to the organic unity of the living individual. But Hegel seems to be speaking of a much more complicated determinacy or capacity that can only belong to a unitary subject that presides over its organic unity.

posit. Insofar as the unity of the living individual coincides with the organic unity of its body, the “irritability” that constitutes the complementarity of the organic unity would rest on the organic members’ differing responses to internal and external stimulation.

Again in parallel with sensitivity, even if a living individual is a unitary self that can directly relate to its own individual self or its constituents, its organic unity can still exhibit the same sort of internal and external responsiveness. But because the organic unity is still a process that does not comprise a unitary self in its own right, responsiveness can only be indirectly ascribed to the whole. Each member is responsive to stimuli the character of which is ultimately determined by one and the same end, namely the self-perpetuation of their unity. Nevertheless, even if we have been treating organic responsiveness as an internal relation, insofar as members stand in a mutual externality to one another, each member can be considered as responsive to modifications that are external to them. As with sensibility, with reference to organic unity alone, there is not much to distinguish internal and external responsiveness. For each member is responsive to an external stimulation and in a way that is conducive to the needs of the organism in general, irrespective of the source of stimulation is inside or outside of the organism.

1.3.3. Re-production

Biological reproduction signifies the process by which parent organisms procreate either sexually or asexually new living individuals of their own kind. But in the logical investigation of the living individual by itself, reproduction indicates something simpler, even though this simple characterization is at the same time contained in its more complex forms. Hegel accounts for the logic of reproduction as a fundamental feature of life in the section “Genus.” But here, as a determinate moment of the living individual, reproduction refers to the self-production or regeneration of the organic unity of the living individual. Again the text is brief and obscure, and

it explains re-production of a living individual that exhibits a unitary subjectivity. Furthermore, it seems to be making reference to a relationship with the outer world, which is supposed to follow from reproduction as an internal moment of the living individual.

Nonetheless, it is at least clear from the text that the moment of reproduction that pertains to the living individual as such refers to the unity of the preceding two moments of sensibility and irritability, and emphasizes the fact that they cannot be isolated from one another. Since neither aspect of the living individual is meaningful in the absence of its other, Hegel writes that they are indeed abstract determinations subsumed by their concrete totality, which happens to be the moment of reproduction of the individual.¹⁵⁵ Self-production is thus their unity in difference, and corresponds to the moment of individuality of the concept, in which the universal identity is reconciled with its particularity.

While sensibility corresponds to the undifferentiated unity that is characterized by the pervasive character of either organic unity or its inner determinacy as a subject, irritability refers to the moment of difference either in the sense of the necessary differentiation of internal constituents, or in the sense of internally driven responses to an other, which acquire existence through the externality of the living individual. Thus, in keeping with our explication of the two previous determinacies, their unification can be construed in two main ways. But this time the difference between the two alternative accounts is little given that both ends up with the individual's self-production or its return to itself.

First, we can think of it in terms of an organic unity that renews itself through the continuous reciprocation of internal constituents which are mutually sensitive and responsive to

¹⁵⁵ "On the one hand, therefore, this whole is opposed to the previous determinate totalities as a third, namely as a *concretely real* totality; on the other hand, however, it is their implicit essentiality and also that in which they are comprehended as moments and where they have their subject and subsistence." *SL*, 683; *Werke*, 6: 479–80.

one another. Insofar as the organic unity as an evergoing process of *self*-differentiation is equally its own incessant regeneration, this is hardly different from what has already been explicated in the internal process of the living individual, except for the addition of sensitivity and responsiveness into the account. Even though sensitivity and responsiveness are capacities objectively realized by the body of the living individual, this way of construing self-production of the living individual still does not seem to need recourse to an externality of the outer world the relation to which is supposed to come later in the exposition. After all, the process of internal formation, which now incorporates its differentiation, can be conceived to uphold itself on its own resources when we suppose that there is no externality that disturbs its dynamic equilibrium. But given that the living individual has its own externality, which, in order to be an individual, actively distinguishes itself from its outer, such an isolated self-reproduction can at best be an abstract process. In any case, this aspect of self-production does not seem to be the one Hegel has in mind here.

Second, we can interpret reproduction as pertaining to the subjectivity of the living individual that distinguishes itself from what it is not by means of its sensibility and irritability. Because Hegel seems to expound these functions with reference to the living individual that has a unitary subjectivity, they signify an inner determinacy which Hegel refers to and a corresponding unitary reactivity that Hegel calls “a vital power of resistance.”¹⁵⁶ But even when we think of mere sensitivity to external stimuli and the responsiveness that is coupled with it, the outcome is an activity that determines the living individual’s own externality in such a way that it preserves and distinguishes itself from the external world, and not merely as an inward determinacy, but objectively through its own externality. A living being is alive to the degree that it effectively reasserts this coupled capacity, which amounts to its continuous production of

¹⁵⁶ *SL*, 683; *Werke*, 6:479.

its individual identity that nevertheless continuously differentiates itself in its relation to this externality. This is why Hegel considers reproduction as the individual's "real *outward reference*" to the objective world, which it presupposes for its own objective constitution.¹⁵⁷

What Hegel calls the life-process, through which the living individual constitutes and maintains itself, consists in this relation to the objective world. Indeed, the account of the life-process shows us that the living individual's re-production of itself is a process mediated by a relation to the outer world, the details of which are examined below.

¹⁵⁷ *SL*, 683; *Werke*, 6: 480.

CHAPTER TWO

THE LIFE-PROCESS

“The Life-process” is the second moment of Hegel’s logical exposition of the concept of life. Just as the organic unity, the life-process is also a necessary feature of all things that can be considered as living. Broadly speaking, this process concerns the living individual’s relationship to what it is not, that is to say, to things that do not belong to its organic unity, to its subjective being or its immediate embodiment. This is tantamount to the world that is outside of the living individual. The life-process is a necessary process to the effect that the living individual upholds its individual organic unity in and through its relationship with this world. But since the outward process necessarily rests on the internal process that constitutes the organic unity, life-process is equally the totality or coupling of the internal network with the external activity. Accordingly, an examination of the determinacy of the outward aspect of the life-process will accordingly elucidate its connection with the internal process of the organic unity in the presence of an external world.

Before going into the details of Hegel’s logical explanation, it is worth broadly laying out the distinctive characteristics of the life-process by contrast with other categories that fall short in expressing them. In a way similar to what we did in the previous chapter, in the first section, we will clarify how the life-process incorporates mechanical, chemical, and teleological processes but is nevertheless inconceivable solely in their terms. But since we have already presented the determinacies of these objective processes in their main outlines, we will not carry out the comparative examination under different subsections. In the first section, while we provide the reader with preliminary means to relate to Hegel’s logical account, we avoid going

into the details of how the life-process is manifest in the lives of different forms of living nature, as this latter will be the topic of the second part of the dissertation. Instead we restrict our task to laying out the fundamental aspects of the life-process that are exhibited by all forms of life. In the second section of this chapter, we explore Hegel's systematic account of these aspects in the *Science of Logic*.

2.1. A PRELIMINARY EXAMINATION OF THE LIFE-PROCESS

Organisms are situated in a world, and they cannot but be in relation to other things. The living individual is the manifestation of selfhood as an objective being surrounded by a world of objects that are profoundly different from it. It is a subject, which constitutes an internal identity that asserts and actively distinguishes itself from the rest of the world.¹⁵⁸ The unity of an internal network of complementary organs and processes already specifies the organism as an individual. Over and above the external body it constitutes for itself, it also institutes an internal or inward existence, that is to say, some degree of subjectivity, which, in its simplest form, may be no more than the unity of its bodily constituents, although it is at same time the power that is unconfined by the state of its immediate constituency. Its self-assertion is thus the continuous process of going beyond what it has determined itself to be while at the same time deriving an inwardness for itself that is, as Hans Jonas puts it, "truly pitted against the rest of the things."¹⁵⁹

This opposition seems to be one between two different "worlds" both of which have objectivity: the internal world of the living individual and the external world that surrounds it.

¹⁵⁸ Hans Jonas emphasizes the concurrence of this internal identity or selfhood with life: "The introduction of the term "self," unavoidable in any description of the most elementary instance of life, indicates the emergence, with life as such, of internal identity—and hence, as one with that emergence, its self-isolation as well from all the rest of reality. Profound singleness and heterogeneity within a universe of homogeneously interrelated existence mark the selfhood of organism" Jonas, "Biological Foundations of Individuality," 242.

¹⁵⁹ Jonas, "Biological Foundations of Individuality," 242.

The objectivity on which the world of the living individual immediately rests is its body. The organic unity of the living individual as a self-sustaining objective process draws a distinction between this body, that is, its own externality, and the externality that is outside of that body. But the objectivity of the organic body, which is continuously recreated, does not consist in a mere combination of parts outside of parts, nor is it a subsistent totality that is indifferent to the fate of its instantaneous boundary and composition. It does exhibit behavior that is akin to chemical affinity and aversion, but it does so only as a totality of concurrently and complementarily working constituents and without coalescing with the object of its relation or decomposing into simpler compounds. It maintains its unity in difference and actively separates itself from the rest of the world thanks to the normative character of its internal process. Since it is a process that exists to the extent that it sustains this separation, the norm in which its internal unity as well as inwardness consist is to uphold this unity and inwardness over against the world and its modifications.

The living individual can relate to the world thanks to its body. But this also suggests that insofar as it has objective existence, it is exposed to external influence by a world of objects. Those objects can mechanically and chemically affect the living individual to such a degree as to impair or destroy its organic unity. Unlike mechanical objects, however, as an objectivity governed by subjectivity, the living individual is not indifferent to external impacts, and correspondingly, the life-process is not indifferent to its own constitutive terms. It is rather responsive to those impacts, which corresponds in Hegel's terminology to the living individual's *irritability*. Although the living individual is always subject to the risk of being destroyed as a result of impacts that are beyond a certain threshold, its interactions with its environment including its responses, is a function of its determining character, that is, its individual concept. This concept involves a network of mechanical and chemical processes that are subordinated to

an end which is before all the perpetuation of this network. But in the presence of an external world of mechanical and chemical processes, the complementarity of its organs is by itself not sufficient in order for the living individual to uphold itself. It must have the means to protect and regulate itself in the face of external effects such as mechanical impacts or chemical corrosion. In other words, for there to be a living individual in the first place, it must be utilizing its body and regulating its mechanical and chemical determinacy to maintain itself over against the world instead of being utterly at its mercy.

As any mechanical object, the living body has a certain degree of resistance against external determination or impacts. But the outward process that Hegel explicates as a necessary feature of life, or equally the responsiveness or irritability that characterizes it, goes beyond resistance to external incursion. Nothing self-determining can be absolutely resistant or impervious. If a manifold objectivity is impervious, there is no way in which it can be a collaborating unity that would enable a real process. For the constituents of an organic unity define and constitute one another in and through their transactions. The living individual is more resilient than it is resistant in the sense that its constituents have to have a degree of flexibility that would allow the organism to maintain its individuality while not being entirely closed to external influences.

The resilience in question is however not a merely mechanical property. Although mechanical configuration and a specific chemical makeup of the organism are factors that enable this resilience, it cannot be conceived in isolation from the concept of the entire organism. It is not merely the flexibility of a physical part, or the chemical propensity of another; it is the resilience of the entire organism, and accordingly, involves a purposive openness that facilitates the living individual's self-activity.

2.1.1. Sensibility as Making Sense of the Other

The general form of the organism's openness is expressed by what Hegel calls *sensibility* in the *Science of Logic*. As is explained in the previous chapter, Hegel speaks of sensibility first in the context of the living individual's internal process, the minimal universal form of which we construed as sensitivity or organic receptivity. Similarly, in the context of the living individual's outward relation, it could be phrased as purposive receptivity to external stimuli in general, which may take specific forms with varying degrees of complexity. What is common to these forms is that with purposive receptivity to external stimuli, the living individual can engage in a process of assimilation in which the externality gets translated into a determinacy of the living individual according to the conditions of its viability. Depending on the kind of interaction the living being engages in, this assimilation may or may not involve a total annihilation of the subsistence of the external object. The living individual may incorporate the external object into its own body, or it may simply inform itself with the character of the external object in such a way that the latter ceases to be an absolutely external, alien, and vanishing determinacy. Since in a regular sort of an interaction, being informed about the appropriateness of an external object would come prior to its completely annulling appropriation, it is reasonable to first examine the process of assimilation by which the living individual is able to distinguish what conduces to and what injures itself, and explain why it is not simply a mechanical or chemical process.¹⁶⁰

¹⁶⁰ There are interactions through which the organism absorbs and manages to appropriate an otherwise unaccustomed object. If this becomes a regular interaction, however, the organism would later be positively sensitive toward that kind of objects. The contrary is also possible, and the organism may fail to incorporate an unaccustomed yet absorbed objects. For an interesting discussion of such cases with reference to Jean Piaget's concepts of assimilation and accommodation, see Michel Bitbol and Pier Luigi Luisi, "Autopoiesis with or without Cognition: Defining Life at Its Edge," *Journal of The Royal Society Interface* 1, no. 1 (November 22, 2004): 99–107.

As its name suggests, the living individual has an individual character, which is definitive of the conditions of its viability, including its individual needs and aversions. Its relation to what is outer involves needful relationship. To avail itself of its needs and avoid what is detrimental, the living individual has ways of informing itself with the character of the object to which it relates. Animals, for instance, can determine the presence of their needs using their sensory perception. Nevertheless, the capacity of sense-perception is a natural faculty which lacks in universality at which the logical examination of the minimal determinacies of life aims, as is implied by the fact that there are living individuals that exhibit organic unity although lacking in sense-perception. Yet, as we tried to show with respect to the internal process, it is possible to conceive of receptivity in a way that is applicable to all things living, and in terms that would suffice to distinguish this aspect of the life-process from other objective processes. Similarly, calling this capacity sensitivity to external stimuli and construing it as selective receptivity would be safe and suitable for our purposes.¹⁶¹

Regardless of the word choice, it is important to recognize that since selective receptivity allows the living individual to distinguish between stimuli, it entails some sort of evaluation of the significance of the object with respect to the living individual's norms or its conditions of viability. This evaluation is in its minimal form the basic organic responsiveness or

¹⁶¹ Although in *The Phenomenon of Life*, Hans Jonas calls this basic capacity of receptivity 'irritability,' what he means is not much different from sensitivity to stimuli. Hans Jonas, *The Phenomenon of Life: Toward a Philosophical Biology* (Evanston, IL: Northwestern University Press, 2001). For Jonas, this sensitivity is tantamount to having an interior world, even if only in a rudimentary sense. As we talk about in more detail later, Jonas thinks that the more complex is this sensitiveness to stimuli, the richer is the inner world of the living individual.

Whether we call this inwardness feeling, sensitivity and response to stimulus, appetite or *nîsus*—in some (even in infinitesimal) degree of "awareness" it harbors the supreme concern of organism with its own being and continuation in being—that is, it is self-centered—and at the same time bridges the qualitative gulf to the rest of things by selective modes of relation. (*The Phenomenon of Life*, 84.)

However, it is worth noting that although for Jonas mere irritability carries the germ of selfhood or self-awareness and is common to all life, it is as such only local sensitivity devoid of any real relation in which a genuine subjectivity would engage.

irritability that is coupled with selective receptivity or sensitivity. Regardless of its complexity, every living thing, including prokaryotes, registers changes in the environment, exhibits sensitivity to external stimuli, and responds in accordance with the “sense” they make out of this interaction every living thing. Thus in their exchange with their environment, living things can be selectively receptive and discriminatively responsive. Through this selectivity and the accompanying response, they can rearrange their internal organization, and fulfil their metabolic needs and avoid what would destroy them.

Hans Jonas thought that the selectivity of the organism signifies its concern with its own perpetuation, and is therefore indicative of an infinitesimal self-awareness or the germ of selfhood. Similarly, the pioneers of the autopoietic account of life in contemporary theoretical biology and systems theory, as well as philosophers who drew upon the autopoietic theory, saw a cognitive aspect in this selective receptivity, and referred to it as a kind of *sense-making* or *cognition*,¹⁶² irrespective of their differing views with respect to the specificities of the relationship between the internal organization and the process of assimilation.¹⁶³

¹⁶² Because in the latest English translation of the *Science of Logic*, Giovanni translates ‘*Erkenntnis*’ as ‘cognition,’ it is worth noting that the cognition in question in this context is not what Hegel means by ‘*Erkenntnis*’. Although ‘*Erkenntnis*’ is another form of the Idea, it is a process that presupposes life together with its outward process. Besides it involves much more than what comprises life, such as the subject’s ability to conceptualize its object, which is given independently of its activity, and its going after truth and realizing the good.

¹⁶³ According to one of the philosophically most developed accounts of autopoiesis, the autopoietic theory of life explains the phenomenon of life as an autonomous system that is comprised by processes that “(i) recursively depend on each other for their generation and their realization as a network, (ii) constitute the system as a unity in whatever domain they exist, and (iii) determine a domain of possible interactions with the environment.” Thompson, *Mind in Life*, 44. For a brief summary of the debate on the relationship between autopoiesis and cognition, see Thompson, *Mind in Life*, 122–127. However, there are several interesting works that represent versions of the autopoietic theory or that talk about the organic sense-making. Among those are Francisco Varela, “Living ways of sense-making: A middle path for neuroscience,” in *Order and Disorder: Proceedings of the Stanford International Symposium*, ed. Paisley Livingston, (Stanford: Anma Libri, 1984), 208–224; Humberto Maturana and Francisco Varela, *Autopoiesis and Cognition: The Realization of the Living*, (Dordrecht, Holland ; Boston: D. Reidel Publishing Company, 1980); Humberto Maturana, “Autopoiesis, Structural Coupling and Cognition: A History of These and Other Notions in the Biology of Cognition,” *Cybernetics & Human Knowing* 9, no. 3–4 (March 1, 2002): 5–

Insofar as objects are mechanically determined, mechanical process is an indispensable element of this selective process. It is true that any impact would leave marks or traces on the impacted object, on which the mechanistic explanations of biological processes in the early modern period heavily relied. But sensitivity involves registering the objective and external determinacy of the object as, or transforming it into, an ideal determinacy that involves both subjectivity and objective presence. This process of the internalization of the external stimulus cannot be conceived by merely tracing the mechanical chain of causation. To the extent that the living objectivity is mechanically determined, it implies indifference to the kinds of external impression when considered in abstraction from its organic unity. But thanks to this same indifference to external determination in general, the living body is already subordinated to the end of its own internal process. As this purpose consists in this body's self-maintenance and protection, it must be able to distinguish between what facilitates and what impairs its individual existence.

Accordingly, by virtue of being determined purposively, neither the living individual in its entirety, nor its constituents are indifferent to the specific character of external objects. In themselves, external impressions are not stimuli but quantitative differences, which in nature could be demonstrated by properties such as momentum. But *for the organism*, they cease to remain merely quantitatively different. They become internal determinacies in the form of qualitative value or significance which signifies that the external object is in accord or discord

34; Andreas Weber and Francisco J. Varela, "Life after Kant: Natural Purposes and the Autopoietic Foundations of Biological Individuality," *Phenomenology and the Cognitive Sciences* 1, no. 2 (June 1, 2002): 97–125; Evan Thompson and Mog Stapleton, "Making Sense of Sense-Making: Reflections on Enactive and Extended Mind Theories," *Topoi* 28, no. 1 (March 1, 2009): 23–30; Bitbol and Luisi, "Autopoiesis with or without Cognition;" Fritjof Capra and Pier Luigi Luisi, *The Systems View of Life: A Unifying Vision*, (Cambridge: Cambridge University Press, 2014); Stuart Kauffman, *At Home in the Universe: The Search for the Laws of Self-Organization and Complexity*, (Cary: Oxford University Press, 1996); Luisi 2003; Capra and Luisi 2014; Rosen 1991; Jonas, *Biological Foundations of Individuality*. There is much in these accounts that coheres with Hegel's conception of life and yet does not necessarily go beyond the territory of a logical examination.

with the constituency of the living individual. In this regard, the stimulus does not operate as mere efficient cause, as unlike the latter, the former cannot be conceived of independently of the character of which it has an influence on.¹⁶⁴ It is through this sense-making process that organic unities constitute themselves as individuals that are in agreement or at odds with specific external objects.

Interactions of the living individual involve chemical combinations of its constituents with one another or with external objects, which does not operate irrespectively of their chemical propensities. Accordingly, the sensitivity of the organism allows for receptivity to the specific chemicals of its need, and aversion to some others. However the selectivity in question here goes beyond chemical affinity by means of which chemicals combine with one another. Neither the living individual, nor its organs get reduced to a neutral product or disintegrate into tensed chemical components by engaging in a chemical process with external objects. The chemicals are not the complements of organic unities either. As long as the living constituents are subordinated to the universal determinacy of a self-determining individual process, which itself involves a specific network of mechanical-chemical processes, the chemical process with the external object is mediated by the purposiveness in and through which the internal constitution of the organism is perpetuated. In the context of the life-process, chemicals obtain a new significance of which they are lacking as merely chemical objects. They obtain this significance with respect to the organism as an individual; not with respect to the range of their possible reactions, to an external observer, or to any interacting chemical component of the organism.

¹⁶⁴ Evan Thompson makes a very similar point: "The informational stimulus is the stimulus as informed by (the form or structure of) the organism. It cannot be described as "input" definable independently of the organism because it is already relational, definable only in relation to the organism, or specifiable only against the background of the organism's structural coupling with its environment." *Mind in Life*, 69.

Furthermore, unlike the affinity that pertains to chemical objects, the selectivity of the living individual, and its distinctive responsiveness is not merely a fixed or taken for granted specificity of the living individual. The main reason is that the individuality of the living thing itself is not given. Insofar as the living individual is self-constituting externality, the needs and aversions that would pertain to the unity of this externality develops concurrently with its internal constitution.

The reason why the outward process is also different from the teleological process that machinery exhibits also lies in its self-developing character. The purposive organization and regulation of the mechanical and chemical processes in accordance with the inner determinacy of the living individual may mislead one into the thought that the life-process is similar to the way an artifact works. After all, the artifact embodies a concept, and if its function involves chemical transformations, these transformative processes are still going to be organized in accordance with the concept, that is, the end of the artifact. Early modern philosophers tried hard to account for the mechanical configuration and the chemical disposition that conduces to the ends of life, as they knew that it was unconvincing to rely on the random and normatively blind nature of these processes. But in one way or another, they made recourse to the concept of external design. The attempts to understand the sense-making process in analogy with machines overlook the fact that information processing and control mechanisms of machines are designed in accordance with an antecedent purpose and a corresponding blueprint. In computational systems, the inputs and the thresholds within which they will correspond to particular feedback are predefined by the programmer. Similarly the outputs that the inputs bring about do not have any significance for the machine independently of the externally defined standards and tasks. Whereas a machine processes information irrespectively of its assembly or programming, the organism's activity of sense-making is bound up with the

development of its internal constitution. The living individual generates information for its own self and on its own accord.

Pace many followers of the “modern synthesis,” it is misleading to consider the genetic material or program as a blueprint or a recipe that *precedes* the organisms that instantiate it, as it does not exist independently of the internal and outward processes of a self-developing organism. In the previous chapter we have already pointed out the shortcomings of these analogies with respect to the organic unity and internal process of the living individual. The reasons are similar as regards the outward process. Even if inheritable material figures in the way the universal character of the living individual as a whole is expressed and transmitted, and even if this universal character governs the individual’s dealings with its environment and differentiates it from other living things, it would still be misleading to think that this character is absolutely independent of the environment and the metabolic process of the living individual. As long as the genetic material or genome is a constituent of organism that can only function within an internal process, just as the rest of the specific organic functions, the function to which it contributes cannot be determined independently of the life-process of the cell, the organ, or the organism as a whole. With respect to the sensibility of the organism, we can say that, because the genome is not something that can generate the system in which it can function from without, it cannot determine by itself the specific needs and aversions of the organism in accordance with which it engages in sense-making activity with its environment. The character of these interactions are rather determined by the history of the organism, of its species, and of life as a whole.¹⁶⁵

¹⁶⁵ Also see Nicholson, “The Machine Conception,” 166, where he criticizes the software analogy: “the propensity to neglect the crucial role of the environment in shaping developmental outcomes is another consequence of assimilating the development of an organism to the programmed operation of a computer. In a computer, the independence of software and hardware means that the same program is always executed in exactly the same way regardless of the system that runs it. In contrast, when

2.1.2. Irritability as Molding the Other into a Means

As in the presence of the external world, the internal process of the living individual cannot be conceived in isolation from that world, the development of the needs and aversions must itself be considered as involving the coupling of the internal and the external process. The organism develops within an objective setting consisting of mechanical and chemical processes. Inasmuch as it demarcates itself from its environment through its development, it also constitutes itself as viable as that particular determinacy in that particular environment. To make sure that it perpetuates those specific conditions of viability, it has to be continually informed about the modifications of that environment.¹⁶⁶

Nonetheless, the outward process does not consist merely in sensitivity or selective receptivity that only informs the organism about its external conditions. It also concerns what the living individual does to its environment and how it treats external objects. The living individual is not passively receptive in its relations; it is also transformative. As the environment does not have a self-sustaining individuality that regulates itself, being merely informed of the environmental modifications would not be sufficient for the organism to sustain itself.

On the other hand, as long as the environment proves itself to be a factor from which the development of the living individual cannot be totally disengaged, it will also be incorporated into the very self-development of the living individual. Insofar as the living

organisms with a similar genotype find themselves in dissimilar environments they tend to develop differently. This is because the developmental deployment of genetic material is highly sensitive to external conditions. The path from genotype to phenotype is mediated by the environment. The genotype does not specify a unique outcome of development but rather stipulates a norm of reaction—that is, a pattern of different developmental outcomes across different environments that forms the basis of the phenotypic plasticity displayed by all organisms.”

¹⁶⁶ The complexity in sense-making varies along a broad spectrum covering a bacterium’s orientation toward a high concentration of the object of need and various forms of animal communication. These cognitive relations do not have identical characters. For our purposes one important matter is whether or not the cognitive process is mediated by a centralized subjectivity.

individual develops itself in and through its relationship with its environment, that environment to which it relates through its receptivity and responsiveness should be understood to co-emerge with the living individual *as its* environment. Thus in the presence of life, the environment of the living individual is not merely a world of mechanical and chemical objects, but it is the world of that living individual for which it has a particular significance.

Accordingly, another major way in which the living individual can domesticate the determinacy of the alien objectivity is by modifying the environment so as to bring it in agreement with itself. Purposiveness is the pervasive essence of life and its constituents. As long as it is within the range of the organism's capabilities, it subjugates to its own end the world with which it comes into contact. The transformation of the environment in a way that is conducive to the organism is a feature of life that even the most rudimentary forms exhibit. However, it is a feature that does not necessarily require representation of ends, or any consciousness, nor is it explicable in terms of mechanical and chemical processes only. As any activity that involves objects, it certainly involves mechanical and chemical processes. But in its most elementary form, to subordinate objective processes to its end of perpetuation, this process relies on responsiveness that is coupled with sensitivity. This second form of external relation therefore includes the first one, given that the organism needs to be informed of the external conditions and acclimate its internal organization accordingly in order to be able to adjust the other to itself.

The environment shaping process might seem tantamount to an external teleological process, in the sense that the universal determinacy of the living individual gets realized in objectivity. Although the objectivity of the world is informed by the determinacy of the living individual, it gets determined as a means for the organism, and therefore, does not thereby become the organism's or its own end. In this sense, this form of life-process does involve an

external teleological process. However, as long as the immediate means of the living individual, that is, its body, modifies objectivity in order to use it as a further means through which it sustains itself, the coincidence of the means and end still holds, and the living individual proves itself to be its own end in and through its relation with what is other to it.

2.1.3. Self-production through the Other

The third major aspect of the life-process is also the one that makes the character of the logical relation most evident. This aspect involves a total appropriation of the external object as an objective constituent of the organism. This form of assimilation is the process that takes away the apparent self-subsistence of objectivity with its own petard. In nature, it requires mechanical and chemical breakdown of nutrients; it involves a mechanical process such as absorption, mastication, and stomach churning, and a chemical process mainly consisting of enzymatic reduction. These interactions, however, are not totally adventitious consequences of the contingent spatiotemporal circumstances of different objects. They do not get going merely as a result of external occurrences that take place beforehand. They rather take part in a process initiated by a purposive subject that employs these processes as its means. When considered in their isolation, it is no wonder that we cannot identify purposiveness that governs these processes in each mechanical or chemical exchange. After all, in the determinacy of mechanical and chemical objects as such, the purpose is nonexistent. However, as being determined as indifferent to external determination, objects acquiesce to subordination for the purpose that the organic unity is. Of course, these processes are still facilitated by mechanical and chemical laws, as in the absence of a regularity governing objectivity, purposiveness would at most be indistinguishable from mere wishing.¹⁶⁷

¹⁶⁷ On the other hand, the living individual itself is not totally bound by every law that governs mere objects. Above all, organism, when taken by itself, defies the second law of thermodynamics. Neither the

Although assimilation annuls the apparent subsistence of objectivity, it is not a complete annihilation of its being. On the contrary, assimilation is the inspiration that vivifies the object. Inasmuch the life-process is a constituent of life, that which is assimilated in this process equally becomes an integral ingredient of life. In other words, the life-process is above all the activity in which the living individual incorporates external substances into its own externality. Needless to say, in becoming the living constituency that is now bound by an end to maintain itself, the integrated substance does not remain what it was before the assimilation. It is transformed through the internal processes of the living thing in such a way that it becomes homogeneous with the material of the life form in question. In other words these processes, which we call metabolism on the whole, give the raw material the form of the metabolizing living thing.¹⁶⁸ However, the form of the living individual is its concept, which already involves a self-developed and particular externality as its inseparable content. Thus the concept of the living individual is not a universal form that can be imposed upon the raw material from outside as is the case for artifacts. In the process of assimilation, the external object becomes a constituent of the living individual through its incorporation into the life-process. In this way, the living thing generates itself out of what is other to itself by appropriating it.

The kind of assimilation through which the external object is appropriated into the body of the organism is also bound up with selective receptivity and the organism's responsiveness to its environment. In order to sustain itself, the organism has to assimilate only that which would conduce to its internal process, which requires some form of sensitivity to the presence of the

living individual's internal process nor its interaction with its environment contributes to the entropy of the world. On the contrary, the living individual asserts itself as the opposite of entropy by virtue of its self-organization and self-maintenance.

¹⁶⁸ The metabolic process is significantly different in plant and animal life. Hegel says a lot about the differences, which we will examine in Part II. For the time being our focus is on the logical character of the relation of assimilation.

object of need, a selective process of intake, and certain internal arrangements to enable the appropriation of that object.

To recap, the living individual does away with the alien character of the world through a variety of relationships that exhibits its irreducibly purposive and self-active character which nevertheless employs mechanical and chemical processes to sustain itself. It evaluates its environment, it adjusts its internal network in accordance with its environment and shapes its environment according to this internal network, and finally, it takes away the self-subsistence of objects so as to incorporate them into its own body. All of these can be considered as aspects of living things.

In his logical examination of the outward process, which we will examine in the next section, Hegel does not go into much detail of the different forms of assimilation as he does particularly in his examination of the animal life in the *Philosophy of Nature*. Since we are still considering the logical dimension of living, we spare a more detailed examination of the natural forms of these relations for later. Yet regardless of the nature of these relations, the connection between the internal and external processes is visible. The external process is there for the living individual to satisfy the conditions of its viability in the presence of an external world and thereby maintain itself. Continuity of the organic unity is contingent on the competence of the organism with respect to its environment.

However, it would be a mistake to think that the external process is merely a means to the internal process. The constituent processes of life exhibit the same complementary relation that organs have with respect to one another. Given that the external process is performed by the constituents of the organism, this is quite obvious. Just as the constituents that participate in the outward activity of the living individual serve for the sustenance of the internal process, the internal process provides for the perpetuation of the external process. As a matter of fact,

the less complex the organism is, the harder it is to distinguish those two processes. In bacteria, the boundary is a direct part of both internal and external processes. Similarly, in simple organisms, the different forms of the outward process can hardly be told apart from one another. Sensitivity to external stimuli is often at the same time an immediate responsiveness whereas the response is the absorption and assimilation of the external object into the mechanical-chemical network of processes that sustains the organism. Likewise, in plants, the internal activity is for the most part indistinguishable from the outward process. In more complex forms such as animals in which the subjectivity is centralized due to the development of mind, the internal-external distinction gets more evident as the differences between receptive and responsive activities. Yet regardless of how mediated the relation between those processes is, as long as they are constituents of the living individual, they are complementary, and thus serve as means to one another, as well as to the living individual in its entirety. Regardless of whether metabolic activity is mediated by the body's efforts to find and acquire the object of need or an immediate transformation of chemicals into the internal process of the organism, the life-process is an aspect of the self-development of the living individual.

2.2. THE LOGIC OF ASSIMILATION

In the course of its internal process, the living individual constitutes itself as a purposive subject that exists for itself, that is, as an individual that has an interest in sustaining itself.¹⁶⁹ In a very similar way to Jonas, Hegel states that this individual existence with its private objectivity pits the living thing against an objective world.¹⁷⁰ When Hegel speaks about the concept of the living individual first in isolation from the world, he regards this living individual by itself already

¹⁶⁹ David Ciovatti commendably makes the same point: "it has its own continued existence and individuality as an ongoing ontological issue to which it is constantly responsive, in the sense that, as long as it is alive, it is at work in *keeping itself alive*" Ciavatta, "Hegel on the Parallels between Action and the Ontology of Life." *The Owl of Minerva*, 47, no. 1–2 (July 19, 2016), 80.

¹⁷⁰ *SL*, 684; *Werke*, 6:480.

as an Idea, even though he adds that it is Idea *only in its immediacy*. The living individual is therefore, from the very beginning of its conceptual development, necessarily a subject with an objectivity that is subordinated to its purposive unity. Even though its differentiated constitution is initially found at hand, the living individual immediately demonstrates that it is the ongoing production of this presupposed objectivity. Furthermore, the organism comprises a self-determining process that is continually driven by its inner tension where its objective constituents strive to assert their individuality over against the unity of the organism as a whole, while in the end, each renders itself a means for the rest.¹⁷¹ The living individual as such is the self-production of the organic unity in the face of the multiplicity of constituents each of which can only be what they are in collaboration with the rest.

All this suggests that at that point of the logical investigation where Hegel explicates the determinacy of life in its immediacy, there is yet no place for the external world or the organism's interaction with it. The internal process of the living individual in its elementary determinacy operates on the basis of its own resources. On the other hand, when the external world is brought into play, the character of the living individual will have to be revised accordingly, as it will turn out to be mediated by their interaction.¹⁷²

But Hegel notes in advance in the opening paragraph of his account of the life-process that the external world is for the living individual "negative and without self-subsistence," and that in self-feeling, the latter "has the *certainty* of the intrinsic *nullity* of the *otherness* confronting it."¹⁷³ Once again, we see Hegel using terms, such as feeling and certainty, which

¹⁷¹ *SL*, 681; *Werke*, 6:476–77.

¹⁷² "[The living individual's] inner subjective process in which it feeds upon itself, and the immediate objectivity which it posits as a natural means in conformity with its concept, are mediated by the process that refers to the fully posited externality, to the objective totality standing *indifferently* alongside it." *SL*, 684; *Werke*, 6: 480–81.

¹⁷³ *SL*, 684; *Werke*, 6:480.

pertain rather to life that has centralized subjectivity. Indeed, 'certainty' sounds even more problematic as it implies awareness of the self, which requires the subject to be able to consciously distinguish itself from its object. In nature, feeling and self-certainty are faculties of living things with minds, namely animals. Indeed, as we will see, inasmuch as the life-process involves centralized receptivity and responsiveness, it does not apply to other forms of life the assimilation process of which is rather automatically carried out. But if we would like to construe the logical exposition in a way that lays out the fundamental features of all life, we have to construe certainty in simpler but more comprehensive terms. Doing so is particularly hard in this context, as we have meager content. It seems minimally to mean that the possibility of the appropriation of the organism's inorganic other as a means is already implicit in the concept of the living individual. After all, the living individual is the process that subsumes objective processes under its purpose. Accordingly, attesting the truth of this implicit certainty is assimilation.

But "the *nullity* of the *otherness*" does not mean that the external world has no significance for the internal process. On the contrary, the outward process brings forth the concrete reality of the living individual as surrounded by a world that it leaves out of its own constitution. Moreover, the truth of the certainty of the opposing world's vacuity is attained rather as an outcome of the life-process that consists in the strife with that world. Together with the inclusion of the organism's environment into equation, the intrinsic drive of the living individual transforms into a striving to attest the truth of this certainty. The life-process thus comes to pass as the second opposition between the unity of the living individual and its opposing objectivity, and in its outward process, the living individual manifests that it has the capacity to overcome the antagonism of this foreign externality.

2.2.1. Need and Pain as the Contradiction Embedded to Life

Hegel goes on to say that the life-process starts with the *need* and explains how it ends up with its satisfaction. But the process he associates with the need and expounds right after he introduces the concept looks like a reiteration of the internal process of the living individual whereby the latter comes back to its unity from its external and manifold particularity. Of course, to the extent that the living individual is considered as a static correspondence of the object with the concept that unifies it, there is no conflict that drives this individual into a process.¹⁷⁴ But as the examination of the nature of the living objectivity revealed, that was just the abstract concept of life, and insofar as life is a self-determining process, there is no living individual without this process of differentiation in which the manifold objectivity determined by the concept continually asserts its independence. Accordingly, in the previous chapter, we have spoken of the tension between the unity and multiplicity of the living constituency, and explained how this tension drives the living individual to a self-determining unification. This process was explained to stand for not only the constitution of the living individual but its reproduction, which, in the first moment of life, are not really distinct from one another.

Here when Hegel introduces the concept of the need for the first time in his exposition of the life-process, he restates that once the living individual comes into tension with objective multiplicity, it finds itself negated by externality, rendering that externality an other to its own self. This amounts to, in Hegel's words, the living self's getting lost in objectivity. But he adds right away that this is not a total loss as in this other it manages to preserve its identity, and posits that external objectivity as its own world.¹⁷⁵ In this overcoming of the otherness of

¹⁷⁴ "The immediate shape of the living being is the idea in its simple concept, the objectivity conforming to the concept; as such the shape is *good* by nature." *SL*, 684; *Werke*, 6: 481.

¹⁷⁵ *SL*, 684; *Werke*, 6:481.

objectivity, it also objectifies itself. It is in this sense that its self-determination is an objective and external self-determination, that is, the self-determination of objective externality. But inasmuch as it preserves its identity as a living individual, it is also a living contradiction.

We have already spoken about this internal rupture that follows from the self-differentiating character of the soul when we examined Hegel's account of the drive of the living individual and the capabilities that are the twofold expressions of it, namely sensibility and irritability. The internal process of the living individual consists in an incessant exertion to overcome disintegration, which amounts to its self-reproduction. It is precisely in this way that the organism is a self-realizing unity that is always in the making. This process is equally the process of self-differentiation, as any truly self-constitutive being would be self-differentiating, as we have shown in the previous chapter. Self-differentiation, on the other hand, is an incessant replacement of its immediate objective content, which again explains why the tension between sensibility and irritability is reconciled in life's constant regeneration. Now in the presence of the external world, the tension arises between the regenerating individual and the external world that serves as a world of constraints to it. The outward process of life is the living individual's assertion of its unity in the face of external constraints through rendering them its means to live.

Unlike the living individual, its external world does not have a self-sustaining unity. Accordingly, that world's determinacy cannot always be in harmony with that of the living individual. The internal unity of the living individual upholds its own norms which can be disrupted by factors that belong to its external world. While in his discussion of internal process Hegel has already referred to the organic receptivity of the conflict as self-feeling, here in the exposition of the life-process, he specifies that feeling as *pain* (*Schmerz*):

But since its negative moment realizes itself as an objective particularity, that is, since the essential moments of its unity are each realized as a totality for itself, the concept *splits into two*, becoming an absolute inequality with itself; and since even in this rupture the concept remains absolute identity, the living being is for itself this rupture, has the feeling of this contradiction which is *pain*.¹⁷⁶

The choice of word 'pain' is questionable, as pain is ordinarily spoken of as belonging only to human or animal life, and it requires sentience, or centralized sensitivity. Once again, to designate a logical determinacy, Hegel is here choosing a word that would incite an immediate connection with what is familiar to all. After all pain is the most familiar feeling of some ongoing conflict. One can argue that some other term such as 'harm' or 'injury' ('*Schaden*' or '*Verletzung*') could be used to designate this inner conflict while still keeping its difference from a mere damage to inorganic beings.¹⁷⁷ Simple organisms such as bacteria avoid behavior that harms their self-constituted organization even when they don't feel pain. Nevertheless, harm or injury does not make the "for itself" character of this rupture as explicit as the feeling of pain does. Together with pain, the inner contradiction obtains distinctively subjective status that goes beyond the immediate identity with the totality of objectivity that enables it, even though in this context Hegel seems to use the term 'pain' to designate the inner contradiction that can be spoken of any living individual whether or not its subjectivity goes beyond this immediate identity.

However, this raises the question as to why Hegel does not bring in the concept of pain beforehand in his exposition of the living individual, as the latter consists in the immediate and

¹⁷⁶ *SL*, 684; *Werke*, 6:481.

¹⁷⁷ In his examination of Hegel's account of pain, Wendell Kisner uses 'harm' to express this inner contradiction: "Even plants and bacteria are not indifferent to what happens to them, a non-indifference reflected in the fact that we regard harm as a real possibility for them, while even if a rock is shattered into multiple fragments we do not generally think of it as having been "harmed." We have the sense that living things all the way down to single-celled organisms can be harmed in a way that rocks cannot." *Ecological Ethics and Living Subjectivity in Hegel's Logic*, 121–2.

the most fundamental form of this inner contradiction. At least he could have spoken about it within his account of sensibility and irritability, where he also introduces feeling as the minimum cognition of the internal differentiation as a universal determinacy of the living individual as a whole. Perhaps, that would imply that every moment of the living individual is in that sense a painful moment.¹⁷⁸ But this does not bring about an *additional* problem, for if pain is the state or feeling the living individual has in its exchange with the world, then again, as long as it is always in contact with the world, it should always be in pain. Moreover, it is not hard to associate pain with a weakened internal process irrespective of the external stimuli. Also, Hegel's further remarks on pain do not contradict any of these points. He states that pain stands for the contradiction inherent to life without which it cannot be what it is. It is both a privilege and also the penalty of incorporating one's own negativity in itself. It is a contradiction that works for the perpetuation of the living thing.¹⁷⁹ Pain is in this sense similar to death, although only on a smaller scale. Furthermore, as Hegel indicates, even though the pain is indicative of an inherent contradiction, it is immediately the certainty of the unity of the living individual. As long as the living individual is in pain, it is certain that it is still alive. This shows once again that even without bringing the life-process into account, the organism's reception of the manifold objectivity of the body seems to end up with the same certainty in its most rudimentary form.

Nevertheless, Hegel considers the need as the crux of the life-process, and argues that the need as well as the urge that drives the living individual to its satisfaction arises from the pain. If we insist that the living individual by itself accommodates a contradiction through which it maintains itself, we can at best conclude that even in his account of the living individual, Hegel

¹⁷⁸ The actually felt pain is accordingly only an instantiation of this organic contradiction. It is the result of having a body, something that is not entirely the same with its unity.

¹⁷⁹ "It is said that contradiction cannot be thought; but in the pain of the living being it is even an actual, concrete existence." *SL*, 684; *Werke*, 6:481.

has already advanced to explicate the life-process. Accordingly, just as the moment of difference, that is, the pain of being constituted out of an opposition, the unification, which is to say, the *need* to conciliate this pain, is an inherent determinacy of the receptive and responsive living individual. In this regard, while the pain signifies at least a proto- or minimal cognition of a deficiency or a lack, the need, or the object thereof, is that which can satisfy it. Yet in the domain of the living individual as such, the conciliation in question is immediate. The unifying reception of the manifold is concurrent with the particularizing drive of the constituents. To illustrate roughly, suppose that the constituents of the organism are lacking in their need of nourishment. Given the complementarity of organs, this is a contradiction for the unity of the organism as a totality, and the remedy is the very organic unity itself. That is, satisfaction considered at this scale consists in nothing different from what the internal process is already doing: striving for maintenance and reproduction inasmuch the circumstances would allow.¹⁸⁰

As is mentioned above, the concurrence of the pain and its satisfaction is evident in the presence of centralized subjectivity, where feeling is an inward determinacy that overtops the merely external existence of the living individual. In that case, whereas the living individual feels the pain as the negation of its existence, it also comes to feel “certain” of its own unity thanks to the feeling of the pain, and the unity is what the organism needs in broad terms. In this case, the pain is bound up with the striving for a rudimentary self-certainty that does not involve any consciousness or self-consciousness.

¹⁸⁰ As we will see in Part II, this is also applicable to plant metabolism, insofar as the plant life has an immediate relationship with its inorganic world. Once again, this shows why the life process which, at least given the way Hegel expounds it here, seems to require an active engagement with the environment, is rather or more truly an animal characteristic of life. Furthermore, again as we will see, an active engagement with individual objects instead of universal needs also brings about a higher level of self-differentiation, implying a widening gap between the individual and its given universality.

On the other hand, when the organic unity is unable to achieve this need relying on its own resources only, the need becomes an other, and there opens a gap between the lack and its fulfillment. This amounts to a disjunction of the need as the basic requirements for the organic unity itself and the external needs of the organic unity to sustain itself. In accordance with this disjunction, the living individual becomes a twofold activity: an internal process and an external process, both of which contribute to the other to sustain themselves, and in their reciprocation, reproduce the life that incorporates them both.

The pain, or in its minimal sense the proto-cognition of the lack, drives the living individual to a purposive relation with the world in which relation the former makes use of the latter in order to satisfy its deficit and reproduce its unity. The inherent drive is no longer the drive of internal constituents only, but it is the drive of the entire organism towards its object of need or the externality in general. But this world of objects is not the externality that is immediately its own. Life can prevail over the inanimate world of objects only if it finds a way to transform the foreignness of that externality into its own concept. This transformation is assimilation in general.¹⁸¹

2.2.2. The Stages of Assimilation

In the preliminary account of the life-process, we have spoken of the different levels in which assimilation takes place. In the *Philosophy of Nature*, Hegel elaborates on these levels and

¹⁸¹ Compare with Michael Spieker, who thinks that the logical assimilation should not be confused with metabolism as the first merely consists in shapeshifting rather than incorporation.

Die »Assimilation« (SL, XII, 189) ist nicht gleichbedeutend mit der negierenden Einverleibung der Objekte in das Lebendige, denn das hieße, sie mit der Nahrungsaufnahme des natürlichen Lebewesens zu verwechseln. Das Außersichsein im Selbstbestimmen ist ja prinzipieller Natur und somit unverteilbar. Die Assimilation bedeutet vielmehr die Negation der Negation, welche die Objektivität darstellte. Durch seinen inneren Gestaltungsprozeß hat das Lebendige sein Dasein an einem anderen, dem Unorganischen. Dessen Widerständigkeit negiert die Selbständigkeit des Lebendigen und doch identifiziert sich das Lebendige noch mit diesem anderen, es ist *sein* Mangel. Nur deshalb erregte es in ihm den Schmerz. In der Assimilation wird diese Negation negiert. So gibt das Lebendige seinem anderen, das als solches keine Gestalt hatte, seine Gestalt. (Spieker, *Wahres Leben Denken*, 364)

kinds of assimilation with reference to plant and animal life. In Chapter Five, we will talk about different processes of assimilation in some detail. Here we can briefly extract their logical structure with reference to Hegel's account and our preliminary examination of it.

In between (i) the immediate unity of lack and its satisfaction within the organic unity of the living individual and (ii) an utter annihilation and incorporation of the object of need, there are intermediate forms of assimilation in which the determinacy of the externality is registered as an internal determinacy of the living individual, or transformed in such a way that conduces to the organism without doing away with the subsistence of the object. The first of these relations is what we referred to as cognition or sense-making in the previous section, while the second one consists basically in shaping the environment.

Considered only with respect to its externality, the organic body engages in mechanical and chemical interaction with the external object. But this latter does not affect the organism *only* in the way objects affect one another. Since the organism is a self-determining, purposive objectivity, the interchange between itself and the external object is a function of its concept. The object, Hegel says, excites the organism, and excitation or stimulation is different from mechanical push or communication, or from chemical attraction.¹⁸² The living individual is receptive, but its receptivity is always selective. As Hegel puts it, the organism receives the impulse "only to the extent that in principle it is already *in it*," that is to say, only insofar as the

¹⁸² In the *Science of Logic*, Hegel puts it with a degree of clarity unexpected from him: "[i]n so far as the object confronts the living being at first as something external and indifferent, it can affect it mechanically, but without in this way affecting it as a living thing; and in so far as it does relate to it as a living thing, it does not affect it as a cause but it rather excites it." *SL*, 685; *Werke*, 6:482. His explanation in the *Philosophy of Nature* is even clearer: "An important step towards a true conception of the organism is the substitution of the concept of stimulation by external potencies for that of the action of external causes. The former concept contains the seed of idealism, which asserts that nothing whatever can have a positive relation to the living being if this latter is not in its own self the possibility of this relation, i.e. if the relation is not determined by the Notion and hence not directly immanent in the subject." *PN*, 385 (§359 Remark); *Werke* 9:469.

determinacy of the impulse is in accord with the purposive concept of the living individual including the individual determinacy of its particular constituents.

In the first general form of assimilation of the organism's other, this reception is simply information concerning the kind of the impulse with respect to its being conducive, neutral, or detrimental to the organic unity. By being already exposed to external determination, objects are already susceptible to the purposive manipulation. Thus, from within the logical framework, conduciveness indicates a further susceptibility to be manipulated in accordance with the ends of the living individual. Once again Hegel chooses to use 'feeling' as the prototypical form of sensitivity. As we have already noted and will explain in more detail in Part II, feeling as an inward determinacy requires centralized subjectivity. Therefore, its employment in an account of the fundamental features of all life is questionable. In the *Philosophy of Nature*, it is evident that Hegel thinks the plant has neither soul nor feeling, although he speaks of it as a living being. Thus, as long as its logical characterization still suggests unitary subjectivity, feeling does not universally apply to all that Hegel considers as alive, perhaps not even to those invertebrates whose nervous system exhibits limited centralization of sensitivity. For all these negative consequences it begets, feeling as a universal and inward determinacy of the living individual makes it easy to understand how an external impulse is registered as positive or negative in accordance with the individual concept of the living individual. Feeling is thus an inward determinacy that belongs not to the object but to the living individual as a subject, and immediately designates an accord or discord with the living individual's own state or inner determinacy.¹⁸³ However, as long as the subjectivity of the living individual coincides with its

¹⁸³ To clarify, here we are not talking about the sort of inward determinacy the content of which is determined in connection with the living subject's *perceived* ends or expectations, or any comparison between them, as is the case for emotions. Feeling is immediately bound up with the living individual's default end of self-perpetuation of itself or its species being.

internal process, its interaction with its environment is determined merely by the universality of its purposive process, rather than by its individual inward determinacy that expresses it to itself.

But the assimilation is not restricted to a cognitive act through which the living individual immediately determines itself to be in accord or discord with its own felt state or determinacy. The life-process is also transformative. In order to determine itself in accord with its object, it also alters its object. As long as the living individual can engage in purposive acts that subordinate mechanical and chemical processes, it can manipulate external determinacy in a way that suits to its own end. Again the presence of discord, and the accompanying feeling where available, the living individual is driven by its own concept to overcome this discord. Thus, this is the living individual's creating an environment for itself. In and through this activity of shaping the environment, the world ceases to be an alien determinacy, and becomes the living individual's home.

On the other hand, although all of the above are forms of life-process, neither being informed about the externality, nor adapting its own determinacy in accordance with it, nor shaping the environment is for Hegel assimilation *par excellence*. In these forms, even if the external determinacy ceases to be alien to that of the living individual, it does not become living either. Insofar life consists in the self-development of constituents that are not only the means but also ends, the living individual's practical engagement with the world does not necessarily infect that world with its essential determinacy.

This latter is precisely what happens in the process of assimilation that appropriates the external determinacy as an internal constituent of the living individual. This aspect of assimilation is the one that Hegel particularly focuses on in the logical account, as it exhibits the relation in its most complete form. When considered in its relation to the external world, the objectivity of the living individual is an instrument that exercises *violence* on its object through

mechanical and chemical processes. By violence, Hegel means a violation of a being's subsistence or the lawfulness that upholds it. This exercise of violence is governed by the end of a self-sustaining unity. Nevertheless, in its totality this process is a process of interiorizing, and therefore, unlike the external purposiveness that merely dresses the object in an external form, in the assimilating process, the objectivity completely loses its specificity and becomes permeated through and through by the distinctive character of the concept of the living.¹⁸⁴

This transformation is not only the crux of the logic of metabolism but also the link that bridges the internal and external processes of life. Once the object of need is apprehended by the living individual through mechanical process, and its objectivity is bereaved of its distinctive composition, it becomes incorporated into the internal process. But the internal process is equally the reproduction of the living individual. Now we see that the internal moment of self-production itself is reproduced, this time by the mediation of the external world in which the latter gets incorporated into the objectivity of the living individual.

Hence the life-process is the living individual's self-realization this time mediated by its other, the inorganic world. At first, the living individual is pitted against an externality that is alien to it. But then in and through its interaction with the outer world, the living individual proves that it can subdue the externality and foreignness of the external objectivity in such a way that it can conform to its own character. Especially in the assimilation process that incorporates the alien objectivity into its body, the living individual makes it explicit that it is a particular kind of being that can maintain itself in objects that are not immediately its own, and thereby realize itself as a concrete universal, over above not only its particular constituents, but

¹⁸⁴ *SL*, 685; *Werke*, 6:483.

also its individual existence. This emerging universal, which is the joint product of the internal and external processes, is what Hegel calls the *genus*, “real universal life.”¹⁸⁵

¹⁸⁵ *SL*, 686; *Werke*, 6:484.

CHAPTER THREE

THE GENUS-PROCESS

The first subdivision of Hegel's logical examination of life covers the internal process that constitutes and sustains the living individual, whereas the second one expounds its relationship with the inorganic world in general. The third and the last subdivision is called "The Genus" (*die Gattung*), and it concerns mainly the process that procreates a new living individual that is of the same kind as its parent organisms. In that regard, the genus-process is the process of reproduction, but unlike the self-production of the living individual that Hegel explicates as the coming full-circle of the internal process, it stands for the development of the genus as the unity of particular individuals constituting a universal determinacy. Together with the genus-process, the determinacy of life goes beyond the living individual and characterizes the relationship between different living individuals. This relationship is their unification, which brings about two different yet interrelated products. On the one hand, the product is a new and independent living individual. On the other hand, this unification and the coming to be of a new individual is the demonstration of the *genus*, the universal that incorporates them all. With respect to both aspects, what is brought about is a living form of being. The genus is a living form of being in the sense that it proves to sustain itself in and through the activity of its different particulars. Thus, the third moment of the concept of life treats the living individual in relation to its kind, which can be construed as the species being in particular, although what it truly means in the logical explication is life as a genus that subsumes different living individuals.

It is worth recalling that the concept of genus emerges as the universality of the living individual through its relationship with the inorganic world. Hegel's exposition lays out the main

steps through which the kind that he refers to as genus produces itself as universality that can only sustain itself through non-indifferent interactions among its members, but nevertheless also acquires a relatively independent status vis-à-vis its particular members. The emergence of the concept of genus as an outcome of the life-process implies that the genus-process has to do with the relationship of the living individual with its other so as to sustain life. Yet this process as expounded in the *Science of Logic* seems to require a multiplicity of living individuals which go beyond the indifferent and assimilative relationship between the living individual and its external world. Furthermore, in the *Encyclopedia* version of the logical system, Hegel construes the genus-process in a way that the interacting individuals are distinguished as different sexes. However, there are questions as to what extent this plurality of living individuals and their propagative interrelations are necessary features of the determinacy of life, and to what level of success Hegel achieves to deduce reproduction from what is at hand in the logical explication. To address this question, we will have to figure out the meaning, role, and necessity of sexual differentiation.

Biology textbooks include reproduction as a necessary feature in their list of functions and capacities that pertain to living things. Reproduction is certainly one of the conditions that make contemporary perspective of biology possible: without it, there would not be evolution by natural selection, or biological species, or biologists for that matter. But it is not as easy to justify claims that reproduction is indispensable to life in general or that the biological species has the same ontological status as organisms. For example, even though the autopoietic theory of life includes self-production as one of the requirements for life, it does not consider the production of offspring as a necessary feature of living systems. The question of whether reproduction is a necessary feature of all things living can be assessed independently of the claim that complex forms of life could not have evolved without reproduction. Reproduction requires living

individuals in the first place, and there does not appear any contradiction in the thought of organic unities that cannot sexually or asexually reproduce themselves.¹⁸⁶ In its external relation, a living individual can dynamically improve the ways it can cope with its environment. However, in the absence of any reproductive activity, living individuals would lack the advantages of reproductive behavior, and therefore, although whether there is any theoretical necessity is open to question, they would one by one succumb to the destructive power of mechanical and chemical processes, leaving the fate of life to reemergence from the inorganic world. By contrast, by replicating itself, a living individual would have the chance to dispose of what is impaired or what is malfunctioning in its constitution. Similarly, in exchanging and combining material with one another, different living individuals can bring about a new individual that would not be susceptible to that which would kill its procreators. Yet none of this would indicate the necessity of reproduction *for* the living individual as such. Similarly, the concept of genus that applies to a plurality of living individuals may not be necessary to conceive of the character of a single living individual, if genus is to mean something more than the universal character of the organism that continually sustains and renews itself through particular relationships it engages in with its environment.

Nonetheless, Hegel presents the genus-process as the third fundamental moment of life, even though he distinguishes it from the self-production of a living individual, which does refer to the universal character that pervades its internal process. This chapter examines the significance of the genus and explores the sense in which Hegel thinks the genus-process is

¹⁸⁶ Evan Thompson makes the same point from within the perspective of the autopoietic account of life: "Although autopoiesis and reproduction go hand in hand in living cells, there is a logical asymmetry between the two. Reproduction presupposes autopoiesis, but autopoiesis does not necessarily entail reproduction, for a system can be self-producing according to the autopoietic criteria without being capable of reproduction. Such a case, besides being logically or conceptually possible, could well have happened in the history of early life on Earth. Perhaps the very first spontaneously self-assembling autopoietic systems were incapable of reproduction and therefore left no descendants." *Mind in Life*, 167.

necessary, again with reference to the lingering question of whether the logical account presents the minimal features of life that is common to all forms of life, or whether it carries the concept of life to its completion in terms exhibited only by certain forms and approximated by certain others. One of our main challenges consists in bearing in mind, on the one hand, that Hegel is not talking specifically about natural organisms, and on the other, that he is not blocking but paving the avenues for a comprehension of life in nature.

Another challenge results from the usual opaqueness of Hegel's account of the genus in the *Science of Logic*. With a preliminary reflection on the implications of a plurality of living individuals and their propagation, we seek to make the logical account more transparent. We will clarify why reproduction in particular is not a mechanical or chemical, but a living process, and also why analogies with artifacts fall short of organic propagation. Some issues associated with reproduction and organic interrelations about which it is hard to find any reference in the text will also be considered in the first section. However, we will leave the comparison of the specifics of different reproductive processes in nature to our examination of different forms of life in nature.

3.1. PRELIMINARY EXAMINATION OF THE GENUS-PROCESS

Although as a taxonomic rank, the German word '*Gattung*' translates better as 'genus' than as 'species' (*Art* or *Spezies*), it is nevertheless also used to refer to a class, kind, or species. Hegel's choice does not seem to be arbitrary, especially given that in his exposition of the concept and the universal, he speaks of the differences between the genus and the species as different kinds of universals. The genus is a higher universal than the species, although it consists in the plurality of these species, which are its particulars. Although they are both universals, when one is to be contrasted with the other, the genus underlines universality, and the species, particularity. While the genus is for Hegel the universality that maintains itself in its

particular species without determining the features that individuate the members of each of these species, the species maintain themselves, and their genus as a “negative unity,” on account of their mutually excluding one another.¹⁸⁷ In the section on objectivity, genus and species refer to universals that are objectively realized. Likewise, here in the section on life, the genus can be understood as referring to the “universal essence” or kinds that are individualized in objectivity, in a way similar to chemical elements. The main difference of the genus of life is that it individuates itself through the activity of its own particulars which sustain it, rather than being merely given, even though the genus itself does not individuate its particulars either. In this regard, unlike a chemical element, the genus demonstrates itself as the end of a process of reproduction.

Now, for all these possible ways to distinguish the two concepts, taking genus and species as interchangeable terms for an examination of the genus-process still does not seem to compromise Hegel’s account in general. At any rate, when Hegel speaks of genus or species as kinds of universals, he is not speaking about biological taxa. The taxonomic ranking systems used in biology have an arbitrariness built into them. The differences between, say, a genus, family, and order do not reflect the characteristic differences between these ranks more than they basically indicate their being more or less general or inclusive than one another. From the logical point of view, the biological taxon ‘family’ is as much a universal as an order, a class, or a phylum.¹⁸⁸ *Insofar as* taxa are characterized by class membership that consists in merely listing

¹⁸⁷ See *SL*, 578–79; *Werke*, 6:398–400, where Hegel expounds the nature of the *disjunctive judgment*. There Hegel distinguishes the genus and species from abstract universals with their merely “diverse” particulars. Species are not merely diverse but also contradictory, which makes their unity in genus a negative unity of mutually excluding particulars.

¹⁸⁸ As a matter of fact, Hegel thinks that if a genus is higher merely because of its wider scope of inclusion, it is more abstract and void of content, as it loses its connection with the individuals under its rubric. Yet one can still speak of universals that are *truly* higher than others. Life is one of them: it is not merely a higher genus that pertains to all particular genera, but it is itself concretely determined through

members in accordance with an externally specified criterion, such as a similarity in appearance or structure, the differences among those ranks are merely formal or subjective.¹⁸⁹ A class is a container of particulars which are externally brought together. These particulars stand in a mechanical relation to one another, given that they are stipulated as individuals irrespective of their relations with one another. That is to say, the class itself plays no role in the individuation of its members. In that sense, the relationship between these members with their class is equally mechanical, as their character is not affected by the class under which they are subsumed.

Admittedly, considering both the traditional philosophical use and their usage in biological taxonomy, the universals genus and species are in important respects different from classes, even though they also do not individuate their individual members. A genus or species is not merely a property abstracted from different instances that share it, nor is it a class that serves as a container for those instances. It is rather produced as and through the totality of individuals, without which the genus or species cannot have the particular character that it has. It is true that in biological taxonomy, there is a degree of arbitrariness concerning the joints that are carved as the boundaries of different taxa. But as long as the carving is contingent on non-subjective factors such as the descent of organisms, it is not entirely arbitrary. That non-arbitrary element which figures in biological classification is determined by the reproductive process. Reproduction is not an indifferent relationship; it cannot be imposed upon its relata from without. *Insofar as* it is considered in its sexual form, it is a relationship that can only occur between the likes, and a process through which individuals objectively constitute a specific

the reciprocation of its concrete particulars. *SL*, 533; *Werke*, 6:279; *SL*, 547; *Werke*, 6:297. It is only in this sense that life in its entirety and as its completion, is the highest self-mediated genus.

¹⁸⁹ Hegel offers an interesting critique of such classification in the section "Observing Reason" of his *Phenomenology of Spirit*, 145–210; *Werke* 3:185–262.

universal, or demonstrate the universality that they commonly embody, which in biology is appropriately called “the biological species concept.” According to this latter, species is defined not with respect to similarities in appearance, but with respect to the capacity of individuals to interbreed and produce fertile offspring, and moreover, only in relation to other kinds from which they are reproductively isolated. From this perspective, species are not merely figments of external observation, but they are constituted by the activity of living individuals and on the basis of their differentiated individualities which demonstrate their universality through these activities. The offspring is the product of this activity in which different individuals that share the same or related universal character play a role. Therefore, this coproduction of a distinct individual of the same kind concretely demonstrates the particularity of the universal character, yet again, in the form of individuality. It is in this respect that the genus of life in the *Science of Logic* resonates with the biological *species* concept.¹⁹⁰

However, the reference to interbreeding which is evident also in the biological species concept is built upon sexual reproduction, which requires the differentiation of sexes. In contemporary biology, the capacity for interbreeding and producing fertile offspring is a widely used criterion of forming a species, despite the fact that it renders problematic the status of asexually reproducing organisms. But is Hegel’s explication of the genus-process limited to sexual reproduction? In the *Encyclopedia Logic*, Hegel speaks of the differentiation of the

¹⁹⁰ See also John W. Burbidge, *Hegel’s Systematic Contingency* (New York: Palgrave Macmillan, 2007), 205 (fn. 20): “Genus thus serves logically as the common attribute that the individual continues to embody even through a number of assimilations,” or James Kreines, “The Logic of Life: Hegel’s Philosophical Defense of Teleological Explanation of Living Beings,” in *The Cambridge Companion to Hegel and Nineteenth-Century Philosophy*, ed. Frederick C. Beiser (New York: Cambridge University Press, 2008), 357: “[*Gattung*] refers to a general kind within which individuals reproduce, generating more individuals of the same kind. I will generally use “species” to refer to this idea.”

universal that would prove itself to be the genus as the differentiation of sexes.¹⁹¹ Does that mean that Hegel's logical account of life leaves out of consideration other forms of reproduction?

Even though Hegel's account of the genus-process seems to be explicating a process between different living individuals, it is worth considering whether the exposition in its entirety still has the resources to incorporate forms of reproduction that do not require more than one term, such as asexual reproduction. It is worth asking, to begin with, to what extent self-production can be distinguished from the generation of distinct individuals from a single organism. In nature, reproductive process is either asexual or sexual, although both forms of reproduction have various types. The extent to which Hegel's logical account is able to accommodate the differences between forms of reproduction is one of the concerns of this chapter. In any event, since this is yet a logical explication, the concept of genus has a domain larger than that of biological reproduction. It signifies on different levels a relationship between life as a universal and the living as its particular. But before further clarification and examination of Hegel's concept of the genus, we can briefly talk about why reproduction nevertheless seems to be the prevalent logical relation between different living individuals that Hegel takes into account.

3.1.1 The Living Individual in its Ecological Relationships

The genus crops up from within the activity of the living individual in its environment. However, the living individual does not only have relations with the inorganic world, and obviously, not all its relations to other organisms are procreative relations. Nonetheless, Hegel does not seem to include any other sort of relation among living individuals into his account of

¹⁹¹ *EL*, 289 (§220); *Werke* 8:376. Also, as Wendell Kisner notes, the German word for copulation is 'Begattung' which derives from the term genus ('Gattung'). *Ecological Ethics and Living Subjectivity in Hegel's Logic*, 142.

life. Here we can think about whether such relations are logically conceivable, and if they are, whether they are necessary and thereby applicable to all forms of life, or only to some of them, such as those that reproduce sexually, or those the life-process of which is mediated by centralized subjectivity.

Relationships between organisms can be considered under the rubric of ecological relationships in general. Needless to say, if Hegel is to speak of relations and processes in his logical account, they have to be about the living individual as it is conceived within the boundaries of logic, and they must be intelligible without any reference to natural entities. Apart from reproduction, one can think of several other inter-organic processes that have their exemplifications in nature. In ecology, it is common to speak of predation, competition, interspecies collaboration, and various forms of symbiotic relationships used in a broad sense of the term 'symbiosis.' There might be a certain way in which the ontological character of these relations can be expressed in logical terms. If there is, perhaps one reason why these kinds of relationships appear to be left out of the logical examination might be that their fundamental character can already be expressed through the concepts that constitute the internal and external processes of the living individual. Another reason might be that they pertain only to particular forms of life, and therefore lack the universality that a logical explication would demand, even though this latter standard does not seem to be one to which Hegel's own exposition is firmly committed.

One might say that, from a macro perspective that concerns the complementary diversity of life in general, predation, competition, and interspecies collaboration may have critical functions, such as their contribution to population control and to the dynamic balance among different species. This would be directly relevant to how life in its entirety is not merely an aggregate of living things, but itself exhibits a dynamic structure in which the constituents

reciprocally differentiate and sustain one another. Such a perspective, however, considers predation, competition, and collaboration at the species level, and therefore presupposes reproduction. Once the genus-process is explicated, it might be possible to think of the variety of relationships that species or genus as a unity of plurality of individuals can have.

But if the meaning of predation were to be restricted to feeding on a particular resource, reproduction would not be a prerequisite to conceive of this activity. After all, it is possible to conceive of predators that are unable to reproduce, and furthermore, predation considered even at the species level would still presuppose individual living things that feed on others in the first place. Similarly, if competition is considered as a struggle among different living individuals for particular resources or for mating, it is not necessarily interspecies. But furthermore, competition does not even need to be intra-species provided it is possible to conceive of a plurality of individuals that still compete for the same resource without jointly forming a species or without being able to reproduce, even if their differentiation may entail reproduction at some point.

To the extent that predation requires being involved in depriving the prey of its life, it is a relationship between different living individuals. But because of this same requirement, predation does not seem to be a universal feature of all life. The logic of the life-process suggests that as long as the living individual is capable of assimilating its other and rendering it a means to its own life-process, it can perpetuate itself. This is demonstrated in nature by living things that survive without killing or that feed on inorganic nutrients. Competition, on the other hand, does not always require an active involvement or fight with other living things, which are centrally governed activities of a unitary subject. As long as organisms can compete without confronting one another, competition is a matter of external reflection that is not necessarily a direct relationship between living individuals, and is therefore not directly relevant to a logical

exposition of life. Of course, living things develop several “strategies” to deal with their competitors. But from the logical standpoint, contingencies of the kind of competition that involves active behavior concerning the other does not seem to add much that is essential to the living individual’s relationships with its environment as already explicated. The living individual before the derivation of the genus-process is in any case determined in a way that would prioritize its own perpetuation at the expense of its other, regardless of the determinacy of the latter. And the specific ways in which organisms do to outperform their rivals would be dependent on the nature of the organism and the contingencies of the environment. In the context of the logic of life, this presupposes in the first place an account of the differentiation of these different kinds from one another, which is what the genus-process allows for on a minimal level.

The symbiotic relationships between organisms, such as mutualism, commensalism, or parasitism can similarly be expressed in terms of the living process and as diverse practices of assimilative behavior in the sense explained above. Whether the goal is nutrition, protection, or reproduction, the living individual relates to the other in order to perpetuate itself or its species. In this regard, in these different sorts of relationships between organisms, the living individual does not regard the other as if it is an end in itself. In many cases, the other is the source of the object of need and becomes a part of its internal, metabolic, or reproductive process, which puts it on the same footing with the inorganic world that is used merely as a means to the end of life. In some other cases, it is used for protection in a way similar to how organisms construct and inhabit appropriate niches for themselves. Thus, as any other object, the other organism gets treated as the means to the living individual’s immanent purpose, which is nothing but the living individual itself. Accordingly, in all these relationships the other is not strictly speaking treated as a living individual.

Perhaps, as Wendell Kisner suggests, there is a different situation in the case of mutualism, where both organisms benefit from the relationship.¹⁹² Mutualist symbiosis has different types in nature. In some cases, both symbionts are obligate, meaning that they necessarily depend on one another. But in some others, symbiosis is obligate for only one of them or facultative, that is to say, optional for both. If there is a necessary interdependence, the relationship between mutualistic organisms is similar to the one between the organs of the living individual, where those constituents are not merely means but also ends. But the similarity is limited because mutualistic organisms have their own individuality demonstrated through their crisscrossing yet distinctive processes of sensibility, irritability, and reproduction. In no instances of symbiotic relationship, surviving individuals share a common feeling or subjectivity, nor do they conjointly respond to stimuli, or copulate, or bring about common offspring. Even if in some cases of certain symbiotic relationships, each organism would need their relatum to live, it is still questionable whether organisms are to one another anything other than the means to their own end. It is true that practically each becomes the means and end at the same time, although through this mutualistic relationship, strictly speaking, each organism becomes the means to the end of the other, and not to the end that it itself is. To the extent that these organisms are self-producing unities of particularity that share different universal characters peculiar to their own unity, they are different individuals.¹⁹³

For all that, one would reasonably argue that living things with centralized sensitivity or sentience, such as animals, treat other living individuals quite differently than the way they deal

¹⁹² *Ecological Ethics and Living Subjectivity in Hegel's Logic*, 128–133. Kisner uses the term 'symbiosis' instead of 'mutualism.' Here we preferred 'mutualism' as the current literature uses the term 'symbiosis' to refer to all sorts of persistent and regular interaction between different species that involve some sort of spatial contiguity organisms.

¹⁹³ Although not exactly the same, the plant form of life exhibits a similar multiplicity of individuals that share a common base.

with the inorganic world. Animals, for instance, are not utterly indifferent to how others feel or behave, which also makes itself evident in reproductive behavior. From this perspective, relationships such as predation and competition, and certain examples of symbiosis are unique and inexhaustible in terms of assimilation only. But even if we forget about the restraints of the logical investigation and its claim to universality, and start talking about how living things with feelings relate to one another, we should still keep in mind that these relationships still take for granted a multiplicity and variety of organisms, which again indicates that a reproductive process of some sorts is already in process.

Hypotheses for the origin of eukaryotes from prokaryotes or multicellulars from single-celled organisms offer interesting cases to consider. The symbiogenesis theory that explains the emergence of eukaryotes in terms of a single-celled organism engulfing another single-celled organism represents a borderline case between the life-process and reproduction. In this example of endosymbiosis, what is engulfed evolves into an organelle. If we were to suppose that assimilation does not necessarily involve a complete breakdown of the assimilated, this incorporation could fit in with the general character of the life-process where the other becomes an integral constituent of the assimilating organism. However, to the extent that the host organism is also utterly restructured as a consequence of the merger, which is also expressed by the exchange of genetic material, the process can be considered as the reproduction of a new individual. The colonial theory of multicellularity raise the question of whether the union formed by the cooperating single-celled organisms would count as a new organism, especially given that in the new formation, they assume different roles. Similarly, according to the symbiotic theory of multicellularity, the relationship goes beyond a mutualistic exchange and symbionts get subordinated to their unity as the differently functioning cells of an arguably new individual. In such a case, it would be open to debate whether erstwhile

symbionts now cells are still living individuals or whether this unification that brings about a new individual can also be considered as a form of reproduction.

In any case, as we have pointed out in the previous chapter, even assimilation is above and beyond the level of indifference exhibited by merely mechanical and chemical relations, especially given the self-purposive character of the living individual. Such non-indifference plays a central role in the genus-process as well. The nature of that which the organism can assimilate or reproduce with is bound up with the determinacy of the living individual. This determinacy that is common to different living individuals and that may allow them to engage in a propagative relationship with one another points to the kind they together constitute through their relationship. In this regard, a successful logical explication of the genus-process should account for the emergence of the genus, or the “kind” of living individual as such, on the basis of nothing but the organic unity and the life-process of the living individual. In the section on the logic of the genus, we will discuss to what extent Hegel’s account of the genus-process follows and is able to execute this agenda and critically examine why Hegel seems to take sexual reproduction as the determinacy that would more distinctively demonstrate how life in its entirety is not a class but a concrete and organic universal, that is, a genus.

3.1.2. The Reproductive Relation and the Self-Sustaining Genus

If we continue with the distinctive character of reproduction for the moment, we would see how it brings into play further aspects of life which are not only irreducible to mechanical, chemical, or externally teleological processes, but which also develops further the concept of life. In contrast to other forms of ecological relationships, individuals that participate in the process of reproduction treat each other as the means to their ends *only to the extent that* they are themselves the end of the process. But the genus-process shows that they are in fact *not* the end of reproduction. The genus itself is the end of reproduction. Perhaps there is a sense in

which the reproductive activity signifies an end for the individual itself, and with respect to that sense, the other individual is treated as the means to this end. This end is a sort of satisfaction or self-certainty, the attainment of which is driven by an integral lack, or a feeling thereof, in a way similar to how the end of self-realization of the living individual in objectivity through assimilation is driven by another sort of lack.

But these terms such as certainty and feeling, which Hegel problematically uses in the logical explication, suggest characteristics that pertain exclusively to animals, that is, living things that have centralized subjectivity. In animal life, both assimilative and reproductive activity can be culminated in the feeling of the self through the other, although unlike in assimilation, in sexual reproduction, participating individuals typically leave one another intact. Of course, not only is sexual reproduction not restricted to animal life, but the animal does not necessarily need another individual for the satisfaction of its sexual urges, and it can engage in non-reproductive sexual activity with another, both of which further weakens the strength of the appeal to feeling in explaining reproduction. Nevertheless, the sexual urge *does* motivate the animal to reproduce, and when reproductive sexual activity between mutually drawn animals takes place, the end of the reproductive process goes beyond the end of satisfaction of the individuals. For the end product of reproduction is new and distinct living individuals and the sexual urge of the animal seems at best a means that serve for the genus-process.

Furthermore, although either or both sexes may individually benefit from reproductive acts, mating in nature can often be a reason for conflict between sexes, or it can even be detrimental to the individual of one of the sexes, as is most evident in cases such as male self-sacrifice or traumatic insemination. There are many cases in which the only apparent advantage for the male is the continuation of its own traits in new individuals, in case this were to be regarded as an advantage to the male. But irrespective of whether individual participants do or

do not benefit in the long term, they still continue to engage in reproductive acts and produce new offspring, suggesting that there is another way of construing the end of reproduction.

When Kant counts reproduction as one of the three ways in which the organism is the cause and effect of itself, he is in fact speaking at a different level. For in reproduction, unlike in the internal process or assimilation, it is not the organism but the species that is being the cause and end of itself. The identity of cause and effect has to do with their being members of the same species that perpetuates itself through its members. In this regard, the purposive subject in reproduction seems to be not the individual member but the species being which happens to put its members to use as the means of its self-perpetuation. Even in cases of sexual reproduction where living individuals treat one another as the means to their individual ends, the process itself subsumes the ends of its participants and subjects them to its own end, which is to say, the perpetuation of the reproductive process of life itself.¹⁹⁴

However, analogous to the relationship between the organs and the organism, insofar as the species could only have an abstract being in isolation from its members, individual members are not merely means, but also ends for which the perpetuation serves. Within the scope of the logical account, it is true that the living individual perpetuates life by merely sustaining itself through an inorganic world. Yet the genus-process accounts for how in the presence of a multiplicity of individuals, life as a concrete universal perpetuates itself on a higher level. As will be shown, in the logical development, the genus, in its immediacy or simplest form, emerges as an outcome of the life-process. Since the living individual can

¹⁹⁴ Just as the external teleological process gives way to life in its immediacy, here we see how a process that incorporates external teleology as its form again leads to a further living determinacy. In external teleology, ends themselves become means to further ends. Here in reproductive process, individuals who treat one another as means are being rendered as means to the genus, which is a self-purposive higher end. Arguably, the reasoning can be carried further in such a way that the genus becomes life in its entirety.

assimilate or conform parts of its environment to its own ends, and is thus able to reproduce its distinguishing determinacy in and through different objects, it proves itself to be a universal that does not only pervade its internal process but is also the power over its externality. However, this relationship between the living individual and its environment is still not one of a reciprocal activity between particulars that perpetuate their common universal character. The living individual is indifferent to the fate of external objects, whereas the external objectivity itself lacks subjectivity, and is indifferent to its own unity or differentiation. By contrast, the reproductive process is contingent on particulars that sustain their genus in and through their relationship. On the individual level, these particulars are individual organisms that are mutually driven by a sexual urge or desire towards their others, the possible logical import of which we will have to explore later in this chapter.

Admittedly, such a relationship requires a differentiation of sexes, and also at least the capability of feeling if the urge is nothing other than a desire. But the reproductive process and sexual behavior are extremely diversified and not even always or necessarily overlapping in nature. To repeat, engaging in reproduction is not only not necessary but in some cases even fatal, the significance of which Hegel conveys by occasionally stating that the copulation is the death of the animal. Nevertheless, the species being of sexually diversified organisms is contingent on their urge to mate. Although Hegel does not talk about the diversity of species, on a higher level, the particulars of the genus can be thought as different populations or species of living individuals, which perpetuate one another in and through their individual life processes. Since life consists in self-differentiation, whether the unit of life is an individual organism, a population, or a species, the genus that subsumes its particular members retains its identity in and through the reciprocal workings of its self-differentiating particulars.

Despite the exclusive and problematic nature of restraining the explication of genus-process to the sexual reproduction, the differentiation of sexes seems to be the sharpest way in which the genus, the universal that incorporates different sexes as its organic members, proves itself to be a further determination of life. Life is now the Idea in the form of the genus. It requires cooperation of internally differentiated members that have objective existence, which the process of sexual reproduction makes evident. Because the differentiation of the sexes is in fact the differentiation of species members or individuals rather than their particular features, sexual differentiation corresponds to or emulates the organic differentiation of the living individual on a higher level. In this sense, sexual differentiation can be construed as the differentiation of the functions within a genus or species being. The offspring's birth as a consequence of the cooperation of the genus members is the self-realization of the genus, while nurture and continuous breeding amounts to its self-preservation.

The emphasis on sexual reproduction does not seem to dictate that only sexually reproducing organisms would have a genus or species being. On the one hand, Hegel speaks of the universality of the organism in terms of 'genus' insofar as the genus, at its immediate and simplest characterization, realizes itself through the life-process in which the living individual reproduces its universal determinacy through external objectivity. In this process, the living individual engages with a diversity of objects and does so in different ways. Animals eat constantly, and each time they have to eat different individual food. Nevertheless, as long as the object has the general characteristic of an object of its needs, irrespective of the individual features of that object, in incorporating it into its internal process, the living individual retains its universal character while altering its momentary constitution. This persistence of the universality as opposed to individual activity and constitution implies the existence of the genus, namely, the universality of life that has some degree of independence from its individuals. As we

will see, this relative independence becomes explicit in the life of a species being. But it is perhaps in this limited and implicit sense that pertains to the outcome of the unity of the living individual's assimilation and internal processes and that emphasizes the distinction between universality and individuality of life we can speak of the genus or species being of all metabolizing organisms.

On the other hand, we can also speak of the genus of asexually reproducing organisms considering that the offspring has the same universal character as their parent organism and is produced from within its body. Whether asexually reproducing organisms have species has been a controversial topic in biology as they do not fit in the so-called "biological species concept," which is based on the possibility of interbreeding. There are factors such as frequent horizontal gene transfer that further complicates the problem. But from the logical perspective, the main problem seems to be the individuation of the offspring. What sexual reproduction exhibits in excess is the extent to which the parent organisms factor in the individuation of the members of the genus. The particular characteristics of the offspring is a consequence of the copulation of its parent organisms. Thus they actively take part in the differentiation of the new individual of the same species. By contrast, the offspring of an asexually reproducing organism is simply a repetition of itself, i.e., a duplication, which is hard to distinguish from its internal process of self-maintenance or self-renewal.

Admittedly, we argued that an organism's dealings with objectivity is a factor in its differentiation, and as long as the life-process is logically conceivable, it seems possible to speak of further differentiation of duplicates. Besides, in nature, asexually reproducing organisms also go through mutations that give them particular or individuating characteristics. However, just as the kind that the organism is itself does not have a conclusive role in what sort of mutations it would undergo, these changes may alter it in such a way that it can become a substantially

different individual. To the extent that the parent organism or the developing duplicate is merely altered as a result of its incidental interactions with its surroundings it seems as if asexually reproducing species being does not showcase the characteristics of a real universal or Idea whose particulars sustain their unity by virtue of their differences and are actively involved in differentiating one another. On the one hand, sexual reproduction makes this active role of individuals explicit by virtue of the functional differentiation that it signifies. Different sexes signify different roles the complementariness of which is necessary for the perpetuation of the genus or species being. On the other hand, in sexual relation, differentiated individuals can relate to a variety of individuals of their own kind, thus playing a role in the individuation of their offspring that embody the genus.¹⁹⁵

In general, the genus sustains its identity in the face of a multiplicity of its members, the interaction of which nevertheless always differentiates the genus itself. Indeed, the genus that cannot differentiate itself through its new members in accordance with the changing conditions of viability cannot maintain itself. In this regard, the ecological relations of the populations of a genus can be considered to have their own life-process in a way similar to an individual organism. Populations respond to the conditions and modifications of their environment and struggle to form it in a way that accords with their species being, which is often referred to as niche construction. They feed on or fall prey to certain others or affect them in a way to use

¹⁹⁵ Hegel's discussion of sexual differentiation in the *Philosophy of Nature* suggests that one sex, the male, represents the moment of difference or opposition, while the other stands for the moment of identity. As a result of their interaction, a different individual of the same species is born as the unity of identity and difference. The male represents the moment of difference as it posits the new individual outside of itself. The female represents the moment of identity, as it houses the new individual as a part of its own internal process. Their bodies and genitals are duly structured. *PN*, 413 (§368 *Addition*); *Werke* 9:518 (§369). See Alison Stone, "Matter and Form: Hegel, Organicism, and the Difference between Women and Men," in *Hegel's Philosophy and Feminist Thought: Beyond Antigone?*, ed. Kimberly Hutchings and Tuija Pulkkinen (New York: Palgrave Macmillan US, 2010), 217–220. In the asexual reproduction, there is no such moment of opposition. It is developed *only* from within. In that sense, identical or monozygotic twins are more like the duplicates of the asexual reproduction as the "moment of difference" is identical for each twin.

them as the means to their perpetuation. As a consequence of the dynamics of the niche, certain populations sustain themselves or grow while certain others diminish. Moreover, depending on how a population alters its character in and through all these dynamic interactions with others, these relations also open up the possibility of the divergence of species. Although there is no talk about the life of the species and further speciation in the *Science of Logic*, Hegel's account of the determinacy of life in general does not seem to preclude any of this.

Regardless of whether asexual or sexual, the reproductive process cannot be reduced to a mechanical or chemical one. Again, being a process concerning living individuals with bodies, reproduction necessarily involves mechanical and chemical operations. But the production of the offspring from the parent organism in its entirety is unlike any particular mechanical or chemical operation. First of all, asexual reproduction is the development of a new individual organism from within the internal process of the parent. Therefore, regardless of its particular natural types, it involves self-differentiation and self-production of the organism, which cannot be spoken of any mechanical object. Even if there are mechanisms such as gravitational systems that have recurring networks of interactions in accordance with a law, they neither replicate themselves nor produce anything anew from within. Reproduction in all its forms brings about individuals that are similar to their parents, whereas the products of mechanical interactions are indifferent to the individual characteristics of the participants. This is more evident in sexual reproduction where individuals are mostly driven to copulate and breed with their likes. Chemical objects are not totally indifferent as their determinacy involves propensities to react only with certain others. In a way, this is the chemical element in reproduction, where different individuals are attracted to one another. Nevertheless, in merely chemical process, the product is a combination of reactants instead of a new individual object that is distinct from what brings it into being. Although in certain chemical reactions, molecules break their bonds to synthesize a

different product, the original chemical compounds do not remain the same. But as long as living individuals survive their copulation, they maintain their organic unity. Also, the determinacy of chemical products is something new in kind and not deducible from the individual natures of its components, whereas in reproduction the offspring is the differentiation of the same universal as its particular instance.

Insofar as the genus or life in general is a concrete and living universal, reproduction is an internal teleological process where life is both the means and the end of itself. The immediate means of the genus or life in its entirety is nothing but the living individuals that perpetuate life in and through their metabolic activity with the inorganic world and their propagation. Life is thus realized as an end through its living constituents. Since in this process life perpetuates itself by means of living constituents, reproduction is not externally but internally purposive.

Admittedly, the immediate product of a single act of reproduction has an individual existence distinct from its parent organisms in a way similar to the products of a machine. But the universal character that the offspring embodies is different from that of the common design that different artifacts of the same kind exemplify. Unlike the design of artifacts, the universal that parents and the offspring share is not a form separable from its content and applicable from without. Reproduction is not a process in which a passive form that exists independently of its embodiments is imposed externally upon an object. Whether the reproduction is sexual or asexual, the offspring emerges from the organic constituents produced by the bodies of the parent organisms through a process that involves assimilation and organic unity on all of its levels. But unlike what is the case in the production of artifacts, where the product is manufactured in accordance with a pre-conceived form that has no necessary resemblance to its designer or conceiver, parent organisms produce another individual of the same universal

that they embody without having to know what they are going to produce as a result of their interaction.¹⁹⁶ Together with the fertilization, the newly produced living individual starts developing itself, rather than being outwardly shaped by an external agent.

We have already spoken of the tendency to describe the genetic material of the living thing as a blueprint that determines its character mostly irrespective of its own life-process. This viewpoint draws the organism closer to artifacts that are produced in accordance with a form that is independent from the particular material that embodies it. We have discussed why the analogy is misleading in each of the previous two chapters. But because this analogy is quite prevalent, it would not hurt to repeat some of these reasons here. First of all, there is no moment in the development of a living individual in which the genome exists independently of an organic unity that incorporates it as one its constituents. Thus the universal nature of the genus is not merely in the genetic code, which requires readers and activators in the first place, but already in the material produced from within the parent organism. In this regard, it is rather another specialized constituent of the living individual, which objectively and systematically expresses its universal character in a way that is communicable. Furthermore, the living individual that is produced by parent organisms gradually differentiates its constituents as specialized organs with different functions. Nevertheless, this so-called blueprint is identical in all those organs, which suggests that by itself, the genetic code cannot be the sole determiner of their differences. Nor is the genome exclusively authoritative over the living individual's

¹⁹⁶ It is true that there are cases in nature where members of different species reproduce. Hybridization is the most typical example. Since we are not laying out an empirical taxonomy here, the fact that there is hybridization does not change the fact that the offspring is an individual of the universal that its parents instantiate. Parent organisms generate distinct individuals that share fundamental features that make them self-developing organisms, rendering their genus the same. In fact, hybrids are better examples of the self-differentiating character of life.

engagement with its environment, which is a factor that plays a role in its continuous individuation.

3.1.3. Genus in Relation to Death and Extinction

Hegel's examination of plant and animal nature in his *Philosophy of Nature* brings in further reasons why the reproductive process of these forms are irreducible to mechanics, chemistry, and physics. But one last theme that Hegel includes in the logical determination of life as a factor is death. Through reproduction, life shows itself to be the universal that exists in and through its particulars. Individual living things embody their universals as their immanent nature. However, as they always have bodies that are continuously exposed to an objective world, they are equally subject to the possibility of death and disease. This is also what we observe in nature except for a couple of controversial examples. But does that mean that death is an aspect that necessarily derives from what organic unity, metabolic process, and the genus-process involves? As will be examined in what follows, Hegel argues that death is not merely a possibility but a necessity that is inherent in the determinacy of life. In order to discuss whether death is really a necessary determinacy of life and what Hegel means by this necessity, we will have to look at the logical explication in the next section. But here we can say that in one sense, death is *de facto* the reduction of life to mechanical and chemical process. As Hegel states several times, life is merely a mechanico-chemical process when it ceases to be life. However, as long as life shows itself to be a concrete universal that actively differentiates its particulars, life survives the death of its constituents, no matter whether it is a living individual, a species, or life in its entirety. In this sense, by means of the genus-process as well as the death of particulars which is bound up with it, the universality of life sustains itself as a self-differentiating unity over and above its diverse particulars.

In nature, the extinction of species is a part of life and the disappearance of all terrestrial life is always a possibility. The logical account of life does not preclude these possibilities either. The species that cannot overcome the challenges posed by its environment cannot sustain itself, and succumbs to either mechanical and chemical forces or other species. If, from the logical perspective, that which cannot meet the requirements of viability would no longer be a living individual, as long as a species can be considered as alive, it can be considered as dying, which on the species level would suggest the risk of extinction. Nonetheless, it is hard to argue that the extinction of a certain species of a genus is accompanied by the emergence of another of the same genus, in a way similar to how the death of the individual is accompanied by the birth of another of the same species, as is problematically suggested in the *Science of Logic*.

Similarly, insofar the logic of life allows for the death of a particular genus or species, and lets us consider life in its entirety as a genus with all the species being its particular constituents, the possibility of total extinction should not be ruled out. However, we should keep in mind that as examined in the *Science of Logic*, life is a logical determinacy which does not only pertain to life in nature. Moreover, as a component of a systematic explication of determinacies of that which is and can be known, it is an integral determinacy of all that comes after life in the derivation. In this regard, the end or limits of “life” is not its extinction, but its incorporation by other categories such as “knowing” and the Absolute Idea. On the other hand, Hegel shows in his *Philosophy of Nature* and *Philosophy of Spirit* that life is also a necessary constituent of the mind and society, neither of which, needless to say, would exist when life goes extinct in nature.

3.2. THE LOGIC OF THE GENUS

3.2.1. The Emergence of the Genus

A closer look at the logical explication shows that the genus as the third moment of life emerges as the outcome of the living individual's activity on the objective world. At the outset of the logical exposition, life is merely the immediate unity of subjectivity with objectivity, which, according to Hegel, emerges as the outcome of the logical explication of the teleological process. The living individual is thus initially only "a presupposition yet unproven through itself," as Hegel puts it.¹⁹⁷ The externality of the body is immediately its own unification, rendering the living individual a subjectivity that subsumes its objectivity. This objectivity that Hegel calls the organism is always already determined by its pervading universality, whereas the universality that pertains to this objectivity is by virtue of the internally teleological process that the objective constituents comprise. When considered in isolation from the objective world and restricted to its internal process, the living individual as such sustains its objectivity from within its own resources, which consist of nothing but its objectivity that is immediately bound up with it.

Although the internal process explains how the living individual sustains itself as a self-purposive unity of organs, it does so only in abstraction from the external world. The objectivity of the external world is initially only an indifferent other to the living individual until the latter infests the former with its own character. The living individual remains to be proven to be self-determining in the face of its other. As is suggested by the life-process, insofar as the living individual is situated in an objective world, the self-production of the living individual as an idea is indeed contingent on its relationship with an ostensibly alien world of objectivity. The organic unity of the living individual is exposed to the indifferent destructiveness of the mechanical and

¹⁹⁷ *SL*, 686; *Werke*, 6:484.

chemical process, unless it can overcome this objectivity and achieve its unification with it. This also means that from the perspective of life in general, the unification of the subjective with objectivity, which is dictated by the determinacy of the idea, is not fully in place. In and through the life-process, the living individual engages in a relationship with this world, determines it, and makes use of this world's indifferent character to transform it in accordance with itself. This way the living individual comes to demonstrate the universality that pervades its body, by giving that seemingly alien objectivity its own form, showing how its universality is capable of incorporating its other on its own accord. Furthermore, this also shows that once life is in place, the objective world can no longer be ontologically reduced to or fully conceived by its merely objective properties, as it receives its new determinacy from life. In other words, life proves itself to be the governing universality of the world, constantly striving for the subordination of objectivity to its end of self-maintenance.

The life-process achieves its unification with objectivity in different forms, thereby showing how life is self-determining not only in the presence but also by means of its other. As is explained in the previous chapter, when the living individual is informed of the determinacy of its surrounding world by means of external stimuli, it already converts the latter into its own form and thereby overcomes its alien character. Yet this activity, which Hegel calls the theoretical process in his *Philosophy of Nature*, is merely subjective in the sense that it leaves the external object intact, without actually transforming it. In the living individual's practical engagement with the objective world, on the other hand, there occurs an actual transfiguration of the latter in accordance with the ends of the former. The mechanical and chemical determinacy of the objective world makes it susceptible to manipulation, rendering it a moment of the life-process. Thus whereas in the theoretical process the confronting objectivity gets internalized in the form of inner determinacy of the living individual, in the practical one, what is

subjective gets individualized in externality or objectivity. In other words, both in theoretical and practical processes, the living individual proves itself to be the idea by achieving a sort of unification of subjectivity and objectivity; first in a subjective, and second, in an objective form. Since in either activity, the living individual relates to its own determinacy, i.e., that which is determined by it, it relates to itself through the objective world. Thus both activities provide the living individual with a form of mediated self-relation and self-determination which expresses its unity and universality in the presence of multiplicity and externality.

The practical activity appears in two main forms, depending on whether the self-subsistent existence of the confronting objectivity is utterly annihilated or not. The living individual can simply shape its object in accordance with its own concept, or it can assimilate it into its immediate objectivity. In and through these real processes of unification whereby the living individual transforms the external world into its own content, the living individual proves itself to be what it is supposed to be, that is, the power over the external world as well as the self-production of objectivity that bears its marks. While in shaping the world, the living individual produces its presence in inanimate objectivity, in the real process of assimilating the other, the living individual becomes the production process of its own constituent objectivity, or as Hegel puts it, it brings itself forth out of actuality.¹⁹⁸

This is how both activities allow the living to subordinate objectivity to its end of self-perpetuation. Nonetheless, although in the practical formation of externality the objectivity that bears the impression of the living subject becomes a determinacy of life, it still lacks the features that would make it a self-subsistent living individual itself. To recall, the particular constituents

¹⁹⁸ "Through its process with the simultaneously presupposed world, it has posited itself *for itself* as the negative unity of its otherness, as the foundation of itself; thus it is the actuality of the idea, so that the individual now brings itself forth out of *actuality*, whereas before it proceeded only from the concept, and its coming to be, which was a *presupposing*, now becomes its production." *SL*, 686; *Werke*, 6:484.

of a truly living individual, that is its organs, would themselves be actively striving for their maintenance, while the objects formed by the living would remain as inert means. By contrast, in the metabolic process where the external objectivity is first catabolized and then assimilated, the living individual re-produces the unity of subjectivity and objectivity that it immediately is, and it does so in such a way that what gets assimilated becomes incorporated into the self-maintaining organic unity of members.

In consequence of its engagement with the inorganic world, and its ensuing incorporation of its other into its internal process, the living individual becomes self-production as an Idea not only in the sense that its concept is intrinsically embedded in its own objectivity, but in that it generates its own living objectivity from what is not itself, that is, from the indifferent world of objectivity that is initially set over against it. Life proves itself to be a self-determining universal that remains identical in and through an initially opposed yet implicitly compliant externality. The living individual overcomes the alien nature of the outer world, and posits this its other as identical to itself. Once it annuls the otherness of the external objectivity and transforms it in accordance with itself, it comes to prove that the inorganic world is in itself or implicitly a constituent of the universal process that is life.¹⁹⁹ Now Hegel calls this concretely realized universal the *genus*. It is in this sense that the genus is *at first* defined as “the identity of [the living individual] with its hitherto indifferent otherness.”²⁰⁰ The living individual sustains its universal character, given that any universal consists in identity that pertains to different particulars, and the concrete universal is one whose constituents differentiate one another in and through their activity. When this activity of the universal involves its unification and

¹⁹⁹ Hegel speaks similarly in the *Encyclopedia* version: “the living demonstrates itself to be something that reaches over and beyond its other which is incapable of withstanding its power. The inorganic nature that is subjugated by the living endures this because it is *in itself* the same as life is *for itself*. Hence, in the other, the living is merely connecting with itself.” *EL*, 289 (§219 Addition); *Werke* 8:375–76.

²⁰⁰ *SL*, 687; *Werke*, 6:484.

upholding of its own objective particularity, then it proves itself to be the “actuality of the idea.”²⁰¹

3.2.2. The Reproductive Process

The unification achieved by the life-process is, however, limited, and is to be superseded by the reproductive relation of different living individuals in the genus-process. The need for there to be interrelating individuals for the genus-process, however, needs justification. Since the outcome of the life-process is equally a return to the internal process, and therefore, the self-preservation of the living being, one might perhaps consider the genus-process as it first appears as the reiteration of the self-production of the living individual, although this time not solely on the basis of the internal process, but by the mediation of the opposing world of objectivity. After all, Hegel initially defines the genus as the unity of these two processes, which therefore is itself a continuous process of self-realization through objectivity. Having an identity, the living individual is in continuity with itself, although its identity is not one of abstract identity that accommodates no difference but one that is constituted through differentiation. Just as the internal differentiation of the living individual consists in the particularization of the living individual into a complementarity of particulars striving for individuality, the differentiation of the living individual through its engagement with a *variety* of objects might be construed as its reproduction as a totality. Accordingly, the discrepancy between the persisting identity in the face of the particularity of living activity is that which first opens the gap between the universality and individuality as a whole—a gap different from the one between the universality of the internal process and the particularity of organs. One might likewise argue that the initial sense in which the life-process brings about the genus is in the sense of a universal that consists

²⁰¹ *SL*, 686; *Werke*, 6:484.

in the differentiation of the living individual as its own continuous particular moments all of which maintain the same form through a diversity of objects.²⁰²

Indeed, in *The Philosophy of Nature*, Hegel speaks of plant reproduction in similar terms, and considers it as the *genus-process* insofar as it involves “the relation of the individual self to the self,” which in this case is merely self-relation, or “a return into itself.”²⁰³ Similarly, in his account of animal life, he writes that the animal’s self-production through the nature is its “self-preservation or *reproduction*.”²⁰⁴ In his lectures on plant life, because of the reasons to be explained in Chapter Six, Hegel adds that “the relationship with the outer world is already a reproduction of the plant itself and therefore coincides with the genus-process.”²⁰⁵ Unlike what is the case in animal life, the particular constituents of the plant are at least potentially independent individuals that can preserve themselves independently of their originating base, and accordingly their growth is equally a multiplication of individuals. But because of this coincidence of generation and reproduction, Hegel argues that the genus-process acquires its true meaning only in the animal organism, where reproduction is a process distinct from growth, digestion, or internal differentiation.²⁰⁶

In any case, there are differences between mere growth or internal restoration and the production of distinct and self-subsistent individuals, which is observable even in organisms simpler than plants. Perhaps, one might argue, since the logical account proceeds without any reference to spatial parting, the difference between the branch of a tree that could have thrived

²⁰² This seems to be what John Burbidge has in mind when he writes “‘genus’ as it first emerges, then, refers not to that which a number of distinct individuals share but to the various incarnations of the same individual as it is modified and transformed through its interaction with its environment.” John W. Burbidge, *The Logic of Hegel’s “Logic”: An Introduction* (Peterborough: Broadview Press, 2006), 100.

²⁰³ PN, 342 (§348); *Werke* 9:419.

²⁰⁴ PN, 409 (§366); *Werke* 9:497.

²⁰⁵ PN, 346 (§348 Addition); *Werke* 9:424.

²⁰⁶ PN, 346 (§348 Addition); *Werke* 9:424.

independently of its trunk and a bacterium detached by fission from the starting organism might not be adequately reflected in logical terms. While it is true that different branches still belong to the same organic unity regardless of their potential independence, it is similarly worth asking whether a bacterium can be considered as self-subsistent in isolation from its bacterial colony or even from its biofilm. Certainly, Hegel's *Philosophy of Nature* provides a more appropriate context for these speculations. But we can still note at this point that what is different about the most typical form of animal reproduction is the presence of distinct individuals that engage in a sexual relation, and that in his logical characterization, Hegel seems to be exclusively focusing on a concept of genus-process that would form the ontological character of this relation at the expense of other types of reproduction.

Such an exclusion would be unacceptable if the logic of life aims to lay out the minimum qualifications for all life, and if all natural forms we consider as living are expected to precisely reflect logical determinacies of life. But if we consider the logical account as one that stands for the development of the determinacy of life and argue accordingly that animal life is *the* form of life that exhibits that determinacy to an extent to which other forms of life cannot reach, it does not pose a serious problem. Also, since some examples of plant reproduction involves what could be considered as sexual reproduction,²⁰⁷ it would perhaps be safer to say that the logical exposition of the genus-process also advances towards a characterization of the reproductive relation between living individuals differentiated in terms of sexes. Nonetheless, could this still justify the absence of any explicit account of asexual reproduction in the logical exposition?

In a way similar to the above discussion about the differences between growth or internal restoration, one might argue, in defense of Hegel, that from a broader logical

²⁰⁷ As we will see in Chapter Six, that is not exactly how Hegel construes reproductive specialization in the plant.

perspective, there is no substantial difference between the organic unity of life in general and asexual reproduction of particular individuals. The life-process ensures that the living individual reconciles with its other by rendering it a moment or a constituent of its own life-process. In accordance with the course of the logical explication, when life in its entirety is taken as the living individual of the logic of life, its constituents become the particulars of its internal process. That is why, one might reason, any talk of the asexual reproduction of life's constituent particular individuals would not amount to anything logically different from the internal differentiation of life as a living individual. However, there is a crucial difference. The peculiar means-end relation that characterizes the internal process of the living individual is missing in the relationship between the living individual and the objectivity that it subordinates to its own end. In this process, the objectivity does not maintain its self-subsistence in the way that organs of a living individual do. It either becomes an immediate constituent of the living individual, or remains external *and* indifferent to it. The life-process cannot both preserve its particulars and also subordinate them. The most it can do is to demonstrate the implicit or potential life in what is not living. Accordingly, within the confines of the life-process, the universality of life would either be restricted to the internal process of the living individual, or have the non-living objectivity as its particular, thereby depriving itself of the essential character of living individuality, that is, organic unity. In the sexual relation, by contrast, the universality of life acquires a new dimension inasmuch as different—yet not indifferent—living individuals with specialized functions relate to one another, and that is one reason why Hegel focuses exclusively on sexual reproduction. This is the sort of relation that carries the universality of life to a further stage. Although, as we will talk about shortly, what is being produced by the sexual relation is again not the particulars that engage in this relation, but new individuals that no longer require their producers.

In addition to the worry that asexual reproduction features a logical determinacy that is distinct from both internal differentiation and sexual reproduction, it is also questionable whether it is possible to conceive of sexual reproduction without having the resources to deduce asexual reproduction from what is already on the table. For one, the sexual relation requires distinct individuals that prove themselves to have an implicitly universal character. In the absence of any logical account of propagation of distinct individuals from one, it appears that the multiplicity of living individuals must already be taken for granted. Perhaps this latter can be considered as a consequence of the fact that life reveals itself in and through individuals the particular character of which is by and large a contingency. There seems to be nothing in the logical determinacy of life that would bar the thought of a multiplicity of living individuals, especially considering that the confrontation with the particularity that pertains to objects already allows for differentiation of living individuals from one another. What is perhaps implied by the emergence of the genus as a universal that maintains itself over against its other is the inherent possibility of the particulars of this universal. That is to say, the genus as a universal, by virtue of being a universal, is inherently further particularized into different living individuals. Yet the possibility of there being different living individuals guarantees neither the existence of those individuals that can reproduce nor the necessity of any form of reproduction.

In any case, it is not clear how exactly Hegel makes the transition from the life-process or the genus itself to the genus-process as he takes it, that is, the sexual relationship between different living individuals.²⁰⁸ In these circumstances, perhaps the answer to whether and why

²⁰⁸ Hegel's expositions in the *Science of Logic* and in the *Encyclopedia* version are not sufficiently helpful in understanding how exactly the genus comes to particularize itself. In the former, Hegel abruptly starts talking about the relationship between two individuals driven by feeling. *SL*, 687; *Werke*, 6:484. In the *Encyclopedia*, Hegel seems to take for granted the particularization of the genus:

In the initial stage of its process, the living individual behaves as a subject and concept in itself. Through its second stage, it assimilates its external objectivity to itself and thus *posits in itself* the real

the differentiation of living individuals has to finally take the form of sexual differentiation should be sought in the way in which sexual relation advances the logic of life to a new level that the preceding could not.

Once the plurality of living individuals is in place, the main course and the meaning of the genus-process is relatively easier to comprehend. It consists in the relationship between two individuals of the same genus, which reassert their existence through the other. In its engagement with the inorganic world, the living individual constantly strives to verify its own subsistence and supremacy over the rest of the world that they confront. Through this self-relation mediated by its other, it proves itself to be the universal that governs its world. The world thus becomes a moment of the determinacy of the living individual, that is, it becomes a biosphere. What is different in the genus-process is that the self-realization of the universal is not by the transformation of the other, that is, not by virtue of an assimilated externality. It is through the unification of different living individuals, and therefore, by means of a process involving living beings which have to have subsisting externality for the process to proceed.

The living individual's engagement with what is not itself is more readily apprehended with reference to the life in nature. In nature, anything belongs to the living individual until it is proven otherwise. In animal life, for instance, it is made explicit in the feeling of self-certainty that follows the animal's assimilative practice with the world. In the pang of hunger, the animal feels itself as deficient, and strives for the truth of itself in the other that has what it needs. It feels certain of its determinacy whenever it overpowers its external world through its own activity. But this self-assurance comes to a halt when the living thing confronts that which it

determinacy. As a result, it is now *in itself the genus*, substantial universality. The particularization of the latter is the relation of the subject to *another subject* of its genus and the judgment is the relationship of the genus to these determinate individuals standing opposite one another: *the difference of the sexes [Geschlechtsdifferenz]*. *EL*, 289 (§220); *Werke* 8:376.

cannot overcome. Again with reference to nature, it is much plainer how limited this self-assurance through the inorganic world is, as this latter continuously reasserts its independence over against the needs of the organism. In such a relationship where the inorganic externality continuously restores its independence, the subjectivity of the living individual is restrained by factors that are not in the subject's own control. In the sexual relation, on the other hand, the lack that the individual feels, and the urge that drives the animal to its target is different in character: it is an urge that cannot be satisfied through the destruction or complete assimilation of the other. It is thus a relationship between two distinct subjects.

Unfortunately, much of these features of life in nature are not evident or appropriate in the context of the logical exposition. It is not clear how exactly the self-relation through objectivity is transformed into the self-relation through another living individual, and not as straightforward to follow how the logical genus-process proceeds afterwards. But similar to the course of the two other characteristics of life, the motor of the process is the inherent contradiction that the concept of genus houses. More precisely, it is the contradiction that is intrinsic to the identity and difference relation between different individuals of the same genus. Living individuals that participate in the genus-process are identical in that they are implicitly or in themselves the same universal. In other words, their identity is that of their universality. But as such, they are external to one another, and until their particularity with respect to each is other is proven to be the particularity of a common universal that is dependent on their mutual activity and functional differentiation, their universality is yet abstract or merely implicit. Living individuals realize this negative unity of their universality only in their actually coming together.²⁰⁹

²⁰⁹ "The identity with the other individual, the universality of the individual, is thus still only *inner* or *subjective*; it therefore has the longing to posit this identity and to realize itself as universal. But this

The way the backdrop and the actual coming together of different living individuals is explicated in the logic of life is quite abrupt and opaque, which we hope to delve into by means of a brief detour. In the explication of the inner structure of organic constituents, Hegel speaks of the discrepancy that follows from the subjective unity and objective multiplicity of the living individuals, and argues that this inner contradiction is determinative of its character as living. The organs of the living individual are related to one another in such a way that would render their particular existence and universal character null when they are separated from one another. Organs constitute a unity by virtue of a universal identity, whereas this very identity is dependent upon their reciprocal differences. Thus the tension within the living individual is resolved through the very drive that creates it. Since each constituent strives to assert its difference within a network that depends on the complementarity of differences, the unity of these constituents is secured by means of their self-differentiating drives. The identity of a manifold of particulars rests on their differences; otherwise there would cease to be a multiplicity. In the case of any truly self-determining being, the differences have to be the constituents' own doing, which also means that they have to be individuated in and through their joint process. Since life is the self-realization of the objective universal, of the idea in its immediacy, the differentiation of the objectivity manifests itself as a complementarity of means each of which is also being served as an end. Because organs strive to differentiate themselves and sustain their differences, each one ends up constituting the rest together with itself. In striving to make itself its own end, each constituent happens to serve as means to one another.

Now Hegel thinks that a similar discrepancy crops up in genus on account of the identity and difference of distinct and self-subsisting living individuals. While the identity is the identity

impulse of the genus can realize itself only through the sublation of the singular individualities which are still particular to each other." *SL*, 687; *Werke*, 6:485.

of the universal that distinct individuals share, the difference rests on their individuality. Although Hegel immediately starts speaking about the sexual difference, one might simply think that differences between living individuals in general are made possible by the living individual's own activity on the world of objects. The living individual, which asserts its subsistence over against the world by transforming the latter, continuously differentiates itself from itself and reproduces itself and its surrounding externality. The genus as a universal that pertains to particulars is dependent on their becoming differentiated from one another, without which they would collapse to the self-same identity of the abstract universal. But as such, the universal that is supposed to subsume distinct individuals under a common identity does not exist concretely or for itself to the degree that the soul as the unity of the living individual exists for itself and as an end in itself. The soul has concrete existence as the totality of organic activity as the organs of the living individual cannot exist without their internal unification. By contrast, *as long as* the genus is *considered* with respect to its being common to its instantiations it is not the process itself, but is rather abstracted from it by external reflection. From this deficient perspective what is truly concrete is not the genus itself, but the living individuals which share the genus without being actually unified by it. The genus, so the description goes, is in the living individual by virtue of its being a defining feature, but it does not exist for itself up until it determines itself as a genus.

By contrast, Hegel wants to show that the genus of life is more than an abstracted commonality. A concept is self-determining through its own activity, and this activity as well as its self-subsistence rests on the relations between its constituents. Insofar as the genus is understood to be a merely abstract identity on the basis of commonality, it would be indifferent to the terms that happen to fall under its rubric. If it is merely a figment of external reflection, the genus can be thought to persist insofar as its particulars differentiate themselves from one

another. But for the genus to be the genus in the domain of the idea, that is, for it to have objective truth, it must be shown to be concretely produced through the objective process of its particulars. Once the particulars do not only strive for their ends but also function as the means to their unity with the other, their constitutive universal can be said to demonstrate itself on a higher level.

This is what happens, according to Hegel, when the individuals strive to realize themselves through their reproductive relations with other living individuals of their own kind. The genus manifests itself in this relation where the individuals are not indifferent to one another. In this respect, perhaps one could also think of cases of cooperation among the members of the same species. Such cooperation that is based on functional specialization does not only provide for its members, but it also sustains the entire species as an objective universal that has an organic unity that is comparable to the unity of the living individual as such. One can even argue that there is something in competition among the members of the same or different species that would help those species members sustain themselves.

Yet Hegel does not speak of collaboration or cooperation of members, perhaps because it does not add much to the logical determinacy of the internal process of the living individual and because neither forms of relation necessarily involve direct interaction between individuals that brings into account the living functions of sensibility and irritability. To characterize the universal that proves its objectivity over and above that of the individual, Hegel picks up the more obvious sexually reproductive process, which also ultimately allows him to move on to further determinacy in the *Science of Logic*.

Sexual reproduction continues the problematic theme of self-certainty that the living individual achieves in its relation to the external world that it subdues to its ends. In the life-process, the objectivity that stands over against the living individual initially shows itself to be a

factor that puts the organic unity of the organism in jeopardy, until the living individual proves itself to master that objectivity, which it needs to manipulate and assimilate. The mechanical and chemical character of objectivity allows the living individual to subordinate it to its end, and remove the tension. In the genus-process, the difference between the identity of individuals and their distinct particular existence creates a similar tension which drives individuals to overcome the tension and demonstrate their universal identity. Unlike what happens in the metabolic process, the sexual relationship is between individuals reciprocally driven toward each other. Yet here Hegel again infringes the limits of the logical exposition and employs a language that brings in concepts such as feeling and longing that more properly belong to an examination of animal life. He states that the contradiction or tension that drives the participants of the genus-process consists in “the identity of individual self-feeling in such a one who is at the same time another self-subsistent individual.”²¹⁰ In animal life, self-assurance is evident in self-feeling, which the living individual has in its theoretical and practical activities. But again in the genus-process, it first shows itself as an inherent lack, followed by an urge to unite with its other. The genus-process is thus the activity of the living individual that is driven to feel itself in its other and thereby reproduce its feeling of self-certainty in the presence of the other. When Hegel writes that the genus is merely implicit, or only inherently existent as a longing to demonstrate itself until copulation takes place, he goes as far as implying that this drive belongs to the genus itself.²¹¹ What is meant is that once the genus-process is off and running, it becomes the subject that indirectly governs its particulars by means of their own drives.

When the language that makes recourse to feelings is discarded, it is not easy to see how and why different living individuals would be driven to a unity with their other without

²¹⁰ *SL*, 687; *Werke*, 6:485.

²¹¹ *SL*, 687; *Werke*, 6:485.

recourse to their having given characteristics that have chemical aspects. One thing we would recall from the previous section is that it is the chemical aspect of the living individuals that force them to realize themselves in unity with their other, even though in sexual relation, there is no necessary involvement of a third party nor a transformation of participants themselves into neutrality. Nevertheless, there seems to be no obvious reason for why the urge for reproduction would be a necessary characteristic of the living individual apart from its genus being. And as we have pointed out, it is unclear why reproduction would be necessary for the individual that demonstrates its genus as a result of its life-process. On the other hand, it is also worth noting that here we are in the domain of the idea, and at the level of the genus, which is supposed to be a universal higher than the universality that pervades the internal process of a single living individual. If the genus is to be as concrete as the universality that pertains to the different organs of a single individual, and more concrete than a class under which likes are aggregated, it similarly requires an active unity and differentiation of its particulars. This unity cannot be achieved through the relationship with the inorganic world because of the reasons given above. But it can be achieved to a greater extent when different yet not indifferent individuals demonstrate their universality in a sort of relation in which their unification brings about offspring that preserves their universal character. Furthermore, if the contradiction is inherent and not just what external reflection observes, it must have a drive that unites its particulars. All this is characterized most sharply in terms of sexual relation, where differentiation and reciprocal action realize the universal.²¹² The particularity of the living individual, its intrinsically

²¹² Perhaps another possibility that is worth noting is that the conceivability of the genus relation as a logical determinacy brings about the need to think of the preceding determinacies in the presence of the genus and reproductive relations. It is worth asking whether the determinacy of non-reproductive life process can remain what it is when the genus-process is in place.

being limited and constantly striving for the certainty of itself in the presence of the other, is what drives it to a complementary particular of its genus.

But more importantly, the genus carries the Idea to a further level of logical development, which is not exhibited by the above mentioned organic interrelations. Together with the genus-process, there emerges a self-sustaining, purposive universality over and above individual living things. The universality that pertains to the organic unity of the living individual is immediately the same as the totality that the living individual is. But the genus acquires self-subsistence somewhat independently of its constituent individuals. It is true that the organic unity is also relatively independent of its particular and immediate constitution, such as the totality of its cells at a certain instant, as they are continuously renewed in a way similar to how individuals that comprise the genus come and pass. But unlike individuals, the particular constituents of an organism are immediately bound up with the rest, and therefore may not be able to subsist on their own. Although as a universal, the genus still pervades and determines the character of its particulars, when their relation brings about their concrete product, that is, the new individual, the genus keeps existing as real regardless of the state of its former particulars.²¹³ The contrast is most visible in examples from nature where reproduction is possible at the expense of the copulating individuals.

This independent product of reproduction is a being that is actual, but not fully articulated or developed, "*the germ of a living individual*."²¹⁴ Here Hegel is again speaking only with respect to sexually reproducing life, likely because it is through the sexual relation that differentiated individuals of the same species actually produce a new individual that corresponds to the being of the genus as such, as long as it is not yet a sexually differentiated

²¹³ *SL*, 688; *Werke*, 6:486.

²¹⁴ *SL*, 687; *Werke*, 6:485.

individual.²¹⁵ The germ perfectly expresses the idea that life is the universal that has an objectivity which is not merely, or no longer, a given but produced by life itself. But it does so independently of its yet to be developed particularities, demonstrating the reality of its pervading genus. “Thus the germ is the whole living being in the inner form of the concept.”²¹⁶ It is the neutral product of life where the particularities are latent. It also shows how life as genus is not only self-maintaining purpose, but also self-differentiating as a result of its continuous production of different individuals of the same kind. Although Hegel does not seem to call attention to this aspect of life, it has potential to minimally account for species in particular or life in its entirety as a continuously self-differentiating organism.

On the other hand, because the product of the genus-process is still an individual, the genus still cannot declare its absolute independence from the particular. Unlike what is the case in the internal process, the immediate product of the genus-process is not the continuity of the process and the participating individuals, but another individual of the same genus. As the genus is immediately bound up with individuals, Hegel argues that it is “the repetition and the infinite process in which it does not step outside the finitude of its immediacy.”²¹⁷ On the other hand, since this “infinite process” still sustains its universality in and through different individuals which it subordinates to its end of self-perpetuation, it elevates itself to a different level of independence compared to its particulars. The genus is that which goes beyond the limited nature of its particulars.

²¹⁵ With respect to asexual reproduction, whether one can speak of the ‘germ’ depends on the particular form of reproduction. It is hard to speak of the germ in binary fission or fragmentation, but possible with respect to sporogenesis or budding.

²¹⁶ *SL*, 688; *Werke*, 6:486.

²¹⁷ *SL*, 688; *Werke*, 6:486.

When Hegel explains this independent status of the genus with respect to its particulars, he speaks about how the particular individuals “die away” in and through the genus-process.²¹⁸ While death and disease are major moments in the explication of the natural determinacy of life, they do not appear as specific logical categories in the *Science of Logic*. This is reasonable as one would naturally think that death simply signifies the disintegration of organic unity, which makes an individual a living individual. However, this conception of death by itself leaves unexplained the necessity of death and the role it is supposed to play in the genus-process. In the *Science of Logic* Hegel does not elaborate on why reproducing living individuals have to disintegrate for them to bring about a new individual. Yet there are clues for the underlying reasoning throughout the two versions of his logic. “Living things die,” Hegel says, “simply because they carry the germ of death in themselves.”²¹⁹ The necessity of death follows from the contradiction inherent in the living individual’s existing as an individual despite its being pervaded by universality; the same contradiction that sets the genus-process in motion.²²⁰ Yet for Hegel, this is not merely about living. By virtue of its particularity or individuality, the living individual is finite, and all finitude houses an inherent contradiction as it points to its non-existence or to its limits and their beyond. The concrete existence of finite things falls short of their concept, and this inadequacy becomes manifest in their perishing, and that is how, Hegel says elsewhere that “the genus frees itself from the individuality by means of death.”²²¹

One may think that in these passages Hegel might be pointing out the *possibility* of death that is intrinsic to the living individual. After all, difference or differentiation is the essence of particularity, and by virtue of its objectivity, the living individual always bears the risk of being

²¹⁸ “*Ersterben*” is the German term Hegel uses. *SL*, 688; *Werke*, 6:486.

²¹⁹ *EL*, 148 (§92 Addition); *Werke* 8: 198. See also *EL*, 129 (§81 Addition 1); *Werke* 8:173.

²²⁰ *EL*, 290 (§221 Addition); *Werke* 8:376–77.

²²¹ *EL*, 62 (§24 Addition 2); *Werke*, 6:86.

overwhelmed by objective processes. Alternatively, one might suggest that his use of the term death can be dispensed with, as any differentiation is also a “ceasing to be” of what something is the way it is. Hegel responds to this line of thought in a few different passages. First of all, he makes clear that he is not merely speaking of differentiation. In the passage on “Finitude,” he asserts that the finite “does not just alter, as the something in general does, but *perishes*,”²²² adding that this perishing is not just a mere possibility, but a must. Consequently, as Hegel indicates in a different passage, it is a mistake to think that alterability or death is a possibility that “has its cause in extraneous circumstances only” rather than a necessity grounded in the living or any finite thing itself.²²³

But all this may not be sufficient to address why the organic unity of the living individual cannot but be disintegrated regardless of external circumstances. It is true that the living individual has a particularity that individuates it among all the members of its genus, and it is plausible that by virtue of being a particular, it is not adequate to its universal. But if its inadequacy does not necessarily have to do with its limited power to withstand against the destructive power of externality, then it is not clear why its finitude or particularity would directly translate to its inescapable death or disintegration. In Chapter Six, we will examine how Hegel addresses the inevitability of animal death in nature by bringing in the concept of habituation. But admittedly, as long as we stay true to the spirit of the logical investigation, appeals to nature would be irrelevant. Besides, even nature offers challenges to the belief that all living things have to die away.²²⁴

²²² As Hegel puts it dramatically in the same passage, the hour of the birth of a finite is the hour of its death. *SL*, 101; *Werke*, 6:139–40.

²²³ *EL*, 129 (§81 *Addition I*); *Werke* 9:173. Similar thoughts in *EL*, 148 (§92 *Addition*); *Werke* 8:198.

²²⁴ There are forms of life as well as recent examples of empirical research that challenge the dogma of the inevitability of ageing and the decline in regenerative capacity. The transdifferentiation of *Turritopsis dohrnii*, also known as the immortal jellyfish, into its polyp state, the self-renewing capacity of hydra stem

One may suggest that when Hegel indicates that the cause of dying should not be sought *only* in extraneous causes, he is not denying the necessary involvement of externality in the death of the individual. Thus a living thing situated in a world is necessarily mortal, that is, necessarily liable to death. Being liable to death is not an aspect of inanimate objects, which do not have an organic unity. Yet this suggestion may still fall short of explaining why something liable to death has to die eventually, if that is what Hegel means.

Another suggestion would be to avoid taking ‘death’ too literally, as it would lead us to conflate logic with nature, which is something Hegel himself occasionally does. After all, phrases such as “*eventual* death” or “dying away” may not make sense in a strictly logical investigation. Instead, one may try to focus on the logical text without being misled by the allusions to nature.²²⁵

Hegel explains the production of a new individual as an outcome of the dissolution of the living individuals into the universality of their genus. This process has similarities with the chemical process, in which, Hegel says, the differences of the tensed objects are reduced to the unity of the neutral product. In the genus-process the tension is similarly resolved in the coming together of different individuals, but in distinction to the chemical product, what is produced is a third individual that is separate from what brings it into being. Since in the chemical process the product is not a separate one, the capacity for self-subsistence as well as the differences underlying the tension are still implicitly retained. By contrast, in the genus-process, there is no

cells, constant regeneration of red sea urchins or sea anemones are some of the prevalent examples. See Andrea G. Bodnar and James A. Coffman, “Maintenance of Somatic Tissue Regeneration with Age in Short- and Long-Lived Species of Sea Urchins,” *Aging Cell* 15, no. 4 (August 1, 2016): 778–87; Anthony J. Bellantuono, Diane Bridge, and Daniel E. Martínez, “Hydra as a Tractable, Long-Lived Model System for Senescence,” *Invertebrate Reproduction & Development* 59, no. sup1 (January 30, 2015): 39–44.

²²⁵ As is mentioned above, and as we will see in Section 6.2.2. Hegel offers an account of animal death in terms of habit. But given that habituation causes death by inuring sensibility and irritability in general, it is worth asking why Hegel did not offer a similar account in logic in terms of sensibility and irritability.

such disintegration into the starting individuals. Instead, “the isolated singularities of individual life perish” as Hegel puts it.²²⁶ Thus even though normally we would tend to say that as long as living individuals survive their copulation, they maintain their organic unity, in the genus-process as it is logically explicated, they dissolve into the universality of their genus. There are still particularities latent in the germ; yet these are not the ones that are even potentially self-subsistent or independent of the unity from within which they are to be differentiated.

²²⁶ *SL*, 688; *Werke*, 6:486.

PART II

THE NATURE OF LIFE

Hegel presents his account of plant and animal life in the third section of his *Philosophy of Nature*, under the heading of “Organics,” which follows “Mechanics” and “Physics.” In this section, in keeping with the rest of his systematic exposition of natural determinacies, plant and animal nature are explicated as the universal forms of life in nature. Just as every other natural determinacy, the forms of life are as much logical and rational as they are universal. However, given that Hegel explicates life in these two components of his system in substantially different ways, it is worth starting with a consideration of the general character of natural life’s difference from logical life, even though the distinction will become clearer as we examine Hegel’s exposition of plant and animal nature.

A. Natural Life in Distinction from Logical Life

First of all, in the way Hegel conceives of them, the natural forms of life are not empirical concepts borrowed from positive sciences. But neither are they derived by an application of the logical category of life to representations or to empirical-scientific theories concerning living things. Hegel’s section on life in nature is not an outcome of the repetition of the logical category of life supplemented by observation in a way that clothes the bare bones of logical determinacy with empirical flesh and blood. Hegel intends his account of natural forms of life to be, like his logic, an a priori and immanent derivation.²²⁷

²²⁷ This claim has to do with the broader issue concerning the Hegelian system, the problem of the relation between logic and the two other parts of his system. Here I will not try to flesh out a thorough solution to this problem. This is an undertaking that deserves a study and discussion of its own. Instead, I will rather focus on life in nature itself, and in distinguishing life in logic and nature, I will base my account on Hegel’s own account of this difference. *The Owl of Minerva* 34, no. 1 (Fall/Winter 2002–03) has an

The reason why a Hegelian account has to develop the natural forms of life immanently and without recourse to empirical content should be sought in Hegel's commitment to the presuppositionlessness of philosophy. To put it simply, if the system of philosophy is not exhausted by the *Science of Logic*, if a philosophical conception of nature is a constituent of the system rather than a mere addendum, then it should also be free from anything supplied to thought from without. The systematic inquiry into the natural forms of life is a pursuit of universal and necessary knowledge. Accordingly, as Hegel puts it, the *Philosophy of Nature* should lay out what is universal in nature "in its own immanent necessity" and "in accordance with the self-determination of the Concept."²²⁸ Any recourse to experience or other content that is not derived from within the system and is rather supplied from without would be subject to arbitrariness or dogmatism. A philosophical account of natural determinacies cannot rest on empirical evidence, which is always bound up with the particularity of representation in contrast with the universal nature of conceptual thinking. From a Hegelian perspective, bringing in the empirical content is particularly problematic. Knowing the nature of experience as well as the subject of this experience would themselves require a presuppositionless knowledge of nature and life, insofar as experience and its subject are contingent on the existence of nature and life. But nature, although conceptually determined, is what it is independently of any experiencing mind, and that is why the philosophical knowledge of its determinacies cannot have recourse to experience.

excellent issue that focuses on the nature of the relation between Hegel's logic and his philosophy of nature. It contains six important essays that represent different perspectives, which are all worth reading: John W. Burbidge, "Chemism and Chemistry;" Edward Halper, "The Idealism of Hegel's System;" William Maker, "Idealism and Autonomy;" Richard Dien Winfield, "Objectivity in Logic and Nature;" Will Dudley, "Systematic Philosophy and Idealism;" and Stephen Houlgate, "Logic and Nature in Hegel's Philosophy: A Response to John W. Burbidge." Allison Stone's *Petrified Intelligence: Nature in Hegel's Philosophy* (SUNY Press, 2012) is another notable work that discusses the a priori character of Hegel's *Philosophy of Nature*.

²²⁸ PN, 6 (§246); *Werke* 9:15.

Of course, in his exposition, Hegel does introduce empirical terms and give several empirical examples. Although at certain points these additions raise questions with respect to the necessity and universality of Hegel's specific claims concerning natural forms of life, they should in general be treated as supplementary or illustrative points rather than parts of the philosophical explication of natural determinacies.²²⁹

Alternatively, one might think that the difference between the logical and natural life consists in the contingency of nature: unlike the domain of logic, natural beings exhibit contingency. Although this is true, from the perspective of systematic philosophy, this contingency embedded in nature cannot be that which distinguishes the natural forms of life from their logical correlate. Because the contingent features of natural beings lack necessity and universality, they cannot be the constituents of a philosophical derivation of natural determinacy.²³⁰ Although the contingency that is embedded in nature is a factor that differentiates the reality of nature from pure logic, contingency itself cannot specify what is more than *purely logical* in the universal forms of life in nature.

²²⁹ Also See Dudley, "Systematic Philosophy and Idealism," 99:

The *introduction* of empirical terms is not equivalent to their *incorporation* into the system. Hegel acknowledges that attention to empirical phenomena, and a desire to understand them, are what lead us to philosophy in the first place. He also emphasizes that once we have made progress in working out the conceptual determinations of the philosophy of nature, or of the philosophy of spirit, we must then attempt to ascertain the extent to which various empirical phenomena correspond to the determinations that have been articulated. So it is entirely unsurprising, and even to be expected, that in the *Realphilosophie* Hegel introduces numerous empirical terms and examples ... What Hegel cannot do, and claims he does not do, is allow the introduction of such empirical terms and examples to affect the further conceptual unfolding of the system.

²³⁰ "The system includes only those determinations that are necessary to the comprehension of being, and explicitly excludes those contingencies that exceed the determinacy of the concept. The system thus comprehends the rational content of empirical phenomena, while remaining necessarily mute about their contingent features." Dudley, "Systematic Philosophy and Idealism," 101. Cf. Spahn, *Lebendiger Begriff - Begriffenes Leben*, 211.

All this suggests that the manner in which philosophy inquires into life in nature cannot be much different from the way logical categories are immanently derived in the *Science of Logic*. Nevertheless, the philosophical treatment of life forms in nature goes beyond the content involved in the logical exposition of life, and the differences that distinguish the natural forms of life from one another and from the universal category of life do not directly follow from the logical explication. But then how exactly are these two accounts distinguished from one another? Hegel himself speaks of the need for this distinction and provides his answer at the beginning of his logical account of life. There he characterizes the difference in terms of what each determinacy of life presupposes. While the logical life presupposes only other logical categories, the forms of life in nature are conditioned by an inorganic nature.²³¹

The first part of the dissertation has already showed that the logic of life presupposes all the determinacies that figure in the development of the Idea of life, including first and foremost the concept and subjectivity, objectivity, purpose, the logic of mechanism, the chemical process, together with the logical presuppositions of these fundamental categories themselves. We have explored how life as the Idea in its immediacy consists in incorporating those determinacies to facilitate a self-realizing process in objectivity. But the explication in the *Science of Logic* belongs only to the domain of thought. Its constitutive determinacies do not have, in Hegel's words, "the shape of external actuality, but remain enveloped in the conceptual form."²³² The logical account of life lays out what is generally true about the organization of that which is alive, which suggests that the Idea of life stands for the universality of life irrespective of its particular expressions in the domains of reality. The objective being of the Idea of life is not specified further as natural, mental, or cultural. The same is true for the subjectivity of life. The logical

²³¹ *SL*, 677; *Werke*, 6:471.

²³² *SL*, 677; *Werke*, 6:471.

account does not specify in what specific forms and to what extent the subjectivity of life is manifest.

Because the logic of life is a universal account, it does pertain to the living things in nature. These universal characteristics of life figure more or less in the nature of an amoeba or a magnolia, a mastodon or a human, although the extent to which they do so depends on whether or not the living individual is characterized as a *centralized* subjectivity that presides over its objective multiplicity. In any case, the different ways in which life as a logical determinacy can be expressed in nature does not affect its content. But because life is a determinacy that being and thought can assume, there are also non-natural or spiritual forms that express the same determinacy. These forms may all be physically embodied in different ways, and moreover, they may presuppose natural living things in order to be. But they are still over and beyond the determinacy of the natural. Roughly speaking, the mind is a living process that rests on the harmonious workings of different faculties that are built upon one another. A state can be living or dying, depending on whether its institutions cooperate in such a way to sustain the lawfulness that make their functioning and existence possible. Although no state can exist without the physical existence of its institutions and the living agents that operate them, it is equivalent to the totality of that physical presence to the same degree as laws are inks on paper. Similarly, Hegel thinks that an art object can be considered as living if it expresses an identity that consists in a unity of sensuous expression permeated by a concept and realized by the reciprocation of its constituent elements.²³³

The system of logic in its entirety is the self-developing totality of determinacy that Hegel calls the Absolute Idea. Nature is the Absolute Idea's self-external being, or its self-

²³³ For an examination of the relationship between the logic of life and the art work as an expression of it in the realm of the spirit, see Edward Halper, "The Logic of Art: Beauty and Nature," *Proceedings of the Hegel Society of America* 14 (July 1, 2000): 187–202.

externalization. That is why, its distinguishing character is self-externality, namely, the asunderness and ensuing indifference of its constituents.²³⁴ Accordingly, each of the determinacies of nature can be considered as the particular realizations of logical categories in their self-external being. However, in the philosophical system, each one is derived from its presuppositions *according to nature's own logic of externality*. Also, although the *Philosophy of Nature* is the systematic explication of these determinacies that have self-external being, it also demonstrates nature's overcoming its self-external being on its own account and through its own determinacies. In the course of the derivation of these determinacies, the character of externality gradually gives way to subjectivity and inner determinacy, which culminates in animal life, which is, in important ways, the negation of self-externality.

Organics thus expounds the derivation of particular realizations of the logical category of life, not from those logical categories themselves, but from their natural prerequisites, which is to say, the inorganic world as a whole. Thus, the *Philosophy of Nature* accounts for how life is realized specifically in nature, and how these forms overcome, in different ways and to different extents, nature's self-external being.

B. The Condition of Life: The Inorganic World

Although so far we have been speaking of the plant and animal forms of life, in the *Philosophy of Nature*, Hegel defines three natural forms each of which represent conceptually distinct stages of life in nature: these are the geological, plant, and animal forms. Each of these forms is a specific way in which nature organizes itself. These forms manifest subjectivity, inwardness, and self-determination in nature to different extents. They are distinct from the

²³⁴ "[E]xternality constitutes the specific character in which Nature, as Nature, exists." *PN*, 14 (§247); *Werke* 9:24.

living individual logically characterized both by virtue of their particular content, but also by virtue of their prerequisites.

No single determinacy of nature is reducible to others, while all of them presuppose the preceding ones as their enabling conditions. Up until the systematic explication of these determinacies arrives at the domain of organics, it goes through several determinacies, all of which are less developed than life with respect to the level of self-determination, inwardness, and subjectivity they exhibit. Now, although Hegel talks about three forms of organisms under the heading of “Organics,” he adds that the so-called geological organism, itself a form of organism, is not even a “living creature.”²³⁵ It is more truly the foremost prerequisite of living things in nature, which incorporates all the rest of the inorganic determinacies. The geological organism provides the setting that life and living things require. It is only the ground, the basis of life; a skeleton on which life clings. It is the sort of natural entity on which life can flourish. The specific and empirical example to the geological organism is the planet Earth. Hegel uses ‘the earth’ and ‘the geological organism’ interchangeably. But it is worth noting that there seems to be no necessity that the planet earth is the only particular planet that can realize the determinacy of the geological organism. There might be others. The planet Earth has many contingent features that can distinguish it from its likes. But the philosophy of nature does not concern itself with these contingencies. The planet Earth also embodies universal features, and it is these features that the philosophy of nature desires to lay out.

Because living things flourish on a geological organism, the universal features of this inhabitable planet would tell us much about the prerequisites of life in nature. Providing a thorough account of the geological organism or its own prerequisites, ranging from the space and time to the chemical process in nature, is beyond the scope and ken of this work. But

²³⁵ *PN*, 277 (§338); *Werke* 9:342.

speaking about them at a very basic level before our elucidation of natural forms of life will still give us an idea about the preconditions of life.

To begin with, the geological organism is not an individual *subject*. It does have a constituent multiplicity of formations, and it does involve different geochemical processes that are somehow interconnected. But unlike other forms of life, the geological organism does not produce itself; it has a history: its process of formation is prior to it. It does not develop its determinate formation or shape; it does not produce the totality of formations that accommodate geochemical processes solely by its own activity or actively bring them together as their unified subject. In other words, the factors that figure in the formation of the habitable state of the earth are not produced by its geochemical processes, but are results of a history of former and exterior mechanical, electromagnetic, and chemical processes, some of which lie outside of it.

Then why does Hegel still consider the geological organism as the first form of organic being? First, it preserves its determinate shape in and through a multiplicity of processes that it undergoes. Second, even though the processes that factor in its initial formation are exterior to it, it accommodates a totality of self-perpetuating chemical processes, which Hegel calls meteorological process, and which can also be considered as geochemical cycles. The geological organism is in this sense self-regulating. As Hegel puts it, it is “the conservation” and the “perpetual generation” of a system of differences.²³⁶ The members that factor in these cycles, such as landforms or geological formations produced by tectonics, or celestial bodies that are subordinated to the self-perpetuating processes of the earth are self-subsisting individuals which are not reproduced by the processes they enable. But they enable and are connected by these processes of motion that circulate specific sorts of matter and maintain a homeostasis, a

²³⁶ *PN*, 294 (§341 Addition); *Werke* 9:361.

determinate set of conditions. The earth does not sustain or is sustained by individual organs or members produced from within, but it circulates what Hegel calls the universal elements that acquire determinate being in and through the geochemical processes, such as specific landforms, bodies of water and the atmosphere, the interaction of which figure in the emergence of individual living things. And last, thanks to its elemental stability that provides a suitable medium for chemical processes, Hegel thinks the geological organism allows for and continuously and spontaneously generates enclosed—though semi-permeable—*individual* chemical cycles, which we can consider as proto-organic forms that cannot reproduce. Indeed, perhaps it is in this sense that we can deduce a Hegelian conception of primitive organisms. In a way that parallels the immediacy of life in logic, these rudimentary forms of life consist of material components that just happen to fall together within an enclosed region only to engage in a network of mechanical, chemical, and electromagnetic processes that altogether perpetuate itself.

In his exposition, Hegel does not talk much about the necessary factors that facilitate life, and one obvious reason is that the determinacy of the geological organism cannot refer to more complex forms of life. He speaks of some of the factors that play a part in the geological organism, such as neptunic, volcanic, mineralogical, and meteorological processes, the processes concerning the individualized being of the elements, namely, the atmosphere, the sea, and the land, and their distribution, and points out how the totality of processes already imply the fundamental features of life. Here, we can support his theory of life by briefly speculating on the universal and necessary conditions of a habitable planet, while trying, as much as possible, not to extrapolate from the specific conditions of the planet Earth.

Broadly speaking, a habitable planet must have more or less stable conditions that do not radically change. This includes, for instance, retaining a relatively steady orbit; a certain

range of distance to its similarly stable source of heat and to other bodies, which is reminiscent of what natural science calls the circumstellar habitable zone. It does not follow that there is a quantitatively specific range of distance that all inhabitable planets have to the central body of their gravitational system, and an ensuing particular temperature range. Given other conditions of possibility are present, different forms of life can flourish at different ranges.

For there to be self-perpetuating processes that facilitate life, the geological organism must have developed a stable internal structure the constituents of which do not destroy one another. Even if the participant structures are not produced from within, there is still a totality of processes comparable to the complementarity of animal organs. Needless to say, geochemical cycles that support life are dependent on the abundance of sets of chemicals that are able to interact, transform into one another, and bring about autocatalytic reactions. Hegel refers broadly to the elements necessary for life as the universal elements, all of which need to exist together in the geological organism, and get into autocatalytic cycles that he calls meteorological processes.

The necessities embedded in geochemical processes that involve specific kinds of matter are too complex to elaborate here. But, for instance, a potential to form a rich variety of complex and stable compounds is a characteristic facilitating life, and this nature is exhibited by carbon, as it can easily form compounds by bonding to itself. This capacity is related to catenation; binding of a chemical element to itself to form long chains or rings. There are few elements that exhibit this nature, but carbon is not the only one. Likewise, the circumstellar habitable zone refers to the conditions that can support liquid water. Although Hegel speaks specifically of water as a universal element, it can still be argued that the emergence of life from self-sustaining chemical processes would rather require a biotic solvent, i.e., some form of

neutral liquid, not necessarily water. This would mean different freezing and boiling points, and therefore, a different range of orbit.

The geological organism is a totality of self-perpetuating processes, not only because it is supported by external and internal sources of heat and light, but also because it can retain its equilibrium thanks to its insulation from the outside by means of structures such as the atmosphere. In this regard, the atmosphere, which itself needs to be retained by sufficient gravitational force, functions similar to an organism's semi-permeable membrane, which preserves its internal structure, and gets into material exchange with its environment.

The earth is subject to external impacts that would prevent life from sustaining itself on it. In order for life to utilize sun's light and heat without being destroyed by it, the planet earth has certain means to protect itself from such impacts. The magnetic field of the earth which deflects solar winds and cosmic rays, and the ozone layer, which absorbs ultraviolet radiation from the sun, and even having heavier planets around to be protected from comets can be considered as such means. These specific ways of self-protection surely involve contingencies peculiar to the planet earth. But we can infer that any such means that would save the geological organism from harm and allow it to subordinate other celestial bodies to its purpose would be a universal condition of life, together with their own enabling conditions (for instance, a magnetic field would require a relatively substantial core mass, such as that of the iron core of the planet earth). A certain degree of obliquity, angle of the tilt of the spin axis, might also be a similar factor in that it prevents radical variations or lack of variations in temperature across the planet. These factors hint at the living individual's metabolic relation to its other, whereby the former subordinates the latter to its end of self-perpetuation. The difference is that the earth's "metabolism" does not involve true organic assimilation, namely, a transformation of the other into living matter.

Besides the geological organism, one can think of other natural determinacies explicated in Hegel's *Philosophy of Nature* and necessary for any form of life. As a material body, the living thing has a *shape*, and like individual material objects, its shape is determinate. To maintain its individuality, it needs to have a solid boundary. To the extent that shape contributes to the identity of the object, it is bound up with individuality. Mere aggregates do not have determinate shapes. Their particular shapes are contingent on external factors. But there are objects that retain their shapes. Celestial bodies such as stars, planets, and satellites have determinate shapes that have to do with their motion and position vis-à-vis one another in a mechanical system. Likewise, crystallization repeats a particular pattern, giving the crystal a distinctive identity. But unlike the determinate shapes of these inorganic matter, the shape of the living thing is not static; it is active, and released from its dependence on the particularity of matter. The material constituency of the living thing changes continuously. For a multicellular organism, this consists in the continuous renewal of cells. But even in a single-celled organism, there is a continuous and dynamic material exchange with the environment, which alters the inner constitution of the organism while the organic shape retains its main outlines and internal configuration. Each instant is a transient moment of one and the same subject. On the other hand, the material exchange that allows for this dynamic identity also requires that the solid boundary that delineates the organism must have some permeability.

Both the internal process of the organism, and its interaction with its environment involve some sorts of chemical, electrical, and mechanical processes. Life consists in the capacity of transforming the other into its own matter. The organic matter has specific properties that are determined by the kind of the organism. Some of these properties are chemical, indicating specific ways in which they can engage in reactions with other chemicals. Chemical process is also a necessary ingredient of life conceived as a logical category. The main difference is that in

nature, chemicals and the chemical process do not only consist of tensed differences that have tendency to complement one another. Chemicals in nature are material bodies and the reactions between them can consume or release energy. While chemical matter and its processes necessarily play a part in life in nature, the philosophy of nature cannot decisively dictate the particular chemical elements that comprise living matter. It can only imply that only certain chemical matter can comprise life under certain astrogeological, atmospheric, and climatic conditions, and in the availability of other appropriate chemicals and catalysts.

Mechanism and electromagnetism are also processes presupposed by life, both of which are in any case entailed by chemical processes. Although mechanism is also a logical determinacy, in nature it is not merely a relation between external objects, but is specified in connection with the motion of material bodies. All living things have to have a capacity to move themselves as a whole *or* to change the position and configuration of its members. Thus the world they inhabit must allow for motion. For motions to serve for determinate ends, which in life are nothing but the perpetuation of the organism or its species being, they have to have regularity and predictability. Mechanical laws, which govern masses independently of their individuating features, allow organisms to move themselves and objects according to their ends.

C. The Embodiment of Life: The Plant and the Animal

The way Hegel treats and distinguishes plant and animal life should not be considered as a merely descriptive comparison of the two major forms of organisms. The reason why Hegel speaks of these two forms in particular is not that there are radical differences between certain living things on earth that require such a distinction. For Hegel, plant and animal life represent two conceptually distinct stages of life that only a philosophical examination of nature can bring to light. Hegel's examination of these life forms does not try to follow a time order, as the development of the categories of nature does not necessarily correspond to the timeline of the

planet Earth. Similarly, Hegel is not trying to justify a certain evolutionary history of life on this planet. Accordingly, the sequence of these forms of life does not suggest that animals must have evolved from plants with respect to the way they are classified by empirical biology. However, Hegel's account is still developmental. On the one hand, there is a sense in which the inner development of a philosophical consideration of plant nature and its limits proceeds toward the concept of a more advanced form of life. On the other hand, this procession suggests a dependency relation between these two stages, rendering vegetative nature the enabling condition of animal nature.

Despite the howls of protest that nowadays accompany any suggestion of a life form's superiority over another, Hegel's main criterion responsible for this ranking is the key to a proper comprehension of these forms. The animal is a more developed life form on account of the degree to which it realizes subjectivity and self-determination, whereas the plant has subjectivity only in a very limited sense. The philosophical examination of different forms of life is then also the explication of the development of subjectivity in nature, the first genuine stage of which is plant life.

We already see in the logical account how life signifies the emergence of the Idea, the unity of the subject that has an objective being. The category of life unfolds the self-realization of individual subjects in and through their own and inseparable objective being. At a minimum, a subject proper is not a passive substrate of predication but that which constitutes and sustains its identity through its own activity. The subjectivity of life is accordingly the unity of the living individual that upholds its constituent objective multiplicity and preserves it as an individual in a way that is radically different from the integrity of inorganic objects. Earlier we suggested that the soul is the economical way to express this distinctive subjectivity of the living individual and that it is what Hegel thinks the living individual is before all else. There we talked about why the

soul in its simplest expression refers to the Idea that always already has objective presence unlike a merely subjective form or end that exists separately from its possible realizations. But we have also pointed out that Hegel's explication often suggests that the soul stands for the unity of a centralized subject that is capable of inner determinacy.

Here what is at stake is showing the different ways in which nature realizes the Idea. Hegel's binding of the living individual and its subjectivity with ensoulment poses a challenge for such an undertaking. His examination of life in nature states that the plant is the first stage of subjective life and it exhibits the fundamental processes that the concept of life entails. But unlike Aristotle, who speaks of the nutritive soul of the plant, Hegel explicates the nature of the plant without attributing any soul to it, which he thinks is exclusive to animal life. But if the soul stands for the subjective unity of life, how can there be life without a soul?

One way to overcome this challenge is to understand why Hegel specifies plant nature as the first, infantile stage of life, its subjectivity as formal and immediate, and its individuality as a superficial and external unity, which is not yet for-itself. On the other hand, this understanding should best be fulfilled if we also figure out how and why the animal is the only form of life that can concretely realize the Idea and subjectivity in nature. Moreover, achieving both of these goals will also elucidate how the emergence of animal life hinges on vegetative nature.

The logic of life explains how and to what extent life is self-determining by laying out three fundamental processes through which it develops and maintains the collective unity of its objective constituents, sustains and regenerates itself in the face of the world outside, and raises its universal identity beyond its particular existence through reproduction. In agreement with the logical account of life, Hegel often refers to these as the processes of formation, assimilation, and genus, while they can also be understood as the organic unity, metabolism, and reproduction of the organism. Although these three processes comprise the criteria

delineating the minimal conception of what is alive, there are still differences in the ways and extent to which different forms of life satisfy them. The plant is living inasmuch as it is a self-sustaining unity of differentiated members, has a nutritive process through which it assimilates its environment for its survival, and is capable of reproducing itself. But its organic unity, metabolic and reproductive processes, and the way these processes are interconnected are significantly different from those of the animal.

The primary difference consists in how the three fundamental processes of life coincide in the plant. The plant's internal development and organization, metabolism, and reproductive process can be barely separated, while the animal carries out these processes relatively independently of one another. This fundamental divergence between the two main forms of life is the guiding thread of the following examination. Hegel's own explication follows a developmental order that first expounds plant nature and then continues with the animal. But in order to elucidate why and how subjectivity is concretely actualized by the animal, and to distinguish between the requisites of organic and psychological unity, it is best to lay out the differences between the plant and animal with regard to each fundamental process. Hegel notes that despite its relatively simpler nature, it is difficult to explicate plant life because of the way the fundamental vegetative processes coincide.²³⁷ Since speaking of any of these processes without mentioning the others is often impractical, if not inappropriate, an examination that proceeds process-by-process entails a considerable difficulty as well as some repetition, and the discussion of each process will involve occasional references to the other two. However, having already laid out the character of the fundamental processes of life in Part I gives us a leeway, as it does to Hegel, who still distinguishes the vital activities of the plant in accordance with them, and indicates constantly how each is bound up with the rest.

²³⁷ *PN*, 322 (§346 Addition); *Werke* 9:395.

Before moving on to our comparative examination of the two universal forms of life, it is worth noting in advance an important contrast between the ways in which Hegel presents the plant and animal forms of life. Hegel's exposition of plant nature tends to understate the degree of the plant's internal differentiation and subjectivity. By contrast, the animal nature expounded in the work is shown to ultimately exhibit subjectivity and functional differentiation to the fullest extent. When we consider how the layman or empirical biology identifies plants and animals, we might think that this way of characterizing the two forms opens a considerable breach between them rendering the classification of many organisms uncertain. From that perspective, there are plants that exhibit internal differentiation and functional specialization to a greater extent than Hegel's version of the plant. Correspondingly, there are many animals that fall short of the ideal set by Hegel's characterization of the animal in terms of the level of subjectivity, determinate shape, and distinction between fundamental functions. To illustrate, if Hegel's account is taken as a standard, the paradigmatic plant is not the venus flytrap, just as the paradigmatic animal is not the sea cucumber. It appears that Hegel's concept of animal is instantiated most precisely by the mammal, if not by the human being. Although it is harder to decide in the case of the plant because of Hegel's seemingly developmental explication of vegetative nature, perennial plants such as flowering trees sufficiently express the nature of Hegel's plant. This should not mean that Hegel does not speak of complicated examples from botany and zoology. Especially in his discussions, he speaks of more sophisticated features of certain plants and less developed features of certain animals.

More importantly, all this does not reflect a problem about Hegel's system as it is in any case not supposed to be derived from empirical examples or taxonomy. Indeed, Hegel argues that if certain living things fall short of the determinacies that he lays out, deficiency should be

sought in those finite creatures that house contingencies rather than in the theory itself.²³⁸ In other words, this is not a problem of universal applicability as it is the deficiency of those living things or the empirical taxonomy used to classify them. The animal, for Hegel, is a universal determinacy, the features of which may still be inadequately expressed by living things in nature.

However, Hegel can maintain this position as long as his account of these forms is rational and his distinctions are not arbitrary. In this regard, it is crucial to understand the criterion underlying his distinction of these forms of life. The criterion is freedom, namely, the level of self-determination, subjectivity, and individuality that these forms demonstrate. This is not an arbitrary criterion because it has to do with the extent to which these forms of life are able to *distinguish themselves* from the rest of the nature. In other words, their differentia are their self-differentiations. Their distinction from one another as well as from the inorganic world lies in the principle or way of their self-determination. The plant is self-determining by virtue of its self-maintaining organic unity and metabolic process, whereas animals go beyond this vegetative mode of freedom by developing unitary or centralized subjectivity and inner determinacy. This distinction is precisely what we will illuminate in this second part of the dissertation.

²³⁸ "This impotence of Nature sets limits to philosophy and it is quite improper to expect the Notion to comprehend—or as it is said, construe or deduce—these contingent products of Nature. In the impotence of Nature to adhere strictly to the Notion in its realization, lies the difficulty and, in many cases, the impossibility of finding fixed distinctions for classes and orders from an empirical consideration of Nature. Nature everywhere blurs the essential limits of species and genera by intermediate and defective forms, which continually furnish counter examples to every fixed distinction; this even occurs within a specific genus, that of man, for example, where monstrous births, on the one hand, must be considered as belonging to the genus, while on the other hand, they lack certain essential determinations characteristic of the genus. In order to be able to consider such forms as defective, imperfect and deformed, one must presuppose a fixed, invariable type. This type, however, cannot be furnished by experience, for it is experience which also presents these so-called monstrosities, deformities, intermediate products, etc. The fixed type rather presupposes the self-subsistence and dignity of the determination stemming from the Notion." *PN*, 23–24 [§250 Remark]; *Werke* 9:35–36. See also *PN*, 418 (§370 Addition; §368 3rd edition Addition); *Werke* 9:503.

But none of this can be an excuse for making appeals to rather contingent examples from the life on the planet earth in a universal account of natural determinacies unless it is clearly stated that those examples are used only to illustrate the philosophical explication. And Hegel does not seem to be sufficiently cautious in his work. For example, at times his account of the animal seems to be too tightly bounded up with the vertebrate or mammal forms of life on the planet earth, and his examples reflect too strongly their contingent character. These are the problems we are occasionally going to point out in the course of our examination. On the other hand, as Hegel himself admits, nature does not consist of entities all of which are rigidly distinguishable in kind. There are instantiations of life whose categorization under the two main forms of life is open to debate. Thus one would expect some forms to be betwixt and between the plant and the animal.

Finally, Hegel's philosophy of organisms does not say much about certain living things that are hard to classify under plant or animal forms. These are primitive organisms such as fungi, protists, and prokaryotes. These organisms do not exhibit centralized subjectivity, nor are their internal structure and process identical with that of plants. Although Hegel gives occasional reference to such rudimentary organisms as primitive forms of life, it is not clear why he does not allocate a section on them. After all, they also exhibit organic unity the nature of which may be distinguishable from that of the plant.

CHAPTER FOUR

THE ORGANIC UNITY OF THE PLANT AND THE ANIMAL

The organic unity and the internal process of formation that is bound up with it is the fundamental requirement for all living individuality, regardless of whether the living individual is or is not more than a self-sustaining unity of collaborating organs. In this regard, organic unity stands for the dynamic framework of life, irrespective of its kind. Engaging in metabolic exchanges with an environment or reproducing itself would not make sense for something that lacks such a unity, as the non-indifferent nature of these activities imply a universal identity co-instituted by the complementary workings of particular members. On the other hand, the character and organization of this unity is connected to the functioning of these two other vital processes. Under the coincidence of the plant's vital functions lies the peculiar nature of its superficial and external unity and individuality. Hegel shows that it is this same structure that precludes the presence of the soul or the realization of the mind in the plant. The internal process of the animal, however, consists not only of a real complementarity of organs but also of a collaboration of different *systems*, is distinct from the animal's outward activity, and is presided by a unitary and sentient self.

4.1. THE PLANT AS AN ORGANIC COLLECTIVE

The logical account sets forth the organic unity as the unity comprised by the cooperative activity of an organism's constituents. The living thing is a self-realizing and self-sustaining whole to the extent that its constituent organs harmoniously provide for one another. Organs stand in a means-end relationship to one another in such a way that each one winds up working for the perpetuation of the whole. Because organs are not indifferent to the

functioning of one another or to their specific roles, they are not mere parts of a whole. The complementarity implies a necessary differentiation of constituents, which allows them to serve each other in a way they cannot provide for themselves. When a particular organ fails to carry out its function, its dysfunction would put the unity of the entire organism in jeopardy.

When thus characterized, the nature of the plant only incompletely demonstrates organic unity. Admittedly, the plant is a unity of constituents such as roots, stem, and leaves, which carry out different functions that sustain the organism as a whole. Although in biology, these constituents are rightly considered as organs, it may not be a coincidence that people often speak of the *parts* of a plant in distinction to the *organs* of an animal. Hegel, who argues for the need to distinguish organs from parts, occasionally refers to these organic members of the plant as parts as well. They are not parts in the sense that they are found given in advance or externally combined, or that their characteristics are determined independently of the rest of the organism. On the contrary, being members of an organic unity, they develop from and differentiate within the internal process of the plant. That which is organic, Hegel argues, is an immanent differentiation of a universal identity that sustains itself as a unity of multiplicity.²³⁹ Not only members owe their particular features or roles to their being congruent with the universal character that pervades the entire organism, but also they do not exist as the things they are in default of this pervasive unity. Roots develop in conjunction with the leaves, and both grow from within the same organic structure. What Hegel points out, however, is that there is something superficial about the differentiation as well as the unity of the organic members of the plant.²⁴⁰ Unlike the organic unity and internal differentiation of the animal viscera, the unity of the plant is not exactly a determinate unity of indispensable and

²³⁹ PN, 305 (§344 Addition); *Werke* 9:374.

²⁴⁰ PN, 303 (§343); *Werke* 9:371.

interdependent organs with fixed roles. The differences between plant members, Hegel writes, “is only a superficial *metamorphosis*.”²⁴¹

4.1.1. The Superficial Differentiation and Unity of the Plant

Hegel’s use of the term ‘metamorphosis’ is an allusion to Goethe, whose *Metamorphosis of Plants* expanded the term to include the transformation of plant parts. Hegel is in agreement with Goethe’s “all is leaf” hypothesis, which suggests that all members of the plant are modifications of one and the same organic structure.²⁴² Goethe makes his case by pointing out the developmental continuity of different members of the plant, and by indicating how certain members of some plants, which are otherwise considered as distinct, are absent in some others. Both of these points hint at what Hegel wants to emphasize about plant parts. The intrinsic identity that Goethe attributes to these members lies in their capacity to assume one another’s role. Under appropriate circumstances, one kind of member can transform into another, and none of them is, strictly speaking, an indispensable organ of the whole plant. The plant is thus a unity of homogeneous parts in a way more than it is a unity of an interdependent multiplicity.

To clarify, it primarily means that plant parts can alter in a way that would allow them to fulfill one another’s function, and not that every member concurrently carries out one and the

²⁴¹ PN, 303 (§343); *Werke* 9:371.

²⁴² Goethe 2009, *Metamorphosis of Plants*. Goethe puts his hypothesis into words in his diary he kept in Italy before he published the *Metamorphosis of Plants*: “While walking in the Public Gardens of Palermo, it came to me in a flash that in the organ of the plant which we are accustomed to call the *leaf* lies the true Proteus who can hide or reveal himself in vegetal forms. From first to last, the plant is nothing but leaf, which is so inseparable from the future germ that one cannot think of one without the other.” Johann Wolfgang von Goethe, *Italian Journey: 1786–1788*, trans. W. H. Auden and Elizabeth Mayer, (London: Penguin Classics, 1992), 366. Hegel speaks of Goethe’s work and expresses his agreement: “the whole growth (*Production*) of the plant shows the same uniformity and simple development; and *this* unity of form is the leaf” PN, 316 (§345 *Addition*); *Werke* 9:386.

same function.²⁴³ Indeed, Hegel later emphasizes that the transformability of members and the unity of their form is only one side of the picture, the other being their differences which consist of an organic elaboration as complicated as what many consider as a sexual distinction. Roots, for example, may not be able to photosynthesize, although in certain plants, they do when they are exposed to light. However, they can develop from within themselves the leaves that can photosynthesize. And yet, this is not exactly Hegel's main point either. For one might perhaps argue that the same applies to animals in view of cell potency, which refers to the capacity of cells to differentiate into different kinds of cells. Cells, tissues, and organs are in one sense the differentiation and development of otherwise identical stem cells. But the main difference between animal organs and plant parts is that while the former do not grow to be complete organisms, the latter can all become individual plants on their own account. This, Hegel argues, "can never be the case in animals with the exception of the polyps and other quite undeveloped (*unvollständigen*) species of animals."²⁴⁴

Because each major member of the plant has the potency to develop *every* vital function in appropriate circumstances, they are not necessarily dependent on one another's support. The difference between a twig, a branch, and a bough, for example, is somewhat arbitrary, as it is one of magnitude rather than of quality. As Hegel points out, each can itself put out roots and become a proliferating tree in its own right. Indeed, he states it as a common fact that the body of the plant rather serves as the root for branches and twigs.²⁴⁵ In this regard, different branches or twigs of the same tree form a unity on account of a common ground that

²⁴³ The examples Hegel offers to illustrate the transformation of one "form" of plant organ to another are mostly from Goethe's *Metamorphosis of Plants*. See PN, 316 (§345 Addition); *Werke* 9:386–87.

²⁴⁴ PN, 314 (§345 Addition); *Werke* 9:385. Exceptions in this or many other cases point out the continuity of species and the arbitrary boundaries of taxonomy more than they show an inconsistency.

²⁴⁵ PN, 315 (§345 Addition); *Werke* 9:386.

holds and maintains them, rather than an indispensable complementation. The plant is therefore a quasi-individual aggregated of other self-subsistent individuals. To a large extent, its unity is merely structural rather than integral.

An example Hegel also benefits from, the phenomenon of grafting, is a notable illustration of the plant members' relative independence from one another. Although the health of a tree as a whole is tied to the well-being of its members, grafting demonstrates that those members do not even have to be of one and the same kind. A certain plant grafted onto a tree of a different kind can develop itself according to its own kind. Interestingly, this is the example Kant gives to illustrate how each member of an organism functions both as a means and as an end in providing for the tree. He points out that each branch of a tree can be regarded as an individual tree on its own right, sustaining itself parasitically on the trunk.²⁴⁶ However, because of the very reasons we are laying out to distinguish plant and animal life, Kant's choice of a tree to exemplify natural purposiveness in general is problematic. Animal organs do not exhibit the degree of independence that plant members have, and each organ exists only in virtue of being a member of the unity they together constitute. As Hegel points out, viscera, the inner organs of the animal body, are not self-subsistent as organs, and can only exist in unity with the rest.²⁴⁷ While there are only few organs the loss of which will not be fatal, none of those organs can develop into the full-fledged animal.

Although it is possible to speak of means-end relationship in both the plant and the animal, it is not only the well-being, but also the identity of the animal organ which rests on the unity of the entire organism. Grafting shows that the unity of the plant organism can be relatively indifferent to the identity of its constituent organs, and the grafted branch can

²⁴⁶ Kant, *Critique of the Power of Judgment*, 243–244; *Gesammelte Schriften*, 5:371–372.

²⁴⁷ *PN*, 315 (§345 Addition); *Werke* 9:385.

continue to exhibit the essential characteristics of its own kind, such as bearing its particular fruit irrespective of the kind of the rootstock.²⁴⁸ In this sense, parts of a tree can alternatively be considered as symbionts that are not totally subordinated to their unity.²⁴⁹ Transplantation of animal organs is evidently possible, although transplanted organs merely compensate for the function of the supplanted organ rather than participating as a means in the coemergent development of organs that belong to an organism of a particular species. Even if xenotransplantation, i.e., the transplantation of organs or tissues between members of different species, is not ruled out and shown to work at least for short spans of time, its likelihood is incomparable to that of interspecies grafting of plants, which even has intrafamilial examples.

4.1.2. The Indeterminacy of the Plant's Individuality and Subjectivity

Inasmuch as plant members are themselves living individuals and potentially whole plants by themselves, each features an organic unity on its own account. The members that are capable of sustaining themselves on their own are therefore relatively indifferent to the nature or function of the rest. In other words, the plant's internal process operates self-sufficiently and relatively independently in each individual part. The unity of each of these individual plants consists similarly in *nothing but* the complementary functioning of its own particular members, which explains why the plant is characterized by evermore particularization. Thus, Hegel states that particularity in the plant is immediately bound up with organic unity and the plant itself is immediately identical with its objective organism.²⁵⁰ Each particular member immediately displays the minimum degree of universality and pervasiveness of organic unity in its own internal process. But the differentiation of each is transient and relative to the rest and each of

²⁴⁸ *PN*, 314 (§345 *Addition*); *Werke* 9:384: "buds retain their individuality to such a degree when they form a branch of another tree that from a single tree one can grow, e.g., a dozen varieties of pears."

²⁴⁹ See Section 3.1.1. where we offered a characterization of symbiotic relationship.

²⁵⁰ *PN*, 303 (§343); *Werke* 9:371.

these parts can end up generating new individuals having their own “internal” differentiation. That is to say, the differentiation of the plant is more a multiplication of particular plants than a qualitative specification that individuates those members in some significant way. This is connected to why Hegel thinks that the plant members are “particular only in relation to each other, not to the whole.”²⁵¹ Their connection to universality is not a dynamic connection to a concrete center, but a connection to a common ground if not also an implicit reference to a common identity. Furthermore, the whole itself falls short of a concrete universal or subject, as it is as much particular as any other part. Its wholeness is also relative and superficial for it may not cease to be a whole when it loses some of its parts, and because each member is in turn a whole by itself.²⁵² Since the whole is not dependent on any particular combination of parts, it does not have a distinct and necessary character with regard to its being a whole.

Nevertheless, because it comprises a self-developing and self-maintaining process, the organic unity of the plant as a whole or of any of its potentially independent members is still irreducible to the mechanical and chemical processes that the organic activity incorporates. Unlike any particular mechanical or chemical process, which is initiated by factors from without and brings about consequences external to it, the internal process begins and ends with itself.²⁵³ The self-realizing and self-sustaining process of the organism subordinates mechanical and chemical processes to the unity of its complementarity by exploiting their external determinability. In this regard, the living thing is not merely mechanical or chemical, but an internally teleological natural entity whose end is itself.

²⁵¹ *PN*, 304 (§343); *Werke* 9:372.

²⁵² *PN*, 304 (§343); *Werke* 9:372.

²⁵³ Although, as we will see, unlike the animal, plant activity requires an external stimulation, the character of which is nevertheless determined with reference to the plant.

But when it comes to the plant in particular, because it is a collective of individual organisms, it is problematic to specify exactly wherein this “itself” consists. Once the plant develops its fundamental structure by specifying parts with differing functions, its further differentiation is a falling apart into members which are themselves individual plants in their own right. Since this perennial proliferation brings about an indefinite number of new members or individual plants, the unity of the plant itself is not definite either.²⁵⁴ Including the whole body of the plant itself, with regard to any part or individual member, it is not possible to pinpoint the boundary or the center. That is why the plant does not have a self in the sense of having a distinct and central subjectivity presiding over, regulating, and relating to its particular organs. Although being internally purposive renders it a continuously self-relating being that constitutes itself,²⁵⁵ this self-relation is not one between the subject and its particular organs, but one that immediately coincides with the totality of the organic complementarity. It is not a self-relation in which the subject directly relates to its own, inner determinacy. The organic unity as such falls short of an agency that can act upon itself as a whole. Indeed, this whole that the organic unity is does not have any additional activity that would distinguish it from its constituent processes. The merely vegetative life is simply tantamount to the entirety of its internal process, and its subjectivity consists in barely anything over and above it.

²⁵⁴ “[The plant] is not a coming-to-self as an individual, but a multiplication of the individuality: so that the one individuality is only the superficial unity of the many. The individuals remain a separated plurality, indifferent to each other, which do not proceed from their substance as from a common essence” *PN*, 304 (§343 *Addition*); *Werke* 9:373.

²⁵⁵ Even a gravitational system or free-mechanism is self-referring in the sense that it has a relatively self-determined identity since the laws that govern the motions of its members are determined by their systemic interrelations. The plant is self-determining to a greater extent as its members do not just happen to form a system, but are individuated in and through this system of their doing, which involve some degree of interaction with the biosphere in a way that is determined by the specific nature of the plant organism.

The lack of a thorough integration of plant parts and a genuine self that unifies them implies that externality that pertains to the inorganic world is still prevailing in the interrelation of plant parts. Because the fractal structure of its objective being does not allow for such an integration of members, the plant cannot realize the soul in objectivity as a concrete and unitary self. The plant's development exhibits conceptuality, and as Hegel puts it in the *Science of Logic*, "the concept is indeed the soul."²⁵⁶ But this "soul" that is restricted to an immediate unity of complementary functioning, is the soul "in the guise of an *immediate*, that is, it is not determined as soul itself, has not comprehended itself as soul, does not have its objective reality within itself; the concept is as a soul that is not yet *fully animated*."²⁵⁷

It is in this sense that the unity and subjectivity of the plant remains formal. Even though the plant can still be considered to have a self in two main respects, they both point to a deficiency that is overcome in the animal life. The first is by virtue of its self-relating organic unity, of which we have already spoken. While the plant is an organic unity by virtue of being a totality of complementary parts, these parts remain external to one another to a degree that is not demonstrated by animal organs. Unlike the animal, the plant lacks the internal structure that would inseparably combine its members in such a way that allows for inwardness or subjectivity, which we will talk about in greater detail. According to the second respect, the plant has the source of light as its self-like unity outside itself, as this latter governs its growth and tropism.²⁵⁸ In this regard, the plant's organism stands in external relation to its controlling power. The plant strives for its self, but since this self is situated outside, it only continually grows and multiplies itself without reaching at a veritable, self-relating state such as animal self-

²⁵⁶ *SL*, 674; *Werke*, 6:468.

²⁵⁷ *SL*, 674–75; *Werke*, 6:468.

²⁵⁸ *PN*, 306 (§344 *Addition*); *Werke* 9:374–75. One may ask whether light is the only possible external self as different plant parts exhibit other kinds of tropisms.

feeling.²⁵⁹ We will see how the animal brings these two aspects of the self together in a way that overcomes the asunderness of the plant form, and realizes genuine subjectivity.

4.1.3. The Plant's Lack of Inwardness

The primordial and outwardly nature of plant subjectivity is thus demonstrated by its lack of genuine inwardness. The organic unity of the living thing delineates an inside which distinguishes itself from the external world. But even in terms of spatial detachment, this distinction is less evident and more superficial in plant life. Plant nature bears the mark of the objective world's external character also with regard to this inside-outside dichotomy. The plant's internal process brings about a continuous formation of additional or longer leaves and roots, and it is therefore a repetitive outwardly extension rather than restoration and perpetuation of the internal structure.²⁶⁰ Lacking a center, the plant proliferates or spreads indefinitely, which Hegel calls its externalization. Considering that the plant immediately demonstrates its quasi-self as a self-realizing objective end, this externalization is equally its internal process of unification. But because of this continual coming out of and going beyond itself, it preserves itself by virtue of ever new "plant-individuals" instead of bringing its members

²⁵⁹ "The process of self-preservation is to attain the self, to satisfy oneself, to come to self-feeling; but because the self is outside of the plant, the latter's striving after the self is rather a being-drawn-out-of-itself, so that its return into itself is a perpetual forth-going, and conversely. Thus the plant preserves itself by multiplying itself." *PN*, 306 (§344 *Addition*); *Werke* 9:374. In the same passage, Hegel points out another sense in which the source of light, or the sun in particular, is self-like. Without the light source, certain features that individuate the plant, such as its particular taste, color, or smell do not develop. We will talk more about this in our discussion of plant reproduction.

²⁶⁰ One might point out that not all plants are perennial. But classifications such as annual, biennial, and perennial rests on the distinction between the growth and reproduction of plants, which for Hegel is neither clear-cut nor too significant. Production of seeds is a part of the annual or biennial plant's life cycle, and when we consider the homogeneity of plant members, it is not much different from a perennial plant's regrowth from the rootstock. After all, they both amount to an outwardly multiplication of the plant rather than the renewal of an existing inner structure. Given the superficiality of the unity of plant members, whether those parts are spatially contiguous or not is not of much philosophical significance.

into a real unity.²⁶¹ The development of the plant is thus merely a fractal expansion of shape, and “a perennial production of new individuals.”²⁶² In this sense the plant’s internal process of formation coincides with its reproductive process.

Moreover, since the plant’s self-relation is its growth of new members by deriving nutrition from the environment, this self-relation is equally and “immediately a relation to an outer world.”²⁶³ Consequently, the plant’s predominantly efferent nature goes hand in hand with the interfusion of its internal, external, and reproductive processes. In the end, given the homogeneity of plant parts and the absence of profound specialization, the fundamental processes that constitute life cannot be separate in the plant. This is also the reason why it is difficult to talk about the internal process of the plant in isolation from its metabolic activity. What each member does to provide for the growth of the plant is a specific sort of metabolic engagement with the environment by means of which it obtains nutrients for its further growth. Whether through its roots or leaves, the plant is always in direct connection and interaction with the outside world. The growth of plant members is not much of a mediated activity in which the acquisition of its need is distinct from the process of its assimilation.²⁶⁴ There is still a

²⁶¹ “The unification (*Zusammennehmen*) [of the plant’s moments] of self-preservation is not a union of the individual with itself but the production of a fresh plant-individual-the *bud*.” *PN*, 322 (§346a); *Werke* 9:374 (§346).

²⁶² *PN*, 305 (§344); *Werke* 9:373. Also: “[t]he vital process of the plant is an independent process of the plant in each part; branches, twigs, leaf, each possesses an entire independent process, because each is also the whole individual. The plant’s vital process is thus complete in each part, because the plant is particularized through and through without the process having already differentiated itself into a number of different processes. Consequently the process of the plant as an immanent differentiation, appears both in its beginning and in its end-product only as a development of shape (*nur als Gestaltung*). In this respect the plant stands midway between the crystal of the mineral sphere and the free, animal shape.” *PN*, 320 (§345 *Addition*); *Werke* 9:393.

²⁶³ *PN*, 322 (§346a); *Werke* 9:374 (§346).

²⁶⁴ “Does this take place immediately, or is there a sequence of transformations? The main thing in the plant is that this transformation takes place without mediation. But in more highly organized plants this process can also be traced as passing through many intermediate stages: as it does in the animal

transformation of the inorganic into living matter, which Hegel calls the “internally transformed fluid” or the vital sap, and the further internal process that involves the differentiation and circulation of this vital sap into the freshly growing organs. But a considerable part of that metabolic process occurs immediately and at the surface of the plant parts. Besides, the vital sap that constitutes the supposed inside is just the abstract and homogeneous, that is to say, yet to be concrete and differentiated product of those peripheral organs, which are the ones that do the real work in growth and self-maintenance. In other words, the plant does not strive for the preservation of this inner fluid or existing parts as much as it makes use of them to reproduce itself further outwardly.

The authority of externality over the plant’s nature is also evident by the degree to which its activity is determined by its outside. It is true that despite its fractal existence, the plant organism is still a self-realizing and self-preserving individual, and in consequence, its interaction with the world is not merely mechanical or chemical. Plant metabolism does involve mechanical and chemical aspects, but the plant neither leaves the object of its interaction unaffected, nor coalesces with it. As Hegel puts it, it rather *infects* the nutrient it absorbs, and informs it with its life.²⁶⁵ Whether plant parts grow from the seed or from a mature plant, the external process that allows for their growth and specification cannot be explained solely in terms of efficient causation. On the other hand, the seed requires external stimulation, and the roots and leaves are drawn towards the sources of their needs. In this regard, the plant activity is externally instigated and guided, which further demonstrates the shortcoming of its subjectivity. However, as Hegel explains in the logical examination of life, stimulation is different

organism. Yet here, too, the direct transformation into lymph (*Infizieren zu Lymphe*) occurs without the intermediation of the organs.” *PN*, 323 (§343a Addition); *Werke* 9:395–96 (§346 Zusatz II).

²⁶⁵ *PN*, 323 (§346a Addition); *Werke* 9:395–96 (§346 Zusatz II).

from mechanical push or communication and chemical attraction,²⁶⁶ and the need is something specifically biological. Anything with objective being can engage in mechanical or chemical relations, though only a living thing can be stimulated. Because it constitutes from within itself the specifications of its determinability, the plant is still self-determining.²⁶⁷

4.1.4. Plant Sensitivity and Responsiveness

In the *Philosophy of Nature*, Hegel allocates somewhat disproportionate focus on the animal's difference from the plant at the expense of an adequate consideration of the plant's sensitivity and responsiveness, which lie beneath the plant's external interactions. In his lecture notes, Hegel even compares plant sensitivity to mechanical elasticity or expansion and contraction, which is not exactly in conformity with his general view of plant nature.²⁶⁸ In fact, an examination of these features does not only substantiate the plant's vitality, but also contributes to the plant-animal distinction with regard to individuality, subjectivity, and self-determination.

Sensitivity to changes in the environment and a certain degree of an apparent coordination of responses is fundamental to plant life. The plant's responses to external stimuli is determined by its nature, but unlike what is the case for chemical and mechanical objects, this nature involves purposiveness. The response can only be conceived with reference to the preservation of the complementary functioning of the plant's constituents. In order to maintain itself, the plant has to adjust its constitution in accordance with the changing conditions of

²⁶⁶ *SL*, 685; *Werke*, 6:482.

²⁶⁷ Hegel asserts that the crux of idealism lies in this character of stimulation: "An important step towards a true conception of the organism is the substitution of the concept of stimulation by external potencies for that of the action of external causes. The former concept contains the seed of idealism, which asserts that nothing whatever can have a positive relation to the living being if this latter is not in its own self the possibility of this relation, i.e. if the relation is not determined by the Notion and hence not directly immanent in the subject." *PN*, 385 (§359 *Remark*); *Werke* 9:469.

²⁶⁸ See *PN*, 309 (§344); *Werke* 9:379.

viability in its biosphere. Therefore, plant responsiveness requires, and is necessarily coupled with, the reception of the stimulus, which is not indifferent and indiscriminate, but rather selective. This selective receptivity of the plant is its sensitivity, and it is unlike mechanical and chemical relations in that it can receive an external impulse and be stimulated by it only insofar as the determinacy of the impulse has a significance with regard to its preservation, or more specifically, the conditions of its viability.

Merely mechanical interaction is between objects that affect one another only externally and irrespectively of any intrinsic character. From the indifferent perspective of mechanical interaction, there are only quantitative differences such as mass, velocity, or momentum. Although the plant does not have a real inner being over above its external existence, its stimulation is still registered as an ideal determination or factor of its internal process, bearing a qualitative significance which signifies that the stimulus concurs or conflicts with the particular nature of the plant.

A chemical object is not totally indiscriminate: it enters into reaction only with objects with which it has chemical affinity. Although a factor in plant responsiveness, chemical affinity is nevertheless not the sole determiner of plant responsiveness. Any chemical aspect of the process is rather subordinated to a more sophisticated kind of selective receptivity, determined by the end of self-preservation. When chemicals play a part in biological activity, they acquire a new, ideal determination which they are lacking as merely chemical objects. And even if they interact with the organism only locally, such as through cellular receptors, they still acquire this significance not on account of any particular chemical component or with respect to an external observer, but by virtue of the individual, self-preserving organism.

The selective receptivity, which allows the living thing to assess the significance of the stimulus with respect to its own conditions of viability, is therefore exclusively biological. As we

suggested earlier, all living things including the most primordial ones register changes in the environment and respond in accordance with their particular nature. Thanks to this selectivity, they can respond in such a way that they can rearrange their internal organization, fulfil their metabolic needs, and avoid injury. But on account of their kind or internal constitution, the way different organisms exhibit receptivity and responsiveness varies. Through its sensitiveness to stimuli, the plant organism separates itself from the environment and maintains an elementary sort of subjectivity. However, as expected, this sensitivity is rudimentary and does not exhibit the degree of subjectivity inherent in animal receptivity and responsiveness.

There are two main aspects of plant sensitivity and responsiveness that lays bare its rudimentary nature. In all its particular examples, these two capacities are localized in parts without their being integrated into a unitary response, and are accordingly immediately coupled with one another without the intermediation of a higher level capacity.

Even though it is distinctively expressive of the kind of its subjectivity, Hegel does not talk much about the localized and peripheral character of plant sensitivity and responsiveness or make explicit connections between these functions and the particular nature of the plant. Besides quoting the biologists of his time and stating that sensitivity does not amount to sensation, he chooses to emphasize how the animal's sensory integration and centralization makes a difference in the coordination of its responses. By contrast, Hans Jonas draws on the plant's basic capacity of receptivity in order to distinguish animal subjectivity and individuality from that of the plant in a way that still chimes in with Hegel's distinction. Even though Jonas calls this capacity 'irritability,' he defines it as "sensitiveness to stimuli."²⁶⁹ This difference in terminology is not problematic given the immediate coupling of reception and response that we will explain below. This primordial irritability or sensitivity is for Jonas the germ of inwardness or

²⁶⁹ Jonas, *The Phenomenon of Life*, 99.

having an interior world, which matches up with how Hegel construes plant subjectivity as infantile and external.²⁷⁰ It allows the organism to have at least a rudimentary “awareness” of its own being, and demonstrates its “concern” with its own existence and perpetuation. The appeal to concepts such as ‘awareness’ and ‘concern’ is problematic as they presuppose much more than what is at hand. But Jonas knows that plants are not conscious, they have neither representations of themselves nor associated expectations. The sort of awareness and concern that can be spoken of the plant merely consists in its self-preserving activity. This activity requires a capacity of discrimination in the plant’s dealings with the world. But Jonas insists that because of the lack of integration and central control, these dealings do not open up “a real world-relation,” which can only emerge together with specifically animal features.²⁷¹

Plants are sensitive to several kinds of stimuli, which can be triggered by various factors such as changes in water, light, gravity, chemicals, temperature, conduct, or internal modifications. Regardless of whether the plant’s movement is classified as tropic or nastic, or its response as positive or negative, it involves a stimulation of a plant member from without by these external or internal factors. More specifically, the stimulation happens at the cellular level and it immediately elicits a response. To clarify, this immediacy does not mean that stimulation is identical to the response. Even at the cellular level, between the stimulation and response a mechanico-chemical process takes place, which is often called ‘signal transduction.’ This process starts with the excitation of the selective cell membrane and followed by various intracellular interactions that end up modifying the cell’s protein structure or hormone concentrations. However, since the stimulus is not registered by a centralized sensory system, the response is local and mostly peripheral. The only parts of the plant that respond to stimuli are the ones that

²⁷⁰ Ibid.

²⁷¹ Ibid, 100; Jonas, *Biological Foundations of Individuality*, 250.

are directly affected by it. There are cases in which the response of a certain cell is communicated to further cells by means of chemical transmissions called “signals” in a way that would coordinate the entire plant’s response to that stimulus. But insofar as each response cannot but start with a local stimulation that is transmitted to contiguous members throughout the organism, this does not preclude a chain reaction that consists in plant members determining one another in accordance with the internal process of the plant.

There are interesting cases in which plant parts respond in ways that cast a little doubt on the claim that each plant part is by itself an individual with its relatively independent organic unity. An example of such a case is the hypersensitive response, thanks to which certain parts of the plant that are infected by pathogens are rapidly sacrificed in order to prevent the spread of infection. Needless to say, there are mechanisms that underlie hypersensitivity at the cellular level, which involves movement of certain chemicals in and out of the cell in a way that corresponds to a certain gene based activity. But none of these would account for why this response is triggered by specific things, which in this case are pathogens. Pathogens do not mechanically displace plant parts, nor do they chemically bond with them in order to produce a third product. Instead, by means of certain mechanical and chemical interactions, they undermine the functioning of the plant members.

The reason why hypersensitivity is interesting in this context is the seemingly systemic nature of the plant’s response. Plant members have various means to defend themselves against injury, but in this specific sort of response, individual cells do not try to fight against the pathogen in order to save the infected area. Instead, they trigger their own death to save the rest of the plant before it gets infected. Similar to apoptosis, which is the regular and ongoing cellular sacrifice of the self-sculpting multicellular organism, the hypersensitive response is considered as a “programmed” cell death. In this sense, the plant as a whole operates like a

proto-immune system as a function of its internal process. After all, an immune system can be considered as an aspect or component of organic unity, as it also consists in an interactive network of members which together maintain and to some extent determine the system's own identity over against external determination.²⁷² Phenomena such as hypersensitive response suggest that despite the relatively independent and mutually external character of plant parts, one can still speak of the universality that pervades the nature of each part that happens to play a role in the organic unity of the plant. This universal character, which Evan Thompson once calls 'the somatic identity,'²⁷³ emerges and differentiates itself in and through the complementary workings of its own constituent. On the other hand, it is not surprising that the plant can exhibit this level of integrity without centralization. Although the immune system of the animal is much more complicated, it is a function of its internal process and can operate without the mediation of sensation.²⁷⁴ But ultimately what goes on can at most be considered as an implicit relation of the members to the whole, because the immune response belongs to the *totality* of members rather than to a *unitary* self that can stand in real relation to its parts.

To repeat, plants are sensitive not only to external changes, but also to internal ones. This interior sensitivity between plant members or cells should be considered as a part of the dynamic of its internal process of growth and maintenance. Because plant members are always in immediate relation to outside and since their collaborative process is not separated from the external process, the plant responsiveness is ultimately activated from without. Since this

²⁷² Varela and Vaz define immune system as a self-determining network that continuously defines the organism's identity, which is by and large inspired by Niels Kaj Jerne's works. See N. M. Vaz and Francisco Varela, "Self and Non-Sense: An Organism-Centered Approach to Immunology," *Medical Hypotheses* 4, no. 3 (May 1, 1978): 231–67. For Niels Kaj Jerne's similar thoughts, see N. K. Jerne, "Towards a Network Theory of the Immune System," *Annales D'immunologie* 125C, no. 1–2 (January 1974): 373–89.

²⁷³ Thompson, *Mind in Life*, 49.

²⁷⁴ To read more about the hypersensitive response and the related controversies, see: J. B. Morel and J. L. Dangl, "The Hypersensitive Response and the Induction of Cell Death in Plants," *Cell Death and Differentiation* 4, no. 8 (December 1997): 671–83.

external activation is regional and not an outcome of mediation by a central self, the plant does not respond as a whole and at once. Because it does not have a unitary subjectivity that can go beyond its particularization into homogeneous members, the plant cannot exhibit agency or centralized control, and consequently, as Hegel puts it, it cannot “freely determine its place, i.e. move from the spot.”²⁷⁵ Jonas points out that this is evident in the way the plant cannot revert to its original condition without further external stimulation or the vanishing of the stimulus.²⁷⁶

By contrast, the animal can initiate its movements, and move itself as a whole. Jonas takes this to be “the most *prima facie* and popular” distinction between the plant and animal. The animal’s movement is not merely externally conditioned, and not an immediate response to some external stimulus. It still exhibits local and immediate reflex actions, but its locomotion is self-initiated as a result of its feelings and sensation. That is why Jonas adds that this simple distinction between the two forms of life is “indeed a symbol for all the subtler distinctions regarding sentience, centralization, individuality, and freedom.”²⁷⁷ And because Hegel defines the soul as “the initiating self-moving *principle*,” it is also key to understand why the soul is exclusively animal.²⁷⁸

²⁷⁵ PN, 305 (§344); *Werke* 9:373.

²⁷⁶ “The suddenness and swiftness, e.g. with which the leaf-halves of the Venus Fly trap, upon stimulation of their sensitive hairs, fold together over the prey and interlock their toothed edges, look very much like a feat of goal-directed animal motility. Yet the “direction” here is not central but strictly in local response to local stimulation, with no central control involved. Also the return to the original condition, when digestion is finished and the flaps reopen, is not the true reversibility of muscular movement. The difference can most simply be brought out by asking: Can the plant close and open those leaves? The animal can close and open its jaws freely, whenever it feels like doing so—to chew, yawn, or merely to exercise the faculty—and can stop and reverse each movement while in progress. The leaves of the fly trap close or open as conditions determine, and each phase of motion is unidirectional when it occurs, with no accompanying alternative. In brief, it is not “the plant” that moves “its” leaves, as the animal moves *its* limbs: it is those leaves that by a predetermined mechanism react to determinate affections of their own condition.” Jonas, *Biological Foundations of Individuality*, 250.

²⁷⁷ Jonas, *Biological Foundations of Individuality*, 244.

²⁷⁸ SL, 680; *Werke*, 6:475.

4.2. THE UNITY OF THE ANIMAL SUBJECT

The three fundamental determinations of the logic of life find their utmost realization and the inmost articulate expression in the animal. The animal form of life demonstrates that the more the fundamental processes of life diverge into separate systems, the truer and abler the living thing's unity and subjectivity. Hegel explicates these processes under three main headings, which match up with his division of vegetative functions, although these processes for the most part coincide in the plant: (i) structure or shape (*Gestalt*) (ii) assimilation, and (iii) the genus-process.

The first process involves the internal structure and process that constitutes the organic unity, which is in turn presupposed by all the rest of the peculiarly animal functions. Thus the structure does not only lie beneath the organic unity and the inwardness of the animal subject, but also provides the framework for the animal's outward activities such as feeding and copulation. Moreover, as Hegel attempts to show, the animal form of life encompasses all the determinacies that form the vegetative life within this structural process. That is to say, the basic organic activity immediately tied up with this internal structure reiterates all three fundamental processes of the vegetative life, albeit in a characteristically animal way. In a nutshell, the internal structure regenerates itself through the collaboration of its differentiated members and by assimilating what it obtains. Also, the constitutive members of this organic structure exhibit sensitivity and responsiveness. But unlike the peripheral nature of the plant, the organic unity is by and large internalized in the animal, and thereby distinguished from its other activities that involve its relation to what is outside. In other words, the other two characteristically animal activities of assimilation and reproduction do not overlap with the purely organic or vegetative functions. Although they are relatively distinct, metabolic and reproductive processes presuppose the internal structure and process, whereas the former

provides the latter with what it needs to sustain itself. Therefore, the actual carrying out of metabolic and reproductive functions involves more than what is included in the structural process. On the other hand, all three processes are regulated, and the internal and external functions are coordinated, by a unitary self the realization of which is again contingent on the inner structure of the animal.

4.2.1. The Inner Structure of the Animal

As Hegel puts it, the structural process speaks for the idea in its self-relation.²⁷⁹ It is the perpetual process of a totality of organic members where each is reciprocally end and means.²⁸⁰ Yet unlike the self-relation of vegetative unity, which does not return to itself but always points beyond itself and to new members, the organic unity of the animal realizes the possibility of self-relation of a unitary self.²⁸¹ The presence of an overarching self that pervades its structural process and that acts as a unitary subject which takes up its structural preconditions as its particular members is the animal's foremost difference. In contrast with the rudimentary, formal, and superficial subjectivity of the plant, the animal represents the form of life that realizes concrete subjectivity in nature. Despite its having an objective presence that necessarily involves externality, it achieves an inward existence of subjectivity that is not only the unification of, but also the authority over, its own objective being. This inner subjective life implies that the animal life is not limited by or reducible to the immediacy of its organic unity. As a result of the unification of its field of sensitivity in addition to the complementary functioning of its organs, the animal has feeling and sensation which belongs to it as a whole rather than to any of its specific organs. The soul thus finds its true expression in the animal form of life.

²⁷⁹ *PN*, 357–58 (§352); *Werke* 9:435–36.

²⁸⁰ *PN*, 377 (§356); *Werke* 9:459.

²⁸¹ "The organic unity brings itself forth without becoming another individual like the plant; it is a circle which returns into self." *PN*, 377 (§356 Addition); *Werke* 9:460.

This inward existence of subjectivity rests on an objective structure or physiology that realizes a thorough integration of members as well as their centralization. In one respect, it is the plant's lack of such physiology that precludes it from having genuine subjectivity that is not just identical to its objective existence, but presides over it. It is the same reason why, when the aspects of the structure that enables this integration and centralization are impaired by factors such as disease, injury, or genetics, the animal life gets reduced to what is fittingly called 'the vegetative state'.²⁸² In such a state, the animal maintains its vital functions while it temporarily or permanently loses its peculiarly animal capabilities, such as feeling, motility, and perception.

The organic unity that underlies the subjectivity of the animal is more definite and complete compared to that of the plant, and the relation of this unity to its particular members is quite different in these different forms of life. For Hegel, the organism exists as a subject to the extent that its externality "is *idealized* into members."²⁸³ The idealization consists in the organism's overcoming of the externality and indifference that pertains to the objective existence of its constitutive organs. Because of the particular nature of its constitution, in which different members still maintain their relative independence from each other, the plant cannot adequately achieve ideality. Although both the animal and the plant differentiate their members from within rather than being externally fashioned like an artifact, the internal differentiation of the animal is mostly final in form and the differentiated organs do not develop into relatively independent parts that can flourish on their own. Each member is distinguished with specific roles without which the rest of the organs cannot properly operate.²⁸⁴ Consequently, the animal

²⁸² Richard Winfield makes the same point in *The Living Mind*, 61.

²⁸³ *PN*, 351 (§350); *Werke* 9:431.

²⁸⁴ As Charles Darwin notes, natural selection promotes such specialization in different ways:

We should be extremely cautious in concluding that an organ could not have been formed by transitional gradations of some kind. Numerous cases could be given amongst the lower animals

can only sustain its organic unity as the unification of a specific diversity of complementarity functions carried out by a consistent set of organs. Such a “fully achieved unity” is one that accomplishes ideality.²⁸⁵

This more determinate and consistent character of the animal’s internal constitution also has a quantitative imprint. Despite the specialization of its functions, the unity of the plant is indifferent to the number of members that are to carry out specific roles. This is why a plant can have indeterminately many leaves, roots, or flowers, so long as environmental conditions permit. By contrast, the animal does not grow as many organs as it can; its organic unity depends on a specific number of organs that carry out particular duties throughout the stages of their growth. Also, since this unity of differentiated members reaches a mature state, the animal as a whole does not grow in the same way the plant does. Barring a small number of exceptions of indeterminate growth, animal development is not perpetual and fractal repetition of a similar shape, and the internal process that sustains the animal does not necessarily result in further growth. Most animals retain their general outline in growth and grow only in size until maturity, showing how its members form a determinate totality rather than an indefinite aggregate. Even in those few cases such as that of reptiles which exhibit attenuated and indeterminate growth in

of the same organ performing at the same time wholly distinct functions; thus the alimentary canal respire, digests, and excretes in the larva of the dragon-fly and in the fish *Cobites*. In the *Hydra*, the animal may be turned inside out, and the exterior surface will then digest and the stomach respire. In such cases natural selection might easily specialise, if any advantage were thus gained, a part or organ, which had performed two functions, for one function alone, and thus wholly change its nature by insensible steps. Two distinct organs sometimes perform simultaneously the same function in the same individual; to give one instance, there are fish with gills or branchiæ that breathe the air dissolved in the water, at the same time that they breathe free air in their swimbladders, this latter organ having a ductus pneumaticus for its supply, and being divided by highly vascular partitions. In these cases one of the two organs might with ease be modified and perfected so as to perform all the work by itself, being aided during the process of modification by the other organ; then this other organ might be modified for some other and quite distinct purpose, or be quite obliterated. (Charles Darwin, *On the Origin of Species*, ed. Gillian Beer, [New York: Oxford University Press, 2009], 142–143.)

²⁸⁵ PN, 352 (§350 Addition); *Werke* 9:431.

size, the animal structure does not multiply itself. Instead, it expands a fixed shape or continuously renews its existing constituents in a way that retains the same configuration and specialization of organs. Consequently, the unity of the animal organism does not endlessly go beyond itself in such a way to coincide with the reproductive process. Instead, it remains within itself and retains its identity as a determinate unity of organs.

The idealization of members and the ensuing objective unity with subjectivity amounts to, Hegel says, a “duplication of subjectivity.” The duplication is not similar to the way in which the plant grows a further individual plant from within itself. It is the duplication of the unity as organic and psychological. While the organic unity still refers to the complementary functioning of the organs the specifically animal character of which underlies the psychological unity, this latter is the unity of the subject that does not overlap with an objective process but is realized by and presides over it. In Hegel’s words, it is “the *inwardly reflected* self of *singularity*, *inwardly* present *subjective* universality.”²⁸⁶ Putting it differently, it is the individual subject that achieves true inwardness, which is freed from the spatial and gravitational constraints of mere objectivity, or of the proto-subjectivity that is immediately embedded in objectivity. In order to begin spelling out what all this means, we should first explain what this inwardness consists in and how exactly the animal organism can realize it.

The animal subject has three distinguishing functions, which Hegel lays out in his logical exposition as the capabilities of the living subject. The animal is sensible, irritable, and reproductive. In the logical exposition Hegel characterized these faculties mostly with reference to a unitary self, even though we tried to construe them in terms of merely organic unity. In our construal of Hegel’s account, we offered a distinction between the capacities of a living subject and the capacities of an organism that does not have a centralized subjectivity, so that the

²⁸⁶ PN, 351 (§350); *Werke* 9:430.

cognate faculties of less developed organisms can also be conceived in accordance with the logical concept of life. While what Hegel calls the animal subject is the embodiment of the truly living *subject* in nature, what he means by *Gestalt* or structure consists in these functions as well as the infrastructure that facilitates them. The infrastructure, which comprises the inner structure of animal physiology and underlies the three functions of the animal subject, involves primarily the nervous system, the circulatory system, and the digestive system. It is worth briefly recalling those subjective functions before we start talking about the physiological infrastructure, the lack of which is the main reason why the plant cannot realize these capabilities as Hegel lays them out in the logical exposition.

The animal subject is sensible or sentient in the sense that the modifications occurring in any member of its body is immediately registered as a particular determinacy of its own, universal identity. Whether originating from a foreign object or from the body itself, despite the external being of the instigating source, the determinacy of the subject is inward and so to speak all pervading. Because it issues from the animal itself, self-feeling is the simplest mode of this faculty. The animal subject feels itself in various ways as a function of the modifications it unitarily registers. On the other hand, with respect not to the animal subject but to its body, sensibility represents the common identity of its members. The animal's irritability stands for its capacity to respond to that which stimulates it. Accordingly, it points to the animal subject's ability to control and direct its body or its members. Again, with respect to the organic body, irritability is the organism's continuous drive to generate and maintain the differences of its constitution. Lastly, reproduction as a capacity of the animal *subject* refers at its minimum to its preservation of itself through sensibility and irritability. A self-preserving animal subject is one that retains its individual identity of differences, while it transforms what is other to itself, and continually reproduces itself in objectivity.

Hegel notes that these capacities should not be regarded as animal *properties* as if they operate independently of others. In their isolation from one another, Hegel considers them as abstract processes. Although they are the interdependent faculties of one and the same subject, they rest on distinct yet interpenetrating processes in the developed animal organism, namely the nervous, circulatory, and digestive systems. The organic unity of the animal is thus the one system that amounts to what Hegel calls the total structure of these three interlocking subsystems, each of which has a relative center.²⁸⁷ Together they constitute the internal structure of the organism that facilitates its external relations, which in turn provides for this internal structure. In his exposition, Hegel differentiates these constitutive systems themselves into further subsystems by means of which the fundamental animal faculties are carried out.

4.2.2. The Internal Structure of Sensibility

Sensibility, to begin with, is realized owing chiefly to three substructures that more or less correspond to (i) the skeletal system, (ii) the central and sensory-motor nervous systems, and (iii) the autonomic (or vegetative) nervous system, which has, Hegel says, the head as its center.²⁸⁸ Hegel's account shows that these three components that embody sensibility represent its self-relating, responsive, and self-preserving moments, respectively.²⁸⁹

²⁸⁷ PN, 372 (§355); *Werke* 9:454.

²⁸⁸ Sebastian Rand rephrases Hegel's distinction of these last two systems in terms of the somatic system and visceral system. Rand, "Subjetividade animal e o sistema nervoso na Filosofia da Natureza de Hegel," *Revista Eletrônica Estudos Hegelianos* 7, no. 12 (2016), 42. The autonomic nervous system can safely be substituted by the visceral system. Although Hegel is not using any of these terms, in German, several different phrases are used to signify the same system: 'das vegetative Nervensystem,' 'viszerale Nervensystem,' 'autonomes Nervensystem.' Among these the term 'vegetative nervous system' is particularly interesting as it points to the specifically animal incorporation of vegetative life with respect to sensitivity/sensibility. With the addition of the organs of the central nervous system, using the term 'somatic nervous system' to signify the second moment of sensibility is appropriate only if it involves both sensory and motor systems.

²⁸⁹ There are living things which are considered as animals yet lack some or all of the structures that Hegel describes here. But to repeat a point we made in the introduction to Part II, for Hegel, this is not much of a problem of universal applicability as it is the deficiency of those living things and the empirical taxonomy used to classify them. The animal, for Hegel, is a universal determinacy, the features of which

Obviously, the skeletal system protects the inner organs from the outer impacts, and serves as the support structure for the body and its members to secure their steady functioning. Even though this system is presupposed by the developed organism, it is not given independently of the organic unity, but is rather produced from within it. It is puzzling that Hegel includes the skeletal system as a moment of sensibility, although he describes it as the absence of sensibility.²⁹⁰ In developing its skeletal system, the organism produces itself as insensible. One might suggest, because it is the least changing component of the organism, Hegel takes it to be the simplest mode of the universal identity of the animal, which the faculty of sensibility signifies. But more importantly, the development of the skeletal system is a major step toward the development of the animal's inwardness. It does not only provide a covering for the internal process of the viscera, it also encloses and protects the brain and the spinal cord, i.e., the major elements of the nervous system, which in turn realizes the animal's sensibility, and instigates its irritability.

The central nervous system, which consists of the brain and the spinal cord in vertebrates enables the organism to receive impressions from within or without through the nerves and register them as the determinacies of one and the same subject. Here Hegel is referring particularly to feeling and sensation in which the animal registers and feels its own state through the nerves that ramify from the brain into the sense organs. But whereas nerves make sensibility possible, they also serve as the conduit of irritability or the self-determined

may still be inadequately expressed by living things in nature. However, in his explication Hegel chooses terms and gives examples some of which strongly reflect their contingent character.

²⁹⁰ *PN*, 359 (§354); *Werke* 9:439. In this regard, the skeletal system corresponds to the "abstract identity" of the organism: "Sensibility, as self-identity of sensation, if reduced to abstract identity, is insensibility, the inert, dead side of the organism, the deadening of itself which, however, still falls within the sphere of vitality; and this is the production of bone, whereby the organism presupposes its own basis." *PN*, 361 (§354 *Addition*); *Werke* 9:440–41.

response or of the animal.²⁹¹ Thus the nervous system has an inward and outward reference, the means of which can be considered to correspond to what is today called sensory/afferent neurons and motor/efferent neurons. The nervous system is therefore the physiological infrastructure on the basis of which the animal realizes and determines itself as a unitary subject, both by unifying its field of sensation and movement, and by centrally connecting these two aspects of the one subject.

For Hegel, the innermost moment of sensibility is grounded on what he refers to as “the system of ganglia” in general and “the sympathetic nerves” in particular.²⁹² Hegel’s use of these terms mostly rests on the empirical biology of his time, although it does not seem to be much at odds with the contemporary terminology. Despite technological advances in the capacity of observation, the term still means bundles of nerve tissues, more precisely, nerve cell bodies of the peripheral nervous system that form nerve centers.²⁹³ On the other hand, Hegel emphasizes the role of particular ganglia in the abdomen, and although Hegel does not go into much detail,

²⁹¹ In his addition to §354, Hegel points out that it would be misleading to think that brain is the subject that commands a certain message. Although he admits that some message is communicated from the brain to organs through the nerves, he argues that it is “the universal presence of the will and consciousness” which determines the message. *PN*, 364; *Werke* 9:444. However, Hegel’s own conception of consciousness and will suggests that they require more than what is necessary and sufficient for animal life. See *Werke* 10:100 (§400 *Zusatz*):

Die Subjektivität der empfindenden Seele ist eine so unmittelbare, so unentwickelte, eine so wenig sich selbst bestimmende und unterscheidende, daß die Seele, insofern sie nur empfindet, sich noch nicht als ein einem Objektiven gegenüberstehendes Subjektives erfaßt. Dieser Unterschied gehört erst dem Bewußtsein an, tritt erst dann hervor, wenn die Seele zu dem abstrakten Gedanken ihres Ichs, ihres unendlichen Fürsichseins gekommen ist.

The animal can be a universally pervading subject solely by virtue of being a feeling self. In this regard, in case of a less complex animal, it is neither the will nor consciousness that determines the message, but the feeling self. An explication of the faculties of will or consciousness is beyond the scope of this work. However, we can simply point out that even in the higher forms of animals, certain behaviors, which are beyond mechanical and chemical processes, do not require consciousness or will. Behaviors driven by habit or instinct, for instance, which do require communication between the brain and organs but are unconscious and non-volitional, are determined by a unitary subject.

²⁹² *PN*, 364 (§354 *Addition*); *Werke* 9:444.

²⁹³ The central nervous system has similar structures which are today called ‘the basal ganglia.’

he may be taken to have in mind the abdominal and lower thoracic network of nerves that innervate the internal organs, involving structures such as the celiac and renal ganglia, celiac plexus, and lower thoracic and lumbar splanchnic nerves.²⁹⁴ The reason why Hegel refers to these nerve clusters as “little brains in the abdomen” should be their relatively autonomous status in virtue of the way they regulate the workings of the viscera.²⁹⁵ The system of ganglia is “the sensibility which has withdrawn into itself” as it enables the internal feeling that immediately informs the animal of its internal states without the intervention of the outer senses or the outer world.²⁹⁶ Accordingly, it is the nervous system of the viscera that can operate involuntarily and independently of the somatic nervous system. This shows that even with respect to the cooperation of the internal organs of its vegetative system, the animal achieves a unification that goes beyond the locality of sensitivity. The system of this internal network of nerves provides the animal with the physiological infrastructure that unites the sensitivity of the collaborating organs, and allows the animal subject to feel its own states and wants. It corresponds to the self-preserving or reproductive moment of the animal sensibility, on the one hand because the unified sensitivity of internal organs is the condition that makes the perpetuation of their complementary workings possible, and on the other because feeling of

²⁹⁴ “They are found therefore throughout the body, though principally in the parts belonging to the internal structure, especially in the abdomen.” *PN*, 365 (§354 *Addition*); *Werke* 9:445.

²⁹⁵ *PN*, 364 (§354 *Addition*); *Werke* 9:444. They are relatively independent because they still originate from the brain, even though this origination does not render brain as the primary determiner of the nature of these nerves:

There is controversy as to whether these ganglia are independent, or whether they originate in the brain and spinal cord. This expression ‘originate’ is a dominant conception in the relation of nerves to brain and spinal cord, but it is without definite meaning. It counts as an undoubted truth that the nerves originate in the brain. But if here they are in identity with the brain, they are also separate from it; although not in the sense that the brain is antecedent to the nerves, these coming later—any more than the fingers originate in the palm of the hand, or the nerves originate in the heart. Individual nerves can be severed, and the brain still lives, just as parts of the brain can be removed without destroying the nerves. (*PN*, 365 [§354 *Addition*]; *Werke* 9:446.)

²⁹⁶ *PN*, 364 (§354 *Addition*); *Werke* 9:444.

internal states urges the animal into either the process of assimilation or sexual relation, which Hegel thinks involves in either case a form of self-regeneration.

Whether regarding the viscera or to the entire body, sensibility can be considered in general as unified and centralized sensitivity. Nevertheless, even though Hegel speaks of the head as the center of the *physiology* of sensibility, it is crucial to note that the subject or agent of the function of sensibility is neither the head, nor brain, nor any other organ. The brain, sensory cortex, or any other ultimate member is still a part of the physiological process that communicates modifications and is being acted upon by other members external to itself. The real center is the feeling self that encompasses this field of sensitivity in its entirety and relates to it without any intermediate or external means.

Any such spatially extended thing or bodily member is unable to exhibit the self-relation that is involved in feeling. It is true that the body allocates specific locations to register and unify stimuli associated with certain kinds of feelings and sensations. However, any bodily member lacks the sort of reflexivity that would allow it to relate to its own determination as a whole and feel itself. An extended being that does not possess centralized subjectivity cannot directly relate to itself in such a way that the relata are immediately one and the same.

Admittedly, whether an animal or not, the relations of a living thing as well as its organic members should not be considered as if they are on a par with mechanical and chemical relations. From the very beginning, we have been arguing that all living things are self-relating and self-determining first of all owing to their organic unity. In the logical examination, we have explained how an organic unity involves self-relation by virtue of the all-pervading, universal identity that is constituted in and through the internally teleological process that upholds itself. In distinction to an indifferent relation between the whole and its parts, the process of complementary organs amounts to a universal unity that is in relation to itself through its

constitutive particulars. However, we argued that this unity is still implicit in the sense that whatever determinacy it has by virtue of being a unity belongs to the totality of those members that are still external to one another. Members of an organic unity can be sensitive and responsive while those local responses they give are mediated by the ends of the living organism. In this sense, in each of their determination or responses, it is possible to speak of a reference to their constitutive identity or goals. Yet again, this determinacy belongs to the totality of the process, rather than to a unitary self that is in immediate communion with its constitutive particulars. An organic unity as such does not have or require such an encompassing, centralized self that can organize and regulate its functioning.²⁹⁷

Insofar as they are self-sustaining unities, one can speak of self-relating individuals. In this sense, even the individual systems of the body are to some extent self-relating. But such self-relations involve spatially extended parts or members relating to other members or parts, and are therefore not analogous to reflexivity in feeling. As any other organic system, the nervous system is composed of sensitive and responsive units called cells. Although neurons, which are the specific cells of the nervous system, communicate stimuli and commands, they are more than transistors in an electronic circuit of a machine. Their activity cannot merely be conceived in terms of input/output models that follow a fixed mapping procedure predetermined independently of the interaction of these physiological components.²⁹⁸ Even

²⁹⁷ See Winfield, *The Living Mind*, 55: "No organ directly realizes as its end the unity of the entire organism. Instead of aiming at this encompassing concrete universal, each aims at performing the specific operation to which it is bound by its particular physiology. Because the unity of the whole consists in and is continually maintained by the complementary particular functioning of its organs, this unity is nothing but their process. No further activity or factor mediates between the whole and its organs. Consequently, the organism, simply qua organic unity, contains no reflexive activity where it acts upon itself as a whole, ordering itself from a central agency whose function concerns the organism in its entirety, rather than a particular operation in a particular part."

²⁹⁸ For similar thoughts and a decent account of the inadequacy of input/output models to explain autonomous systems, see Thompson, *Mind in Life*, Chapter Three. "Systems described as autonomous in this sense abound throughout the living world—single cells, microbial communities, nervous systems,

though nerve impulses depend on the shifts in electrical charge distributions, neuron activity is always already determined and patterned with respect to the individual and species history of the organism. Neurons, as well as other excitable cells such as muscle or certain plant cells, exhibit the minimal form of selective organic receptivity, which we have been referring to as sensitivity, even though this receptivity requires mechanical and electrochemical means. Yet what neurons ultimately do is to transmit signals from one of their parts to the other. With respect to neither a single moment of the physiological process that facilitates feeling or sensation, nor the entirety of the *physiological process*, which consists of a series of such transmissions, can we speak of a concrete and immediate self-relation or reflexivity. In contrast, forms of sensibility allow a living individual to have a determinacy of a different kind which pertains to *itself* as a subject even though that determinate content does not belong to any of its members in particular. Although the subject is thus inwardly determined thanks to its objective being that enables its sensibility, that inward determinacy is on a different level than corporeal determinacy.

The feeling soul, or the mind in its minimal realization, is not an organ next to other organs, which sustain one another through their operations. Accordingly, it is not an extension of the nervous system either. In the presence of a network that unifies the field of organic receptivity, it is rather the self-referring activity that presides over the complementary workings of these organs, and relate to this its embodiment as a unitary self. When the unitary self relates to its bodily modifications in such a way that it can feel itself, it does not do so by some other means or externally, but immediately and immanently.

immune systems, multicellular organisms, ecosystems, and so on. Such systems need to be seen as sources of their own activity, specifying their own domains of interaction, not as transducers or functions for converting input instructions into output products." Ibid., 46.

The animal is capable of such immediate and immanent relation to its embodiment by virtue of its ideal character. This ideal character lies at the basis of Hegel's account of mind-body relation. Those who think that this relation is an incomprehensible mystery, Hegel says, already start with an assumption that sets them over against each another as absolutely independent and mutually impenetrable entities. Once they are taken for granted as absolutely disparate, there is no way to successfully account for their connection. The early modern philosophers, including Descartes, Spinoza, and Leibniz, all had to enlist God in order to bridge this chasm, and did so to no avail.²⁹⁹

The ideal character, by contrast, emphasizes the immanent connection between the mind and the body by construing their relation not as one of independent and indifferent particulars but as the universal encompassing its particulars.³⁰⁰ The animal subject is conceptually determined in that it exhibits the character of the concept in which the universal incorporates its particulars and is in rapport with them. But given its ideal character, those particulars are nothing but the constituents of the subject's own objectivity. The feeling self is a universal insofar as it retains its identity in the face of a variety of feelings and sensations that it has. That is to say, while the animal is not any particular feeling, it is the realization of all those particular feelings in one self-differentiating subject. The feeling self is the unity of a manifold of sensations and feelings both in the sense that it unifies a field of sensibility by simultaneously registering this manifold, and that it is a temporal series of a unitary sentience. On the other hand, situated in a material world, these feelings and sensations of the animal subject have to have particular corporeal determinations so as to facilitate appropriate responsiveness in the face of an objective world. This totality of corporeality which can be excited by the external

²⁹⁹ *PM*, 30 (§389 Remark), *Werke* 10:44–45.

³⁰⁰ *Werke* 10:48 (§389 Zusatz): "über die Besonderheit übergreifende wahrhaft Allgemeine."

world and corporealize the feelings or inner determinations of the animal subject is the immediate objectivity with which the animal is in immanent communion.³⁰¹ Thus the body is the particularized existence of the feeling self to the extent that it is this subject's own determinate and objective existence.

4.2.3. The Structure of Organic Irritability

The second constitutive faculty of animal life is irritability, that is, its capacity to respond to internal or external stimuli in accordance with its self-perpetuation. While the main element of the system of sensibility is the nerve, in Hegel's examination, the focal point of the system of irritability is the blood. Hegel argues that, like sensibility, irritability is also realized by means of three interconnecting substructures which has the thorax as their center. Again with reference to contemporary terminology, the division can be presented as (i) the muscular system, (ii) blood and its pulmonary and portal circulation, (iii) the heart and the systemic circulation that originates from it.

Hegel describes the first substructure as the transformation of its organic receptivity into reactivity, and is mainly carried out by the muscles of the body. Any sort of organic response in the world of objectivity requires the movement of bodily members, and thus presupposes motility, which is realized by musculature. In this regard, unlike the skeletal system's relation to sensibility, the muscular system is immediately associated with the function of irritability. Nevertheless, the constituents of the muscular system cannot uphold themselves without some sort of a support structure, which is provided by the skeletal system itself. Owing to the ensuing musculoskeletal system, the animal is not only not a soup of organelles kept together by a membrane, but also in distinction to the plant, it has an internally determinate structure that allows it to move itself *en masse*. Innervated by motor neurons, muscles bound

³⁰¹ *PM*, 72–73 (§401); *Werke* 10:100–01.

up with the skeletal system allow the body to move itself and engage in metabolic relationship with the outer world, the details of which are going to be examined in the next chapter.

But muscles are also entailed by the other structures of irritability, namely, the pulmonary and circulatory systems, without which practical relation with the outside would not be perpetuated.³⁰² While the diaphragm is the muscle that enables inhalation, the heart is itself a muscular organ, just as are trachea, bronchi, and blood vessels. By recourse to empirical evidence from his time, Hegel emphasizes the involuntary nature of cardiac contractility. This spontaneous yet regular contraction of the heart perpetuates circulation of the blood which Hegel takes as the universal substance of the animal life in that it generates and nourishes bodily members. Blood is thus the symbol of life as it is the universal's active differentiation into objective particulars that sustain it. Because pulsation is self-excited, it is for Hegel the "living self-movement," and since this universal material that differentiates itself into organs is the embodiment of this self-movement, it "can only be" a continuously circulating "*fluid*, the living *blood*."³⁰³

Although with respect to the animal as a whole, irritability amounts to its motile responsiveness, with regard to its organic unity, it corresponds to its moment of self-differentiation. The animal is self-irritating through the blood in the sense that it differentiates its inner constitution through the autonomic circulation of the blood. Yet the circulation is perpetual and from such differentiation, it comes back to its unity, which Hegel calls the

³⁰² Hegel's transition from the muscular system to the pulmonary and circular systems, which he gives in the additional notes to §354 is obscure: "Muscular movement is the elastic irritability which, a moment of the whole, posits a peculiar, self-dividing movement which arrests the circulatory flow and, as a self-contained movement, posits and generates from within itself a fire-process which overcomes (*aufhebt*) this inert persistence. This dissolution of this persistence is the pulmonary system, the true, ideal process with the outer world of inorganic Nature." *PN*, 366 (§354 Addition); *Werke* 9:447.

³⁰³ *PN*, 360 (§354); *Werke* 9:439. Also in the addition to the same paragraph: "As absolute motion, the natural living self, process itself, the blood is not moved but *is* motion." *PN*, 369; *Werke* 9:450.

digestion. Although circulation is autonomic and self-perpetuated, owing to muscle contraction and relaxation, the nutritive process of the animal goes beyond an uninterrupted chemiosmotic process of the plant, and becomes subordinated to the animal's control. Hegel thinks that the pulsation and the ensuing inner circulation of the blood in the animal creates an immanent individual time which is to some extent susceptible to alteration in accordance with its own feelings, as well as with the intra-visceral relations. Thus, although respiration and circulation together reiterate the nutritive process of the vegetative life, the rate of the process in the animal life depends as much on the state of the animal subject as on the surrounding conditions.

4.2.4. The Structure of Self-production

The third fundamental function of the animal is its reproductivity, which in general signifies its ability to reproduce its identity in objectivity. But reproductivity with respect to the animal *organism* and its internal process is its self-preservation and maintenance. It is in this sense that Hegel ties the reproductive function with digestion, similar to the way he associates digestion with the process of reproduction of new formations in the plant. The difference here is the generation of viscera instead of further individual members. Although reproduction at this level is the system of digestion, unlike sensibility and irritability, it is not articulated into a system that has an integrated structure such as that of nerves or blood or of skeleton or musculature. On the other hand, together with the end of irritability, we are already in the domain of digestion or self-reproduction. Because the systemic circulation of the blood by means of arteries and veins is not only the result but also the beginning of the internal process, it already implies the animal self-reproduction. But although the blood is the undifferentiated unity of organs which conveys what each of them needs to develop and sustain itself, blood itself is produced through the workings of these same organs. And this production has structural

aspects that are not exhausted by the nervous or circulatory systems. As Hegel lays it out, the self-reproductive structure, whose center is the abdomen, consists of (i) the skin, (2) the accessory organs of digestion, and (3) the gastrointestinal tract.

The skin is the outer layer of the organism which protects the skeletomuscular system and internal organs from the outer world. Since it is always in contact with the outer world, it is determinative of the field of outer sensibility that informs the organism of its state vis-à-vis that world, although without necessarily making a conscious distinction of the inner and the outer. Similarly, the skin exhibits irritability in various modes and in response to either internal bodily states or feelings or external stimulations. Perhaps more importantly, Hegel indicates that certain animals which are lacking further internal differentiation carry out most of their functions including sensibility, irritability, and nutrition through an elemental structure of the skin and cellular tissue, and in the end, generate nothing but this very basic structure.

This seems to imply that this elemental structure of skin, the cellular tissue, lies at the basis of the digestive system of the animal. Digestion is a part of the animal's assimilation process, which involves an engagement with the outer world. The skin is where this process begins. It plays a role in respiration, which can be thought as the vegetative aspect of assimilation. But further, it is where the organism opens up itself to the outer world as both respiration and digestion presuppose orifices specialized for relevant intake.

The skin is also continuous with further members such as claws and teeth, which mechanically work on what is being taken in before the visceral, or more precisely the gastrointestinal, digestion starts. The accessory organs of digestion, or what Hegel calls the system of glands including saliva, bile, gastric glands and the pancreas are the ones that start the chemical phase of digestion. Yet the innermost structure of the internal process of digestion takes place in the stomach and intestines, which are the major organs of the gastrointestinal

tract. In these internal organs, what is outer becomes transformed into inner, that is, into the universality of the animal, i.e., the animal blood. Hegel indicates that the simplest kind of animal is nothing much more than an intestinal canal as the regeneration of the animal takes place mainly in the intestines.³⁰⁴

4.2.5. The Unity of the Structural Process

Hegel repeats that these substructures and the systems they realize are not independent, and can only function in cooperation. Besides, if we consider them with respect to their centers as Hegel lays them out, we would see that each system involves the elements of the rest, as the head contains veins and glands, the thorax contains nerves and glands, or the abdomen houses nerves and veins.³⁰⁵ In this sense, each so called center is itself a totality of different functions and structures.

Although their interconnected totality comprises a concrete unified whole, Hegel says that the animal's internal unity, or its structural process in its totality, finds its real unifying point and essential nature in feeling or sentience. The soul, or the feeling, sentient subject is the unity and activity of this totality. In and through this structural process which sustains organs, unifies their field of sensitivity, and forms and informs its responsiveness, the animal is an immediate self-feeling. In the plant, the organic activity ends up with the production of new and quasi-independent members, whereas the structure of the animal is preserved in the perpetual organic process of renewal that begets its universality, the feeling self as its fruit.

This self-feeling life, the soul, whose many internally and externally instigated responses are a function of its feelings, is the minimal realization of the mind. It is the minimal realization in the sense that in feeling, the mind is in immediate connection with itself. As an individual, it is

³⁰⁴ *PN*, 372 (§354 *Zusatz*); *Werke* 9:454.

³⁰⁵ *PN*, 373–74 (§355 *Addition*); *Werke* 9:455–56.

distinct from any one of its particular feelings. However, the feeling soul is neither aware of such distinction, nor it can distance itself from its feelings and then relate to them. It does not make any reference to whatever instigates its particular feelings either. Accordingly, it does not refer to its body, nor does it distinguish itself from its embodiment.

The role and necessity of sentience for the animal can only be adequately comprehended in connection with the way it bridges the animal's internal and external processes. But before our examination of the differences between the plant's and animal's external process, it is worthwhile to briefly recapitulate Hegel's account of the internal process of the animal organism, particularly to attain a coherent understanding of the internal structure of the sentient subject, given the briefness of the main paragraphs of the encyclopedia and the unsystematic nature of Hegel's additions.

With the section on structure, Hegel is trying to show that the animal subjectivity is built upon a physiological structure, whereas the unity and activity that it realizes is necessary to sustain this structure. This structure is a manifold. We have on the one hand a musculoskeletal system, that is, a support structure which provides the animal with a stable yet sufficiently elastic framework. This framework upholds the inner structure that nourishes and sustains bodily members including this very framework. It also protects the organs of the nervous system responsible for the centralized receptivity of the animal. Finally, the musculoskeletal framework is the means for animal motility through which the animal can respond to internally or externally instigated stimuli by moving itself *en masse*. The inner structure, or the viscera, is mainly the circulatory system supported by respiration and digestion. Both respiration and digestion have outward functions that depend on the elements of the musculoskeletal system, for the most part on smooth muscles, to acquire what circulation needs to replenish itself. On the flip side, beside its nourishing function, the circulatory system is there to connect the

respiratory system with the digestive system, and it does so in part owing to the contraction and relaxation of the muscular tissue of the heart and blood vessels.

The operations of respiration and digestion can be affected by external conditions, and in order to sustain itself, the animal responds to those conditions in various ways, including first and foremost changing the pace of its internal circulation and respiration. These two major responses are also dependent on the modifications of one another, such as shifts in blood levels of carbon dioxide and oxygen. In order for these internal systemic cycles to be coordinated with one another, they should be able to communicate those modifications to one another. In the animal, this is achieved by the mediation of the nervous system, and mostly, by the autonomic nervous system, which is receptive and duly responsive to such modifications. Hegel calls attention to this autonomous yet centralized working of the viscera, which has effects on various functions including cardiac contractility, vasomotor actions, respiration rate, gastrointestinal motility, and several reflex actions that help the organism maintain the dynamic equilibrium of its internal process. However, likely because of the limits of the empirical biology of his day, he seems to emphasize the role of the system of ganglia at the expense of the role of brain structures such as the hypothalamus and of the endocrine system in general.

With its ability to function without the interference of feeling, the internal process of the animal organism amounts to its vegetative life. The animal does not have to be conscious, feeling, or awake for these processes to continue. Nevertheless, given the division of internal functions, even this vegetative process of the animal in its entirety requires and exhibits centralization through the autonomic nervous system. Thus, even when the animal is not awake or feeling, it has internal means to centrally coordinate its different functions. However, this does not mean that these internal processes can only be controlled and influenced by the autonomic nervous system. While feelings realized through the central nervous system can have

various effects on the functioning of these systems, a centralized responsivity through the musculoskeletal system allows for voluntary changes in activities such as breathing.

Although the respiratory and digestive systems both have outward references and activities, respiration by itself does rarely require sentience and voluntary interference. On the other hand, the perpetuation of both respiration and blood circulation hinges on digestive process, which in turn requires an outward activity that obtains the external material to be digested. The digestive system is not able to acquire the needs of the organism without the mediation of sensation, feeling, and motility. Similarly, without these functions, the viscera coordinated by the autonomic nervous system cannot always facilitate on its own account the appropriate responses to biospherical changes that would harm the animal. The animal will always be forced by its needs to actively interact with its environment and devise ways to overpower it.

To illustrate, although the digestive process is able to rest on the body's own resources for a while, it ultimately depends on acquiring additional supplies from without. The animal metabolism requires both sensory means to be informed of the object that would satisfy this sort of a need, and motor means to capture and take hold of it. These two features necessitate, first of all, a centralized self that has control over its body, which in turn presupposes the integration of locally sensitive parts, as well as parts through which responses will be exhibited as a unified self. Second, to actually perform these practical endeavors, the animal must also have a specific external structure separate and characteristically different from the viscera. This structure has to involve sense organs for sensation, appendages for taking hold of the object of desire, as well as a certain body shape that would render the pursuit of the needed object in an effective way, depending on the natures of the species and their prey. The outward functions of sensation and motility are coordinated through the centralized feeling of the animal subject.

This can be considered as the coupling of sensibility and irritability that plays the main role in metabolism. However, the internal structure of sensibility also serves as the mediator between this outward activity and the internal process. In other words, through the centralized sentience, the sensorimotor activity and coupling is also connected to visceral activity. Feelings such as hunger issue from within the viscera and set the body in motion even in the absence of an immediate sensation of the object of need. Correspondingly, the internal network adjusts itself to external modifications of body parts, as the feeling of pain originating from, say, the appendages is countered by visceral adjustments,³⁰⁶ or as the perception of certain objects trigger feelings or emotions that initiate bodily fight-or-flight responses.

In this regard, even though the animal organism achieves a genuine differentiation of organs in comparison with the plant organism, the organic unity of the former goes beyond organic complementarity that maintain and produce its members. On the one hand, it is the coordinated workings of different *systems* with differing functions, all of which are bound together with a physiological structure that realizes a centralized control and regulation. On the other hand, it is the unity of this sentient subjectivity, which regulates the cooperation of the internal and external activities that sustain one another. In order to conceive of the difference and necessity of this higher unity of the internal and the external, we now need to proceed to a comparison of the plant and animal metabolism.

³⁰⁶ It is however, questionable, whether feeling is *necessary* for adjustments that do not require relocation of body or its appendages.

CHAPTER FIVE

THE ASSIMILATION PROCESS OF THE PLANT AND THE ANIMAL

In the *Philosophy of Nature*, Hegel explains the assimilation process of both the plant and the animal as an outward process through which the parts of the inorganic world are appropriated into the living thing's own being. Whether plant or animal, the living thing strives for self-maintenance in face of an external world. To put it in Hegelian terms, it achieves this end not only by not being negated by that world, but also by sublating it and demonstrating itself as the power over it. In this chapter, we will elucidate what all this means in the context of the philosophy of nature, and examine how Hegel differentiates between the assimilation process of the plant and the animal.

As we try to illuminate the process of assimilation expressed in Hegelian terminology, we can also consider his disuse of concepts that one would expect to see in an account of assimilation. Hegel thinks that the assimilation of the inorganic world has different forms, although the most prominent one has to do with the consumption of nutrients. The totality of the processes that lead to the ingestion and digestion of these nutrients, and the ensuing synthesis of organic material, derivation of energy, and extraction of organic waste can loosely be called metabolism. However, Hegel's explication of the metabolic process is by no means centered around familiar terms such as the exchange of materials or energy requirements, which are widely used in accounts of the living thing's vital relationship to its environment. Before we go on to examine Hegel's account of the differences between the plant and animal metabolism, we can briefly discuss how his conception of the metabolic activity in terms of the

continuous appropriation of otherness can be reconciled with the idea of continuous material exchange and energy consumption.

Hegel's account of the assimilation process is guided by the self-determining character of the living thing that is nevertheless susceptible to external determination. Every living thing is a finite entity situated in a world of objects and other living things. Nothing that has a corporeal being is exempt from interaction with the surrounding world. But the living thing is not just passively exposed to external influence. It is active and its life hinges on its ability to distinguish itself from the rest of the world, and uphold the identity it constitutes in and through its activity. But because it is still pitted against an objective world, this activity does not consist in an absolutely isolated internal process that comprises a dynamic equilibrium of complementary members. Even though the living matter is not determined independently of its individual and internally purposive nature, it is still subject to mechanical and chemical influences.

Therefore, in order to sustain itself, the living thing must be able to protect its integrity from the incursions of the mechanical-chemical world. Moving masses impact one another in ways that can impair or totally destroy a living thing's bodily integrity. Similarly, the organic constitution involves teleologically ordained chemicals which can still get into chemical reactions with chemicals in a way that would perturb its functioning beyond repair. The living thing must be capable of addressing these factors from within its own resources. However, because the organism is always situated in a world of objects, it does not develop its means to deal with the external world separately or subsequently. Its organic unity is already an embodied, individual, and self-sustaining process of processes, and therefore, it always has an externality that is susceptible to objective influence. This living body is not an external addition to its subjectivity, but that which realizes it regardless of the level of its realization. Accordingly, the externality of the living thing cannot be given to it in some remote space devoid of mechanical and chemical

objects. Rather, the living thing constitutes itself as a subject-object within the same world and by incorporating this world's objective processes and its matter. Yet it produces itself as a system that has complementary, if not coinciding, internal and external functions that maintain it as a unity and distinguish it from what is outside.

The internal process is a system of collaborating organs, each of which function for the maintenance of the rest. The continuation of the system depends on a dynamic exchange among these organs, the totality of which amounts to the unification of their multiplicity. This unification is always in the making, and therefore, the living individual is always a self-renewing process. But because the living individual is always subject to external influence, this self-renewing activity cannot be carried out independently of its outward activity. That is to say, its outward activity must be a constituent of its self-renewing activity in its entirety. Furthermore, because this self-renewing activity is *from the very beginning* one that constitutes a material body, it continuously derives material from without. Hence the inorganic world is the living thing's "*external* condition and material."³⁰⁷

Thus, the processes of internal formation and self-preservation over against nature are bound together. The living thing as a whole is an active unity that thwarts the incursion of the inorganic world by means of its self-organized body, which continuously reconstitutes itself through an incorporation of materials from the same inorganic world. It can resist the external world; but it can also appropriate it into its body and manipulate it to its own ends. This is how the living thing determines itself in determining the other, and explains why its subjectivity demonstrates the living thing's power of determination over objectivity.

The nature of the metabolic appropriation or material exchange varies according to the form of the metabolizing life. The life of the plant consists in the continuous formation of new

³⁰⁷ PN, 380; (§357); *Werke* 9:464.

members. Accordingly, its internal process mainly involves the formation and differentiation of these members from the homogeneous plant sap. But as we will see in detail, the exchange of materials, which amounts to the transformation of inorganic materials into the matter of life and excretion of the waste products, takes place almost immediately in those members. Thus, the internal and external processes largely coincide in the plant life.

On the other hand, because animals retain a specific shape, and do not grow indefinitely, they convert materials not only for growth, but also for continuous replacement of the existing cells and maintenance of organs throughout their life span. Indeed, on the individual level, the animal life can be said to consist in the ability to renew its collaborating members, roughly speaking, before their deterioration leads to the cessation of fundamental functions. But unlike the plant, the animal has to make an effort to have access to its need and satisfactions, as we will discuss in detail. Apart from its advantages for the population or the species from the evolutionary point of view, one reason that makes death and aging an ever-present risk for the animal is that it can repair and regenerate itself only by putting effort into consuming that which can mechanically and chemically damage it. Apparently, the more and older an organism grows, the less likely it becomes to retain an equilibrium between regeneration and loss of members. Because of what Jonas calls the precarious nature of this pursuit,³⁰⁸ in addition to the fact that the animal also has to renew the organs specialized for its external relationship, it is subject to more intense confrontation with the outer world, just as it would require more energy to derive from it.

Compared to the absence of any emphasis on energy consumption in Hegel's text, it is still easier to draw a parallel between Hegel's idea of appropriation with the exchange of materials as is commonly employed in accounts of life. One might think that, if nothing else, the

³⁰⁸ Jonas, *The Phenomenon of Life*, 99–107.

animal's need for surplus energy for its specifically outward and non-vegetative metabolic activity indicates why Hegel had to bring the concept of energy into his explication. One simple reason why he does not do so is that the term 'energy' as understood today was not prevalent in his time. Nonetheless, what is more important is whether this absence makes a substantial difference.

Let us first consider plants. The metabolic process of the plant could be read in terms of an energy cycle. Even if the plant cannot feel its needs, it does need energy. Thanks to its immediate access to resources, the plant converts inorganic matter into energy which it mainly uses for the formation of new members or adding to the size of the existing ones, which in turn continue to transform those same kind of inorganic materials. Admittedly, plants can store "energy," but they do so in the form of their own living matter which they synthesize by appropriating the inorganic world. Thus, speaking of energy does not add much to the concept of plant assimilation in its broadest terms, which would explain why Hegel does not need to mention energy needs and consumption in his account of plant metabolism.³⁰⁹

By contrast, animals require energy for a number of functions other than growth or regeneration, above all for all kinds of motility and mental activity, for the digestion of their source of energy, and for maintaining a stable bodily temperature. When abstracted from the sorts of changes it is used to bring about, energy in general is a transferrable capacity, if not only a conserved quantity that has pragmatic value for mathematical equations that are used to calculate transformations. While it is difficult to define energy as it has several different forms, the fact that it expresses the convertibility between those forms is the very reason underlying its use. What is called 'food energy' entails its convertibility into heat or mechanical energy.

³⁰⁹ Nonetheless, Hegel does say that the plant derives its "*Befeuering und Bekräftigung*" which Miller translates as "specific energy" and "vigour" from light. *PN*, 336 (§347); *Werke* 9:412.

This seems to be more or less what Hegel has in mind when he speaks of the generation of heat in the body. The animal, Hegel says, in consuming itself, that is, its own metabolic products, perpetually generates heat.³¹⁰ In one sense, the internal process, the production of the blood, is this cyclical activity of generating heat by breaking down organic matter. The heat is both potentiality and actuality of the organism. It is actuality in that the activity that perpetually generates it is that which maintains an active posture and distinct bodily temperature. It is potentiality in that it can be used for regeneration, or converted to motility in the search for further food, for the avoidance of danger, or for other zoological ends.³¹¹

Accordingly, even if Hegel is not very explicit, his answer to the question of the surplus energy that the animal needs for its specialized outward process lies in his emphasis on the fact that the animal has to feed on individual and organic matter. Whether the animal feeds on plants or herbivores, it assimilates a power greater than that of the inorganic world, a capacity that has already demonstrated itself as organic growth. The appropriation of this power provides the animal with the capacity to engage in those outward metabolic activities that precede digestion.³¹²

³¹⁰ PN, 355 (§351 Addition); *Werke* 9:434.

³¹¹ Nevertheless, the animal's assimilation of the food is still fundamentally different from the combustion process of a fuel-operated machine. Unlike what goes in a machine, which is assembled externally and independently of its combustion process, food itself becomes the very "machine" that consumes itself.

³¹² PN, 372 (§354 Addition); *Werke* 9:454. In his construal of Hegel's account of life, Dieter Wandschneider lays out the connections we have been making between distinctive animal faculties with respect to the animal's need to metabolize organic matter:

Higher levels mean an *increase in complexity* and thus, in principle, require more complex organisms. Plants, for example, are *autotrophic*, i.e. they are in the position to produce organic substance *itself* out of the materials dissolved in the ground at their locations by converting these into system-like organismic substances. By contrast, animals are *heterotrophic*, i.e. they require organic substance which is produced by *other* living organisms, e.g. plants. This at first seemingly inessential fact nevertheless has decisive consequences for the organization of animals, a point to which Hegel also alluded ([*Werke*] 9.430–1): not only must an animal be equipped with an appropriate set of teeth and digestive system for the intake and processing of nourishment; it must above all and from the outset

Yet in keeping with the previous chapter, to understand the differences between the metabolic processes of the plant and the animal, it is best to focus on the extent to which each form of life achieves subjectivity. The plant is a unity, but only by virtue of a totality that comprises it, and not a unity that presides over its constituent totality. In other words, it is limited to the unity of an internal process that is not regulated by an overarching subjectivity. The plant demonstrates a self-differentiating universality whose particular members are sustained by an all-encompassing process. But as Hegel puts it, this universality is submerged in its particulars in such a way that it is incapable of distinguishing itself from its organic unity as its encompassing self.³¹³ Even in cases in which all the particular members are generated from within the internal process of the plant, its universality is at most a pervasive and common identity that still cannot act upon its members or itself in its entirety as a unitary subject. Because it cannot act upon itself or its members, it cannot “freely determine its place, i.e. *move from the spot*.”³¹⁴ But if a self-sustaining living thing is not animated, then it must be able to maintain itself on the spot, without having to search, find, or approach to its sources of nourishment. Hence the plant nutrition is “not an interrupted process but a continuous flow,”³¹⁵ the immediate nature of which is bound up with the plant’s internal structure, and explains why it does not have or require mindedness that pertain to the animal form of life.

be able to find such nourishment. To this end, the animal must be able to move about and orient itself in its environment. And this requires an *organization of the senses*, a *nervous system* and – in principle – a central agent for guiding and controlling, a *brain*; both for the processing of sense data, as well as for coordinating and monitoring vital external action. (“Nature of Kant, Schelling and Hegel,” *The Routledge Companion to Nineteenth Century Philosophy*, ed. Dean Moyar [New York: Routledge, 2010], 93.)

³¹³ PN, 305 (§344); *Werke* 9:373.

³¹⁴ PN, 305 (§344); *Werke* 9:373.

³¹⁵ PN, 305 (§344); *Werke* 9:373.

The animal, by contrast, cannot survive solely on inorganic resources contiguous with it. It has to work for its food, and accordingly, it must have the means as well as the motivation to search, find, and acquire it, both of which require a unitary subjectivity. Correspondingly, whereas the metabolic process of the plant consists in direct contact with its immediate surroundings, whereby the inorganic resources are absorbed by members through chemiosmotic processes without being mediated by an intermediary system of digestion, the animal has internally differentiated viscera that makes it possible for it to internalize its process of assimilation, and liberate it from an attachment to immediate surroundings, while rendering it dependent on already synthesized inorganic materials to compensate for its additional needs.

5.1. THE PLANT'S PROCESS OF ASSIMILATION

Plant life consists in a perpetual generation of new formations, for which external resources are required. The plant's conversion of these external materials into further plant parts is its process of assimilation. Whether rooted in the ground, or freely floating on water surface, this process is completely dependent on the availability of resources in the plant's immediate surroundings. The peculiar way in which the plant relates to these resources distinguishes plant life not only from the animal life, but also from the inorganic world it subsumes to bring itself forth as new formations. The result of the process, on the other hand, reiterates how the three fundamental functions of life coincide in the plant in contrast with their separation in the animal.

5.1.1. The Plant's Relation to Its Needs

The essential resources for vegetative life are all inorganic materials, such as light, water, carbon dioxide, and oxygen, although Hegel calls them universal elements in general, and classifies them under light, air, and water. These elements are universal rather than individual because, as such, they are free-floating materials unincorporated by any individual object, and

have an indeterminacy to the extent that they are not individuated by specific characteristics that pertain to individual objects, such as color, odor, or taste.³¹⁶ Furthermore, they are universal in the sense that any particular oxygen, carbon dioxide, or water molecule or light ray or photon is indistinguishable from any other particular of its own kind. That is to say, they lack the distinguishing features that would individuate them.

The kind of relation that the plant has to these materials is for Hegel one of the distinctive features of the plant's metabolic process. As long as these inorganic resources are available in the environment and the relevant members of the plant are in suitable physiological condition, the phases of plant nutrition undergo continuously and rather automatically. This is why Hegel says that the plant "does not take sips of water," and it is rather air and water that perpetually "acts" on the plant.³¹⁷ The vegetative process is simply contingent on immediate contact with the environment that contains these resources, which are then absorbed by corresponding plant parts through chemiosmotic processes, and incorporated into the plant's chemical cycles by means of specific enzymes.

Nevertheless it would be a mistake to think that the plant's assimilation processes are entirely mechanical and chemical. For one, the cell wall and the cell membrane are not semipermeable or selectively permeable by accident; they are organic members that are developed from within the plant organism in accordance with an internal teleological process that strives for its own continuation. That is, the plant's relationship with external chemicals is not merely a matter of external contingency. The plant assimilation is mainly characterized by the photosynthetic process which involves specifically developed structures and catalysts. For instance, the plant obtains the carbon dioxide it needs for carbon fixation through tiny pores on

³¹⁶ Many think that carbon dioxide can be considered to taste sour.

³¹⁷ *PN*, 308 (§344 Addition); *Werke* 9:377.

the plant members called stomata, which are also mentioned in Hegel's text as the organs of the plant's relation with the air.³¹⁸ These pores are surrounded by guard cells, and together, they form the structure called the stomatal complex which regulates the gas exchange with the environment. These structures are sensitive to modifications in the environment, such as shifts in light intensity, carbon dioxide and water concentration. The plant can regulate the in-and-outflow of essential gases and water using the guard cells surrounding stomata, which can open and close those pores due to changes in their volumes. Although the changes in pressures or volumes of these cells can simply be explained in terms of osmotic or turgor pressures, the entire mechanism of sensitivity that modulates the opening and closure of stomata in response to environmental changes is yet to be fully explored.³¹⁹ But regardless of the details of the undergoing mechanical and chemical processes, it is clear that the stomatal function is determined by the end of the plant and in accordance with its specific nature. Even though carbon dioxide constitutes only a tiny fraction of the atmosphere, the plant is capable of receiving it among all the rest and transforming its constituent carbon into its own matter, by utilizing what mechanism and chemism have to offer. This should be why Hegel states that the plant's relation to air cannot be reduced to mechanism and chemism.³²⁰ Although it involves these processes and produces chemical products, the plant itself is not a chemical outcome of independently reacting chemicals. Unlike compounding or disintegrating chemicals, the plant is

³¹⁸ *PN*, 340 (§347 Addition); *Werke* 9:416.

³¹⁹ Wagner L. Araújo, Alisdair R. Fernie, and Adriano Nunes-Nesi, "Control of Stomatal Aperture," *Plant Signaling & Behavior* 6, no. 9 (September 1, 2011): Araújo, Wagner L, Alisdair R Fernie, and Adriano Nunes-Nesi, 1305–1311.

³²⁰ "The process with the air, therefore, must certainly not be represented as an appropriation by the plant of something already formed which it increases only mechanically. Such a mechanical representation is altogether to be rejected; what occurs is a complete transformation, an operation accomplished by the majesty of the living organism, for organic life is just this power over the inorganic to transform it." *PN*, 339 (§347 Addition); *Werke* 9:416.

rather a unity that incorporates chemical cycles and appropriates chemicals into its own matter in order to preserve itself.

Hegel expresses similar thoughts when he speaks about the plant's relation to light. Light is that which provides the plant with its vital power or energy which it requires for the growth of its parts. No doubt, chemical and mechanical processes make the chlorophyll's absorption of photons possible. But he argues that in its relationship to light, the plant does not merely behave chemically. It rather appropriates the light into itself, in accordance with its own nature.³²¹ As is indicated above, Hegel describes light as the plant's external self that governs its behavior. But plant parts, mainly leaves, are themselves capable of growing and being directed towards the light source, which we call the plant's tropic response. Plant parts are stimulated, and as explained above, stimulation as Hegel uses the term can only pertain to organic matter whose sensitivity is a function of its life-process.

Hegel adds that the plant does not only subordinate light into its end of self-perpetuation. It also uses light to activate its distinctive aromatic and colorful nature. Thus in and through its interaction with its environment, the plant organism develops and individuates its identity. Here he makes an analogy with vision. Also enabled by light, vision provides the animal with its inward determinacy. It is one of the ways in which the animal assimilates its environment and puts it into its own form, although in this form the animal is still reflecting its other in its own way. Similarly, in its absorption of light, the plant reflects light in its own form. Both examples involve a self-relation which Hegel designates as "for-itself," in that plants and animals constitute themselves as independent beings over against their other.³²² The difference

³²¹ To quote his words, "verhält sie sich aber zugleich nicht chemisch, sondern nimmt dasselbe in sich auf und hat es in sich, wie beim Sehen." *PN*, 338 (§347 *Addition*); *Werke* 9:414.

³²² *PN*, 338 (§347 *Addition*); *Werke* 9:414.

is that in the animal this individual determinacy belongs to a unitary subject. But the color or the aroma of the plant is neither explicit to the plant itself, nor a determinacy that pertains to the plant as a whole.

The plant is not only sensitive to gases and light, but also to water, without which no plant on the planet earth can survive. While leaves are the main organs that carry out the plant's relation to air and light, roots are mainly responsible for water absorption, and tend to grow and bend toward water. This phenomenon called root hydrotropism is the root's response to its sensitivity to water's presence. Although the mechanism of the coupling of this water sensitivity and root growth is not fully understood, the root cap is believed to contain sensitive cells that help determine the direction of root growth. Normally, roots grow down in accordance with gravity. But in the shortage of water, plant roots can respond by restraining gravitropism in favor of hydrotropism.³²³ This is an example that demonstrates that although plant cannot move itself as a whole, it has a self-sustaining organic unity that can adjust its internal functions in response to the environmental modifications to which it is sensitive rather than indifferent.

To sum up, through its mostly direct and uninterrupted relation to universal elements, the plant satisfies its essential needs by utilizing mechanical-chemical processes even though these processes are still subordinated to the survival of the living thing as opposed to being randomly occurring. The apparently conative behaviors of the plant that rest on its sensitivity and responsiveness, and therefore go beyond mechanical-chemical processes, such as its growth and tropisms, are in any case exhibited in the presence of nutritive sources. In their sheer absence, metabolic process comes to a halt. In their presence, the plant grows new formations without having to put any effort to search for its needs.

³²³ An attempt to explain the undergoing mechanism can be found in this paper: Nobuyuki Takahashi et al., "Hydrotropism Interacts with Gravitropism by Degrading Amyloplasts in Seedling Roots of Arabidopsis and Radish," *Plant Physiology* 132, no. 2 (June 1, 2003): 805–10.

5.1.2. Carnivorous plants: an exceptional case?

The plant kingdom contains an astonishing variety of kinds some of which have members that seem to go beyond an immediate relation to inorganic nutrients. There are several different species of so called carnivorous plants that obtain nutrients by trapping and assimilating organic matter, employing differing mechanisms. Depending on their species, they attract their preys with their colors, scents, or secretions, trap them with their sticky leaves, slippery pitchers, suction traps, or by simply snapping shut their leaves. In many examples where some secretion of fluids or the movement or reconfiguration of parts or internal liquid is involved, plant sensitivity and coupled responsiveness is clearly observed. Although this coupling of sensitivity and responsiveness operates on the basis of mechanical and chemical means, and is always local and not mediated by a centralized system, it still evolves and operates as a function of the plant's needs.

As regards assimilation in particular, carnivorous plants pose the question of whether the plant's acquisition and use of organic materials contradicts Hegel's claims about the plant metabolism. Besides, they draw additional attention to the extent of plant sensitivity and digestion. Plant sensitivity to external stimuli is not limited by immediate mechanical contact or being directly exposed to specific chemicals. Empirical studies of plant responsiveness offer examples of plant sensitivity to gravity, light, temperature, magnetic fields, and electric signals. However, despite the fairly common use of the phrase "plant perception" in such studies, none of these examples demonstrate a centralized sensation of external stimuli or perception at a distance.³²⁴ Even though plants produce hormones³²⁵ and have mechanisms of internal electric

³²⁴ For instance, the effect of ethylene on plant members is a frequent example, as it is believed to play role in many functions including growth, flowering and fruition. It is characterized as a gaseous hormone that can be "transmitted externally between plant parts, or between neighbouring plants ... blurring the distinction between within-plant signaling and sensory perception of environmental cues." Mark C. Mescher, De Moraes, and Consuelo M, "Role of Plant Sensory Perception in Plant-animal

signaling, such electrochemical and linear communication does not suffice to speak of a pervasive and centralized self that has a unified perception. Plant parts can be responsive to one another similar to the way in which they are locally sensitive to external stimuli. The stimulation of a particular plant cell is immediately tied to a response without being mediated by other structures, even if the response of each cell cannot be conceived as totally independent of the universal nature and or organic unity of the plant. Besides, lacking the power of locomotion, perception at a distance can be of little help to plants. Arguably, it would be to the plant's advantage to have parts that prepare their defenses against factors such as predators or pests in advance. But plants can already do this by their chemical sensitivity to volatile stimuli, and as long as they cannot actively pursue or eschew the source of the stimulus, having sight or smell would not contribute to the plant's life-process more than what those functions would require to operate in return. Thus, carnivorous plants do not have perception at a distance either. Their interaction with the prey is contingent on a chemical or mechanical stimulation triggered by the prey itself, and is not initiated by an organism that actively seeks out its source of nutrition.

But the main challenge that carnivorous plants particularly pose concerns digestion, which Hegel thinks is immediate in plant life. As we have already discussed, the animal has a digestive system that is distinguished from the actual acquisition of the food. That is to say, in contrast to the vegetative process in which inorganic nutrients are immediately absorbed by plant parts, the animal has to mechanically and chemically break down its food. But in a sense, this is what carnivorous plants do; using self-produced enzymes or other forms of life such as

Interactions," *Journal of Experimental Botany* 66, no. 2 (February 1, 2015): 425–33. The authors of the quoted work, who seem to think that the difference between animal and plant sensibility is just a matter of degree, consider this example as an olfactory stimulator. However, the fact that this or another gas have an odor does not entail that plants have the sense of smell.

³²⁵ Plant hormones are produced by plant cells. Plants do not have specialized organs that secrete hormones. Thus plant hormones do not necessarily affect the entire plant. This further supports Hegel's view concerning the superficial unity and individuality of the plant.

bacteria and bugs that decompose the prey into the nutrients that they can absorb and then incorporate into the plant's own matter. This can be considered as an intermediary stage somewhat comparable to the animal's mechanical and chemical digestive processes. It involves a certain degree of mediation, internality, specialization, and localization.

Thus, with respect to their ability to digest organic matter, carnivorous plants can be considered as exceptional cases. But this does not seem to be seriously problematic as regards the coherence of Hegel's philosophy of nature. First of all, the nutrients digested by self-produced enzymes or symbiotic organisms comprise only a part of the plant's metabolic process. The plant is still dependent on light, water, and gas intake, which Hegel considers to be the universal elements necessary for the plant. Insofar as the philosophy of natural life is conceived as a systematic explication of the fundamental determinations of the different forms of life in nature, as opposed to those of particular life forms flourishing on a particular planet or ecosystem, exceptional cases can be considered as contingencies for which the determination of nature in general makes allowance.

Admittedly, to the extent that, say, water and air are taken to be specific compounds, the claim to universality of Hegel's account of plant life can be questioned. One way to address this worry is to think of the universal elements not as specific chemicals but as different universal determinations of matter, as Hegel speaks about them earlier in the *Philosophy of Nature*.³²⁶ Carbon dioxide and dihydrogen monoxide, for example, are specific chemical compounds that participate in the life-process of the plants that flourish on the planet Earth. Their function cannot be isolated from the meteorological processes of this particular planet that enabled the emergence of life on earth. Even though the determinacy of vegetative life may

³²⁶ A sufficient justification of this point would require a detailed examination of Hegel's account of light and the physical elements. This is an almost completely neglected topic which is nevertheless beyond the scope of this work.

involve a dependency on certain gases and liquids, it does not follow that on a different planet that satisfies the conditions for the physical occurrence of organic unities, the vegetative life would still be dependent on the same exact gas carbon dioxide and the liquid dihydrogen monoxide, just as its main constituent element would not have to be carbon-based.

Even though Hegel lays out the determinations of different conceivable forms of natural life, as Hegel himself admits, nature does not consist of entities all of which are rigidly distinguishable in kind. As Hegel puts it, nature “everywhere blurs the essential limits of species and genera by intermediate and defective forms, which continually furnish counter examples to every fixed distinction.”³²⁷ But just as there are species that do not fully conform to their concept as plants or animals, one can also think of certain species that push the boundaries of their constitutive concepts. Carnivorous plants are no doubt plants, as they do not have unitary subjectivity that exhibits centralized sentience and responsiveness. But what renders them as outliers in the philosophical examination of life forms is that they presuppose forms of life that themselves depend on plant life. Carnivorous plants decompose organic matter, which belongs to animals that feed on plants. Given the developmental nature of Hegel’s account, it should not be expected of it to incorporate such a relation as a fundamental determinacy of vegetative life.³²⁸

5.1.3. The Immediacy of Plant Metabolism

The plant’s immediate relation with its nutrients have consequences that distinguish plant life from that of the animal. First of all, we can think of these consequences in terms of the plant’s members that are mainly responsible for connecting the plant with the sources of its

³²⁷ *PN*, 24 (§250 Remark); *Werke* 9:36.

³²⁸ A similar, perhaps more controversial example would be parasitic and mycotrophic plants, which rely on fungi or other plants for all their nutritional needs. It is even debatable why these organisms are called plants in the first place.

needs. Roots absorb water and minerals from the soil, while leaves absorb light and engage in gas exchange with the air. Both roots and leaves are in immediate contact with the materials they absorb. The continuity of the internal process of the plant depends on the sustenance of these parts. But this is in a sense circular given that the internal process of the plant is nothing much more than the production of new roots and leaves. Thus, more truly, the plant sustains itself by bringing to life new members to participate in its organic unity. That is why Hegel calls the plant's process of metabolism, its "self-specifying process ... outwards."³²⁹ The process of assimilation overlaps for the most part with the process in which the plant develops its essential members.

As we will discuss in detail, the animal uses the products of its assimilation not only to sustain its internal process, but to support and continue its search for food and mates. The plant, however, is stationary; it does not seek for food or mate, nor does it invest in organs for perception at a distance. Because its metabolic process is mainly contingent on the contact of its roots and leaves with their corresponding need, the plant can be said to metabolize in order to bring about further parts that enable metabolism. And as long as the plant's life-process produce new members instead of just maintaining the existing ones, its metabolic process does not only coincide with the internal process, but also with its reproduction.

We stated earlier that for Hegel the differences between the growth and reproduction of plants is neither clear-cut nor too significant. Given the homogeneity of plant members, and the indefiniteness of plant individuality, growing from the seed is not much different from growing from a bud. Both amount to an outwardly multiplication of the plant rather than the renewal of an existing inner structure. But none of that can justify the neglect of the myriad strategies for pollination. Flowering or bearing fruits, for instance, cannot be seen on a par with

³²⁹ *PN*, 336 (§347); *Werke* 9:411.

growing roots and or leaves. As regards metabolism, these further and arguably more sophisticated articulations require additional investment which is a burden for the metabolizing members as it does not recompense itself. In other words, reproduction does not always directly coincide with metabolism. But neither is Hegel unaware or overlooking these aspects of plant reproduction. On the contrary, he spares a considerable space for a discussion of plant reproduction, which we should best examine in the next chapter on the genus-process.

In any case, since the plant's process of assimilation always leads to the formation of further parts, it never results in an inner determinacy. Hegel says that the sprouting of the plant is nevertheless not a never-ending outward growth. The plant still differentiates itself in ways that can be considered as its moment of return to itself, such as its blossoming. The flower, Hegel adds, is more than the bud "which merely grows."³³⁰ With their distinguishing colors, scents, tastes, and figures, flowers and fruits are, in a manner of speaking, the images of individuality, which Hegel similarly describes as "the image of the self generated in the plant itself."³³¹ However, even in these most explicitly individuating processes, such as blossoming or bearing fruits, the plant always seems to be related to externality, not to itself. Even though the appearance, taste, and smell are there for the perpetuation of the genus, they are still contingent on a relation to other living individuals, rather than to itself.

Because of the superficial unity of its perpetually grown members, the metabolic process is not tied to a centralized sensitivity that can register its own state over against an objective world. The plant does not feel itself. In connection, nor does it feel any appetite given the absence of a chasm between its needs and their fulfillment. As Hans Jonas puts it, the animal life involves surmounting two interconnecting gaps. It has to overcome the spatial gap

³³⁰ PN, 342 (§347 Addition); *Werke* 9:419.

³³¹ PN, 342 (§347 Addition); *Werke* 9:419.

between the food and itself, which is accompanied by a temporal gap between the need and its fulfillment. In order for the animal to ultimately get over these gaps through its motility and digestive apparatus, it “provisionally” spans the spatial gap by perception, and the temporal gap by its feeling of hunger. By contrast, as long as the plant metabolism goes on automatically in the availability of nutrients in immediate contiguity, and therefore, without any particular effort, there is nothing to drive the plant into further action, nor any need for it to feel or perceive at a distance.³³²

5.2. THE ANIMAL’S PROCESS OF ASSIMILATION

The previous chapter examined how the internal process and the structure of the animal organism provides the enabling conditions of not only the ideal self-relation and subjectivity, but also an outward activity presided by the animal itself. The foremost outward activity necessary for survival is the process of assimilation whereby the animal transforms the outer world in different ways and appropriates it for its own ends. Just as the logical process that involves the annulling of the self-subsistence of the object and transformation of it into living determinacy is the main logical form of assimilation, in nature, nutrition, or metabolism broadly construed, lies at the crux of the assimilation process, as it involves a total appropriation of the inorganic matter as an objective constituent of the organism.

The metabolic process of the animal involves the interdependency of a set of peculiarly animal functions. The animal is sentient; its characteristic sensitivity is a unitary act that lies in an inner determinacy that expresses the animal’s state to itself. On the one hand the animal

³³² Still, it would be too much to say with Jonas that for the plant, “no further apparatus for adaptation to short-term changes is necessary.” *The Phenomenon of Life*, 103. There are various adaptations such as hypersensitivity, cold acclimation, flood or drought tolerance, and so on to which the plant resorts when there are considerable changes in the environment. Even though such responses can still be explained in terms of sensitivity, they still involve articulations otherwise not necessary for the regular plant metabolism.

feels itself, and is thereby immediately informed about its needs. On the other, it is able to perceive its environment, although not necessarily consciously. This way, it can make sense of a world to which it relates, and organize a response in accordance with its needs and the conditions of its viability. Not only can the animal feel what it is lacking in, and perceive the means that can fulfill that lack, but being able to move itself as a whole, it can also actively search for and seize those means, and appropriate them for its ends. Because the animal metabolism depends not on the immediate availability and contiguity of its sustenance, but on effort involving locomotion, its process of digestion is divorced from the search for sustenance, even though both require one another to keep functioning. Digestion, on the other hand, is the main phase of the assimilation process in which the inorganic matter is converted into living matter by means of mechanical and chemical processes that are subordinated to the animal's perpetual activity of self-production.

Nevertheless, although nutrition lies at the heart of the animal's assimilation process, Hegel conceives this process in a more extensive sense that is still compatible with the logical account of the life-process that we thought through in Section 2.2. Assimilation is in general a relationship with the outer world in face of which the animal should preserve itself. This can only be achieved if the animal can appropriate what is external in such a way that it can be identified with the nature of living subjectivity.³³³ Hegel speaks of theoretical, practical, and the ideal-real processes as the three distinct modes of assimilation.³³⁴ In accordance with our earlier construal of the logic of the life-process, Hegel shows that in all three processes, the animal

³³³ PN, 381 (§357 Addition), *Werke* 9:464: "since the organism is directed towards the outer world as well as being inwardly in a state of tension towards it, we have the contradiction of a relationship in which two independent terms appear mutually opposed while at the same time the outer must be sublated. The organism must therefore posit what is external as subjective, appropriate it, and identify it with itself; and this is *assimilation*."

³³⁴ PN, 381 (§357 Addition), *Werke* 9:464–65.

organism is faced with an other, whose seemingly alien determinacy it overcomes in different ways.

5.2.1. The Animal's Theoretical Process

The theoretical process of assimilation involves what we earlier called sense-making, which denotes the living thing's relationship with others or with itself by which it informs itself about those relata in differing ways. The simplest forms of specifically animal ways of sense-making are feeling and sensation, both of which can only pertain to a unitary subject and involve centrally mediated processes.

Although it is possible to consider the local sensitivity of the plant as a primordial process of sense-making, the plant lacks even a proto-cognitive unitary subjectivity that the most rudimentary animals have.³³⁵ Admittedly, even merely local sensitivity involves some degree of mediation than is involved in mechanical or chemical relationship. That which impinges on locally sensitive organic constituents is registered not merely as a mechanical impact or chemical reaction, but in terms of an internal determinacy that expresses the nature of the interaction with reference to the ends of the organism. But in local sensitivity, this is so not because the local response is actively mediated or monitored by the rest of the organism, but because every constituent is already determined by the concept, that is, the universal nature, of the living individual. The internal determinacy of the local sensitivity is not an inner or inward determinacy.

One of the main differences of animal sensibility is that the animal's physiology facilitates the centralization of its internal field of sensitivity. Admittedly, having a vegetative, merely sensitive aspect, the animal can also be locally responsive to stimuli, as is observed in

³³⁵ In his discussion of instincts, Hegel says that plants do not have sensation or theoretical relationships. *PN*, 407 (§365 Addition); *Werke* 9:495.

numerous examples including pupillary light reflex, patellar reflex, or mammalian diving reflex. These reflexes follow simply from the given nature of the animal, even though that specific nature develops as a result of a dynamic interaction of the species members within their biospheres. But even in cases of local responsiveness, the animal sensitivity is different from that of the plant: the response is mediated by the autonomic nervous system, as the animal unity is necessarily dependent on the complementarity of organs that should be continuously adjusted to one another's functioning in a way that would conduce to the preservation of each. As regards the organic unity of the plant, all examples of seemingly communal adjustment is contingent on a contiguity of parts that can transmit a signal, or external agents such as fungi, rather than a specialized network system that connects organs to each other, such as the autonomic nervous system or even the networks of ganglia on which Hegel lays emphasis.

On the other hand, in such reflex responses, the animal subjectivity is still dormant or not actively guiding. Thanks to the central nervous system, however, the animal members do not just automatically respond as a function of a given nature, but can also communicate modifications to a center that combines the field of sensibility in such a way that the animal registers its state as a unitary subject. This is how the animal can feel itself and in turn dynamically monitor and regulate its body. The animal stands over against the world, and if its responses to it were not centralized but only local, it would be unable to sustain its unity on its own accord. A comatose or hibernating animal can maintain its vegetative functions to the extent that it is supported externally or it does not run out of internal resources. Otherwise, the animal cannot survive on passive responsiveness, even when those responses are mediated by the autonomic nervous system.

The animal requires nutrition above all, and for it to get the main process of assimilation going, it must be informed of two main things. First, it must be informed about its internal state:

it must feel hunger. Second it must be able to sense the presence of its need and satisfaction in its surroundings. Because animal nutrition is not a matter of contiguity with nutrients, it has to be carried out without the need for external stimulation. The embodied animal subject informs itself of its need to go after food. And being motile through its musculoskeletal system, the animal is able to seek its food. Nevertheless, food search, capture, ingestion, and digestion are not necessarily continuous processes either. Their timing is determined not only with respect to the availability of food, but also by the animal subject itself. Besides, these processes require centrally governed guidance that involves sense-making activities.

The theoretical process is in this regard the relationship of the animal with the external world whereby it can both feel itself involving its appetites, and have determinate sensations through which it can inform itself about its surroundings. Sensation ensures that the outer world to which the organism relates is no longer a completely external and alien determinacy, as it gets appropriated into the inward content of the animal. In other words, the theoretical relation renders the other *for the animal*, for it is translated into a determinacy of its own self. This is why Hegel says that in sensation the animal senses “a particularized form of itself.”³³⁶ In and through a manifold of feelings and sensations that it accommodates thanks to its body, the animal subject realizes and sustains itself as an idea realized in nature.³³⁷ It is an embodied subject which is inwardly determined in particular ways some of which consist in the sensory appropriation of the world. In and through these determinate sensations, the animal determines itself in various ways while retaining its identity as an individual, self-differentiating subject.

³³⁶ PN, 382 (§357 Addition); *Werke* 9:465.

³³⁷ Sense, Hegel says, is the immediate unity of the animal with its object. “Die unmittelbare Einheit des Seins und des Seinen.” *Werke* 9:466. Miller translates this passage as “the immediate unity of the being of the organism and its object,” although his use of the term organism is misleading. PN, 383 (§358 Addition).

Although Hegel talks about specific animal senses in the *Philosophy of Nature*, the discussion is neither very clear nor useful for the purposes of this study.³³⁸ Similarly, we do not have space for an examination of Hegel's controversial thoughts on the allegedly rational completeness of the five senses. Hegel's discussion of these senses in that work suggests once again that he aims at an account of animal nature that is not in its simplest realization but one that falls just short of rational being. Nor can we go into the intricacies of sense-perception and its differences from other faculties of the mind. Here we are more interested in his distinction of the two main forms of life, and therefore, do not have to engage in an account of different faculties of the mind, which Hegel lays out in greater detail in the third part of the *Encyclopedia*; the work that covers his philosophy of spirit.

Nevertheless, the distinction Hegel makes between the senses of sight and hearing, and those of taste and smell can provide us with a transition to the practical process. The first group of senses are purely theoretical because in perceiving its object, the animal does not actually transform it into an objective means to its own ends; the theoretical relation leaves the object as it is. In what Hegel calls the real or practical relationship with the inorganic nature, the animal does away with the subsistence of the object. To different extents, the senses of smell and taste involve a process of real transformation that affects the integrity of the source, even though this is mostly negligible particularly in case of olfaction. In this regard, although these senses engage in a theoretical and proto-cognitive relationship with their objects, they also tend toward the practical relation.³³⁹ The sense of touch, which Hegel sometimes confusingly refers to as

³³⁸ See *PN*, 382–84 (§358 and §358 Addition); *Werke* 9:465–68.

³³⁹ Hegel's own explanation is confusing. On the one hand, in §358 (*PN*, 383), he classifies smell and taste under the senses of theoretical process. In the addition to the same paragraph, however, he identifies them as practical senses: "Während das Gefühl der Sinn des gleichgültigen Daseins der Dinge ist, so sind Geruch und Geschmack die praktischen Sinne, deren Gegenstand das reale Sein der Dinge für Anderes ist, wodurch sie verzehrt werden." *Werke* 9:467.

feeling,³⁴⁰ can be considered to lie in between these two groups of senses, as it requires an active interaction with the object that does not transform it.

Besides the physiology of centralization, the other aspect of animal sensibility that differentiates animal life from plant life has to do with the way the animal uses its sense organs. Plants can reorient their parts as a consequence of their localized sensitivity, which is itself dependent on external stimulators. By contrast, the animal subject is able to reorient its entire body or position its external parts in order to better perceive its world. It does so in accordance with its feelings, in order to fulfill its needs of survival, and by means of its centralized nervous and musculoskeletal systems. On the other hand, just as the theoretical and practical processes serve as the means to the internal or structural process, the latter also serves for the life-process, and perhaps not only for the feeling of fulfillment that the practical process ultimately provides, but also for the theoretical process that involves sensing the pleasurable, at least in animals that exhibit the necessary level of development for sense-perception. The food, ideally, tastes good, and that is one reason why the animal heart beats.

5.2.2. The Animal's Practical Process

The role and activity of animal subjectivity is the main factor underlying the distinction between animal and plant metabolism, as is the case with the theoretical process. But in particular, motility plays the main role in the animal's practical process. The animal has to move itself as a whole in order to find its nourishment, and unitarily move its limbs in order to seize it. Its capacity for locomotion demonstrates the unitary character of its subjectivity, as it moves its

³⁴⁰ He uses the term '*Gefühl*'.

body not by virtue of being an efficient cause external to the body, but by being the power that immediately animates its embodied existence.³⁴¹

Earlier, we discussed how the authority of externality figures in the nature of the plant. By contrast, despite its bodily existence, the animal demonstrates a certain degree of independence from externality. This is not because it has a soul that exists independently of its body. The soul is the kind of being and activity that is realized in and through the workings of the animal body. The soul is always already embodied. When Hegel says that the animal overcomes heaviness and that it is freed from gravity, he does not mean that the animal body is not subject to gravitational forces. The animal has a body which is subject to gravitational attraction, but it is the animal itself which determines its particular place by being able to relocate itself.³⁴² Second, even though the realization of psychological unity is contingent on gravitational forces, it is by itself not subject to gravity. The animal self is a feeling self, and feelings are not chunks of masses subject to gravitation. Indeed, because the animal's motile response is a function of its psychology, be it feelings, sensations, or instincts, even when its body is subject to gravitational forces, it moves in a way that is determined by its individual or its species being's ends, and in

³⁴¹ This unitary self is demonstrated by features other than self-motion as well. Following locomotion, the animal voice and heat can be considered as the increasingly internalized expressions of the animal's inwardness. The voice starts as a motion within, but it is not merely the sound of the internal workings of organs. It is rather a self-expressive and individuated determinacy. Other objects also have sounds, which is an element of their determinacy. However, they make sound only when externally affected, not on their own accord. Similarly, heat is a permanent manifestation of continuous self-movement that is specific to the individual animal, which helps maintain the dynamic shape of the animal body and makes the animal's distinction from the outside world further evident. *PN*, 355 (§351 *Addition*); *Werke* 9:434. But the inwardness of the subject manifests itself in the purest mode in feeling. Even though feeling assumes a bodily form and is expressed in various ways, it still has an existence that can be distinguished from its bodily manifestations. It is a pure self-relation in which the subject feels nothing other than itself, its own determinate being as an animal subject.

³⁴² "True, the animal does not escape from the general determination of being in a particular place; but *this* place is posited by the animal itself. And it is for this very reason that the subjectivity of the animal is not simply distinguished from external Nature, but the animal distinguishes itself from it; and this is an extremely important distinction, this positing of itself as the pure negativity of *this* place, and *this* place, and so on." *PN*, 354 (§351 *Addition*); *Werke* 9:433.

accordance with the specific features of the biosphere that its species being inhabits. Third, the animal subordinates gravity as a determinacy of its ideal being as it realizes itself by summoning the forces of gravity for the realization of its ends.³⁴³ It would be hard for a freely floating animal to sustain itself.

Admittedly, just as the animal has reflexive responses in which its subjectivity is not active, there are aspects of its practical process that do not involve agency or locomotion. Hegel notes that at least in part, the animal metabolism occurs through immediate contact with the inorganic matter, as is demonstrated by the skin's absorption of light, air, and water, and by breathing. Interestingly, what such relationships of the animal have in common with those of the plant is that they both involve what Hegel calls the universal elements as their relata. Nevertheless, these universal, inorganic elements are not sufficient for the animal, as it cannot directly metabolize them into organic matter. This inability to metabolize its own food from the universally diffused inorganic matter is bound up with the animal's ability to move itself and relate itself to already metabolized organic matter.³⁴⁴

Admittedly, there are also animals that have much less sophisticated digestive and feeding systems the activation of which seems to depend on an immediate contact with their food. Still, all animals need some extent of motility to eat or to avoid being eaten. Hegel cites

Compare to Ciavatta's "Hegel on the Parallels between Action and the Ontology of Life," 83:

Hegel conceives of self-locomotion as involving a kind of living transmutation of the essentially mechanical pull of gravity. He conceives of self-moving organisms as "free" of gravity ... for Hegel this does not merely mean that animals use gravity as a means for their own ends, thereby continuing to presuppose gravity as an independent, external, conditioning force that sets the terms for all organic activity. Rather, it implies that self-moving animals exist as incorporating gravity into their own organic processes, and that they thereby generate a distinctive, organic reality that cannot ultimately be understood in terms of the essentially mechanistic relationships that gravity involves.

³⁴⁴ "The real process is at first a process with the Elements, for the outer world itself is, in the first instance, universal." *PN*, 391 (§362 Addition); *Werke* 9:476.

Treviranus who gives hydra as an example to this “lower” kind of animals.³⁴⁵ Even though the hydra’s ingestion of the prey or its stinging by its tentacles may require stimulation by immediate contact, the animal moves around and unitarily extends its tentacles before it runs into its prey, and once it paralyses its prey, it again uses its tentacles to bring the prey towards the orifice. Furthermore, attack on the prey by tentacles is also a unitary one that does not only include the directly stimulated tentacle, but all the rest of them.

Of course, the animal does not have to move itself continuously. It has the power to move or stop itself, or change its direction.³⁴⁶ Although these changes are not haphazard, that which prompts the animal into a practical relationship with the world is not anything external to the organism, either. It is rather an internal rupture, a “diremption of the organism within itself,” to put in Hegel’s own terms.³⁴⁷ This rupture consists in the self-relation in which the animal subject faces its negation in its own body. It feels itself as a lack, an absence, a need for something that it is or has not.

Only that which is living can feel a lack, says Hegel, as that which incorporates its other within itself is but a living subject.³⁴⁸ The other of the living subject is the inorganic nature.³⁴⁹ But its life consists in appropriating this inorganic nature as its own objective existence, its own body. Thus, in the context of life in nature, the Hegelian *aufhebung* is made flesh in this assimilation of the other into the organic determinacy. Through its practical relation, the animal actively shows that it is a self-determining concept with objective being. Its universality is that

³⁴⁵ PN, 399 (§365 Addition); *Werke* 9:485.

³⁴⁶ However, even retaining a posture entails a continuous muscular contraction.

³⁴⁷ Hegel uses ‘Diremption.’ *Werke* 9:468

³⁴⁸ PN, 385 (§359 Remark); *Werke* 9:469.

³⁴⁹ It is worth noting early on that when Hegel explicates the animal’s process of assimilation, he always refers to the animal’s relationship with its inorganic other. In fact, he admits that the plants and animals that the animals consume are themselves organic. But for the feeding animal, they are nothing but its own inorganic nature that ceases to be anything individual or self-subsisting once it seizes them.

which infects what it is not and converts it into a particular of its own, and although it is lacking, it is still not merely limited. For that which is merely limited is limited by an other, whereas that which is lacking also contains within itself the possibility of its overcoming the lack. The animal body is not only the reason why it feels the lack, but also its primary means to recurrently overcome it.

Inasmuch as the animal feels its own self as a lack, Hegel thinks that the self-relation is not only negative, but also an affirmative one. With a questionable wording, he states that it is “at the same time positive self-relation and the certainty [of the self] in face of this its negation.”³⁵⁰ As we have pointed earlier, strictly speaking, the animal cannot be certain of itself merely by virtue of feeling. In feeling as such, what feels and what is felt are immediately one and the same. The animal cannot detach itself from itself and regard itself as an object of its feeling, nor can it feel itself as a subject confronting objectivity. Nevertheless, regardless of its content, this feeling of itself, including the feeling of itself as lacking, is an immediate affirmation of its unity and individuality.

From this contradiction between self-negation and self-affirmation, there emerges the urge that drives the animal into action.³⁵¹ This drive can be considered as the animal’s (not necessarily conscious) assertion of its subjectivity and power over against the external world. When it feels itself lacking, the animal also feels the drive to overcome it. But because of the character of its own objectivity, the cure that would ease the pain and reestablish the animal once again as the power over its inorganic world is to be found in the external object. In other words, the urge that drives the animal into this defiance stems from the fact that it finds its own subsistence as a subject in its own other, that is, in an object that is pertinent to its specific

³⁵⁰ *PN*, 384 (§359); *Werke* 9:468.

³⁵¹ For the examination of the logical determination that corresponds to this urge, see section 1.2.2.

needs.³⁵² Hegel describes this feeling of dependence on the other that is opposite of what the living thing is as “the unpleasant feeling of need.”³⁵³ This feeling is that which drives the animal to annul the subsistence of this other, and reaffirm its own power and unity in its stead.

Hegel often refers to that peculiarly animal drive that originates from a specific need as the *instinct*. Depending on the content of the need, instinct can take various shapes. But in all of its different shapes, it is an inner drive that aims at sustaining the animal by getting rid of the need that instigates it. Hegel notes that this purposive character of the instinct is puzzling to many, who think that purposive activity can only be conscious. But the animal does not have to know its ends as ends. Feeling or sensation can incite the animal into action, without being able to represent ends or without distinguishing itself from its object.

The instinct immanently determines an animal’s biosphere, that is, the domain of its vital interactions. Hegel calls this domain the inorganic nature of the animal. Each and every animal has its own inorganic domain that it distinguishes from the rest of the world, and it does so at least or firstly by means of its instinctive drives. The predatory animal is not merely driven to the sight of a specific prey. It is already receptive to that universal kind of sight on account of

³⁵² “The animal can be stimulated only by *its* own non-organic nature, because for the animal, the opposite can be only *its* opposite; what is to be recognized is not the other as such, but each animal recognizes its own other, which is precisely an essential moment of the peculiar nature of each.” *PN*, 390 (§360 *Addition*), *Werke* 9:475.

³⁵³ “What is primary, therefore, in animal appetite is the subject's feeling of dependence, that it is not for itself, but stands in need of an other which is its negative, and this not contingently but necessarily; this is the unpleasant feeling of need. ... But equally, too, the animal restores its lost harmony and finds satisfaction within itself. Animal appetite is the idealism of objectivity, so that the latter is no longer something alien to the animal.” *PN*, 387 (§359 *Addition*), *Werke* 9:472.

its internal determination.³⁵⁴ To put in Hegel's terms, the animal sees through the determination of its other.³⁵⁵

Driven by the feeling of hunger, and the desire to satisfy it, and the sensation of an individual object that can gratify its nutritional needs, the animal moves itself as a whole or moves its external members in order to take hold of its object. Vertebrates move by means of a centrally governed musculoskeletal system, which keeps up a determinate shape that would enable a coordinated movement of all the constituents, as well as a central nervous system that facilitates that unitary coordination. Invertebrates, on the other hand, utilize a variety of mechanisms and extremes, which again depend on (at least to some degree) centrally controlled muscular or other support structures, even though the degree of integration differs according to the species.

In addition to its specialized internal structure and process, the animal has an external structure that consists not only of the means for locomotion, but also of the bodily projections it uses to seize the object of its need, and to break it up mechanically into pieces small enough for the digestive system to work with.³⁵⁶ These activities require a centrally guided movement in accordance with a continuous process of sense-perception. Hegel's examples are claws and teeth, although the animal kingdom displays various structures that carry out similar functions. Unlike purely mechanical processes, all of these bodily functions are rather purposive ones that

³⁵⁴ "[T]he urge is rather so immanent in the animal that this specific determinateness of the grass, and moreover of this grass, this corn, etc., is in the animal itself for which everything else simply does not exist." *PN*, 390 (§360 *Addition*); *Werke* 9:475.

³⁵⁵ "Das begehrende Organische ... das Dasein des Anderen durchschaut ..." *Werke* 9:479 (§363 *Zusatz*).

³⁵⁶ "The appetitive organism which knows itself as the unity of itself and the object confronting it, and so sees into the determinate being of the other, is structure turned outwards and provided with weapons, whose bones and skin have made themselves into teeth and claws respectively." *PN*, 393–94 (§363 *Addition*); *Werke* 9:479.

make use of the nature of the mechanical process to abolish the apparent self-subsistence of their objects.

Further decomposition of the nutrient is accomplished through the chemical operations of digestive enzymes. Nevertheless, Hegel argues, “assimilation cannot be a chemical process either.”³⁵⁷ We have already examined that in a merely chemical process that is not subordinated by a purposive process, the tensed chemicals yield a product that does not retain their qualities, and the reaction itself is a one-time event that is indifferent to preceding or succeeding reactions. The digestive activity, by contrast, is not merely a random consequence of contingent spatiotemporal circumstances. The animal is the subject or agent of this lifelong activity in and through which it preserves its individual identity, while informing the other with that identity. The digestive process is a constituent of that purposive activity which would lose its true meaning in isolation. Although the animal uses chemicals to decompose its food, neither the animal nor any of its relevant organs lose their determinative characteristics by engaging in chemical interactions. Hegel says that the organism is in a state of tension with its object, yet negates it and renders it identical with its own determinacy.³⁵⁸ Similar to tensed chemicals, animals are also prone to engage in a relationship with objects with specific qualities. However, unlike a chemical reaction that requires an external factor to be instigated, the animal is the activator and the initiator of its own process. Its propensities are not given as such but are rather the determinacies of the self-determining evolutionary history of life. The chemicals the animal uses are not randomly found, but are the products of its own self-sustaining internal process.³⁵⁹

³⁵⁷ *PN*, 394 (§363 Addition); *Werke* 9:479.

³⁵⁸ *PN*, 397 (§365 Addition); *Werke* 9:481.

³⁵⁹ “[I]n the living being we have a subject which preserves itself and negates the specific quality of the other, whereas in the chemical process, each of the substances taking part, acid and alkali, loses its quality

Similar to respiration, digestion is where the external process unites with the internal process. Respiration is closer to vegetative assimilation, which Hegel calls immediate infection, as it relates to the universal elements and accordingly involves less mediation than digestion.³⁶⁰ The animal metabolism does not merely rely on universal inorganic elements, but feeds on individual living matter, whether plant or animal. Because digestion is mediated by intermediary stages involving internal mechanical and chemical operations, it is also separated from the external activity that provides it with what it assimilates. Whereas the metabolic process of the plant consists in direct contact with its immediate surroundings, viscera makes it possible for the animal organism to internalize its process of assimilation, and liberate it from an attachment to immediacy.

The product of the digestion is the conclusion of the animal's return to itself from that external activity. This conclusion is thus on the one hand, a return to its feeling of self-satisfaction, and however rudimentary, the recognition of itself as the power over its inorganic world.³⁶¹ On the other hand, it is the animal's self-production from this assimilated other. Hence, Hegel says, the outward process is "transformed into the first, formal process of simple reproduction from its own self, into the uniting of itself with itself."³⁶² Even though the animal abolishes the apparent individuality and subsistence of its source of nourishment, it is the vivifying transformation rather than a complete annihilation of the latter's existence. But unlike what is the case in plant metabolism, what gets incorporated does not form new members that can carry on the external process. Because the animal retains its shape, assimilation helps the

and is lost in the neutral product of the salt or returns to an abstract radical. There the activity is extinguished, but the animal, on the contrary, is a lasting unrest in its self-relation." *PN*, 394 (§363 *Addition*), *Werke* 9:479.

³⁶⁰ *PN*, 479 (§345 *Remark*); *Werke* 9:381, *Werke* 9:480.

³⁶¹ *PN*, 399 (§365 *Addition*); *Werke* 9:485.

³⁶² *PN*, 395 (§365); *Werke* 9:481.

animal restore its existing constituents and provides it with the extra supplies that are required for the search, recognition, and the capture of its food.

5.2.3. The Animal's Ideal-Real Mode of Assimilation

Digestion results in the animal's production of itself. But Hegel argues that there are other kinds of self-production in which the animal bestows upon itself or its determinacy external forms of existence. One of these kinds is reproduction, or the genus-process, in which animals generate other self-subsistent members of their species. This form of production is the main subject of the following chapter. The other kind is the animal's production of itself in the matter of inorganic externality. This kind is also of two forms. Hegel's discussion of the first form, which talks about the by-product of digestion, that is, excretion, can safely be avoided. After all, Hegel himself notes that what is produced through this activity does not actually bear the identity of the animal.³⁶³ The other form, which is the better representative of the animal's determining externality is what Hegel calls the ideal-real production through the constructive instinct. "The constructive instinct," Hegel says, "like excretion, is a self-externalization, but as a building of the form of the organism into the outside world."³⁶⁴

As mentioned above, in his notes to §357, Hegel divides animal assimilation into three modes: theoretical, practical or real, and ideal-real. The theoretical mode merely translates the determinacy of the world in a way in which the organism can make sense of it in accordance

³⁶³ Excretion, as Hegel defines it, is the animal's making itself external in the form of "abstract repulsion." *PN*, 404 (§365 *Addition*); *Werke* 9:492. Hegel continues as follows:

Since it only makes itself into an external thing, this latter [excrement] is [for the animal] something non-organic, an abstract other in which the animal is not identical with itself. The organism in thus separating itself from itself is disgusted with itself for not having more self-confidence; this is what it does when it abandons the struggle, rids itself of the bile which it has discharged. Excrement has, therefore, no other significance than this, that the organism recognizing its error, gets rid of its entanglement with outside things; and this is confirmed by the chemical composition of the excrement. (*PN*, 405 [§365 *Addition*]; *Werke* 9:492)

³⁶⁴ (*PN*, 365 [§354 *Addition*]; *Werke* 9:446)

with its ends. The practical activity involves assimilation by consumption, which includes breathing air, drinking water, and eating food. The ideal-real mode of assimilation corresponds to the animal's transformative engagement with its biosphere in which it determines the latter, or produces formations in it, in accordance with its own ends.

Hegel considers the ideal-real activity as the unity of the theoretical and practical because it involves practical transformation that alters the form of the object while still leaving it intact. In this activity, the object does not become a subject-object, that is, a living thing; it remains as an object. Yet it still becomes determined or assimilated by life and participates in its external process without being itself an end, that is, a constituent of the internal process or organic unity. Although such an activity can be carried out by consciously purposive behavior, the constructive instinct is the lowest denominator that even the lowest forms of animals possess to unconsciously shape their biospheres.³⁶⁵ More truly, the constructive instinct is more predominant in lower forms of organisms that do not develop more complex mental faculties.

Animals instinctively alter the inorganic world that is in discord with their nature or needs and create a suitable environment for themselves. But like practical assimilation, instinctive activity is driven by appetites. The animal needs not only food but also shelter. The activity satisfies the appetite, this time not by destruction, but by construction of nests, lairs, burrows, or dams. These building activities make the environment into a part of the living

³⁶⁵ The text is somewhat ambiguous as to where exactly the instinct belongs in these the three assimilative processes. In that same passage in which Hegel lists the different modes of assimilation, he speaks as if instinct and the constructive drive belongs to the ideal-real mode of assimilation. (Hegel writes "der Instinkt und der Bildungstrieb," while Miller translates it as "instinct, including the constructive instinct." *PN*, 381 [§357 *Addition*]; *Werke* 9:465) But later on, in §361, he characterizes the instinct as a practical relationship with the inorganic world, but adds that its activity is partly formal and partly real assimilation. *PN*, 389; *Werke* 9:474. By formal assimilation, Hegel has in mind the activity of the constructive instinct by which the animal transforms its biosphere in accordance with its ends. Formal assimilation, he says, is the unity of the theoretical and practical because it involves practical transformation that still leaves the object intact. In the main paragraphs of the text, Hegel brings up this form of assimilation before he speaks about practical assimilation in more detail. By contrast, in his additions, the elaboration of the formal assimilation follows that of practical assimilation.

thing's self-determined externality. Hegel considers even migration and stocking food as similar practices as they show how the animal determines its own habitat. He also speaks of what he calls the other side of the constructive instinct, which involves the animal's instinctive use of internal resources for the production of organic yet external products.³⁶⁶ Such internally generated materials such as the spider's web, the insect's venom, caterpillar's cocoon, or the bee's honey all serve for the felt needs of the animals or their species.

More importantly, Hegel thinks that the animal's production of "itself as an outer existence" provides it with a satisfaction at a different level. The practical relation is the animal's return to itself. By quenching its thirst or sating its hunger, the animal overcomes its lack and at least temporarily feels itself satisfied. But Hegel notes that this satisfaction is indeed only an enjoyment of the other, and therefore, in feeling itself satisfied, it is not really enjoying its own self. But when it transforms its environment according to its needs, it becomes immediately present to itself in an objective and enjoyable form.³⁶⁷

³⁶⁶ It is not clear how we can consider the production of these products as a partially theoretical activity given that the materials used for these formations are also products of assimilation, and not ready-found inorganic matter.

³⁶⁷ *PN*, 409 (§365 *Addition*); *Werke* 9:497.

CHAPTER SIX

REPRODUCTION IN NATURE

Throughout his account of life, Hegel restates that life consists in the universal identity that always relates to itself in its self-differentiation. As regards a single living individual only, this universality signifies the organic unity that preserves its own identity by continuously renewing its organs. In the course of Hegel's expositions, both in the *Science of Logic* and the *Philosophy of Nature*, we see that the totality of the process through which the internal organs renew themselves must be a combination of the internal and external processes. The process thus consists in the subsistence of the living individual's universality in and through its individual activity of appropriating its other. However, what takes place as a result of this combination can simply be considered as the individual's self-production rather than a truly reproductive process.

On the other hand, when we consider a plurality of individuals of the same species, the genus is the life of those members that together form a universality, a species being, which continuously preserves itself in and through the birth and death of its individual members. Indeed, the genus-process which Hegel is concerned with here has more to do with this aspect of the genus rather than that of self-production. Nevertheless, the plurality of individuals of the same species already presupposes a process of reproduction, and accordingly, the real focus of the genus-process is on reproduction, that is, the process through which living individuals engender other self-subsistent members of their own or related species. Moreover, since the species being of the living thing is not given in advance and independently of the lives of its species members, the genus-process equally denotes generation in the sense of the production of the genera or the species themselves.

But, for Hegel, even the procreation of an individual of the same species by itself does not correspond to the true meaning of the reproductive or genus-process, unless it consists in a real relationship between different living individuals. In parallel with our analysis in the logical explication, we can say here that Hegel's exclusive focus has to do with the structure of organic unity which the genus as the mediated idea of life incorporates. This is how the genus produces and preserves itself as the universal identity of complementary differences that he refers to as different sexes. The genus-process in its true sense, according to Hegel, is therefore equivalent to the sexual process. This suggests that, as regards Hegel's account, only animals exhibit the genus-process, and not even all of them.

As we will discuss in the first section, Hegel argues that plant reproduction goes barely beyond self-production. Just as the internal differentiation and growth of plant members is immediately brought about by these members' appropriation of inorganic matter, this latter is nothing but the propagation of the plant into relatively independent individual plants. In that aspect, reproduction of the plant is hardly distinguishable from the other two fundamental processes of the plant. However, some plants develop specialized reproductive organs and bring about seeds from which new plants sprout. Hegel thinks that this form of reproduction from the seed is mostly superfluous in plants, as the sprout is hardly different from the new members the plant develops from within its own body. Moreover, he points out that what is commonly regarded as the plant's sexual reproduction is not a true relationship because those so-called sexes do not determine the individuality of the reproducing plants.³⁶⁸

Below we clarify and critically examine these reasons why Hegel thinks that the plant's reproductive process can only be a rough sketch of a truly reproductive relation. Particularly because Hegel overlooks or underestimates the fact that cross-pollination is possible among the

³⁶⁸ *PN*, 342–345 (§348 and §348 *Addition*); *Werke* 9:418–422.

plants of not only the same but also of the different species, Hegel's emphasis on the superficiality of the plant reproduction's sexual aspect is not compelling. Yet what is more important is Hegel's lack of emphasis on the inferiority of the plant's subjectivity as an explanation of the rudimentary character of its reproduction, even though drawing on that inferiority would be more consistent with the preceding comparison of the plant and animal life. In what follows, we call attention to that aspect of plant reproduction, and distinguish the reproduction of the animal from the plant on that basis.

6.1. PLANT REPRODUCTION

Hegel thinks that life consists in a subject's relation to itself in and through its own objective constitution. The genus-process exhibits such a self-relation in different ways, both in the production of the genus and in the genus' own relation to its particular members. In keeping with his account of the formation and assimilation of the plant, Hegel maintains that the plant exhibits both of these relations only in a rudimentary way when compared to the genus-process of the animal.

The plant's process of self-production does not amount to a real differentiation that sustains the plant as a unitary individual. The gist of plant nature lies in its constant relationship with its biosphere which brings about a continuous growth of further members that would at the same time sustain and carry out the plant's internal and external processes. The process of assimilation already amounts to the regeneration of plant parts. Given that the plant parts are at least potentially self-subsistent individual plants, Hegel argues that the external process coincides with the genus-process. The genus-process of the plant is then equally the digestive process, as the digestion of the plant is nothing but the production of those members by assimilating inorganic matter. But because each fresh member is potentially a subsistent individual on its own accord and the extent of complementarity of these members is limited,

Hegel thinks that the plant's indefinite growth does not add up to a genuine self-relation in which it relates to itself as an individual. It remains a superficial unity of relatively independent parts that fall short of comprising a self-relating unitary being.

6.1.1. The flower, the Fruit, and the Seed

The production of the flower, the fruit and the seed, however, stands for a slight progress beyond this superficiality of plant life. We will recall that Hegel thinks the subjectivity of the plant resides in one sense in the sun, namely, the source of light that governs its behavior and provides its power. The plant's constant striving in growth towards the sun in order to become one with this its subjectivity only leads to further sprouts. On the other hand, already in its relation to light, the plant assimilates this power into itself, producing a living body out of it. However, most plant leaves and stems reflect green light because they cannot absorb it. From Hegel's viewpoint, we can suggest that plants cannot entirely assimilate light. Accordingly, it is not one of their individuating features: most plants are green because of the role of the universal elements of light and water. On the other hand, the green light is the most powerful as regards the energy it contains. Arguably, by reflecting it, the plant protects itself from its external subject as much as it gives in to it. Thus, in its most vital relationship, the plant reflects the being of the sun no less than it reflects its own self-preserving unity.

In the blossom and the fruit, Hegel thinks, the plant comes closer to becoming a self by assimilating light and other needs in a way that expresses its own individuality. For in blossoming and bearing fruit, the plant does not reflect what it cannot assimilate. On the contrary, it reflects what it does with what it absorbs. The flower and the fruit have distinct colors, smells, and tastes that differentiate them from other flowers and fruits, even though these properties are for an other, which is to say, they are not explicit to the plant itself but

have their significance in their relation to an other. Neither are they determinacies that pertain to the plant as a whole.

The flowering plant does not only immediately replicate itself in the form of virtually identical leaves, either. Even though flowers and fruits of a plant are just as similar to other flowers and fruits of the same plant, they are still not the immediate means to further replication of their copies. These more sophisticated articulations add up to a burden for the metabolizing members as they do not directly participate in metabolism. Quite the opposite, they arrest the growth of the plant. Hegel sees in this arrest of growth a self-negation insofar as it contradicts the very nature of plant, that is, continuous growth of new parts. However, in this self-relation also lies the glimpse of the individuality of the plant. For what follows from this arrest is the production from within of the flower and the fruit. These formations, Hegel thinks, reflect the individual determinacy of the plant to the extent that they are not merely shaped by their relationship to externality.

Thus, although Hegel insists on the coincidence of the fundamental functions in the plant, he also maintains that with the blossom and the fruit, the plant goes further than an immediate unity of internal formation and assimilation. These two articulations demonstrate that the plant does not only differentiate itself from what it assimilates, namely, the inorganic world, but it also makes itself into a profounder process of internal self-differentiation. The flower itself, in particular, has members that make an allusion to animal organs, more specifically, to genitals, although these reproductive organs exist in the same plant.³⁶⁹ Hence, Hegel thinks that in the flower, the plant attains to an *image* of a genuine self.³⁷⁰ Furthermore, members such as the pistil and the stamen are enveloped by the petals, all of which ultimately

³⁶⁹ PN, 342 (§347 Addition); *Werke* 9:419.

³⁷⁰ PN, 342 (§347 Addition); *Werke* 9:419.

serve to develop and protect the reproductive organs, as if the latter are internal organs of a living individual that reproduces itself in the form of seeds.

The production of the seed is a more genuine relation or return to self. In the growth of new members, such return is always deferred. But in developing its seeds, the plant arrests its indefinite growth and generates its own concept in its stead. Hegel construes the seed as the plant's concept because it is the whole plant that is not yet articulated into its differences.³⁷¹ Thus, the plant does not only attain to a genuine self-relation, but it produces its own universality in the individual seed.³⁷²

Similarly, Hegel argues that the production of the seed occurs not merely as a result of an immediate metabolic process of leaves and roots, but it is mediated by the plant's own arrest of its proliferation, and its producing fruits from within its own matter.³⁷³ In this regard, the production of the seed can be considered as the plant's genus-process. However, Hegel thinks that this process is ultimately superfluous. Eventually, the germination of the seed brings about nothing more than what the process of formation and assimilation produces. Sexual reproduction of the plant produces seeds which merely allow the plant to grow its members at locations different from that of the parent plants. As we will explain further, the reproductive relation between different plants is still the genus-process only in the limited sense of self-production.

³⁷¹ See *SL*, 687–88; *Werke*, 6:485–86.

³⁷² Hegel also describes the difference that the seed makes in terms of shape, even though it sounds mostly figurative. With the fruit, and arguably with the seed, the plant reproduces itself not as a linear growth that cannot return to itself, but in a rounded shape. This, he deems, is the concentration of the plurality of leaves "into one point," where the point symbolizes an infinite self-relation. *PN*, 342 (§347 *Addition*); *Werke* 9:419.

³⁷³ *PN*, 343–350 (§348 *Addition*); *Werke* 9:420–28.

6.1.2. The Spurious Sex-life of Plants

For Hegel, the concept of the genus-process is more adequately expressed in sexual relation, which he thinks can only take place between different individuals.³⁷⁴ Because the plant does not reach a level of genuine relationship between living individuals, he thinks that its internal differentiation into sexual organs can only be the beginning or adumbration of the genus-process. Moreover, he argues that a proper sexual relationship occurs between different individuals whose sexual determinacy pervades their entire being. But Hegel thinks that the plant is asexual: reproductive organs are only members of one and the same plant, and they form an isolated circle “apart from their individuality.”³⁷⁵

But anyone who is minimally acquainted with plant life would know that fertilization occurs between different plants. In fact, although self-fertilization is possible and in certain circumstances more advantageous, on the whole, cross-pollination is more common and favorable. Hegel is much more than minimally acquainted with the plant biology of his time. Indeed, with the question he raises about the possibility of sexual relation in the plant, Hegel acknowledges fertilization.³⁷⁶ However, he concludes that fertilization is not a *necessary* process of plant life. Since plants already propagate by budding, by stolons or other members that come into contact with soil, sexual reproduction in plants is “a play, a luxury, a superfluity for propagation.”³⁷⁷

³⁷⁴ PN, 342–44 (§348 and §348 Addition); *Werke* 9:419–22.

³⁷⁵ PN, 345 (§348 Addition); *Werke* 9:422.

³⁷⁶ In his formulation of the question of whether there is sexual relation in plants, he uses the word ‘Befruchtung’ which means both fertilization or pollination and impregnation. He writes: “Es ist daher eine berühmte Streitfrage in der Botanik, ob wirklich bei der Pflanze erstens Sexualunterschied, zweitens Befruchtung wie bei den Tieren vorhanden sei.” *Werke* 9:420. Soon in the same passage he paraphrases the second question in terms of the possibility of “copulation” (“*Begattung*”).

³⁷⁷ PN, 345 (§348 Addition); *Werke* 9:423.

Hegel goes further, and most likely being influenced by his botanist friend Franz Josef Schelver, he argues that pollination is not necessary for the fertilization and the ripening of the seed.³⁷⁸ He notes that most plants are hermaphrodites, while there are also a few species of dioecious plants, that is, plants in which the two different reproductive organs (stamens and pistils) are distributed to two distinct individuals. Yet even some types of those plants, he indicates, can change sexes at some point in their lifetime. His main point is that the sexuality of these plants lies merely in the production of a particular organ. That sounds as if Hegel overlooks the fact that there are sexually dimorphic plants even though he does speak of dioecious plants. In sexual dimorphism, the dissimilarity between the plants of the same species goes beyond having different sex organs. Besides, insofar as living individuals are subordinated to their species being as the latter's means to sustain itself, it is also conceivable for the entire plant to be determined in accordance with its sex in a way conducive to pollination.

However, given that the actual sexual process between plants barely affect the rest of the plant, Hegel is still correct in pointing out the isolation of sexual organs and their relative aloofness from the participating plants' individuality. The fact that the plant completely loses its reproductive organs yet continues to flourish is an indication of the relative independence of the individuality of the plant from its sexuality, even though there are similar examples in the life of animals.

As we will discuss in more detail, animals of the same or related species that are differentiated by sex come to a common identity both in the product of copulation and in what

³⁷⁸ "Now if we ask whether a plant can bear ripe seeds without the pistil receiving pollen from the filaments and anthers, the answer is that in some instances the plant does not bear ripe seeds, but in others it certainly does. The position generally is, therefore, that in most plants *contact* of the pistil with the pollen is a condition of fertilization, but that in many plants fertilization occurs without contact being necessary." *PN*, 346 (§348 *Addition*); *Werke* 9:423. Perhaps Hegel has in mind what today is called agamospermy, a form of apomixis, that is, development of the embryo without fertilization.

Hegel refers to as “the sense of unity.”³⁷⁹ By contrast, Hegel argues, the affirmative identity of the plant is already present in each and every member, and therefore, the plant does not need its other to demonstrate its universality. But Hegel seems to be overlooking the fact that with cross-pollination, not only individual plants but also plant species are sustaining and differentiating themselves in and through their complementary differences. In this regard, plant reproduction does not look too different from animal sexual reproduction. In both forms of life, it is possible to speak of hybrid speciation wherein individuals from different species hybridize to form a new species being. The character of such relation goes beyond the possession of particular organs, but involves individuals with substantial differences. Even plants, which can propagate on their own, may thus be able to demonstrate an aspect of their determinacy only by means of a relation with an other.

It is true that unlike sexually reproducing animals, plants cannot come to a common identity in the feeling of unity engendered by the reproductive act. However, Hegel’s emphasis on this aspect of sexual reproduction is not as significant as he seems to think of it. In the next section, we will speak about why it is also problematic to explain animal sexual reproduction in terms of this feeling of unity. For the time being, we can at least note that the feeling engendered by sexual relation is not necessarily tied to reproduction, and to that extent, the fact that plants cannot feel may not be a good criterion to distinguish between plant and animal reproduction.

On the other hand, the feeling that prompts the animal into sexual relation is more directly associated with the main contrast between the plant and animal reproduction. When Hegel lays out the differences between the life-process of the plant and the animal, he explains how they arise from the plant’s deficiency in subjectivity and individuality. Surprisingly, we do

³⁷⁹ *PN*, 347 (§348 Addition); *Werke* 9:425.

not see the same emphasis as regards reproduction even though the same deficiency seems to be the most substantial difference. After all, just as the plant does not have significant control over its nutritive process and is rather dependent on the immediate availability of nutrients, it does not actively govern its reproductive relation either.

For one, the plant does not feel the need to reproduce. Thus there is no internal desire that would urge the plant into action. Even if the plant had such a desire, it would have been mostly redundant as long as the plant does not have the means to actively satisfy that desire. The plant cannot change its location or centrally control the motion of its parts, just as it cannot perceive its sexual partner. Consequently, it cannot actively seek for its mate. On the flip side, one can argue that the plant does not need to actively seek for its mate. Plants do have myriad of strategies for reproduction, but they mainly consist of developing structures that enable propagule dispersal or pollination without the plant having to put any effort. Although plants develop these structures from within their own life-process and as a result of their dynamic interaction within their biospheres, they leave the main work to external factors. They require winds, waters, and animals to disperse their seeds, spores, and pollens. Accordingly, they develop seeds that can float in water or cling on to other mobile things, pollens that winds can easily carry to the pistils of other flowers, fragrances, deceptive looks, and tasty fruits that can attract pollinators or animals that help spreading seeds. Perhaps one of the most interesting cases in this context is plants that can shoot their seeds out of their seedpods, a strategy also known as ballistichory. But this phenomenon occurs due to internal tension within the seedpod, which is itself triggered either by dehydration under sunlight or by the growth of the fruit. Thus it does not involve any real agency on behalf of the plant.

Similar to a chemical reaction, the sexual reproduction of the plant depends on the presence of a suitable external factor to go underway. But of course, the outcome of the

reproductive process is neither a neutral chemical product, nor is the match between the plant and the mediating agent a given factor. To the extent that the plant determines the particularity of its members and constitutes the specifications of its determinability from within itself, it is still a self-determining individual. In view of that, its sexually related traits and process cannot be conceived independently of its self-preserving, purposive nature. However, even though the plant uses all these strategies to preserve and propagate its identity in the world, it does not do so by virtue of its subjectivity or any sort of centrally governed activity. This is evident from the fact that the plant members that play a role in the reproductive process, such as its pistils or stamens can carry out their function without the involvement of the entirety of the plant. Surely enough, the development of the seed from the ovules need to occur within an organic unity that requires a complementary working of other members. However, because different members of the plant can equally be considered as relatively independent individuals, the reproductive process can take place in a certain part of the plant relatively independently of others. Again this is manifest in the examples of grafting where a single tree can grow several different kinds of fruits at the same time.

6.2. ANIMAL REPRODUCTION

In his addition to §367, Hegel states that the genus-process consists in the genus' coming to existence in distinction from individuality.³⁸⁰ This distinction first comes to pass when the genus, as the universality that pervades the existence of the animal, relates to itself through what Hegel would call the sublation of its immediate material constitution, whereby the genus demonstrates its relatively independent existence from its constitutive materiality. Such self-relation is indeed common to all three processes of life, namely, its formation, assimilation, and reproduction.

³⁸⁰ *PN*, 410–11 (§367 Addition); *Werke* 9:498–99.

In the internal process of formation, the animal sustains its organic unity through the dynamism of its own internal constitution of complementary organs. In that case, the universality of the organism is the implicit and immediate unity that upkeeps organs as the complements of a system. But in the other two processes of assimilation and reproduction the self-relation is mediated; the universality of the animal sustains itself over and above its immediate existence by means of a relation to its other. Indeed, because the animal is situated in an inorganic world, it has to maintain its unity over against that world. But the animal validating its power over its objects in various forms of assimilation is equally the genus demonstrating its freedom from the particularity of its immediate composition.

The genus-process proper carries this demonstration one step further. With reproduction, the universality that pervades the nature of the animal goes beyond the existence not only of the animal's immediate constitution but also of the very individual animal itself. And it does so by a self-mediation insofar as the participants of the process are its own constituents. Mating animals relate to one another in such a way that the product of their interaction retains their common identity irrespective of whether they themselves live or die. The genus survives, so Hegel argues, the death of the individual. Nevertheless, Hegel does not fail to note that this independence of the genus from the individual is not yet an absolutely free existence. The genus is still bound up with individuals even though it demonstrates its distinction from them. In other words, it does not exist by itself, without being embodied by its own particular individuals.

Before we go into the details of the sexual relation, we should note that reproduction is not the only form of genus-process as Hegel conceives of it. In his exposition, we see that this process shows itself in three main forms and equally at three different levels of the animal life. These two other forms of the genus-process are speciation and disease/mortality. In line with the rest of our examination, we will keep our discussion of these two processes brief and mainly

limited to Hegel's own remarks, and move on to Hegel's characterization of the animal's reproductive process.

6.2.1. Speciation as a Form the Genus-process

In speciation, the genus differentiates itself into different species. Hegel's brief account of speciation is a clear indication of the aimed-at universal hold of the philosophy of nature. Underlying various forms of animals, argues Hegel, is the one universal kind. "There is only one animal type," he writes, "and all the varieties are merely modifications of it."³⁸¹ This one universal kind refers to the concept of the animal, which, however, cannot but exist as embodied in particular forms. Being situated in a physical world, the particularity of the animal is inevitable. The animal, as Hegel puts it, "*qua* a natural life, is still essentially an immediate existence, and therefore is determinate, finite, and particular."³⁸²

The living being is self-differentiating insofar as its life-process involves adaptation to given circumstances. Nonetheless, from the very moment of its emergence, whether considered as an individual or a genus, life is still subject to external contingencies that play a role in its further differentiation. Hegel briefly speaks about the ways species are differentiated as a function of their environments including the general medium, climatic factors, available food sources, and coexisting life forms. What is worth noting about these modifications is that they are often systemic rather than piecemeal. As Hegel puts it, the particularity of the organism permeates every part of its constitution and harmonize members with one another.³⁸³ Any partial modification that affects the animal must be accompanied by modifications in the rest of the system. From a broader perspective, the specific complementary interaction between the

³⁸¹ PN, 421 (§370 Addition); Werke 9:503–04 (§368 Zusatz).

³⁸² PN, 417 (§370 Addition); Werke 9:502 (§368 Zusatz).

³⁸³ PN, 421 (§370 Addition); Werke 9:507 (§368 Zusatz).

internal process and the outer articulations that connect the organism with the external world rests in this joint development. As Hegel emphasizes in his additions, the carnivorous organism requires a different combination of viscera and external appendages compared to that of the herbivorous one.

The differentiation of the one kind of animal into different particulars can also be read in terms of the development of true subjectivity and individuality which starts with a simple self-feeling organism and culminates with the rational animal. The differences between the extents to which different species fulfill subjectivity and self-determination can be a subject matter of another work that involves an account of different mental faculties. But at the most general level, the genus that signifies the universal animal kind sustains itself regardless of the particular forms of its species. Similarly, any particular species maintains itself as a universal by virtue of its individual members that are different from one another.

One particular differentiation, that of sexes, is especially conducive to the preservation of the species, as it enables species members to actively participate in the preservation of their species in and through their relationship to one another. However, the genus can differentiate into species, or species can differentiate into different kind of members in ways that do not involve sexuality but still result in relationships that concern life beyond individuality. Although Hegel emphasizes the hostile sort of relationship that involves the death of species members, one can also think of intraspecies and interspecies cooperation some of which do not directly involve reproductive relations.³⁸⁴ Such dynamic relations can be considered as the internal processes of the genus which preserves its identity in difference. Yet the only affirmative

³⁸⁴ It is nevertheless worth asking, as we did in Section 3.1.1, whether there are any other sorts of ecological relationships between animals that do not already presuppose sexual reproduction.

relation that Hegel speaks of is the sexual relation where individuals that are external to one another still constitute a common identity in their interaction.

6.2.2. Disease as a Form of the Genus-process

Hegel classifies disease as another moment or category of the genus-process. Disease signifies an internal differentiation, but one that does not facilitate a unity of multiplicity. On the contrary, it is the disruption of the harmonious and complementary workings of internal organs, a conflict between one or more organs or systems with the concept of the individual, which is to say, the principle of the organs' unity and differentiation.³⁸⁵ But because it signifies a falling asunder rather than a perseverance, such a disease by itself does not amount to a return of the universal from its particularity. In this regard, it should rather be the recovery from the disease that stands for a moment or form of the genus-process. Recovery consists in the living individual's overcoming of difference that emerges from within itself. It is still different from the immediate unity of differences in self-production, which can also be considered the norm or health of the living thing. For in health, there is a due proportion of organs, which, Hegel says, are "fluid in the universal."³⁸⁶ In other words, their particularity is not at odds with the unity of the organism as a whole. By contrast, in recovery, which is manifest in fever, the body fights against the internal difference that posits its own individuality apart from the system and performs like an external power. As Hegel puts it, it "establishes itself in isolation and persists in its particular activity against the activity of the whole, the fluidity and all-pervading process of which is thus obstructed."³⁸⁷ Recovery is thus the restoration of this fluidity and universality of

³⁸⁵ *PN*, 428; §371; *Werke* 9:520. Later on, Hegel argues that disease proper is the disruptive particular's becoming the center or the self of the organism. Accordingly the disease is the "dual life" or conflict between this invasive self and the "universal self." *PN*, 434 (§372 *Addition*); *Werke* 9:526–27.

³⁸⁶ *PN*, 428 (§371 *Addition*); *Werke* 9:521.

³⁸⁷ *PN*, 428 (§371); *Werke* 9:520.

the organism by an overcoming of otherness. Although it is in this sense similar to appetite, where an internal lack drives the animal to assimilate its other, the difference is that in recovery the conflict is internal and is not between the organism and an object of need.

Although the animal is capable of overcoming the disruption, in Hegel's words, it "can just as well succumb to it."³⁸⁸ In fact, Hegel does not only argue that the animal does not necessarily recover from disease, but also that it necessarily dies of disease. In recovering from a particular disease, the animal does not put an end to its inherent inadequacy as an individual being. It is necessarily and inherently an inadequate being; "disease is in its very nature."³⁸⁹ Because it is an individual with objective existence, it lacks the absolute fluidity of the universal that nevertheless pervades its being. Hegel states that "this disparity between its finitude and universality is its *original disease* and the inborn *germ of death*."³⁹⁰

The connection between the necessity of this original disease and individuality is nevertheless not adequately elaborated in the text. The closest and most explicit explanation to this necessity is the habitual character of life. Habit plays the main role in the organism's self-induced destruction. But how is a capacity that makes life easier for the animal is also that which eventually destroys it? Habit is a basic process of animal individuation. It is the way in which the animal constitutes a second nature for itself over and beyond its immediately given nature. In and through its confrontation with the external world, the living thing strives to overcome the alien character of its other, and to assimilate it into its own being. But whatever confronts it is a particular object, and accordingly, in its struggle, the living thing determines itself in a particular way. The more the organism has to deal with the same kind of beings in its biosphere, the more

³⁸⁸ PN, 440 (§374); *Werke* 9:534.

³⁸⁹ PN, 441(§375 Addition); *Werke* 9:536.

³⁹⁰ PN, 441(§375); *Werke* 9:535.

accustomed to particular ways of assimilation it becomes. Thus, in giving itself a particular determinacy, the animal transforms its physiology, and constitutes a second nature, which may cause the animal to gradually lose its resilience and adaptivity, and become more susceptible to external factors with which it is not accustomed to deal. Habituation inures sensitivity and irritability in general, which are the fundamental capacities enabling both the internal and the external processes of the animal. The dulling of these faculties would also mean a waning ability of the animal to distinguish itself from others, which is a common way to speak about the effects of aging on immunity. This is how, Hegel says, the process of animal life becomes “the inertia of habit,” which eventually “brings about [the animal’s] own destruction.”³⁹¹ Habit is thus life-process that becomes deadened and ossified. As Hegel puts it, “the living being, as a singular, dies from the habit of life, in that it lives itself into its body, into its reality.”³⁹²

“In the end,” Hegel argues, the genus of the animal, its universality as a member of a species, “retains the upper hand.”³⁹³ Even if the particularity of the animal leads to its eventual death, its universal being subsists in other particulars.³⁹⁴ Insofar as the species does not become extinct, the death of the individual demonstrates the independence of the genus from the individual. To that extent, the perpetuation of the genus in and through the “original disease,” namely the inherent death of its particulars, is another aspect of the genus-process as Hegel construes it.

³⁹¹ *PN*, 441(§375); *Werke* 9:535.

³⁹² *PN*, 442 (§375 Addition); *Werke* 9:536.

³⁹³ *PN*, 442 (§375 Addition); *Werke* 9:536.

³⁹⁴ Hegel’s account brings to mind two distinctions made by empirical science. The first one is the genotype/phenotype distinction. But instead of limiting the universality of the organism to a particular constituent, Hegel conceives of it as the pervasive concept that cannot but be expressed in particular characteristics. The other distinction is the one between the innate and the acquired/adaptive immune systems. Whereas the innate system corresponds to the more generic or universal defensive system, the adaptive system is developed in and through the particular dealings of the animal.

However, we can still ask whether the genus necessarily depends on the death and succession of its individual members. The death of the individual might be beneficial for a certain population because of resource economics or the costs of taking care of the older animals. One can maintain that as long as the planet on which the species exists has to have limited resources, the population must equally be limited in number. But if this is not compelling enough, one can also think of Hegel's account of the necessity of death from within an evolutionary perspective and argue that heritable variation is the necessity of the genus which entails the elimination of the less fit individuals of a population. Just as the death of the individual derives from a lack of differentiation, the perpetuation of the genus hinges on its differentiation from the immediacy of its incompetent members. However, this line of thought would require much more elaboration, which unfortunately falls far too outside the purview of this study.

But at least we can admit that if the genus is to survive the death of different individuals, it will require, in the first place, reproduction of some form. It is in reproduction, more than in any other form, that the genus-process proper reveals itself. Furthermore, as long as it involves an interaction between individuals or internal constituents, it also entails a self-differentiation in objectivity. However, as we have already discussed in our examination of the logic of the genus, Hegel explicates reproduction specifically as a sexual relation despite the fact that the animal world showcases several kinds of asexual reproduction. In what follows, we will first examine Hegel's account of sexual reproduction in animal life before we discuss the exclusion of asexual forms of reproduction from this account.

6.2.3. The Sex-relation

Like the nutritive process of animals, the sex-relation starts with the feeling of a specific need. Hegel's account of the inherent deficiency that underlies this feeling of the need is not

self-explanatory. Broadly speaking, it stems from the discrepancy or tension between the individual and its genus, which exists immanently in that individual. The lack of concurrence shows itself in the particularity and complementarity of the different individuals of the same species. Although Hegel does not spell this out in the main paragraph, his following additions clearly suggest that this complementarity rests on the differentiation of sexes.³⁹⁵

Hegel claims that the animal's instinct is "to produce itself as a self-feeling,"³⁹⁶ but as long as its sexual determinacy entails coming to completion via another, it feels the need to feel itself in the individual of the opposite sex. Thus the animal is driven to copulation with its complement in order to feel "its own self" in it, "to integrate itself through union with it."³⁹⁷ In this self-feeling, Hegel sees the unity of the other two processes, namely, formation and assimilation, as reproduction involves a self-feeling through another and in another. Mating animals feel themselves in their interaction with an animal of the same or related species without, at least ideally, assimilating or transforming one another. This activity is, for Hegel, their becoming what they are in themselves over and above their particularity: one and the same genus.

But even if it is meant to account for the universal features of the sexually reproducing animals, Hegel's emphasis on the association between the genus and the feeling of unity in the other is questionable on several grounds. Sexual reproduction of the animal, counting its most sophisticated species, is not always a relation of *mutual* need and desire. In the case of sexual coercion, both the desire and the feeling of satisfaction can be one-sided. On the flip side, a sexual relation that brings satisfaction to the animal can take place between members of species

³⁹⁵ See Alison Stone, "Sexual polarity in Schelling and Hegel," in *Reproduction, race, and gender in philosophy and the early life sciences*, ed. Susanne Lettow (New York : SUNY Press, 2014), 266–67.

³⁹⁶ PN, 412 (§368 Addition); *Werke* 9:516–17 (§369 Zusatz).

³⁹⁷ PN, 411 (§368); *Werke* 9:516 (§369).

that cannot even interbreed. Besides, even animals that can breed together can engage in sexual relations that engender feeling without producing offspring. If the genus-process involved such relations that do not end up with procreation, Hegel's recurrent references to the continuity of the genus at the expense of its individual members would have totally lost its force.

Accordingly, one would want to argue that Hegel is speaking only about the kind of relations that can produce offspring. However, insofar as we cannot distinguish between fecund and barren relations in terms of feeling, the feeling of unity would seem to be irrelevant. It is true that all fundamental processes of life, at least in part, involve overcoming otherness. To that extent, the genus-process that Hegel has in mind consists in overcoming the otherness of another animal, which at least theoretically takes place in the feeling of unity that Hegel speaks about. However, the animal goes through a similar process in assimilation, which also starts with the need and ends up with satisfaction. Therefore, to be able to consider the sexual relation as the genus-process proper, it must be distinguished from relations of assimilation. In most cases of sexual reproduction, copulating animals remain intact, without being converted into the matter of one another. Nonetheless, there are other relations, such as mutualism, that include interactions between animals in which either or both animals treat the other as its means for its self-preservation without annihilating it. However, as long as none of these relations involve a direct interaction that is driven by desire or instinct, or culminate in self-feeling in the other, Hegel's emphasis on the feeling of unity may not be entirely irrelevant either. Like the nutritive process, sexual relation starts with a need and the accompanying desire, but it does not get rid of its object. Besides, at least in some cases, sexual relation allows both individuals to satisfy their needs, however temporarily. All in all, these differences may still not be sufficient to explain why Hegel does not explicitly speak about how sexual relation involves individuals that

treat the other as a means to their own satisfaction, although such instrumentality is not necessarily in conflict with the idea of a higher universal that subordinates these individuals and their desires to its own perpetuation.

On the other hand, Hegel goes beyond the unity in feeling, and argues that the unity and identity of copulating individuals come to a concrete existence in the ultimate product of their interaction, namely, the offspring. This new individual, which embodies the unity of the reproducing individuals, Hegel says, is the “realized genus,” an asexual life wherein the differences of the parents perish. Nevertheless, because it is still only an individual that is “destined to develop into” a perishable member of a particular sex, the realized genus does not exist as a genus on its own account. In other words, the genus cannot release itself from its dependence on the existence of individual members, even though it does demonstrate its independence from their particularities. The genus-process that pertains to animal life, thus, cannot go beyond the “spurious infinite progress” of propagation.³⁹⁸

We have already argued that Hegel does not organize his explication of the genus-process of the plant and animal life with much reference to the extent of subjectivity these two life forms exhibit, although the unitary subjectivity of the animal is central to the difference between animal and plant reproduction, as is the case with the process of assimilation. We have explained that in plant life, reproduction is barely distinct from metabolism and growth. In animal life, the difference is indisputable, although the process does incorporate the metabolic activity of the copulating individuals. Even if we think of sexual reproduction in plants, it occurs on a local base, by the mediation of external agents, and without any involvement of the plant as a whole in the process. By contrast, the entirety of the animal is involved in copulation, and carries out this process mostly independently of external agents.

³⁹⁸ *PN*, 414 (§369); *Werke* 9:519 (§370).

To begin with, the motivation that drives the animal into action derives from the feeling of the need and the desire for the object that can satisfy it. This also suggests that it is not an ongoing process. In most cases, the prospective mate is of the same or related species, which is desired and identified not necessarily consciously, but mostly on account of feelings, predispositions, and instincts. Of course, mere desire and sexual urge are not by themselves sufficient, unless the prospective mates just coincidentally flock to each other. Before taking action, animals require the means such as sensation and/or perception to be informed of the existence of a prospective mate in the vicinity. They also need centralized bodily control not only to approach their mates, but also for the copulative act itself.

By being able to identify members of their species and to be attracted to them, animals perpetuate their species. But the involvement of the sexually reproducing animal in the genus-process is not limited to sexual intercourse. In laying eggs or pregnancy, that which is to become an independent individual is developed and differentiated from within the internal process of the parent with material contribution coming from both parents. In this process, at least in most cases, the irritability of the animal does not respond to the developing embryo as if it is a foreign object. It rather treats it as a member of the same universal it embodies.

The recognition of the universality shared by different individuals is also exhibited in the way the developed animal cannot remain indifferent to its offspring. Feelings and instinctive urges play an important role in the animal's nurturing behavior. But unlike the instincts that are tied to the assimilation process, which on the surface aims at the individual survival, parental instincts directly point to the survival of the species being. Many animals both feed and protect

their offspring until they become able to sustain themselves, and in turn, to perpetuate their species being.³⁹⁹

On the other hand, animals also develop traits that help them avoid breeding with their kins, that is to say, with animals that are most closely related to their individual determinacy. This allow animals to diversify their strengths and get rid of certain flaws or drawbacks, especially given the changes in environment. After all, for Hegel, the significance of sexual relation must be tightly connected with the opportunity it provides for the genus's self-preserving self-determination.

Nevertheless, although by far the most prevalent, sexual reproduction is not the only form of animal reproduction. One might argue that even though Hegel thinks that asexual forms of reproduction do not represent the function of reproduction that "has attained to a developed existence," he still could have spoken about them under the genus-process. Many marine creatures such as corals, sea anemones, and hydras, as well as some species of worms, can reproduce by budding, although they are all capable of reproducing sexually. These creatures are rudimentary forms of animal life and all of their fundamental features bear resemblance to those of vegetative life as they do not involve much difference between the internal and external process, their subjective activity is minimal, and their shapes and boundaries are not as definitive as the more developed forms of animal life. As its name suggests, budding is analogous to budding in plants, although it is equally similar to sprouting from the seed, as in the latter, the new individual, once sufficiently developed, becomes spatially distinct from the

³⁹⁹ "But the perfect animals still behave as genus to this existence, for in it they find their universal; these are the mammals, and those birds which hatch out their young. Of all animals, monkeys are the most docile (*bildsamsten*) and have most affection for their young; the satisfied sexual instinct persists for them in objective form, for they have passed over into an other, and in caring for the needs of their young, they have the higher, disinterested intuition of this unity." *PN*, 426 (§370 Addition); *Werke* 9:514 (§368 Addition).

parent organism. In a way similar to budding in plants, the differentiation of the offspring from the parent is superficial, and the process as a whole is not much different from the process of assimilation. In this sense, propagation by budding may equally or better be regarded as cloning than reproduction. As regards these points, reproduction by fragmentation is not much different from budding, except that new individuals develop from the fragments that are already separated from the parent.

The more interesting case of asexual reproduction is parthenogenesis, where the offspring develops from an unfertilized egg. Even if it is still relatively rare, parthenogenesis is observed in several different species of animals, including some species of vertebrates. Concerning some reptiles, birds, or insects that reproduce by parthenogenesis, one can still speak of an internal differentiation of “sexes” exhibited by the differing maternal gametes. In fact, as long as meiosis is involved, there is always a material exchange that ends up with the differentiation of the end product. However, in ameiotic or apomictic parthenogenesis, one cannot even speak of a proper meiotic variation. When reproduction is limited to mitotic division, the differentiation of new individuals is mostly contingent on the environmental circumstances and their developmental histories. Accordingly, there are examples of animal reproduction which exhibit a minimal degree of self-differentiation of the offspring.

CONCLUSION

THE SCOPE OF LIFE

Having offered a comprehensive commentary to Hegel's categorization of life in the *Science of Logic* and his account of natural life forms in the *Philosophy of Nature*, we now revisit the main points of the study from a broader perspective, rearticulate our own conclusions in their connection with one another, and provide clarifications for some issues that are otherwise left open ended. We will first reconsider what Hegel thinks to be the fundamental features of life in a way that directly relates their logical determinacy to their realization by the different forms of life. We will bring our exploration to a close with a consideration of life with respect to Hegel's idea of freedom as self-determination.

A. Life Inwards: The Unity, Self-Relation, and Subjectivity of Life

In Chapter One we sought to show that the logical categorization of the living individual involves a distinctive internal constitution. Although it is possible to think of this constitution as a basic form or structure of life, it actually consists in a self-sustaining process. Like any individual, the living thing is a unity of multiplicity. Its multiplicity, however, does not consist of externally aggregated or assembled parts. We have explained that the part-whole relationship falls short of the internal constitution of the living individual given the intrinsic indifference of the parts to the whole and of the whole to its parts. The living individual is rather constituted of a system of organs whose subsistence depends on their collective network of means-end relationships.⁴⁰⁰

⁴⁰⁰ See Section 1.1.1.

The living individual reiterates the internal pattern of the concept, but in a way peculiar to the domain of the Idea where the conceptually determined particulars also have objective being.⁴⁰¹ Organs are those particular objective constituents of the system of life, which has a universal identity on account of the unique network of complementarity that it accommodates. The objective existence of organs is pervaded by a shared, universal character which is itself emergent in their synergetic process. In contrast to aggregated objects, they share a universal identity of their own doing. Like objects, organs interact with one another, but their interaction is unlike (i) mechanical relationships that are indifferent to their terms and (ii) chemical relationships that bring about a further product at the expense of the interacting objects.⁴⁰² Organs do enter into mechanical and chemical relationships with one another, but thanks to the external determinability of these relationships, all organic interactions are specifications of the universal character of the organism. For these interactions take place, ideally speaking, only as long as they are conducive to the perpetuation of the entire organism. Although all organs thus operate purposively, unlike in external teleology the end they realize is not an external or merely subjective concept that is imposed from without and independently of their process. The end is rather the unity and concept of their own process, which itself comes to operate as the means to realize each constituent.⁴⁰³

Because both the organs and their unity are purposively determined to continuously realize or sustain themselves, their activity in its totality is always and immediately self-driven. But organs are also intrinsically driven to distinguish their activity from the rest in a way that

⁴⁰¹ See Section 1.2.1.

⁴⁰² See Section 1.1.2.

⁴⁰³ See Section 1.1.3.

maintains the whole, providing the living individual with its ideal character.⁴⁰⁴ Organic unity entails an internal differentiation without which particular organs could not be distinguished from one another. The means-end relationship between organs suggests that each organ is realized by means of other organs. This requires that each organ is determined differently from the rest, and given that the determinacy of each organ involves its activity, it equally means that each organ has to perform a different function through which it can provide for the others what the latter cannot provide for themselves. In this way, the totality of organs sustains the entire organism, thereby making it the organic unity of the living individual.⁴⁰⁵

If we go back to our elucidation of natural forms of life, we see once again that different forms of life in nature demonstrate these specifications of the organic unity to different extents. All living things are self-sustaining processes that maintain a unity and identity of differentiated members. But the animal, as explicated in the *Philosophy of Nature*, is the paradigmatic case of internal differentiation. Although both the animal and the plant exhibit internal differentiation of members from within themselves, unlike plant members, animal organs do not develop into potentially independent individuals that can further differentiate into different organs. In the animal, organic differentiation is final in form and number. Every organ performs a different function, while each is indispensable to every other and to the unity of the whole. It is accordingly less of a problem to think plant members in terms of mere parts, as there is no particular member that is indispensable for a developed plant. Also, animal organs retain their character and subsist insofar as their synergetic process perseveres.⁴⁰⁶ Plant members, by contrast, continuously give way to new members in a way that diminishes the distinction

⁴⁰⁴ See Section 1.2.2.

⁴⁰⁵ See Section 1.2.3.

⁴⁰⁶ See Section 2.2.1.

between its internal and reproductive processes. On the basis of these reasons, Hegel states that the animal unity is a fully achieved unity that demonstrates ideality, an overcoming of the externality and indifference of its objective constituents. Ideality is not attained to the same degree in the plant because of the vestiges of objective indifference and independence that still pertain to its members.

Nonetheless, it is important to keep in mind that in his account of the animal, Hegel is not speaking of a specific species that exists on some planet. He argues that one must conceive of the living thing in its most developed form, and accordingly characterizes a universal type of natural living thing he calls the animal.⁴⁰⁷ Just as there are specific kinds of animals such as mammals or human beings that express the content of his characterization more thoroughly than others, as Hegel admits, there are many animal organisms that do not attain ideality to the degree that this characterization sets forth. Not only does nature always contain imperfections, but certain species of animals are less developed with respect to their unity, ideality, and internal differentiation. For the same reason, it is completely natural for there to be organisms that fall in between plant and animal forms with respect to how these forms are characterized by any true philosophy of nature. Accordingly, even though Hegel's exposition of the animal form and his additional remarks in particular often seem to be based on specific examples from the domain of mammals or even from human anatomy, those examples should best be regarded as illustrations of the universal type, which we have attempted to illuminate in this work.

This connection between the logic of organic unity and its demonstrations in externality still leaves us with an important question: the status of single-celled organisms. It appears that partially because of the limits of his empirical knowledge of microbiology, Hegel does not speak much about microorganisms. When he does, he speaks of them as spontaneously developing

⁴⁰⁷ *PN*, 421 (§370 Addition); *Werke* 9:508 (§368).

points of life, whose status in the development of life forms is situated between the geological organism and the plant. In one sense, the single-celled organism must indeed be ontologically prior to the plant, as the latter presupposes the possibility of interaction among cells. Every plant member is itself constituted of smaller units of life, which are internally determined to execute certain functions. But we know that a single cell is capable of sustaining its life on its own account. More importantly, with its organelles, a single-celled organism exhibits the internal differentiation of members in a way similar to animal organs. Organelles are not only necessarily interdependent like animal organs, but they also have a fixed number.

The logical account suggests that the immediacy of life finds its initial, differentiated structure as ready at hand, which it at once starts reproducing. The correlate of this immediacy in nature would be the first and the most primitive organisms that occur as a result of blind chance. But the organelles are relatively complicated structures that can develop from within the organism. Because they engage in metabolic interaction and asexual reproduction, the internal differentiation of bacteria, as now understood, for example, cannot be considered as merely given by nature. Hence, considering only its level of internal differentiation and the determinate number and structure of its organelles, the single-celled organism demonstrates the determinacy of the living individual a bit more accurately than does the plant.⁴⁰⁸ Correspondingly, if the living individual is nothing but the organic unity of necessarily interdependent organs, the single-celled organism would represent life in nature perhaps as much as does the animal. Indeed, it is with respect to the structure of the single-celled organism that the autopoietic accounts of life theorize the nature of the living individual.

⁴⁰⁸ Of course, one may rightly protest that this claim overlooks the fact that the plant consists of different kinds of cells all of which are also internally differentiated. But here the emphasis is on the determinate character of those differences.

However, even if the logic of the living individual still leaves room for ambiguity, it appears to contain more than what is expressed by the organic unity of a single-celled organism. The logic of life, to some extent, anticipates Hegel's stance with respect to the scales of development in the animal kingdom. Just as we first need to conceive of the most developed animal determinacy in order to make sense of lesser developed examples of animal life, we need to first lay hold of the idea of a sophisticated living individual in order to speak of different gradations in the living nature.⁴⁰⁹ However, this is only partially true given that the logical account of categories is itself developmental, and therefore, different natural determinacies can also correspond to certain moments of the logical explication. In any case, given the immanent derivation of natural determinacies themselves, it would not be reasonable to expect any one-to-one correspondence between those moments and natural forms of life, although it would still be permissible to think of the rudimentary organisms in line with the initial descriptions of the living individual.

But if we stick to Hegel's account of the living individual, the adherence of the single-celled organism to the determinacy of the living individual cannot be maintained for long. As we have repeated several times, the logic of the living individual tends toward a characterization of an organic unity that is permeated by a unitary, centralized subjectivity that is capable of inward determinacy. Thus the sophistication that neither the plant nor the single-celled organism expresses lies in the truth of the soul or the capacity of subjectivity. When Hegel speaks of the negative unity of the living individual, he characterizes it as true centrality that can relate to its externality as a unitary subject. In connection with this he speaks of sensibility and irritability in

⁴⁰⁹ It is worth noting that this does not mean that the animal should be conceived before the plant. It rather means that living things in nature should best be thought with respect to the philosophical concepts of the plant and the animal. Nevertheless, it is hard to say that Hegel makes the same emphasis with respect to the plant.

ways that evoke centralized subjectivity, which was the reason why we were at pains to formulate Hegel's account of the fundamental capacities of the living individual in terms that would also apply to organisms less developed than the animal with respect to subjectivity and self-determination.⁴¹⁰ Given our construal of sensibility and irritability in terms of less complex and distinct capacities of sensitivity and responsiveness, we showed it is possible to consider non-animal living things as actively self-distinguishing subjects. Nevertheless, we also pointed out that Hegel's specification of those functions and references to feeling suggest that the determinacy of the living individual is expressed most completely by the animal, which is also corroborated by his remarks in the *Philosophy of Nature*.

The problem of the "plant soul" can also be viewed in the same light. The concept and the subjectivity of the living individual is its soul, whereby the soul means *at its least* the permeating unity of mutually external members that wind up working for the same end that involves their own subsistence. It thus signifies the minimum ideality of the organism that the vegetative nature also displays. Yet Hegel makes it explicit that the plant does not have true subjectivity or soul. Although any organic unity, unlike mechanical and chemical processes, is in its entirety a self-instigating and self-driven process, the plant lacks the capacity of self-animation that the animal soul entails. It lacks the true centralization of the self and it is self-related not through an inward determinacy, but only by virtue of a self-sustaining process of externality. And the same goes for rudimentary organisms such as bacteria and intermediate forms such as fungi and organisms that Hegel refers to as infusoria. Nonetheless, all this should not mean that these specific organisms do not qualify as living individuals. Although they fall short of the developed determinacy of the living individual, they are still natural processes that are irreducible to mechanical, chemical, and teleological ones.

⁴¹⁰ See Section 1.3.

We should, however, restate that there are specifically natural features that make ensouled things possible in nature. These features not only distinguish animals from other forms of life, but they also lay bare the difference of the natural account of life from the logical one. As we have explored in detail in Section 4.2, these features mainly concern the infrastructure of unitary subjectivity, which itself depends on a unified field of sensitivity and organs and structures that support and facilitate it. Hegel's specifications of animal structure might occasionally be going beyond the boundaries set by the precepts of an immanently developing explication of universal determinacies in nature. Perhaps those parts of his account can be further released from an attachment to earthly or anthropomorphic phenomena. But here, what we would like to emphasize is that even in its purely natural formulation, the natural determinacy of the animal would still be different from the living individual as a purely logical category. While the logic of the living individual speaks of the logical structure of unitary subjectivity and its distinctive self-relation, it does not and cannot specify the necessary physiological framework that can realize it in nature. But this absence of further specification is that which allows the logical account of living subjectivity to apply also to non-natural or spiritual forms of life, as this latter's unification and centralization require structures different from and more complicated than those that are merely natural and material.

B. Life Outwards: Relation to Life's Other

The living individual constitutes an internal identity that actively distinguishes itself from inorganic objectivity. The organic unity already specifies the organism as an individual over against all else that can externally relate to its body. But being limited by this other of itself, the internal process of the living individual is in fact conceived only in abstraction from its external relationship. Because the living individual has a body that is always susceptible to external influence, its self-renewing activity cannot be carried out independently of its outward relation.

Since the inorganic objectivity involves mechanical and chemical processes, which are indifferent to organic ends, the living individual needs to demonstrate its self-actualizing unity over against these processes. In order not to succumb to its determinative power, it needs to transform inorganic objectivity, and make it a constituent of itself. This is what Hegel calls the life-process, the activity through which the living individual sustains itself by transforming the external objectivity and making it conform to its own determinacy. In Chapter Two, we have examined the logic and modes of this outward activity and distinguished it from mechanical, chemical, and teleological processes.⁴¹¹

In nature, assimilation is the living thing's relationship with the outside using its body in consequence of which the living thing appropriates parts of the inorganic world into its own determinacy. We have seen that the life-process has its correlates in plant and animal life mainly in metabolic activity, although Hegel also lays out forms of animal assimilation other than metabolism. The specific nature of metabolic appropriation, however, varies with the form of the metabolizing life as well with the contingent features of individual organisms.

Hegel speaks of the theoretical mode of appropriation as if it is peculiar to animal life. In this mode, the animal is informed of its surroundings by means of its sense organs and in the form of inner determinacy facilitated by the faculty of sensibility in general.⁴¹² This is how the animal can translate and assess the character of the external object in such a way that the latter ceases to be an absolutely alien determinacy. In anticipation of Hegel's account of the animal, and on the basis of our construal of a primitive mode of "sensibility" in terms of sensitivity to external stimuli and selective receptivity, we have argued that all life is able to selectively

⁴¹¹ See Section 2.1. for a logical construal of the different modes of this activity. See Section 2.2. for an examination of Hegel's account of assimilation in logic.

⁴¹² See Section 5.2.1.

distinguish between stimuli and respond accordingly, and to that extent, all living things engage at least in a primitive sort of theoretical relation or proto-cognition.⁴¹³ Indeed, not only plants, but also fungi, bacteria, and individual cells are sensitive and responsive to stimuli. Nonetheless, we have also noted that, unlike less developed forms of life, the animal's theoretical relation involves inner determinacy that pertains only to the organism with centered subjectivity. The external stimulus is not merely transformed into an alteration in the self-sustaining and conceptually permeated objectivity of the organism, but it becomes translated into a peculiar determinacy of the animal subject.

Indeed, it is the feeling, the capacity for the most basic inward determinacy, which drives the animal into a necessary metabolic relationship in the first place. Unlike other forms of organisms, the animal feels hunger and pain, and using the guidance of its senses it moves itself to find its nourishment.⁴¹⁴ Somewhat misleadingly, Hegel's logical explication of the life-process relies substantially on terms borrowed from the animal's practical process, such as need, feeling, pain, and violence. This again suggests that the logical account characterizes life as the minimum reality of true subjectivity and mindedness. Being aware of this restriction, we attempted to construe the features of the life-process in terms that can also illuminate less developed forms of life that are short of true subjectivity.⁴¹⁵ However, the difficulty of limiting the concept of need and satisfaction to the contradictions intrinsic to the organic unity exposed that unitary subjectivity makes a significant difference concerning the separation of internal and external processes of the organism.

⁴¹³ See Section 4.1.1.

⁴¹⁴ See Section 5.2.2.

⁴¹⁵ See Section 4.2.1.

In Chapter Five, we have seen that the differences between the metabolic activities of the plant and the animal makes this separation most evident. Hegel calls the animal's metabolic activity its practical process, and distinguishes it both from its internal formation, and its theoretical and reproductive processes. By contrast, plant metabolism is immediately bound up with its process of formation and propagation. As we have emphasized throughout the dissertation, one of Hegel's major claims concerning the plant organism is that its fundamental processes of formation, assimilation, and reproduction are not clearly distinguishable from one another. The internal process of the plant consists not in maintaining a fixed set of members, but in their renewal through proliferation. The plant's continually generated formations are in contiguity and direct relationship with their surroundings, converting external materials into further plant parts.⁴¹⁶ In that sense, the internal formation and the assimilation process of the plant is an immediately converging circle. In the animal, however, the organic members that deal with the acquisition of external needs are distinguished from the internal organs, namely, viscera. While the viscera nourish the structures which are used to acquire whatever satisfies the animal's needs, that acquisition itself sustains the internal process of the viscera. With respect to the plant, speaking of needs is not entirely fitting, as the plant metabolism occurs continuously in the availability of nutrients in immediate contiguity and without putting any effort for satisfaction. Consequently, the plant does not have any need to feel or perceive at a distance, nor is it by any means driven intrinsically into further action. By contrast, the animal has to obtain its nutrition by its own activity, signifying a breach between its need and satisfaction. This is why, the metabolism of the animal is mediated by a unitary subjectivity that

⁴¹⁶ See Section 5.1.1. for details.

feels the animal's internal state of need, informs itself with the whereabouts of its nutrition, and animates its body to seek and get hold of its satisfaction.⁴¹⁷

Because Hegel's exposition of the life-process in the *Science of Logic* borrows terms from specifically animal reality, the main paragraphs concerning the practical relationship of the animal are very similar in content to that of the logical account.⁴¹⁸ Still, the difference between the logic and nature of life again reveals itself in the specification of the structures that make the distinct theoretical and practical activity possible. To be able to move itself, the animal requires a certain physiology that lets it move itself and seize objects, inform its motor structures to initiate its motion, sense or perceive the objects of its satisfaction so as to guide its motion, and feel in order to motivate itself. Given these structures and the centered subjectivity, the animal can coordinate its sensibility with its responsiveness, and in turn, its internal process with the external process. Again, the majority of Hegel's descriptions of the structure that enables theoretical and practical activity pertain more specifically to vertebrates and mammals. However, it is worth noting that Hegel's specification of these structures is found mostly in his remarks and additional notes. These additions, however, contain many empirical details which, strictly speaking, should not be considered as parts of the philosophical explication of natural determinacies.

C. Life in Life: Life Generating Itself

The life-process shows that the living individual maintains itself by appropriating into itself the parts of the inorganic world that surrounds it. The internal constituents of the living individual share a common identity that permeates and determines them. When assimilated,

⁴¹⁷ See sections 5.1.3. and 5.2.2.

⁴¹⁸ A specific term that is absent in the logical account but present in the *Philosophy of Nature* as a concrete or animal mode of vital urge is instinct, which we have spoken in sections 5.2.2 and 5.2.3.

objects acquire this same universal determinacy of the organism. But because the living individual can maintain itself in and through different objects that it assimilates, it demonstrates that its universality is not limited to the common character of its internally differentiated organs, but it also retains itself in and by means of its confrontation with what is not itself.

In the logical account, the living individual's reproduction of itself and its universality through the other universality amounts to the unity of the internal process and the assimilative activity, which, for Hegel, is genus in its immediate form. This form of production, however, is not yet anything more than the self-renewal of the *individual* through its inorganic other. Even though life demonstrates its universality through its own activity, within the bounds of the life-process, it is still limited to the life of a single organism. The universality of life that is still bound up with a single organism and its self-preservation is genus only implicitly.⁴¹⁹

The universality of life, the genus, becomes explicit and concrete universality when the living individual reproduces itself by producing distinct individuals of the same universal. This is the main subject matter of what Hegel calls the genus-process. We have argued that reproduction may not in fact be a necessary feature of life on the individual level. Besides the fact that there seems to be no logical relationship between organic unity and its being reproduced as a distinct individual, the first forms of life emerging on any planet may well be incapable of reproduction. Hegel himself speaks of primitive organisms that spontaneously emerge and die without reproducing.⁴²⁰ Regardless of whether those forms of life can actually procreate or not, the possibility that some forms may not be fertile cannot be discarded. This is even corroborated by the fact that some very complex animals are indeed infertile. However, we have also noted that reproduction is that which carries the logic of life to a further level as it

⁴¹⁹ See Section 3.2.1.

⁴²⁰ *PN*, 296 (§341 *Addition*); *Werke* 9:363.

allows the genus to sustain itself in and through different individual organisms without being dependent on any particular one. Just as organic unity has a relatively independent character with respect to its continually renewed immediate constitution, or just as the subjectivity of the living individual, together with centralized subjectivity, acquires an inward and relatively independent character over and above its organic unity, the genus acquires a relatively independent status by rising above the immediacy and contingency of the living individual. Nonetheless, as long as the genus of life still depends on the presence of *some* living individuals, the life of the genus is still conditioned by a givenness that is not determined by the activity of the self-determining subject. Thus, similar to the feeling subject which immediately relates to its inner determinacy of particular feelings or sensations, the genus as universal can only relate to itself in and through its particulars pl. This theoretically infinite recurrence of the universal in its particulars without directly relating *to itself as a universal* points to the limits of the Idea in the form of life.

As we have seen, in his logical exposition, Hegel characterizes the genus-process in terms of a relationship between different living individuals.⁴²¹ In this relationship, individual organisms overcome their mutual externality and bring about a common product of their own kind. The complementary functioning of different individuals that sustain their species being reiterates the internally differentiated unity of the individual on the level of the species. We have discussed the reasons why Hegel characterizes this complementary relationship in terms of sexual reproduction at the expense of not providing any explicit characterization of asexual reproduction. Moreover, in elucidating this sexual relationship Hegel again relies on concepts borrowed from animal life, such as feeling and desire or longing.⁴²² In our examination, we have

⁴²¹ See Section 3.2.2.

⁴²² Hegel uses the term 'Verlangen' in *Werke*, 6:485.

noted that despite their obvious heuristic value, such references of Hegel should not be considered as essential elements of a logic of life. But Hegel's main idea is that by virtue of producing a distinct individual through their relation, different living individuals make explicit their mutual identity, without losing their complementary differences from one another. The newly produced germ is the concrete concept of life: the idea produced solely by the activity of life itself. It is through this product that the universality of life acquires a higher level of independence and self-determination. The genus of life thus sustains itself through its own activity, and independently of the contingent features of its constitutive individuals.

Yet again, Hegel's characterization of the genus-process as an interrelation between individuals, and his references to feeling, desire, and satisfaction signify that the living individual of the logical account is the individual presided over centralized subjectivity, and its genus-process consists in sexual reproduction, which finds its most accurate natural expression in the animal organism. The sex-relation is prompted by the animal's feeling of lack, which stems from its being an incomplete particular of its species being. This intrinsic lack drives the animal into a union with its complement, with the member of the other sex. The result of this copulation is a yet to be differentiated universal of the genus, which sustains the identity of the copulating animals independently of their individual existence.

In Section 6.2.3. we have critically examined Hegel's account of animal reproduction, discussed the limits of his emphasis on the feeling of unity with the other, and evaluated his restriction of animal reproduction to copulation at the expense of asexual forms of reproduction. Also, in Section 6.1.2., we have noted that in his discussion of plant sexuality, Hegel understates how sexuality can be determinative over the entire plant, and how sexual reproduction allows both the plant and animal species to differentiate themselves. But we have also acknowledged Hegel's account of the superficial character of sexual reproduction in the

plant, particularly given the theoretical distinction between plant and animal life, which highlights the fragmentary nature of the plant and the coincidence of its vital processes. We have pointed out that what Hegel's account of reproduction in nature really misses is a due emphasis on the role of unified subjectivity in the sexual reproduction in the animal, which he does not spare for other fundamental aspects of life. To offset this lack of emphasis, we explained how the animal differs from the plant by virtue of the degree to which it has control over its reproductive process and by how it actively plays its part in copulation without leaving most of the task to external factors.

It is again the role of true subjectivity that explains why single-celled organisms are not on par with animals with respect to their reproductive process. Unless we consider them as necessarily tied to cell colony life, the reproductive process of single-celled organisms does not coincide with their metabolism to the extent that the plant growth coincides with its proliferation. Even though the division of single-celled organisms is a consequence of their internal growth, it still brings about organisms that have distinct and determinate organic unities. In this sense, it is much more similar to propagation through seeds or spores. However, because asexual reproduction is not an activity of different subjects that actively engage in their propagative relation through their inward determinacy, it does not demonstrate the extent of self-differentiation and self-determination that sexual reproduction begets. Asexually reproducing organisms merely bring about their copies which are differentiated only by external factors or chance occurrences within or without the objective processes of organism.

D. Life and the Scope of its Freedom

Exploring life, either as a category of logic or a determinacy of nature, can be a good start towards a comprehension of Hegel's conception of freedom as self-determination. This is not because life is the paradigmatic case of self-determination. Whether as a logical category or

a natural determinacy, the freedom of life is fairly limited. Nevertheless, life is the first thought determinacy of what produces its own objective being, and its natural realization is the highest level of freedom that nature can possibly embody. Common to both is their being the simplest form of the Idea in their respective domains; in both logic and nature, they signify self-determining subjectivity that pertains to an objective being.

Life's defining logic demonstrates self-determination in each of its fundamental moments: it develops and sustains the collective unity of its objectivity, sustains and regenerates itself in the face of its other, and raises its universal identity beyond its particular existence through reproduction. Life is thus determinative over its internality, over its other, and over its relationship with other life. Different forms of natural life demonstrate life's self-determined determinacy in nature, although each does so to a different degree.

To begin with, the living individual is a self-realizing and self-sustaining process of manifold objectivity. It is unlike an aggregate of objects whose principle of unity exists outside of it. Life is a process of its own unification. The living individual exhibits ideality as it consists in the unity of organs whose interdependence and cooperation overcomes their indifference and externality. To some extent, it is similar to a mechanical system of bodies whose interrelations form an equilibrium that expresses regularity and lawfulness which figure in the character of the system's participants. But as we explained in Chapter One, even as a mere organic unity, the living individual is still different from a mechanical system in that it can produce and further differentiate its constituents. Organic differences are not merely extrinsic and relative, but intrinsic and permanent. Organs sustain and reciprocally determine one another in content in keeping with their universally pervading identity. Echoing the particulars of the universal in the domain of the Idea, organs are differentiated from within the living individual in a way that continuously realizes the latter's concept and subjectivity, namely, the soul. This concept of the

living individual expresses its basic identity which is, within the confines of the logical account, not altered by anything external to it. Its self-determination consists in sustaining its identity through the workings of self-differentiated constituents and in its actively distinguishing itself from what it is not, again by incorporating its other in various modes.

Natural organisms demonstrate the physical reality of self-determination. Both the plant and the animal distinguish themselves from their externality and grow or renew their members from within themselves. In their development and functional differentiation, constituents acquire their particular character from their universal identity, the continuation of which sums up what it means to be a living thing. But as we have explained, the animal realizes self-determination and subjectivity to a greater degree and at a higher level compared to the plant, which lacks true subjectivity. The level of organic integration is lower in the plant as its members do not exhibit the ideality and necessary differentiation that animal organs have. Also, given the plant's continuous proliferation and lack of centrality, its unity is rather indeterminate. Lacking the structure as well as the need for centralized subjectivity, the plant falls short of an agency that can act upon itself as a subject. As a consequence, its determinacy is still the determinacy that pertains only to its external being, in which subjectivity is only implicit. Thus the plant does not determine itself as an inner determinacy in a way that radically distinguishes itself from the externality and indifference of nature. Apart from the self-differentiating potential of the seed, the furthest extent to which the plant expresses its self-distinguished individuality is through its specific products, such as its flowers and fruits. But even in those relatively more individuated features, the plant is not for itself more than it is for an other.⁴²³ By contrast, with respect to external being alone, the animal's outer appearance and its individuated voice already carry animal subjectivity above and beyond vegetative forms of self-determination. After all, both

⁴²³ See Section 6.1.1.

outer appearance, such as its facial expressions, and its individuated voice express the subjective and individual being of the animal. By virtue of its feeling and sensation, the animal determines itself not merely in the form of determinacy that belongs to its body, but in the form of inner determinacy. Although the inner determinacy of the animal is enabled by its body, it truly belongs to its centered subjectivity.

The life-process demonstrates that the living individual is also self-determining in its relationship with its other. This other is that which the living individual treats as nonlife and determines according to its own concept or identity. Even when the living individual, as it were, passively subject to external influence, it actually determines its own determinacy, both by registering stimuli and being affected by them in ways that are peculiar to its own identity and by responding to those stimuli in equally specific ways that follow from its purposive and self-sustaining character. Yet more importantly, the living individual is able to transform inorganic objectivity into the living objectivity of the Idea. In the organic unity, the living individual already exhibits its power to manipulate mechanical and chemical purposes to its own end of self-realization by exploiting their susceptibility to external determination. In the life-process, it demonstrates the same by using the same kind of processes to assimilate inorganic objects and generate from them its self-determined determinacy. In this way, life renews and reproduces itself through its own activity.

Plants exhibit this transformation of nonlife in an immediate manner. The plant consists mainly of extremities, which are in immediate contact with universal elements that they automatically inform and integrate into their matter. Plants are selectively receptive, and their selectivity is determined by the purposive nature of their organic unity. But this selectivity is not mediated by an inner character, an explicit subjectivity. Although plant behaviors such as tropisms cannot be explained in terms of external, efficient causes, the plant still cannot alter its

orientation or configuration unless it is incited to do so by other external agents. Because the light source is the foremost external agent that governs the behavior of the plant, Hegel calls it the subjectivity of the plant. In that sense, the plant's principle of activity is not entirely in itself, and in important senses in an other. In contrast, the animal's relationship with nonlife is in many aspects and to a greater degree self-determining. Although for both forms of life, the way they are influenced by others is a function of their purposive identity, in its theoretical relation, the animal determinacy takes forms of feeling, sensation, and perception, all of which comprise inner and subjective content. Unlike the plant, the animal does not only process what Hegel calls universal elements, but is capable of assimilating individuals, such as other living things. It can go after its sustenance upon internal stimulation prompted by appetite or the feeling of a lack, without necessarily being stimulated by the direct presence of an external object. It is capable of freely pursuing sustenance and avoiding threats as it can determine its location and move its limbs. It moves by the guidance of its sensations, which are by and large in its control. But because of the precarious nature of its pursuit of sustenance, the animal, unlike the plant, is not abandoned to its fate decided mostly by external conditions; it figures rather as the protagonist of its quest for survival. The animal can even instinctively shape its surroundings in a way that gives the inorganic world the purposive determinacy of life.

One would rightfully ask to what extent instinctive behavior is self-determined. Although instinct is a characteristic peculiar to animals and can perform its role by means of specifically animal structures, it is given to the animal by birth. Because the instinct is given, it is not self-determined determinacy. It belongs rather to the species being or genus of the animal. Likewise, the animal does not have a definitive say in the kinds of sustenance that nourishes it or threats that can destroy it. Many animals are born herbivores or carnivores, prey or predators, or can only make use of specific kinds of inorganic materials. Their capabilities are

determined mostly by a universal character that does not only pertain to their individual moments or developmental stages but also to all organisms that share the same species or genus with it. In other words, the living thing's individual identity is to a great extent bound up with its genetic identity that derives from its genus.

Now although being determined by the genetic identity seems to be a limit to individual self-determination, it does not render the self-determination of life totally meaningless. First of all, the being of the genus cannot be conceived independently of its members and their reproductive activity. Given the nature of assimilation in general, species cannot be differentiated from one another solely on the basis of external factors, such as climatic conditions or factors that trigger mutations. Their individuating differences can also derive from their individual interaction in their habitats. Once life is in place, the causal relation between the world and life can no longer be unidirectional. And the more explicit the subjectivity of the living thing, the greater is the extent to which the latter has a say in the direction of its species' genetic differentiation. As we have discussed earlier⁴²⁴ genetic determination is not the external determination of a given structure but the determinacy by virtue of a universal identity that is irreducible to any material structure, and that, in nature, has a developmental history. In this regard, the genus is itself what life demonstrates itself to be.

Thus, secondly, the self-determination of life is also meaningful with regard to the life of the genus or life as the genus. The genus preserves itself on its own accord by demarcating reproductive relationships among its members as well as defining those members' instincts to nurture and cooperate. Again in nature, all this is more explicit in the animal form of life. Although the plant's formation and metabolism is already its proliferation, it also develops structures through which it is able to propagate its genus. However, because it lacks subjectivity,

⁴²⁴ See sections 3.1.3. and 5.1.2.

in its reproductive process, the plant is not as active as the animal, and its sexual reproduction is contingent on the mediation of external factors. But the animal is again driven to reproduction and nurture by its sexual and parental urges, and it is the one that actively carries out its copulative act. On the other hand, although animals can pick their mates, and although there are those who like to improvise with some other species' members, certain animals can reproduce only by certain others. In and through the relationship among different individuals, the genus can both differentiate and sustain itself as a universal.

The genus, therefore, achieves a higher level of self-determination by releasing itself from an attachment to specific individuals. This is the reiteration, at a higher level, of the universality of life's emancipation from its particulars. In the internal process of life, the universality that is shared by organs maintains itself even though the minute constituents of those organs continually change. Likewise, the living thing, the animal in particular, can uphold its identity by assimilating a variety of individuals. In reproduction, this freedom of the universal rises to a higher level, as the genus is independent of any particular individual's organic unity and life-process. This independence becomes most explicit with the death of parents since death demonstrates the continuity and self-perpetuation of the genus despite the vanishing of its presuppositions. It is in this sense that "the death of this [individual] life is the coming to be of spirit," which is to say, the implication of the universal that exists independently of individuals and is explicit to itself.⁴²⁵ Nevertheless, even at its culmination, the genus is still implicit and limited in freedom: it is still bound up with some individuals, and it is not yet the universal that can *explicitly relate to itself as a universal*, which is the feat of thought thinking itself.

Lastly, if life is not eternal, then not all living things can be dependent on other organisms that precede them. Single-celled organisms are self-determining in a similar way

⁴²⁵ *SL*, 688; *Werke*, 6:486.

plants and animals are, as they sustain their internal constitution and assimilate their biosphere into themselves. But they are still products of other single-celled organisms. If life had emerged at some point from the inorganic world, there must have been forms of life that were not products of other life forms, and it is much more likely for them to have been as simple as possible, simpler, perhaps, than an asexually reproducing bacterium. However, that should not suggest that first organisms must have been unconditioned. As regards being conditioned by another, the situation is perhaps worse for the first living things, as they are dependent on nonlife rather than life. As we have mentioned above, in the *Philosophy of Nature* Hegel speaks of rudimentary organisms that spontaneously emerge from the geological organism. If we are to think of the determinacy of a natural living thing that emerges from inorganic processes, or from their self-sustaining geochemical cycle for that matter, we have to admit that the differentiation that defines its organic unity is initially found ready at hand, which is something that can take place on a particular suitable planet by chance. Given such a ready-made start, the organism is not entirely self-determining. Indeed, if we think of how species evolve, we would have to admit that the members of any lineage are to some extent determined by the givenness of its primogenitor organism. But in that sense, primogenitors are also dependent on the existence of a planet, and so on until the beginning of nature or cosmos, if such a beginning makes sense at all. Of course, Hegel's philosophy of nature is not concerned with the evolutionary sequence or with the chronology of the cosmos. But we can still argue that as long as natural determinacies incorporate what precedes them, they are in that regard dependent on their precedents. For instance, the animal, the plant, primitive organisms and all other forms that fall in between are contingent on the geochemical cycles and inorganic processes, which are in turn contingent on chemical processes, electromagnetic and gravitational interactions, mechanical motions, and spatiotemporal matter. In that sense, all life in nature is conditioned. In a similar way, in the

Science of Logic, we see that the Idea of life in its immediacy emerges from objective processes, which again implies an original givenness that seems on the face of it at odds with self-determination.

But if we were to follow this line of thought, there would not have been any self-determined logical or natural determinacy as all of them are conditioned by their precedents in the system. Indeed, there would not have been such a thing as self-determined determinacy at all, for the self-determined determinacy is determinacy that determines itself and therefore presupposes determinacy in the first place. Without there being determinacy, there would only be indeterminacy, which cannot both determine itself and be indeterminate.

But if Hegel's system can in general be read as an explication of self-determination, as it boasts to be, this is to a great extent because Hegel believes that self-determination is *not* precluded by preconditions. On the contrary, self-determination consists in its being able to accommodate its presuppositions as its enabling conditions. Everything that determines itself has enabling conditions, yet none of them is reducible to those conditions. The distinguishing feature of the self-determined is still its own doing. In our construal of the logical explication of life, we have explained how and in what sense the living individual distinguishes itself from the forms of other-determined determinacy and from objective processes of nonlife in and through producing and differentiating its own content in its internal and external activities. Again, in our comparative analysis, we explored the extent to which natural forms of life distinguish themselves as organic unities and sustain their distinctions. Of course, in nature, the individual characteristics of external conditions do have a say in the individuation of the plant and the animal. However, their influence is still not definitive. The more developed the subjectivity of the living thing, the more influence it has on the direction of its distinction from all else.

Moreover, that which is self-determined ensures that it integrates its enabling conditions into its processes and provides them with its own individual character. In life, it does so by exploiting the indifference and external determinability of objective processes to its end of self-maintenance, well-being, and reproduction. When they are transformed into the immediate objectivity of life and allow the living individual to sustain its embodied reality, objective processes cease to be indifferent and become, as the constituents of the living body, self-serving and self-initiating. In nature, both the plant and the animal can employ their material preconditions as the enabling conditions of their self-determination. Once life is in place, the inorganic world ceases to be what it is without life; it becomes a means to it, rendering explicit the potential that is implicit in it. However, this freedom through the assimilation of the other is still limited in the sense that the living thing's need of sustenance is a perpetual one.

But at least in the animal's life, the process of nutrition is interrupted, and can itself be subordinated to peculiarly animal faculties that involve more developed forms of self-relation and subjectivity, such as the feelings of content and pleasure, regardless of the fact that these latter also serve for the perpetuation of the genus. Feeling and sensation comprise the minimum reality of the mind, which, as we have explained, also requires enabling, material conditions. Nonetheless, the conditions that realize mindedness, such as the underlying structure of sensibility, do not determine and cannot account for the peculiar character of mental faculties and their particular determinacy. It is the life of the embodied mind that will determine what it is and how it further develops itself.

ABBREVIATIONS FOR HEGEL CITATIONS

<i>EL</i>	<i>Encyclopedia Logic, Part I of the Encyclopaedia of the Philosophical Sciences in Basic Outline.</i> Edited by Klaus Brinkmann and Daniel O. Dahlstrom. Cambridge: Cambridge University Press, 2010.
<i>PM</i>	<i>Philosophy of Mind, Part III of the Encyclopaedia of the Philosophical Sciences.</i>
<i>PN</i>	<i>Philosophy of Nature, Part II of the Encyclopaedia of the Philosophical Sciences</i>
<i>SL</i>	<i>The Science of Logic. Translated by Georgia Di Giovanni.</i> Cambridge: Cambridge University Press, 2010.
<i>Werke</i>	<i>Werke in zwanzig Bänden.</i> Edited by Eva Moldenhauer and Karl Markus Michel. 20 vols. Frankfurt am Main: Suhrkamp, 1986.
<i>Werke 3</i>	<i>Phänomenologie des Geistes</i>
<i>Werke 5</i>	<i>Wissenschaft der Logik I. Erster Teil. Die objektive Logik. Erstes Buch.</i>
<i>Werke 6</i>	<i>Wissenschaft der Logik II. Erster Teil. Die objektive Logik. Zweites Buch. Zweiter Teil. Die subjektive Logik</i>
<i>Werke 8</i>	<i>Die Wissenschaft der Logik (Enzyklopädie der philosophischen Wissenschaften im Grundrisse 1830. Erster Teil. Mit den mündlichen Zusätzen.)</i>
<i>Werke 9</i>	<i>Die Naturphilosophie (Enzyklopädie der philosophischen Wissenschaften im Grundrisse 1830. Mit den mündlichen Zusätzen.)</i>
<i>Werke 10</i>	<i>Die Philosophie des Geistes. Enzyklopädie der philosophischen Wissenschaften im Grundrisse 1830. Dritter Teil. Mit den mündlichen Zusätzen.</i>
<i>Werke 18</i>	<i>Vorlesungen über die Geschichte der Philosophie I</i>

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