

### **Phenomenology and Genetic Engineering<sup>1</sup>**

[W]ith the unity of a living organism, we can certainly examine and analyze it from outside, but can understand only if we go back to its hidden roots.

-Edmund Husserl

*Husserliana* VI, 116

Martin Heidegger interprets Aristotle's writing on biology and physics according to his phenomenology, wherein I see relevance to today's practice of genetic modification; hence, the nutshell of this presentation: Aristotle, Heidegger, and genetic modification, admittedly an odd commingling! But if phenomenology, that branch of philosophy that claims to offer access to the nature of entities in perception or the things themselves (*die Sachen selbst*), could inform the discourse of genetic modification in some way and if Aristotle's timeless reflexions on the essence of things, organic and inorganic, could contribute, then the controversy surrounding genetic modification has just admitted another voice sanctioned with history of two great thinkers.<sup>2</sup>

By way of an outline, I would like to discuss, briefly, the process of genetic modification, versus traditional hybridization; following this I'll move to a definition of phenomenology and its relation to Aristotle. In conclusion, I'd like to say that aside from

---

<sup>1</sup>Although my argument is critical of genetically modified foods, I do not support chemical/pesticide farming either. In some ways, it is worse environmentally than GM farming. See chapter four, "The Potato," of Michael Pollan's *The Botany of Desire: A Plant's Eye View of the World* (New York: Random House, Inc., 2001).

<sup>2</sup>Cf. §7 of Martin Heidegger's *Sein und Zeit*, 15th ed. (Tübingen: Niemeyer, 1979); hereafter SZ. Translated as *Being and Time*, by John Macquarrie and Edward Robinson (Oxford: Blackwell, 1962); hereafter BT.

the obvious differences in scientific method, genetic modification is a fundamentally new departure from standard hybridization in method and philosophy.

### I Monsanto Corporation and Biological Selection.

Manufacturers of genetically modified foods advertise that their products are simply innovations within the historical tradition of agricultural stretching back thousands of years. Regarding genetically modified foods, we need to look no further than to the multinational Monsanto Corp. based in the United States. Monsanto has aggressively positioned itself as the Microsoft of GM products, with a market share that rivals state owned monopolies of the Soviet Union.<sup>3</sup> What Monsanto's press department says about GM products, therefore, is declarative of the GM industry. The corporate giant, in fact, maintains that its genetic modification is of the same variety as ancient "technologies" such as cheese making, alcohol fermentation, and hybridizing.<sup>4</sup> As I hope to show briefly, this is false in its science; in a more extended way, I will suggest that this claim is, more importantly, dishonest in its philosophical (ontological) approach.

Anyone who has ever had a vegetable bed or knows even the basics of biology already knows a bit about humanity's long heritage of farming beginning with the Neolithic age about 10,000 years ago. But, it is important to remember that species manipulation and change occurs through a process Darwin called "natural selection"; when species manipulation and change occur by the human hand, Darwin called this

---

<sup>3</sup>This likening of American corporate monopolies to Soviet-style state owned companies is borrowed from John Ralston Saul; see his *The Unconscious Civilization* (Concord, ON: Anansi, 1995).

<sup>4</sup>M. Pollan, *The Botany of Desire*, 196.

process “artificial selection.”<sup>5</sup> For millennia, species modification happened by nature or by man, but the uninformed observer could not tell whether man or nature had modified the organism because, essentially, the process of change - artificial or natural - was still circumscribed by nature as one obeying its laws of selection and reproduction. Even artificial selection could not violate nature’s laws of reproduction. The laws of reproduction state that gene flow occurs within a species, i.e., the crossing of Stripy and Beefsteak tomatoes; or it may happen even between species but this usually results in sterile offspring, i.e., the mule. Intra-phylum reproduction is already an oxymoron.<sup>6</sup> So, reproducibility and, therefore, gene transfer is firmly stipulated by the internal laws of the organism, and Mother Nature in general. The cardinal difference between natural and artificial selection along with mutations, the processes recognized by Darwin as evolution, and today’s genetic modification is that the internal laws governing the reproduction of species have become permeable.

## II. Control: Genetic Engineering

Before I mention genetic modification, I would like to make a note of clarification. If we designate genetic modification as genes that have been bio-technologically altered through therapies in the laboratory, i.e., the kind of genetic modification denoted by GM foods, then we are talking about genetic engineering, not modification. Modification is too soft a term, implying an adjustment, mere change, or enhancement of an existing faculty. The bridge between Denmark and Sweden has modified the Øresund seascape; eyeglasses modify my vision for the better. Engineering, however, introduces the

---

<sup>5</sup>Charles Darwin, *The Origin of Species*, edited by J.W. Burrow (London: Penguin Books, 1968).

<sup>6</sup>Cf. Pollan, *The Botany of Desire*, 195-6, 212.

concept of control and intentionality. A damn spanning the Øresund would control the water flow of the Baltic; surgery would re-engineer and itself control my eyesight. Engineering, consequently, is more willful and at the same time more technological, often orchestrated at a more elementary level for the purposes of systemic control. The case, of genetic modification is, then, the case of genetic engineering. As such, GM foods bare the stamp of deliberate human control; the wilderness, wildness and unpredictability of nature becomes micro-modified, controlled by design engineering.

But what is genetic engineering? Genetic engineering involves the use of enzymes to isolate particular genes or gene sequences to produce an “artificial gene.” In the gene lab, the artificial gene is then inserted into a vector, or medium, often for the purposes of cloning. With genetic engineering, this novel gene is, consequently, separated and retained by a process of downstream processing (individual isolation of genetic material from a crude compound through a biotechnological procedure).<sup>7</sup> The process of genetic engineering, of course, is marked by the character of the scientific experiment, which seeks to exclude all variables, all non-standardized elements, and reduce reality within the test tube to an essentially engineered ‘experience.’<sup>8</sup> Note, however Thomas Fay’s gloss on this peculiar sense of experience, “[h]ere the word experience is to be understood in the sense of the experience derived from experiment, i.e., a controlled experience . . . *Control* is obviously of the essence here; the being in

---

<sup>7</sup>Bill Indge, *Schaum’s A-Z Biology* (New York: McGraw Hill, 2003), 119.

<sup>8</sup>This is a paraphrasing of Sir Arthur Eddington; see his *The Mathematical Principles of Relativity* (Cambridge: Cambridge University Press, 1960), 1-3.

question can manifest itself only in certain rigidly predetermined way.”<sup>9</sup> Under this sense of experiment, the outcome of the altered genes, it follows, is coded, as it were, with the objectivity and control of the laboratory and its engineer.

Genetic engineering now offers the enticing prospect of primary control of things in a dependable, reliable and potentially absolute way. Just as the laboratory has removed the contingencies as much as possible in the test tube, genetically engineered crops remove chance from the treated organism itself. Consequently, genetic engineering means greater control over the environment, nature. Monsanto heralds this as a new green revolution to that will feed the world, which indeed it could be.

But as Michael Pollen points out Monsanto is not really interested in feeding the world’s poor. Rather, it is interested in selling intellectual property to those who can pay well. The software of the genetically engineered organism, its genome, is, in fact, the locus of importance here. In this way, biotechnology of this sort is not at all akin to historical innovations in agriculture for the reason that agriculture has always been about the total of the crop produced, not ephemeral intellectual property or copyright laws genetically scripted in the plant. This shift from the tangible wholeness of the crop itself - its colour, taste, appearance and so on - to the invisible genetic code signals a fundamental philosophical reposition inherent in genetic engineering.

We have noted that genetic engineering is rooted in a desire to assert control. At the same time, this means that genetic engineering is a will to eliminate the variable and erratic forces of nature by trying to foist complete control over the land, essentially distinguishing it from all other agrarian methods that are themselves controlled by the

---

<sup>9</sup>Thomas A. Fay, “Heidegger: The Origin and Development of Symbolic Logic,” *Kant Studies* 69 (1978), 453.

laws of nature. Genetic engineering stands unrestrained, an uncontrolled will assailing nature in an attempt to order and mechanize the food production economy, potentially driving farm into a kind of uniform food-producing machine-scape. “Agriculture is now mechanized food industry,” as Heidegger observed fifty years ago.<sup>10</sup> That agriculture has changed in perspective from a local enterprise fraught with uncertainty to one of increasing control implies a change of perspective regarding the tools and method of farming. More fundamentally, however, it implies a shift in consciousness about what the status of the farm actually is. In fact, it involves a transformation in our ontology of life in general.

### III. Phenomenology and Truth

Ontology is the study of what a thing itself is, the study of being as such. As a way of access into such a nebulous study, the thoughts of Heidegger provide an especially fertile and rigorous path to follow. Heidegger approaches the question of being through his phenomenological method. In his words, “phenomenology [is] the *science of phenomena*.”<sup>11</sup> And we are to understand that “‘*phenomenon*’ signifies that which shows itself in itself, the manifest.”<sup>12</sup> Heidegger’s vocabulary has important implications for the ontology because he moves ontology from a study of the object in question to the study or science of the manifest, or thing as phenomenally present. This, following Edmund

---

<sup>10</sup>Martin Heidegger, “Question Concerning Technology,” in *The Question Concerning Technology and Other Essays*, translated with introduction by William Lovitt (New York: Harper Torchbooks, 1977), 15

<sup>11</sup>Heidegger SZ 28/BT 50.

<sup>12</sup>Ibid., 28/51.

Cf. “‘*Phenomenon*,’ the showing-itself-in-itself, signifies a distinctive way in which something can be encountered . . . [P]henomenon is understood from the beginning as that which shows itself in itself” (31/54).

Husserl, abolishes the problem of the sharp subject/object dichotomy and the philosophical dilemma of how we can ever know that the outside world for sure exists.<sup>13</sup> Consequently, the thing (*phusis*, nature) under phenomenological investigation can be qualified and defined without the metaphysical problems that, for instance, Descartes and modern metaphysics has encountered. The object as phenomenon is certain for me the phenomenological observer but always provisional, phenomenal, in a timeless or absolute sense.

In Heidegger's hermeneutic phenomenology, determining the absolute status or essence of an entity is, actually, prohibited by the movement of phenomenology. Hermeneutic means interpretive and if the entity is always given as interpretive rather than absolutely then the entity itself must be imbued with certain nonobjective character. And this is just what Heidegger contends. According to Heidegger, the decisive moment in the history of the West occurred when the pre-Socratic definition of truth as disclosure (*a-letheia*) moved to the Platonic notion of truth as veracity (*Wahrheit*) and agreement (*adaequatio*).<sup>14</sup> This transformation in the concept of truth meant that being (*phusis*, nature) becomes defined as objective presence, rather than as the movement of disclosure and revealing. The earth now is conceived as inanimate object, nature is a series of determinable forces, humanity an irreducible subject and stranger to its world.<sup>15</sup> The

---

<sup>13</sup>For Husserl, "objects exist for me, and are for me what they are, only as objects of actual and possible consciousness." From his *Cartesian Meditations: An Introduction to Phenomenology*, translated by Dorian Cairns (Den Hague: Nijhoff, 1973), 65

<sup>14</sup>Heidegger, SZ/BT, §44a.

<sup>15</sup>Cf. M. Heidegger *Holzwege*, 5th ed. (Frankfurt: Klostermann, 1972), 85. Also Heidegger's *Unterwegs zur Sprache* (Pfullingen: Niske, 1959), 248.

former understanding of truth, which discloses, as an interpretive, temporal and interconnected event within the horizon of one's lived-world is herewith occulted.

At this point the question arises, 'what could Heidegger's esoteric observations on the history of the word truth possibly have to do with genetic engineering?'

Acknowledging the phenomenological description of truth as disclosive, Heidegger's reading of Aristotle, I propose, makes his reflexions on the concept of truth quite concrete with regard to genetic engineering. First, a final elaboration of what Heidegger calls authentic truth, followed by Aristotle's treatment of things or nature (*phusis*) in his *Physics* as interpreted by Heidegger, and then the significance for genetic engineering.

#### IV. Heidegger on Aristotle and Disclosure.

For the purposes of relevance to genetic engineering, it is important to stress the less discussed but no less important aspect of unconcealing, or truth, for Heidegger; this is the counter-movement to unconcealing, concealing or withdrawal.<sup>16</sup> That entities are capable or being-disclosed implies, of course, that entities are capable of being-concealed. Said another way, both disclosing and concealing are implicated in the movement of truth. In fact, because the concealed, or hidden, is so closely intertwined with disclosing, or the unhidden, "[t]he unhidden must be torn away from hiddenness; it must in a sense be stolen from hiddenness."<sup>17</sup> Significantly, however, the hiddenness or concealing can never be eradicated from the entity; it always retains a mysterious uncertainty that denies constant, full disclosure. Hence, authentic truth for Heidegger signifies the ongoing moment of disclosure of an entity no less than the internal, latent movement of

---

<sup>16</sup>Heidegger, SZ Kapital 44/BT sec. 44, .

<sup>17</sup>M. Heidegger, "Plato's Doctrine of Truth," translated by Thomas Sheehan, in *Pathmarks*, edited by William McNeill (Cambridge: Cambridge University Press, 1998), 171.

concealment within the moment of truth. Truth, in essence, is twofold: disclosive and concealing. Phenomenology, then, recognizes this authentic source of truth as disclosive but also as not fully disclosed, not fully objectified.

Heidegger finds an expression of this ancient, authentic sense of truth in Aristotle's *Physics*. Given that phenomenological truth means the disclosure of things, which is also the disclosure of nature (*phusis*), Aristotle's discourse on nature, physics, fits the phenomenological method well for Aristotle is undertaking a description of how things show themselves. By nature, according to Aristotle, beings have in themselves the origin and ordering (*arché*) of their own motion and this is what is responsible for a being becoming what it is.<sup>18</sup> In this way, all beings have an internal tendency to become what they, by their nature, should be. To wit, "[p]hysiological processes, adaptations to the environment, and all form of seemingly purposive behavior tended to be interpreted as being due to nonmaterial forces. This interpretation was widely accepted among Greek philosophers, [most importantly] including Aristotle, who discerned an active soul everywhere in nature."<sup>19</sup> In biology, for example, the ordering of a species sees to it that the end (*telos*) of an organism endeavours to be accomplished. The acorn endeavours to reach its end as the oak tree. Everything in nature wants to become itself, to achieve its own specificity, by reaching its particular end. In order that a being can reach its own end, Aristotle's figures, that a being must be limited in its scope and existential

---

<sup>18</sup>Aristotle, *Physics* (B, I 192b13-15), translated with commentaries and glossary by Hippocrates G. Apostle (Grinnel, Iowa: Peripatetic Press, 1980), 25; hereafter *Physics*.

<sup>19</sup>Ernst Mayr, *Toward a New Philosophy of Biology: Observations of an Evolutionist* (Cambridge, Massachusetts: Harvard University Press, 1988), 40.

determinacy. As such, every physical entity must stand with circumscribed limits.<sup>20</sup> As Heidegger interprets Aristotle the limit (*Grenze*) of a thing is not to be understood as a negative principle but a positive one. With a limit a thing is circumscribed, determined as what it is. The limit of A is B; therefore A is determined as what it is by virtue of not being commutable with B. A limit actually brings a being into existence because it sets out a frontier between the entity and its breach with not being what it is.

In Greek thought, what comes to be and passes away is what is sometimes present, sometimes absent - without limit. But *peras* in Greek philosophy is not 'limit' in the sense of the outer boundary, the point where something ends. The limit is always what limits, defines, gives footing and stability, that by which and in which something begins and is. Whatever becomes present and absent without limit has of and by itself no presencing, and it devolves into instability.<sup>21</sup> Limit gives definition and form to an entity. For "what comes up and becomes intrinsically stable <*Ständig*> encounters, freely and spontaneously the necessity of limit, *peras* . . . Coming to stand accordingly means: to achieve a limit for itself, to limit itself."<sup>22</sup> The limit draws the boundary and frontier against non-being, thereby allowing a being to come to stand according to its internal particularity.

Heidegger, in accordance with Aristotle, finds a limit to be an internal safeguard on a thing by maintaining its identity and preventing it from degenerating into non-being. Evidently, the limit of a thing gives an entity specificity and stability to make a claim to its own uniqueness. A limit, thus, is not a defect or deficiency in a being.<sup>23</sup> On the

---

<sup>20</sup>Aristotle, *Physics* (B, I 193a21-28)/ 26.

<sup>21</sup>M. Heidegger, "On the Essence and Concept of *Phusis* in Aristotle's *Physics B, I*" in *Pathmarks*, edited by William McNeill (Cambridge: Cambridge University Press, 1998), 206.

<sup>22</sup>M. Heidegger, *An Introduction to Metaphysics*, translated by Ralph Manheim, (New York: Doubleday, 1961), 60.

<sup>23</sup>As William J. Richardson writes, a limit "is the being's restricting of itself to its confines, its self-containment, hence the *Being* of the being by which it is what it is in distinction

contrary, it is a beginning of a thing that comes to stand on its own internal order of change and form.<sup>24</sup>

As Heidegger follows Aristotle, there, indeed, does seem to be the possibility for the misappropriation of beings, of using beings unwisely, which would be a violating of the organic limit that fixes the thing as what it is. Using beings unwisely means transforming beings or turning them into mere functions within an economy of control. This would somehow deform the constitutional originality and stability of an entity in favour of an outside author. In other words, the origin and ordering of the being's motion arises now outside the organism, from a force outside its boundaries or limits. By not respecting the intrinsic limit of a being, its presence gets "distorted into a mere 'looks like,' 'mere appearance.'"<sup>25</sup> This violation essentially tears into the look of the thing, which is especially relevant if we recall that a species is defined in its Greek origin as unique appearance (*eidōs*).<sup>26</sup> The violation destabilizing its phenomenological being, its being as it appears to us, corrupts its independent particularity. This sounds abstract and it is, which is the point. Precisely because the form of an entity can be abstracted, this

---

from what is not being. For a being to come to stand on its own, then, means for it to establish a frontier for itself." From his *Heidegger through Phenomenology to Thought* (Den Hague: Martinus Nijhoff, 1963), 265.

<sup>24</sup>Heidegger is still following Aristotle. From the 1939 lecture course he is now in the middle of Book *B I* of the *Physics*.

Consequently, in one way *phusis* is spoken of *as follows*: it is what primarily and antecedently underlies each single thing as 'the order-able' for beings that have in themselves the origin and ordering of movedness and thus change. But in the other way, [*phusis* is addressed] as placing into the form, i.e., as the appearance, (namely, that) which shows itself for our addressing (193a 28-3). Nb. this is Heidegger's translation from *Pathmarks* on page 208. It differs significantly from those more standard translations such as those of Apostle, Hardie, and Gaye).

<sup>25</sup>Heidegger, "On the Essence and Concept of *Phusis* in Aristotle's *Physics B, I*", 206.

<sup>26</sup>Cf. Heidegger SZ 61, 319/BT §§15, 64, and *An Introduction to Metaphysics*, 60, 180-1.

means that the internal limit of the thing becomes plastic and distorted. The thing's ultimate resistance, withdrawal from transcendent definition, is defiled and the entity is exploded in its teleological and historical specificity. For an extreme example, Heidegger points us no further than to the nuclear reaction which is, perhaps, the most visible sign of the destruction of limits.<sup>27</sup> The atomic bomb, then, would be the explosion of the things themselves.

#### V. Genetic Engineering Disallows the Withdrawal, the Earth.

Genetic engineering reenters the presentation now as a technology radically different from the historic agricultural processes of crossbreeding. While crossbreeding seeks a primitive form of control over the farm, it still treats the plant or animal as an internally sovereign being, a new breed still governed by the laws of nature, not the control of the geneticist. Genetic engineering, conversely, seeks total control of the organism by re-manufacturing the essence of its being, by violating the natural sanctity of its form. We can now, unfortunately, add the name of Bill McKibben to that of Heidegger and Aristotle since such technology, which robs nature of its withdrawal - specificity and hiddenness – and, in turn, spells the end of nature.<sup>28</sup> In this sense, the end of nature represents the technological control of biology through the functionalization of the organism's innate limits, understood as its unique genetic code. The primarily technicist programme of genetic engineering implicates the explosion of the Aristotelian definition of a thing as a self-contained and delimited. Organic things can now be assembled as an

---

<sup>27</sup>Cf. M. Heidegger, "Science and Reflection," in *The Question Concerning Technology and Other Essays*, translated with introduction by William Lovitt (New York: Harper Torchbooks, 1977), 170-1.

<sup>28</sup>Cf. B. McKibben's *The End of Nature* (London Penguin Books, 1990).

agglutinations of genetic material, which we can imagine, as Bernhard Radloff writes, could lead to a further techno-animality where the life of the organism is exploded into “electronic exteriorizations - imaging, storage and retrieval systems;” as such, life could be “reactivated merely as a phantasmagorical effect of these systems . . . as a collage or montage of citations drawn from the informational resource machine of history”<sup>29</sup> Thus, life moves from a disclosed and apparently end-oriented existential mystery, to a mystery solved as a species specific genome, to intellectual property data indicating a mere function within an economy of what we could call hyper-control.

Genetic engineering technology, having “crossed out the ghost of authenticity,” no longer permits the existential question of what the oak tree, the pig, or the human being is.<sup>30</sup> Phenomenology’s interest in the “things themselves” is deadened because the things themselves are intellectual property - dead, void, simply place holders or functions of an economy of production and control. Natural entities, what we could label the things themselves, now fail to resonate or enchant us. The economy of production and control signaled by genetic engineering eliminates the withdrawal, the mystery, within the moment of truth because the organism seems to show itself fully circumscribed, if not as someone else’s intellectual property. Genetic engineering, therefore, is not just an intensification of control over nature but also a corruption of the ancient sense of truth as disclosure and withdrawal. Even if this sense of truth is today not readily acknowledged, the potential to enact this truth, to follow the movement of disclosure and withdrawal (again which is also at the heart of discovery of nature according to Aristotle and

---

<sup>29</sup>B. Radloff, “The Value of Availability in Literary Studies,” *Philosophy Today* 36/2 (1992), 147.

<sup>30</sup>Ibid.

Heidegger) should remain a possibility to counter the technician's overtures to gain greater control over the environment, to which we are indelibly connected.

Subsequently, I see genetic engineering as a way of bypassing the ancient and phenomenological sense of truth as disclosure and withdrawal in order to set a kind of planetary control, initially at least, over food production. As I have noted, this destroys the organic understanding of what nature is in the narrow sense by conceptualizing a thing (*phusis*, nature) as a vacant entity for the purposes of control and functionalization

In this way, genetic engineering poses a rejection of nature traditionally conceived as the guiding force of the earth. Genetic engineering, as Radloff again puts it so well is "an essentially technological mode of thinking which is representational and hence calculative [that] is not confined, therefore, to the scientific realm" but may be enacted, as it were, as a form of control over all living beings.<sup>31</sup> This amounts to control over the earth, that mysterious and enigmatic well-spring of nature itself.

At last, we can also think of genetic engineering and its technologies as having nothing remotely in common with historic agricultural means of crossbreeding. These historic practices have worked in concert with the variability and withdrawal of nature. The organic farmer must work with the rhythms of nature and land, which in a sense retains the dignity of the earth. The crop's internal structure had not been chemicalized and controlled by corporate America. This farmer dances to an ancient art that lets the

---

<sup>31</sup>Bernhard Radloff, *Will and Representation: The Philosophical Foundations of Melville's Theatrum Mundi* (New York: Peter Lang, Inc., 1996), 167.

earth in Heidegger's words be "present as the sheltering agent" against human control.<sup>32</sup>

It "*lets the earth be an earth.*"<sup>33</sup>

---

<sup>32</sup>M. Heidegger, "*Der Ursprung des Kunstwerkes*," translated as "The Origin of the Work of Art" by Albert Hofstadter (New York: Harper & Row, 1975), 42.

<sup>33</sup>*Ibid.*, 46.