

Endmatter

A FEELING FOR THE FUTURE: THE PROCESS OF CHANGE AS EXPLORED BY FRED. L. POLAK AND BARBARA MCCLINTOCK

by *Henriette Kelker*

Abstract. Fred. L. Polak explored the mechanisms of social change in terms of "future-visions" held by a community. The future, says Polak, participates actively in the present, providing part of the context within which today's decisions are made. Barbara McClintock acquired her insights in maize genetics by developing "a feeling for the organism." New insights, she maintains, emerge through a mutual relationship between researcher and subject. Though scholars in different fields, both acknowledge the power of images in the creative process. There is a difference in the extent to which each scientist perceives this power to be available to create new ideas.

Keywords: creativity; "feeling for the organism"; future-vision; myth of power; process of change; utopia.

The merit of Fred. Polak's work has been recognized more by politicians and business people than by philosophers and theologians. His ideas on futurology and prognostics were implemented in the plans of national governments and the European Community. In 1954 Polak's pioneering work, *The Image of the Future* (1954),¹ was awarded the Council of Europe Award. In it Polak explores the effects of different types of future visions on the vitality and development of cultures. He understands the future as actively participating in the present, providing part of the context within which today's actions and decisions are shaped.

Barbara McClintock, a cytogeneticist of remarkable character, led the

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way towards a new understanding of scientific research. By developing "a feeling for the organism," she acquired unique insight into the genetic processes of maize. Because McClintock was a pioneer in her field, her views were not readily accepted by her peers. Not until the 1980s did McClintock's work receive the recognition it deserved, culminating in 1983 in the Nobel Prize for Physiology or Medicine. McClintock was then eighty-one years old.

Polak and McClintock, though scholars in different fields, have a similar understanding of the sources of creativity—an understanding that warrants a closer examination. Throughout her career McClintock maintained a critical distance from the paradigmatic practices and expectations of her time, perceiving, not a world that is reducible to independent processes and events, but one that is relational and whole. Polak explores a world in which the present is shaped through its interaction with images of the future created by science, art, and spirituality. He stressed, in the 1950s, that a new vision was needed to pull Western culture back from the brink of destruction. The 1990s offer a perspective from which to look back and reconsider Polak's ideas.

THE WORK OF FRED. L. POLAK

In *The Image of the Future*, Polak examines the process by which an image of the future becomes the present. Polak proposes "to expand the time-concept to include [the] interaction between completed and non-completed time, thus adding a new dimension to the historical process of socio-cultural dynamics" (Polak 1961, 1 : 5). Polak's thesis is that not only is the world pushed towards the future by the events and ideals of the past, but there also is a pull towards the future coming from the idealistic images held of it. The various possibilities that are the future are operative in the creation of the present. "It is the future-which-is-not-yet, one of many possible futures, which as if she already existed, sends her light and her shadows ahead, influencing our beliefs and our unbeliefs, our hopes and our despairs" (Polak 1958, 22).² The future is both humanly created and human-creating.

Polak sees in the future-visions of Mediterranean and West European cultures the precursors of subsequent development. The rise and fall of civilizations corresponds to the energy contained in their future-visions. Polak differentiates between visions that affirm or reject the inherent value of existence and those that affirm or reject the power of human will to affect change in human existence, now or later. Elise Boulding translates Polak's words with the terms "essence optimism," "essence pessimism," "influence optimism," and "influence pessimism" (Polak, 1973, 47).³ A society can thus be characterized by the combinations:

essence optimism/influence optimism, essence optimism/influence pessimism, essence pessimism/influence optimism, and essence pessimism/influence pessimism.

Essence pessimism prevailed among the ancient Egyptians, who were preoccupied with death and life after death rather than with current life. Later, Gnostic sects, influenced by creation stories introduced from Iran, held a negative view of creation. Positive views of existence are associated with belief in a creation that is essentially good, though perhaps incomplete. This belief is basic to Jewish, Greek, and Christian cultures as well as to some ancient fertility cults. Introduction of apocalyptic thoughts reversed these views.

Influence pessimism is typically associated with a deterministic understanding of the world and with autocratic deities: creation will unfold according to a plan upon which humanity has little influence. More optimistic views recognize humanity's ability to affect its own fate, whether in this life or the next. Christianity and Judaism have each gone through periods of influence optimism and influence pessimism. Prophetic calls for reformation attest to a positive regard for human will. Augustine's doctrine of predestination, on the other hand, conveys an influence-pessimistic message, later amplified in the doctrines of the Protestant reformers.

Future-images are portrayed by Polak as having two functions: a social critical function and a decision influencing function. Utopic and eschatological visions critically reflect on the social situation of their time. They sketch the totally other life of which humanity is capable or which may be anticipated. Within these images a tension exists between temporal and spatial remoteness, and particularity, between what is desirable and what is attainable. When the particular gains the upper hand, the ideal becomes ideology. Thus, through the development of applied science, the ideals of pure science collapsed into the goals of the industrial revolution. The hunger for knowledge which drove world exploration spawned the tyranny of colonialism. Philosophical ideals, such as those expressed in Kant's *Zum Ewigen Frieden*, combined with particular ideas about racial supremacy and human purpose eventually sublimated into the catastrophes of the two world wars. This self-limitation of a vision through the drawing of spatial boundaries has, according to Polak, repeatedly proved to be catastrophic because it causes the self-destruction of the future-image.

Polak concludes that without a positive vision and a good dose of influence optimism there is no future. "Each culture has exactly such, so much and so long a future as there is energy contained in the reach of her future-images. The future of a culture can be known and measured by the power of her future-thoughts" (Polak 1958).⁴ Thus, Polak is

alarmed by the spirit of the 1950s. Politically, philosophically, and culturally there are no future-images that offer positive choices. Existentialism, circular literary forms, visual art without perspective, and atonal music reflect the mood of the time and fail to provide the energy needed for social and spiritual inspiration. The end of spirit/matter dualism (God is dead) marks the end of hope and the end of meaning.

Yet Polak's work does not end here. His assessment of the 1950s is at the same time a powerful call to action. He refuses to accept a dead-end future as much as he refuses to accept the Holocaust—which he himself narrowly escaped—as the dead end of history. He argues for the active construction of new future-visions and for decisions made in response to them. Though recognizing fully the limitations of human will, Polak points at the individual's responsibility to build new visions, visions grown out of a genuine belief in the creative ability of humankind.

Polak identifies Western culture's greatest problem as its crippled awareness of "the Other." "The task before us," says Polak "is to reawaken the almost dormant awareness of the future and to find the best nourishment for a starving social imagination" (Polak 1973, 301-2). This nourishment is available from the creative dreamers and visionaries who are at work in our midst today. The powerful note on which Polak's work ends is in itself an affirmation of such creativity.

THE WORK OF BARBARA MCCLINTOCK

Considering published work, McClintock's contribution seems to have been strictly to the field of cytogenetics. Evelyn Fox-Keller, however, exposes in McClintock's biography the person behind the Nobel Prize-winning work, and hence allows us a glimpse of the ideas and attitudes that set McClintock apart from the rest of the world of scientists.

Being one of the first women in her field, McClintock constantly needed to fight gender bias. Her credibility as a scientist and colleague was accepted only reluctantly by her male peers. Her tendency to disassociate herself from paradigm-directed modes of thinking, which eventually became the strength of her career, did not ingratiate her to her peers. Geneticists typically study commonalities observed in large numbers of individuals, obtaining data that are then reduced and abstracted. McClintock was more interested in exploring the exception and the anomaly. Quotes Fox-Keller, "The important thing is to develop the capacity to see one kernel that is different and make that understandable. If [something] doesn't fit, there's a reason, and you find out what it is" (Fox-Keller 1983, xiii). McClintock's insight into maize genetics, in particular into the processes governing differentiation, was based on the vision she developed through her relationship with maize plants as organisms. Her knowledge was obtained, in the first instance,

by intuition rather than reason. Says Fox-Keller, "As she watched the corn plants grow, examined the patterns on the leaves and kernels, looked down the microscope at the chromosomal structure, she saw directly into that ordered world. . . . For her, the eyes of the body *were* the eyes of the mind. Ordinary language could not begin to convey the full structure of the reading that emerged" (Fox-Keller 1983, 148-49).

For McClintock, communicating her vision became the major hurdle in her life. How could she articulate in analytical terms the knowledge conveyed by complex images consisting of patterns and colors and their subtle variations? The composite picture of the maize plant, consisting of many integrated and interactive phenomena, could not be reduced to a series of sequential processes. Scientists who eventually took up her ideas have acknowledged the need to actually *see* what McClintock saw, before they were able to appreciate her insights. Evelyn Witkin, a colleague of McClintock's at Cold Spring Harbor, developed this understanding by looking over McClintock's shoulder while receiving a running commentary, enabling her in the end to "actually see the genes turning on and off" (Fox-Keller 1983, 149). The prerequisite of a shared vision does not impress scientists who insist on a need for objectivity and independent verification. McClintock's ideas were simply unacceptable to those who looked *at* rather than *inside* the organism. It would take many years before the science community was ready to accept McClintock's insights.

In her approach to scientific research, McClintock deviated considerably from her contemporaries. She had no desire to extrapolate from abstract data. Rather than being "puzzle solving" (as suggested by Thomas Kuhn [Kuhn 1970, 36]), the pursuit of science was for McClintock a way of loving the world. To understand the organism, she said, one needs to place oneself at an equal level; one has to go down and communicate with it. This approach leads to a knowledge that is intimate and participatory rather than objective and public. What is more, this knowledge leads not to power over but to participation in the world. In McClintock's words, "One must have the time to look, the patience to 'hear what the material has to say to you,' the openness to 'let it come to you.' Above all, one must have 'a feeling for the organism'" (Fox-Keller 1983, 198). Such feeling, inevitably, is subjective. One uses imagination and intuition to arrive at an image that feels right. Yet it also opens up the world of the organism as does no other method and provides a new perspective from which to interpret quantitative data.

Both McClintock and Polak had a passionate love for the world that enticed them to in-depth study. They were motivated, not by an urge to explain, but by an urge to know. They participated in the life of the

world much as players participate in a game—not players who participate by a set of strict game rules but players at an infinite game (Carse 1986). To understand the mechanisms of differentiation and change, both McClintock and Polak employed imagery. The future-visions called for by Polak are not the extrapolations of economic data and social statistics but the imaginative application of human creativity.

To McClintock knowledge was pure joy, a joy she desperately wanted to share but had difficulty communicating. To share her insights one needs to understand the world as interactive and complex, knowable only through simultaneous employment of senses, feelings, and reason. To explore it one needs to be prepared to be led as well as to lead.

ACKNOWLEDGING THE POWER OF MYTH

The images used by Polak and McClintock to convey their insights are the building blocks of knowledge. "Knowledge," according to Carse, "is what successful explanation has led to; the thinking that sent us forth, however, is pure story" (Carse 1986, 165). According to Mircea Eliade, it is such story, or myth, that provides a model for the world and a justification for the actions of humanity (Eliade 1969, 76).

When new images tell a new story, the future, too, becomes new. New images thus play a role in the creation of the future. Adriana Berger sees imagination as a means to move into other worlds, which have ideas rather than sense perception as a frame of reference (Berger 1986). The new dimension thus given to human experience allows for new creativity, and the energy invested in it gives to the process of life its character of openness (Altner 1993; Pfetsch 1992).

Polak and McClintock explore an open-ended world, or myth: the one, socio-historical, and the other, scientific. Polak's analysis of the history of future-visions is above all an analysis of the power of myths and an exploration of what happens when these myths fail. He applies his findings to the situation of the 1950s, a time without positive future-visions and thus potentially without a positive future. The solution, he concludes, lies in the creation of future-images, which inspire society to act towards a hopeful future. One needs to ask, though, whether the active ingredient of the future-image is the vision itself or the myth that pervades it.

Positive future-images can be created at will, even scientifically informed ones. Politicians have become adept in this exercise yet fail in most instances to generate the energy necessary to take a creative new direction. Images designed with the building blocks offered by the prevalent myth are bounded by that myth. Polak summons people—politicians and economists in particular—to break these barriers. A new future is achieved, says Polak, "by inventing the future, by formulating

dynamically compelling, idealistic visions of the future, by drawing up blueprints for the future, and by artistically creating logically consistent sketches of the future" (Polak 1971, 250). Any future-vision remains stuck in a paradigmatic quagmire if it does not see beyond the boundaries of the prevalent myth.

Change requires a willingness of people to let go of their current myths. The utopia plays a key role in preparing for change and has affected the development of Western culture. Writes Polak: "Its imaginative and yet practical thinking about desirable possibilities makes it a co-determining spiritual fertilizing agent in bringing about the future. Through its challenging and responsive image of the future, the future itself is as it were retroactively set in operation" (Polak 1961, 1 : 455). From the middle of the nineteenth century on there is a shift towards ideology—utopia harnessed by the particular. In the 1950s, having focused on too many ideologies and having too many times been plunged into disaster because of it, Western society appears to have lost the motivation to uphold any ideals. In this century the increase of negative utopias, or dystopias, has become a reminder of the ideals that have been lost: faith in human potential; the promise of progress; hope for universal affluence. Dystopias are rooted in a spirit of both essence- and influence-pessimism and are self-destructive, eliminating the need or desire for future-images. Warns Polak, "Negative images of the future have made us spiritually ripe for a visionless existence bounded by today" (Polak 1961, 2 : 32).

Polak expects this century to be critical in determining whether Western culture will survive and rejuvenate itself or deteriorate into chaos and barbarism. What scene does the end of the century present? Is there a recovery of idealism discernable? In 1991, Richard Slaughter observed only a scant ability to imagine new and different futures. But he also observed "that contemporary views of futures tend to be not so much about the things we want to achieve as about the things we want to avoid" (Slaughter 1991). Negative though the approach may be, this urge to preserve attests to a positive valuation of human existence and of the earth that supports it—to some essence optimism. Moreover, the expectation that one may be successful in this preservation reveals a measure of influence-optimism. Is this an indication that new ideals and visions are taking hold of people?

Not yet. Though many urgently call for practices that are nonexploitive and earth friendly, a new myth that would allow such change has yet to grow roots. Hence the failure of the Earth Summit. In the 1990s it is still difficult to imagine human beings in a nonexploitive relationship with nature and with each other. The crux of the problem, identified by Polak as a crippled awareness of "the Other," has remained unchanged.

The goal is still *productivity* rather than *creativity*, lacking the required feeling of mutuality. The application of power to achieve social change still catches people's imagination. Thus, in *The Chalice and the Blade*, Riane Eisler paints a picture of ancient humanity in harmony with nature and then envisions reclaiming such harmony through the manipulation and reorganization of society (Eisler 1987). Her envisioned "pragmatopia" is an oxymoron. One cannot organize society to be an integrated part of nature. Interaction and integration are first and foremost states of mind. They are the ideals of a myth that cannot be imposed on a culture. The interactive relationships needed are *internal* relationships, not *external* confrontations.

Wendell Berry feels that we need to regain a sense of balance. "Having placed ourselves in charge of Creation, we began to mechanize both the Creation itself and our conception of it. . . . By means of the machine metaphor we have eliminated any fear or awe or reverence or humility or delight or joy that might have restrained us in our use of the world" (W. Berry [1977] 1986, 56). This does not mean that we reject all technological achievements. In her work, McClintock relied on sophisticated isolation and observation techniques that gave her access to the world of maize. The question is not "to use or not to use" but *how* to use human skills. Ursula Franklin addresses this issue as she explains how a feminist perspective represents an entirely different paradigm: "The great contribution of women to technology lies precisely in their potential to change the technostructures by understanding, critiquing, and changing the very parameters that have kept women *away* from technology. Only then do we have the possibility of changing the real world of technology itself" (Franklin 1990, 104).

During the past decades, positive future-images have been created that feed the imagination and are based on nonexploitive ideals. Paolo Soleri sees technology as the means by which humanity *can* express its unity with the earth. "For a cosmos whose 'what' is the spirit, the 'why' is creation and the 'how' is technology" (Soleri 1973, 3). Soleri proposes a new self-contained city structure: an "Arcology," which is to reflect architecture as "the ecology of reflective life" (Soleri 1973, 46). Cars will be things of the past, and technology will enhance unity rather than fragmentation. Thomas Berry dreams of a nonexploitive world based on the mutual dependence of humanity and nature. Like Polak, Berry believes that "we need to remember that this process whereby we invent ourselves in these cultural modes is guided by visionary experiences that come to us in some transrational process from the inner shaping tendencies that we carry within us" (T. Berry 1988, 201). Utopic as these images are, they have enough connection with reality to generate pockets of creative energy. And true to the utopic tradition, the authors stop

short of prescribing methods to achieve the ideal states. Their visions are not positioned in a far-off future but at an unspecified distance, close enough to touch if we want to.

ABANDONING THE MYTH OF POWER

The myth of the Enlightenment has been the myth of power. It grants authority to this era's triumphs: technology and economic organization. As faith in these achievements dwindles, a new image is slowly emerging of a world moved by relationship rather than power, in which humanity is not necessarily central. The view of humanity as noncentral to the world marks a change in thinking equal in magnitude to the change introduced by Copernicus's new view of the world as noncentral in the universe. This new myth is so far only loosely afloat in Western culture, slowly capturing the conscience of people. The result is a reevaluation of values, manifested here and there by individual people who make decisions that are at odds with the ideals of power, profit, and progress. This is the change Polak has been looking for. It now becomes evident how difficult it is for the myth of power to escape its own grasp. After all, the notion that humanity has the power intentionally to create new myths and to transform culture is rooted in the myth of power itself. There is a fine line, which Polak recognizes, separating the need to create new images and the danger of overparticularizing them.

From the vantage point of the myth of power, the effect of action is proportional to the power of the authority behind the action. These are the premises on which both Newtonian physics and Western militarism are based. When results do not agree with predictions, human error rather than faulty premises are the accepted explanation (Kuhn 1970, 37). From the point of view of an integrated and interactive world, however, the effect of action includes inherently an element of unpredictability, since all interacting parts are expected to exercise some degree of freedom.⁵ A myth in which humanity is noncentral discourages particularization of future-images, because it accepts an open and uncertain future.

Polak identifies the energy that future-images can provide as the only hope for continued creativity. Absence of empowering visions means absence of potential for renewal. This statement reveals the origin of Polak's theory in the Newtonian myth of a mechanistic world explained by cause and effect, action and reaction. In such a world, the only energizing images are those that allow for goal-oriented action with the always-present danger of over-particularizing. Acceptance of an uncertain future does not need to deprive the world of the creative energy enclosed in future-images. Joanna Macy explains how an experience of

the world as interactive and interdependent leads to a flexible identification of *self*. "As we awaken, then, to our larger ecological self, we find new powers. We find possibilities of vast efficacy, undreamed of in our squirrel cage of separate ego" (Macy 1990, 47). These possibilities cannot be predicted; they cannot be modeled; they can be recognized only through creative participation, as Barbara McClintock participated in the image she created of the maize plant; and there is an important difference between the desire to participate in creation and the wish to control. New images do not need to encourage control-oriented action. Any time interaction is freely allowed between myth and experience of the world—between stories and events—novelty is allowed to be generated. John B. Cobb, Jr., describes this generative process as "creative transformation." Without it, "each experience, and therefore also the reshaping of the world, would be nothing more than the rearrangement of elements of the past. . . . The present would be the impotent consequence of the past; complete metaphysical determinism would be the final truth; and creativity would be an illusion" (Cobb 1975, 67). Thus, true novelty becomes the knowledge that allows creative participation in the world. McClintock's knowledge of the maize cells led to her creative insights in maize genetics. A fixation on one aspect of experience, or on reduced data, would clearly interfere with this creative process.

The manner in which McClintock arrived at her insights illustrates the process of creative interaction. McClintock, throughout her research, had focused on what happened in the organism, *not on what could be abstracted from observations and calculated from numerical data*. The integration of observation, experience, and imagination is to some extent autonomous. McClintock knew that it is possible to hinder and distort this process by giving authority to some kinds of knowledge and suppressing others; in other words, by appointing oneself as the designer of answers. On one occasion, soon after she arrived at Stanford to work on a problem, she had a strong feeling of loss and discouragement. "I wasn't seeing things, I wasn't integrating, I wasn't getting things right at all. I was lost" (Fox-Keller 1983, 115). She took a walk, found a bench under some eucalyptus trees, and she sat there for half an hour. She recalls letting "the tears roll a little. . . . I must have done this very intense, subconscious thinking. And suddenly I knew everything was going to be just fine" (Fox-Keller 1983, 115). It was. A few days later she had solved the problem. Clearly, this was a process over which McClintock allowed herself only limited control. Knowing from experience how she could facilitate the process, she gave her subconscious mind the freedom and space it needed, and then, trusting its conclusion, employed her reason in the service of this newly emerged knowledge.

Like fixation on particular data, fixation on a particular future-image reduces the freedom and the ability (willingness) to recognize unexpected opportunities. Alfred North Whitehead explains that “the future is merely real, without being actual. . . . The present is the immediacy of teleological process whereby reality becomes actual” (Whitehead [1929] 1978, 214). Thus, using Whitehead’s terminology, if one anticipates a future-image to be realized, one gives premature actuality to the future, preventing oneself from perceiving its array of possibilities.

CONCLUSION

The example from McClintock’s life illustrates the limited control one has, and ought to maintain, over the creative process. Rather, control over creativity is to be shared among the participating elements. Predictions and expectations are merely a rearrangement of the elements of the past, void of novelty and unable to carry a culture into a renewed future. Knowledge is as much a matter of feeling as it is a matter of rational analysis. Polak’s and McClintock’s approach to creativity is echoed in Slaughter’s conclusion: “Once we give up the impossible task of trying to ‘predict the future’ and instead begin to participate in creating it, the foundations of informed optimism and empowerment become much clearer” (Slaughter 1991, 541). Polak pleads for such participation, and his insights are as valid today as they were in the 1950s.

McClintock was above all energized by the joy of creating new images. “Not that I had the answer, but [I had] the joy of going at it. When you have that joy . . . you let the material tell you where to go, and it tells you at every step what the next has to be because you’re integrating with an overall brand new pattern in mind. You are not following an old one; you are convinced of a new one. And you let everything you do focus on that” (Fox-Keller 1983, 125). McClintock’s aims were, admittedly, different than Polak’s: she was not out to save the world. Her approach to the generation of new images, however, offers rich possibilities to those who aspire to move into the twenty-first century with new visions of a whole earth teeming with opportunities for relationships, interactions, and creativity.

NOTES

1. The original work, *De Toekomst is Verleden Tijd*, by Fred. L. Polak, abbreviated by A. M. Polak Daniels-Boon Hartsinck, has been translated by Elise Boulding as *The Image of the Future*, and later was abridged by the same author under the same title. At the time of writing I had access to only the Dutch abbreviated version and both English versions.

2. My translation.

3. Polak derives his terms from the German concepts *Seinsollen* and *Seinmüssen*, arriving at his own terms *Seinsoptimismus* (or *Seinspessimismus*) and *Willensoptimismus* (or *Willenspessimismus*),

translated by Boulding as "essence-optimism" ("pessimism") and "influence-optimism" ("pessimism").

4. My translation.

5. This freedom towards the future is described by Alfred North Whitehead as "the category of Freedom and Determination," governing the process of becoming (Whitehead [1929] 1978, 27).

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