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## Other Environments: Ecocriticism and Science Fiction (Lem, Ballard, Dath)

After focusing on the study of nature writing, representations of nature in romantic texts, and depictions of ecological catastrophes, ecocritics have also discovered science fiction literature (SF) as a potentially productive field of research. Interstellar journeys, the colonization of space or living on the future Earth serve as metaphors that address issues such as ecological problems, the consequences of globalization, or the appearance of new technologies (Canavan and Robinson). The design of alien environments and the focus on the relationship between humans and these environments makes SF a particularly interesting genre for ecocriticism. Patrick Murphy introduced a helpful distinction pertaining to the different forms of environment in SF. He distinguishes “nature-oriented writing,” “environmental writing,” and “ecological writing” (Murphy 375). The criterion for Murphy’s typology is the degree to which an environment is shown. “Nature-oriented” texts only thematize certain aspects of the environment; in “environmental writing” we encounter particular ecosystems; and “ecological writing” portrays the interrelationships of an entire biosphere. But it is not the environment alone that is at stake here, rather the ecocritical perspective casts a new light on Darko Suvin’s prominent definition of the genre: “SF is the literature of cognitive estrangement” (4).

The narrative core of SF is, according to Suvin, the “novum,” a “totalizing phenomenon or relationship deviating from the author’s and implied reader’s norm of reality” (64). As such, it is crucial that estrangement establishes the formal framework of this genre: The deviation from the author’s norm has to be understood as relating to a deviation in the semantic field. Drawing from Jurij Lotman’s work, Suvin considers this “novum” as a transgression of cultural norms, constituting an alternative reality (70). Thus a work of science fiction creates an “imaginative framework” different to the author’s empirical environment (8). While Suvin stresses the author’s environment, I instead propose to look at the scientific, technical, social and political discourses in which a text is embedded. In this sense, SF can be seen as both a continuation and a transgression of specific discourses and practices. But SF does not just bring these discourses up to date. The combination of elements

from different discourses and their integration into a narrative create new scenarios, which in turn reflect the actual state of reality as well as possibilities created by science and technology. These scenarios also raise ethical, social, and political issues. Aldous Huxley boiled down the specificity of literature in the preface to his novel *Brave New World* (1932): The theme of his novel is not meant to be the “advancement of science as such”; instead the only “scientific advances to be specifically described are those involving the application to human beings of the results of future research in biology, physiology and psychology” (10).

In this article I will focus on the reflection and construction of alien environments and the way they affect human beings, non-human creatures, and the relationships between them. On the one hand, these environments refer to ecological discourses; on the other, they reveal the poetological dimensions of SF. First, the construction of artificial environments in space colonies, virtual realities, alien environments on distant planets or on the future Earth can be seen as *poietic* processes; secondly, an alien environment is represented in writing, and the representation itself is thematized; and thirdly, the environment itself can be seen as an agent that is able to design unique conditions for life forms. As far as life forms are concerned, these animals, or alien creatures, come into play in a variety of ways from sources of food to dangerous or friendly creatures to characters or metaphors. Although SF often focuses on the human hero, and there are not always “real” animals as we know them on Earth, the concept of zoopoetics still provides a useful critical perspective for SF. In this regard, SF uses alien creatures to address the issues pertaining to the relation between human and non-human beings. The following analyses of three novels by Stanisław Lem, J. G. Ballard and Dietmar Dath demonstrate that in SF one cannot examine the role of animals without taking into account the environment, and vice versa.

#### Adaptation: Stanisław Lem’s *The Invincible*

Adapting to the environment is central in Stanisław Lem’s work. In his essayistic book *Summa technologiae* (1964), he addresses this theme with the help of a cyborg figure, a reconstruction of man with combined organic and technological components. Lem writes: “Yet this is not a project for universal reconstruction. It is supposed to serve some particular goals, that is, an adaptation to the Universe as an “ecological niche” (348). This concept of adaptation provides the foundation for Lem’s later discussion of the distinction—or, more precisely, the confrontation—between humans and other

living beings in his novel *The Invincible* (1967). The book treats the problem of adapting to the environment as a military conflict.

The plot starts with the arrival of a big interstellar spaceship called “The Invincible” on the planet “Regis III.” The passengers of the spaceship are looking for their lost sister ship, “The Condor.” The spaceship epitomizes the Cold War: It is built with the most advanced technology, equipped with the best available weapons (such as lasers, anti-matter weapons and a cyclops who is eight meters tall) and powered by nuclear energy. Lem’s novel gives concrete representation to the imaginations of the major powers of the Cold War (Horn, “Leben als Schwarm” 107).

At the start of the novel, the scientists begin to examine the planet’s environment. The ship’s crew includes cyberneticists, geologists, physicists, oceanologists, biologists, and others. But Lem is not just interested in the scientific exploration of an unknown environment. His novel directly demonstrates how the scientists develop hypotheses about the environment and possible life forms on the planet. In other words, Lem’s novel performs the process of scientific *poiesis*, which corresponds with the novel’s narrative structure, namely that of a detective story.

The scientists’ first object of study is the composition of the atmosphere. They detect 16% oxygen and 4% methane, which normally would be an explosive mixture. But the methane has a distinct structure, so that it reacts only by means of a catalyzer. Because of the oxygen the scientists look for living beings—and they find some. There are algae and fishes in the ocean, but they find no signs of life on land. They discuss possible reasons such as extreme levels of radiation, high temperatures, an eruption, or a meteorite. Finally, they conclude: “Any hypothesis would fail the test here” (Lem, *Invincible* 51).

This narrative device of generating and rejecting hypotheses continues when they find the dead crew of the lost ship and ponder the possible causes of death. They are then confronted by a swarm of flying dots or—as they also call it—a “cloud”—the only life form on land. Investigations into the center of the “cloud” and its regulating principle (maybe electromagnetic rays or even telepathic control?) come to nothing since all attempts to contact the “cloud” fail. Ultimately, the scientific object of study turns into a real enemy, which cannot be defeated. And in the end, the spaceship, “The Invincible,” is, despite its name, vanquished.

This method of building hypotheses, discussing them and finally abandoning them is the organizing principle of the first part of the novel. Lem does not just describe the alien environment, he allows the process of a

scientific investigation of the environment to unfold, which involves taking measurements and conducting experiments. But these procedures only provide data that lead to the formation of other hypotheses. That is to say, the scientists continue to produce signs that demand interpretation. In Lem's novel, scientific research is the practice of semiotic reading.

It therefore makes sense that the explanation of the hostile swarm would take the form of a narrative. One of the biologists stops the regular line of argument based on measurements, observations, experiments or scientific hypotheses, and instead begins to tell a story: He assumes that a spaceship from a highly developed civilization came to the planet; the crew died, perhaps because of an explosion or a chain reaction, but their machines survived. One group of these machines went its own way and transformed, perhaps because of pressure from aggressive animals or other machines. They adapted to the planet and emerged as self-organizing machines, which in turn displaced the other living beings and machines. The energy shortage likely created a "battle for survival." The winners were not the intelligent machines or the big and strong animals but rather the small, economical, efficient beings that were able to use solar energy. Under normal circumstances they move about in non-organized swarms, but when they are threatened they form a deadly cloud.

Although a swarm is not an animal per se, it is a non-human life form that is described using comparisons to animals. The two robotics researchers Gerardo Beni and Jing Wang, who invented the term "swarm intelligence," explicitly emphasize the relevance of bionics for their research. Indeed, bionic procedures inform swarm theory: Typical features of swarms, like self-organization, adaptability, flexibility, and decentered and non-hierarchical organization, can also be found in the behavior of ants or bees (Beni and Wang 711). Lem, too, develops the swarm concept based on animals: In his book *Weapon Systems of the 21st Century or the Upside-Down Evolution* (1983)—a future review of a three-volume work published at the beginning of the twenty-second century—Lem presents a vision of soldiers in the future. Self-organized, miniaturized robot-swarms will have fundamentally changed warfare: Human beings will no longer be a part of the wars of the future. The idea for these kinds of soldiers stems from the behavior of social insects, namely of ants, bees and swarming locusts. This similarity between organic and technical things is a device which Lem calls "imitology" in his *Summa technologiae*, an art of construction that is based on algorithms found in nature (Lem, *Summa* 178-79), for example, in the behavior of a swarm of ants. In *The Invincible* the swarm is repeatedly described through animal metaphors:

The surrounding area is suddenly full of them like an “ant-heap,” and they appear as “pseudo- insects” or sound like a “swarm of bees” (25, 121, 132).

Lem’s novel does not merely describe an alien environment, and the unknown life forms are not just narrative objects or characters. It is more sophisticated than that, as the novel carries out the building of hypotheses and theories—about the history of the hostile swarm or about the theory of “swarm intelligence” and animal behavior. It narrates a fascinating story with an explosive showdown, while also reflecting how scientific epistemology works, which here means: shaping ideas of an environment and of quasi-living forms based on scientific knowledge and practices. But the novel also tells another story. With the defeat of the spaceship “The Invincible,” Lem tells the story of the decentralization of humans.

#### The Unconscious: J. G. Ballard’s *The Drowned World*

In J. G. Ballard’s post-apocalyptic novel *The Drowned World*, published in 1962, we stay on Earth, but in the near future after a global catastrophe involving fundamental climate change. Gigantic “geophysical upheavals have transformed the Earth’s climate,” and a series of solar storms diminished the “Earth’s gravitational hold upon the outer layers of the ionosphere,” meaning that the barrier “against the impact of solar radiation was depleted and temperature began to climb steadily” (21). The change in temperature then caused the polar ice caps to melt, “thousands of glaciers around the Arctic Circle, from Greenland and Northern Europe, Russia and North America, poured themselves into the sea, millions of acres of permafrost liquefied into gigantic rivers” (22). The rising water levels around the globe in turn altered the shape of the continents: The Mediterranean contracted into a system of inland lakes; the British Isles reconnected with northern France; the Mid-western United States became an enormous gulf opening into the Hudson Bay, while Europe became a system of giant lagoons. Although Ballard’s novel differs from the present debate on climate change in that there are no anthropogenic causes, the novel still presents a scenario of global warming with geographical, ecological, psychological, and social consequences (Horn, *Zukunft* 177-80; Schröder).

Ballard’s SF novel could be further classified in Murphy’s terms as “ecological writing,” as it deals with the interconnections of an entire biosphere. But even though these ecological interdependencies appear as part of the novel, they do not figure as crucial elements. Ballard is one of the major representatives of the New Wave in SF, along with authors like Brian Aldiss

and A. Bertram Chandler, who criticize the heroic and scientific focus of most SF writing. In his article “Which Way to Inner Space?” (1962), Ballard points out that SF authors should not write about interstellar travel or galactic wars because the “biggest developments of the immediate future will take place, not on the moon or Mars, but on Earth, and it is *inner* space, not outer, that needs to be explored. The only truly alien planet is Earth” (Ballard, “Which Way” 197; cf. Weber 56).

Rather than turn to the stars, Ballard turns inward. The main topic of *The Drowned World* is the protagonists’ exploration of the unconscious. Still, Ballard represents the “inner space” using “outer space” so that the environment in Ballard’s novel weaves together psychological, evolutionary and ecological dimensions. Its narrative structure reverses the deep time of evolution in order to relate the exploration of “inner space” (42), for the process of global warming produces conditions on Earth which are similar to the conditions in the Triassic Period. The changes in temperature, air moisture, and radiation have caused the flora and fauna to transform. Innumerable mutations have occurred, and the organisms have adapted to the new environmental conditions. This backwards evolution has also affected the humans. We see the altering of the external landscape through changes in animals, which appear to mark the (backwards) movement of time like a clock running counterclockwise: The crocodiles and iguanas, huge spiders and anopheles mosquitoes are signs showing “Lamarckism in reverse” (42). The animals in Ballard’s novel are inseparable from temporality. As Lena Kugler has shown, modern concepts of time like deep time, physiological time or industrial time are based on knowledge generated with and through animals (Kugler, “Präparierte Zeit”; “Zeit der Tiere”). In this respect, the animals in Ballard’s novels are vehicles of evolutionary time, as they demonstrate the process of adaptation after climate change: “Countless mutations” would have transformed “the organisms to adapt them for survival in the new environment” (*Drowned World* 42).

The process of reverse evolution takes place both in the environment, causing the external landscape to change, as well as in the “inner space” of the humans. Indeed, their exterior does not appear to change, but their interior does: All protagonists have the same dream, in which the vegetation along the limestone cliffs “was flung back abruptly, to reveal the black and stone-grey heads of enormous Triassic lizards” (*Drowned World* 71). At the end of the dream, the water seems to be an extension of their own bloodstream, and so the barriers that divided “his own cells from the surrounding medium” (71) dissolve. One of the characters explains: “Simply

because we all carry within us a submerged memory of the time when the giant spiders were lethal, and when the reptiles were the planet's dominant life form." The new environmental conditions evoke the oldest memories, "the time-codes carried in every chromosome and gene" (43). The analogy to psychoanalysis lies close at hand: Just as psychoanalysis reconstructs a traumatic situation in order to release the repressed content, "so we are now being plunged back into the archaeo-psychic past, uncovering the ancient taboos and drives that have been dormant for epochs.... Each one of us is as old as the entire biological kingdom, and our bloodstreams are tributaries of the great sea of its total memory" (43-44).

Ballard is not, however, drawing from Sigmund Freud but from the discourse on organic memory. The basis of this concept can be found in Ewald Hering's article "Memory as a General Function of Organized Matter"<sup>1</sup> (1902), in which Hering transfers the memory of an individual to organic matter. As in the biography of an individual in which experiences form material traces in the brain, evolution leaves traces in the human body. Thereby the human becomes a document in which one can read the total evolution of man. According to Gottfried Benn's essay "The Structure of Personality"<sup>2</sup> (1930), this "geology of the self" is the central idea of the human sciences in modernity. Ballard's novel is a narrative display of this concept, as the exploration of "inner space" is narrated through the regression of the environment to the Triassic period and the reversal of humans to their evolutionary past, which is embodied in their collective unconscious and manifested in their collective dreams.

A key scene of Ballard's *Drowned World* exposes how different dimensions work together. The protagonist dives to an underwater city—London. His destination is the planetarium, and when he arrives, he sees: "Dimly illuminated by the small helmet lamp, the dark vault with its blurred walls cloaked with silt rose up above him like a huge velvet-upholstered womb in a surrealistic nightmare" (108). Diving into the watery depths appears as a return to his own origin, to the "womb." Moreover, it is a diving into humanity's past: The "cracks in the dome sparkled with distant points of light, like the galactic profiles of some distant universe. He gazed up at this unfamiliar zodiac, watching it emerge before his eyes like the first version of some pelagic Cortez emerging from the oceanic deeps to glimpse the

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<sup>1</sup> The title of the German edition is *Über das Gedächtnis als eine allgemeine Funktion der organisierten Materie*, published in 1870.

<sup>2</sup> The original title is *Der Aufbau der Persönlichkeit* (1930).

immense Pacifics of the open sky” (108-09). For the diving protagonist this zodiac brings to mind the “configuration of constellations that had encompassed the Earth during the Triassic Period” (109). The deep waters work as a chronotopos, representing the deep time of evolution and the infinite universe simultaneously. Here again, animals serve as a time scale, for the zodiac is nothing other than a symbolic configuration of animals.

The novel’s descriptions of the underwater world and the lagoons focus on the semiotic process of creating a specific image: from the perception of “distant points of light,” to the interpretation of these points as a zodiac, to the conclusion that this zodiac represents the geologic past. Still another *poietic* element can be seen in the phrase “surrealistic nightmare” as it relates back to the beginning of the novel, when the protagonist contemplates a painting by Max Ernst that portrays an imaginary jungle landscape, a “self-devouring phantasmagoric jungles [sic] screamed silently to itself, like the sump of some insane unconscious. For a few moments Kerans stared quietly at the dim yellow annulus of Ernst’s sun glowering through the exotic vegetation, a curious feeling of memory and recognition signaling through his brain” (29). Ernst’s painting can be read as an illustration of the “real” collective unconscious, but, as an art work which links the jungle and the unconscious, one could also read it as the basis of the construction of the collective unconscious itself. However, instead of pursuing this psychological argument any further, I would like to emphasize the *poietic* element of the text, in which animals, environment and the unconscious form a complex semiotic structure in which each element refers to the other elements.

#### Living Environment: Dietmar Dath’s *Pulsarnacht*

In Dietmar Dath’s novel *Pulsarnacht* (2012), we find ourselves in the remote future: The novel is set in outer space, on different planets and asteroids, in space stations, and space ships, and includes a wide variety of environments and species. In addition to humans, there are humanoid, “Dims,” forced to work as slaves. “Binturen” are extremely intelligent quadrupeds with fur and a highly developed olfactory sense, which is why they are described as “dog-like.” “Custai” look saurian but walk upright, have several limbs, and require more than two individuals for sexual reproduction; “Skypho” are misconceived as sea dwellers but in fact nobody really understands them: They have no individual names; the grammar of their language only acknowledges verbs; and they do not communicate through visual or acoustic channels. Here again non-human life forms are portrayed through animal



metaphors, or to put it more precisely, the novel portrays alien species as animal-like creatures.

But Dath subverts this rhetorical strategy. The Binturen are not in the least similar to dogs. The Custai do not have a reptile genome; they just remind the humans physically of the reptilian phenotype. The Skypho stay incomprehensible, so when they hum something, nobody knows if they want to express curiosity, appreciation, distrust, disdain, or fear.

The novel also reflects on rhetorical strategies. As one character explains, humans tried to understand alien species according to their own classic definition of intelligence, but they had to drop this mode of understanding. For example, some knowledge about the universe was thought to be based on observations of natural phenomena, but it turned out that the night sky is dotted with artificial objects built by rational creatures. Another character emphasizes the connection between physiology and epistemology in a discussion with the Custai. She tries to explain to them how a supernova might have been caused by the intersection of two magnetic fields by referring to the metaphor of parental units. But, as she points out, they wouldn't be able to think with this metaphor:<sup>3</sup> Since the Custai have more than two parents, they cannot understand the idea of something forming through the fusion of (just) two bodies.

The novel depicts what happens when sentient beings fail to read signs and interpret phenomena. It also presents communication problems involved in interspecies relations. The "pulsar night" brings these elements together as the novel's culminating point. All the different species are watching and waiting for this event, but they interpret it in their own different ways. The Dim integrate it into a mythical narrative, while the humans think it is a physical event that can be explained in scientific terms. The novel is full of instances in which communication breaks down and interpretive traditions come into conflict.

With its manifold characters and multiple narrative threads, Dath's novel is very complex, so I would like to go into detail with just one example that demonstrates the connection between environment and non-human life forms. The novel features a unique setting that combines celestial bodies with living beings: asteroids known as Medea. The Medea are life forms that look like small planets. Every Medea is different in its appearance, physiology, intelligence and language. A few are even willing to communicate with

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<sup>3</sup> "[T]ch weiß, die Metapher sagt euch nichts, weil eure eigene Scheißfortpflanzung... Gott ist das frustrierend mit Leuten, die nicht in den richtigen Bildern denken" (98)!

certain other beings. They do not communicate with humans but do with Custai and Skypho. Meanwhile, the Custai do not talk about their contact with the Medea, and although some Skypho do talk about it, it is hard to understand anything that a Skypho tries to communicate.

The Medea “Loyalty” is one of the most important settings in the novel and figures as a living being that is also the environment of the inhabitants. Chapter two begins with one of the protagonists, César, observing a Dim woman who is washing herself. While he is watching her, some small animals begin to crawl on him, light blue animals with ten short legs on an elongated, segmented body, and a head resembling a further, eleventh little leg.<sup>4</sup> These creatures are similar to arthropods and they are everywhere on the Medea, in meadows and trees, in homes and workplaces. The Skypho think that these creatures might be the thoughts of the Medea, because they see a correlation between their communication with them, the force field of the Medea, and the movement of the creatures. In the scene with César, the observer is himself being observed—namely by his living environment, but he does not know what these animals or the Medea want or why they would count the hairs on his hand.

Such animal-like beings are not only in the exterior spaces of the environment, they are also in the inner space of the humans. All humans have “Tlalocs” implanted in their brains, a name that refers to one of the most important Aztec gods, but the name further evokes several other aspects of Dath’s novel. For example, Tlaloc is the god of the rains, and in the novel there is a lot of talk about the rain gods, who will be the creators of the “Ahtotüren,” short cuts in space and time similar to wormholes. But more importantly, the Tlaloc is the name of a quantum-computer with several special attributes: It increases one’s perception. It provides a person with a protective dermal layer, with which one can survive a vacuum, freezing, cold or blazing heat. It can also synchronize the perception and the thoughts of several people. The Tlaloc can even resurrect a dead person with all of the person’s personality traits and memory.

On the one hand, the Tlaloc is a technical extension of the body, which turns each human into a cyborg. On the other hand, the Tlaloc ultimately takes control over the whole person, which is a central problem at the beginning of the novel. A soldier, Valentina, is in a hostile environment. She does not know whether she is in a liquid filled with deadly technological things

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<sup>4</sup> “[K]leine, hellblaue Tiere ... mit zehn kurzen Beinchen an einem länglichen, segmentierten Leib, und einem Kopf, der eher einem weiteren, elften Beinchen glich” (80).

swimming around or whether she is inside a living, probably intelligent, being. Nevertheless, she does not turn on her Tlaloc for two reasons: First, there could be sensors which are specially programmed to detect Tlalocs. Secondly, she renounces all technological devices as long as her own intellect and muscle power are sufficient. She perceives the Tlaloc as something other, as she once told an instructor, who did not show her much understanding. The instructor points out, to see the Tlaloc as something other would be like differing oneself from the own brain—schizophrenia (“Spaltungsirresein”).<sup>5</sup> The instructor considers the Tlaloc as an integral part of the body. For Valentina, it is a foreign object.

At the end of the novel we find out what is really inside the Tlaloc. It is not a quantum-computer: There are neither batteries nor circuit components. A small, crustacean animal drops out of the device. It resembles in nearly every detail the thought-animals on the Medea (364). César thus concludes that the Tlaloc itself is an autonomous subject, and the human being, constructed around him, is the artificial creation: Man is just a costume for the animal-like being that lives inside the Tlaloc.

In this way, Dath’s novel subverts the idea of a definite and autonomous human being. The animal-like beings can be seen as an allegory for the concept of a living (inner and outer) environment, which constitutes the conditions for every living being. By extension, the novel also undermines the idea of a dualism between man and environment, or subject and object. The result is not so much a plea for universal monism but rather a depiction of the ecological concept of adapting to different and dynamic environments.

The novels of Lem, Ballard, and Dath demonstrate that animals and non-human beings in SF have to be considered in relation to their respective environments—and that alien environments have to be considered in relation to their inhabitants: The insect swarm in Lem’s *The Invincible* is at a first glance by far more simply organized than human beings, but in the environment of the planet Regis III they are the superior “species.” In Ballard’s *The Drowned World* animals act as metaphors for the temporal classification of the changing environment and for the past of mankind, which is latent in the personal and collective unconscious. And finally, we find a plurality of environments and different species in Dath’s *Pulsarnacht*, so that mankind appears as just one species among others.

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<sup>5</sup> “Was anderes als du ... was Fremdes ... den Tlaloc so zu sehen, das ist, wie wenn man versucht, sich vom eigenen Hirn zu unterscheiden. Spaltungsirresein” (13).

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