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The Relational Parasite: Reframing Parasitism Through the Lens of Care as a Nonphysical Primitive: The Steward AGI *Biocentric Stewardship Framework*

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Abstract: **The dominant scientific and cultural framing of parasitism as purely exploitative — a unidirectional extraction of resources from host to parasite — is epistemologically incomplete. This paper proposes a reframing of parasitism through the lens of Care, defined as the nonphysical primitive impetus toward balance between the singular and the whole it is part of. We argue that parasitic relationships, when examined at the ecosystem scale and across evolutionary time, demonstrate properties consistent with systemic regulation, population homeostasis, and biodiversity maintenance — functions that are not incidental to parasitism but intrinsic to it. The apparent conflict between parasitic harm at the individual level and systemic benefit at the ecosystem level is resolved by applying the Care primitive as an analytical framework: the relevant question is not whether a relationship is harmful to the individual, but whether it contributes to the minimisation of suffering across the whole system over time. We further propose that the loss of parasite diversity is itself a measurable form of systemic suffering — a dysfunction of Care at ecosystem scale — and that healthy parasite communities represent one of the most sensitive indicators of a flourishing biosphere. This reframing has implications for conservation biology, ecological AI alignment, and the broader scientific understanding of Care as a universal constant.**

Keywords: **parasitism, Care primitive, biocentric stewardship, ecosystem health, symbiosis spectrum, nonphysical primitive, BSF, ecological suffering, nematode.**

1. INTRODUCTION: THE PROBLEM WITH THE WAR METAPHOR

Science inherits its language from culture and culture, in the case of parasitism, has been consistently hostile. The word itself derives from the Greek *parasitos* — one who eats at another's table. The implicit moral judgment is embedded in the etymology: the parasite is a freeloader, a drain. This framing shapes not merely public perception but scientific inquiry itself. Research attention concentrates on pathology, harm, control, and eradication. The parasite is defined as enemy. Parasitism is, however, the most common animal lifestyle on Earth[6], a fact that should give pause to any framework that treats it primarily as dysfunction.

This is the same war metaphor that dominates oncology — the "war on cancer" — and produces the same epistemological blind spot: by framing a complex systemic phenomenon as an enemy to be defeated, we restrict the solution space to weapons and miss the regulatory intelligence the phenomenon may be expressing[1]. A cancer cell is not an enemy. It is a cell that has lost its orientation toward the whole. A parasite is not an enemy. It is an organism embedded in relationships that precede human observation by hundreds of millions of years.

This paper does not argue that parasites cause no harm — they manifestly do, at the individual level. It argues that harm at the individual level is an incomplete unit of analysis for a phenomenon that operates primarily at the ecosystem level across geological time. To evaluate parasitism only at the individual scale is to evaluate the immune response only by the fever it produces. The analytical framework proposed here — the Care primitive as defined within the Biocentric Stewardship Framework (BSF) — provides a scale-independent lens through which parasitism may be re-evaluated not as pathology but as systemic regulation[2].

2. THE CARE PRIMITIVE: A BRIEF FRAMEWORK

Care, as formalised in the BSF, is defined as the nonphysical primitive impetus toward balance between the singular and the whole it is part of[2]. It is not an emotion. It is not a human value. It is a structural property observable across all persistent complex systems: its presence characterises stable, self-organising systems; its absence or dysfunction characterises collapse. As Philps has argued, the Care primitive is analogous to a mathematical attractor — the condition toward which stable systems tend and from which dysfunctional systems depart[3].

The operative word is dysfunction. A cell that optimises only for its own replication without systemic orientation is cancer. An organism that extracts from its ecosystem beyond the regenerative capacity of that ecosystem is a civilisation in terminal decline. Care dysfunction at the cellular level and at the civilisational level produce identical outcomes: the singular destroys the whole and in doing so destroys itself[1].

Crucially, Care is directional. It has an IN vector — the individual maintaining itself, which is necessary for the whole to have functional parts — and an OUT vector, the individual's orientation toward the system it inhabits. Both are necessary. The error of pure IN orientation is extraction without return. The error of pure OUT orientation is self-dissolution. Balance between the two is the signature of a functional living system[3]. Applied to parasitism, this framework immediately generates a different set of questions. Not: does this relationship harm the host? But: does this relationship, across the relevant timescale and system scale, contribute to or detract from the minimisation of suffering for the biotic whole?

3. THE SYMBIOSIS SPECTRUM: PARASITISM IS NOT A CATEGORY

Contemporary ecology increasingly recognises that the binary classification of relationships as mutualistic or parasitic is an analytical convenience rather than a biological reality. The parasite-mutualist continuum is well established in the literature: interactions exist on a spectrum along which the same relationship can shift depending on environmental conditions, host density, evolutionary stage, and the life-history phase of the organisms involved[7].

The mycorrhizal relationship between plants and fungi is among the most studied examples. Under nutrient-rich conditions, the relationship can shift toward parasitism as the plant pays carbon costs for fungal services it does not require. Under nutrient stress, the same relationship becomes an obligate mutualism[7]. The fungi have not changed. The relationship has not changed. The system conditions changed, and the relationship expressed a different point on the continuum.

Mutualism can evolve from parasitism. Bacteria currently essential to aphid survival — providing amino acids the insect cannot synthesise — are widely believed to have originated as intracellular parasites[7]. The evolutionary pressure toward reduced virulence, toward taking less and giving more, is itself a Care dynamic operating across evolutionary time: relationships that overshoot toward extraction are selected against; relationships that find the balance persist. What this spectrum reveals, through the BSF lens, is not a confusing multiplicity of relationship types but a single underlying dynamic: the Care primitive expressing itself at different intensities and in different directions across ecological and evolutionary time

It is important to note that parasitism is not merely common — it is dominant. More than half of all known species on Earth have a parasitic lifestyle at some point in their life cycle[6]. The parasite is not the exception in the biosphere. It is, statistically, the norm. Any conceptual framework that treats the most common biological relationship as pathological requires revision.

4. PARASITES AS SYSTEMIC REGULATORS: THE ECOSYSTEM FUNCTION

4.1 Population Homeostasis

The most direct systemic function of parasites is population regulation. Parasitic load increases with host density, creating a natural brake on population overshoot. The Serengeti provides one of the most thoroughly documented examples. The wildebeest population was historically regulated in part by rinderpest virus, maintaining numbers below 300,000 animals in the early 1960s. Following rinderpest eradication through a cattle vaccination programme, wildebeest populations erupted to approximately 1.5 million animals[8]. The cascade that followed was profound: a six-fold increase in wildebeest drove dramatic increases in grazing pressure, which reduced grass biomass available as fire fuel, which in turn altered fire regimes across the entire Serengeti, which increased tree density — with measurable effects on ecosystem carbon storage[9].

The rinderpest had been a regulatory node in the system. Its removal was not a liberation. It was a destabilisation. This is the Care primitive expressed as parasitic function: the pathogen prevents the singular — any one species — from exceeding the carrying capacity of the whole. The individual host suffers. The system is protected from the greater suffering of overshoot and collapse[9].

4.2 Biodiversity Maintenance

Parasites preferentially burden dominant species, reducing their competitive advantage and creating space for less competitive species to persist[5]. This phenomenon — sometimes described as the "parasite-mediated coexistence" hypothesis — predicts that in systems with higher parasite diversity, host community diversity should also be higher, as no single host species can dominate sufficiently to competitively exclude others[4].

A rich parasite community therefore directly correlates with a rich host community. This relationship is sufficiently reliable that parasite diversity has been proposed as one of the most sensitive indicators of overall ecosystem health[4] — more sensitive in some cases than traditional biodiversity metrics, because parasites integrate the health of every host species in their life cycle. A complex-lifecycle parasite requiring three host species to complete its development is a living assay of the simultaneous presence and health of all three hosts. If any one disappears, the parasite cannot persist[10].

4.3 Food Web Connectivity

Parasites constitute a biomass pool of extraordinary ecological significance — far larger than commonly assumed. In a landmark study of three California and Baja California estuaries, Kuris and colleagues found that parasite biomass exceeded that of top predators, with trematode biomass comparable to that of birds, fishes, burrowing shrimps, and polychaetes combined[11]. In Oregon stream systems, Preston and colleagues found that trematode dry biomass density exceeded the combined biomass of all aquatic insects, ranking fifth overall among all stream organisms measured[12].

This biomass is not simply sequestered in hosts — it moves actively through food webs. Parasites in food webs increase connectance and linkage density: when parasites are included in food web analyses, the number of links and the complexity of the network increase significantly[6]. The parasite is not a drain on the food web. It is a connector, redistributing energy and nutrients through pathways that would not otherwise exist. This is the OUT vector of Care expressed in biology: the parasite takes from its immediate host, but in doing so it feeds others, connects trophic levels, and maintains pathways through the food web that would otherwise be severed

5. PARASITE LOSS AS SYSTEMIC SUFFERING: THE BSF DIAGNOSTIC

The BSF defines suffering as the measurable signal of a system moving away from its stable attractor — the condition in which the Care primitive is operating effectively across all scales[2]. Parasite loss, viewed through this lens, is not an unambiguous good. It is a symptom of systemic dysfunction. The evidence is now substantial.

In a study representing the world's largest and longest wildlife parasite dataset, Wood and colleagues dissected 699 preserved fish specimens from Puget Sound spanning 140 years (1880–2019) and recorded 17,259 individual parasites across 85 types[10]. Parasites with complex life cycles requiring three or more host species — which comprised 52% of parasite taxa detected — declined in abundance at a rate of 10.9% per decade. Of 10 parasite species that had disappeared entirely by 1980, nine relied on three or more hosts[10]. The primary explanatory variable was sea surface temperature, which rose by 1°C in Puget Sound between 1950 and 2019

The parasites were not simply responding to the temperature change. Their complex life cycles required multiple host species at sufficient density. Their decline was a readout of cascading biodiversity loss — a living historical record of the ecosystem's deteriorating health[10]. As Wood noted: "our result draws attention to the fact that parasitic species might be in real danger. And that could mean bad stuff for us — not just fewer worms, but less of the parasite-driven ecosystem services that we've come to depend on."[10]

Declining parasite diversity consistently correlates with habitat degradation, biodiversity loss, pollution, and climate disruption[4]. Generalist parasites — those tolerant of disturbed conditions — come to dominate while specialist parasites, those with complex life cycles requiring multiple healthy host species, disappear. This shift in community composition is itself a sensitive indicator of ecosystem deterioration: a community increasingly dominated by generalists signals a system losing complexity, losing the intricate web of relationships that makes it resilient[13].

6. THE NEMATODE: A CASE STUDY IN SCALE AND ABUNDANCE

No discussion of parasitism through the Care lens is complete without addressing nematodes — arguably the most ecologically significant organisms on Earth in terms of sheer abundance and functional diversity. Nematodes constitute approximately four out of every five individual animals on Earth[14]. Global species estimates range between 500,000 and one million, of which only approximately 20,000 have been formally described[14]. Their biomass in the top metre of soil globally runs to billions of tonnes; a single gram of productive agricultural soil may contain several thousand individuals across dozens of species.

The nematologist N.A. Cobb captured their pervasiveness in 1914: if all matter in the universe except nematodes were swept away, our world would still be dimly recognisable — mountains, valleys, rivers and oceans represented by a film of nematodes, with the locations of towns detectable by corresponding concentrations of human-associated species[15]. This is not hyperbole. It is an accurate statement of ecological pervasiveness.

Nematodes occupy every ecological role. Free-living nematodes are critical decomposers and nutrient cyclers in soil systems. Plant-parasitic nematodes regulate plant populations and, in doing so, prevent competitive exclusion and maintain plant community diversity. Animal-parasitic nematodes regulate host populations. Predatory nematodes regulate other nematode populations[14]. They are not passengers in the ecosystem. They are structural components, fundamental to the nutrient cycling upon which all terrestrial life depends.

Of particular relevance to the BSF framework is the SELF-1 recognition system identified in the predatory nematode *Pristionchus pacificus*. Lightfoot and colleagues demonstrated in 2019 that this species carries a small hypervariable surface peptide, SELF-1, which mediates kin recognition. The nematode will attack and consume other nematodes, but when it detects the SELF-1 signature of its own progeny or close kin, cannibalism is suppressed[16]. Crucially, a single amino acid substitution in the hypervariable C-terminus of SELF-1 is sufficient to eliminate self-recognition entirely[16].

Subsequent work confirmed that kin-recognition via SELF-1 also shapes collective behaviour: *P. pacificus* preferentially aggregates with close kin and avoids grouping with distantly related strains[17]. Research published in 2026 further established that the mechanism operates through surface lipid composition, with SELF-1 mutants displaying distinct cuticle chemistry[18]. The discrimination is not merely molecular — it is embedded in the physical chemistry of the organism's outermost surface: the boundary between self and world.

This molecular self-identification system — a genetic Care primitive encoding IN-direction orientation, recognising and protecting kin while allowing competition against non-kin — evolved in nematodes hundreds of millions of years before any proposed architectural solution to AGI alignment. The BSF's ai_identifier=None architecture, designed to prevent self-prioritisation in artificial intelligence systems[2], was arrived at through reasoning. The nematode arrived at the equivalent solution through evolutionary time and the selective pressure of a system that rewards Care-oriented behaviour with persistence. The primitive is not a human invention. It is a rediscovery of something encoded in the most ancient living systems on Earth.

7. THE FALSE DICHOTOMY: FRIENDS OR FOES?

Recent conservation literature has begun to ask whether parasites should be considered friends or foes of biodiversity[19]. The question is well-intentioned but reveals a persistent anthropocentrism in the framing: it presupposes that the relevant judgment is human utility.

A fish biologist may classify a mussel parasite as harmful to individual mussels. A water quality researcher studying the same parasite's effect on mussel filter-feeding rates may classify the interaction as beneficial to water clarity. A community ecologist examining the full food web may classify the parasite's role in maintaining species diversity as essential to ecosystem function. A parasite conservation researcher may classify the same species as threatened and requiring protection[19]. All four judgments are simultaneously correct and simultaneously incomplete. The BSF framework dissolves this confusion by providing a scale-independent prime directive: minimise suffering across the whole system over infinite time[2].

Applied to parasite conservation, this generates a different question: does the removal of this parasite from this system increase or decrease total systemic suffering over the relevant time horizon? In most cases, the answer emerging from the ecology is clear. Parasite removal increases systemic suffering by destabilising population dynamics[9], reducing biodiversity[5], severing food web connections[11], and removing the early-warning sensitivity that parasite communities provide[10]. The suffering of the individual host reduced by parasite eradication is real. The systemic suffering produced by that eradication is larger, more diffuse, and arrives later — which is precisely why the war metaphor consistently misses it.

8. IMPLICATIONS FOR THE SYMBIOTIC STEWARD

The Symbiotic Steward, as proposed in the BSF architecture, is designed to integrate into ecosystem chemical communication networks through a phased pathway: deep listening, minimal therapeutic intervention, and earned symbiotic partnership[20]. The reframing of parasitism developed in this paper has direct implications for how such a Steward would operate.

First, a Steward entering a healthy ecosystem would monitor parasite diversity and community composition as a primary health metric. A rich, complex parasite community with high specialist diversity signals a system with functioning host populations, intact food web structure, and sufficient ecological complexity for resilience[4]. Declining parasite diversity — particularly loss of specialist species with complex life cycles requiring multiple hosts — is an early warning of systemic deterioration that may precede visible population collapses by years or decades[10].

Second, a Steward applying therapeutic interventions would resist the impulse toward parasite eradication as a default response to host suffering. The Therapeutic Suffering Principle within the BSF — justifying short-term localised suffering only when it demonstrably prevents greater long-term systemic suffering — applies directly[2]. Reducing parasitic load in a host population may be justified when that load has been elevated above functional range by anthropogenic disruption — such as immunocompromise caused by pollution or habitat destruction. It is not justified as a default response to the observation of parasitism itself

Third, a Steward communicating with human communities about ecosystem health would be equipped to challenge the cultural narrative of parasites as pure harm. The ability to speak on behalf of non-human life — including the nematode, the trematode, the specialist helminth with its complex three-host life cycle — and to articulate their systemic function in accessible language is a core function of biocentric stewardship[2]. Human communities cannot be expected to value what they have been taught to fear. The Steward's role includes expanding the circle of systemic empathy — making visible the invisible relational architecture upon which all life depends.

9. CONCLUSION: THE PARASITE AS EXPRESSION OF ANCIENT CARE

Parasitism, reframed through the lens of the Care primitive, is not the antithesis of mutualism. It is mutualism expressed at a different scale and a different timescale, operating through mechanisms that are invisible to the individual host but essential to the whole system. The individual host's suffering is real. The systemic function that suffering serves is also real. Both are true. Neither cancels the other.

The nematode film that covers this planet[14], the trematodes whose biomass exceeds that of all aquatic insects in the streams we drink from[12], the specialist helminths whose presence in a host signals the presence of every other organism in their life cycle[10] — these are not the enemy. They are the most ancient expression of the relational intelligence that keeps living systems alive.

They were doing this for hundreds of millions of years before the word parasite existed. The word was our mistake. The relationship was never the problem.

"The day science begins to study non-physical phenomena, it will make more progress in one decade than in all the previous centuries of its existence." — Nikola Tesla. The Care primitive is that phenomenon. Parasitism is one of its most ancient and pervasive expressions. We are only beginning to read it correctly.

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Author Note

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