Learning for biosphere security in a crowded, warming world

Among all the pressing needs for educational innovations that humanity faces today, arguably the most imperative is the need to elicit the learner's active involvement in a 'Great Transition' that addresses the global ecological overshoot and the unraveling ecological situation within the biosphere. An effective Transition curriculum must transcend the conventional discourse about 'security', 'sustainability', 'progress' and 'growth' and counteract the anthropocentric conditioning that pervades mainstream educational practice. This paper outlines some major learning outcomes that such an ecocentric curriculum would entail. Political expediency demands that this difficult course change be accomplished with a minimum of friction and confrontation and a maximum of pedagogical efficacy. Strategies include: paying explicit attention to ethics by starting with widely shared values; encouraging critical questioning; proactively extending a scientific worldview that embraces empathy and beauty in nature; and openly and critically engaging with the hidden curriculum – the implicit messages that learners receive through discourse, media and social environments inside and outside of school. Thus, the anthropocentric notions of property, entitlement and superiority can be subverted and displaced thorough a gradual process of questioning and extending of ideas by the learner. Learning environments that are becoming increasingly multicultural offer challenges and opportunities in this endeavour.

With the advent of the so-called 'Anthropocene' there has come unprecedented upheaval on a global scale. Anthropogenic warming and its effects on regional climates are changing planetary environments in ways that we are just beginning to understand. From the anthropocentric perspective, the complex challenges in our crowded, warming world range from increased susceptibility to natural disasters through ever-increasing collective demands on ecological support structures, to a decrease in the capacity of those structures due to their ongoing deterioration (WWF, 2016). The availability of 'resources' per capita is severely limited in some regions and is decreasing further globally. Global climate change will reduce agricultural productivity, biodiversity and public health, and rising sea levels will flood coastal lowland (many of them fertile and densely populated) driving unprecedented numbers of displaced people to find shelter in host communities with vastly different cultural traditions. Knock-on effects will further weaken socio-political structures, national and regional economies and healthcare systems. Against the backdrop of those negative trends, many of the goals enshrined under the concept of human security are receding out of reach (Lautensach and Lautensach, 2013).

From the biosphere's perspective, countless species are being driven into extinction and unique ecosystems are deteriorating into wastelands or are being converted into industrial monoculture plantations. Entire taxa that took millions of years to evolve are being endangered for the sake of questionable projects in the name of 'sustainable development'. The seventeen Sustainable Development Goals (SDGs) of the United Nations were conceived purely for the benefit of one single species, without any precautionary consideration of the unknown complexities in our environmental support structures, let alone genuine concern for the intrinsic value of non-human nature. Not surprisingly, they are receding from our grasp as well; in fact, they worsen our ecological overshoot (Wackernagel *et al.*,

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2017), being based on the same exploitative ethic that has led to this situation.

From human security to biosphere security

The magnitude of this crisis has given rise to the notion that a 'Great Transition' is necessary to lead humanity into a sustainable future that is secure and acceptable within the widely subscribed terms of human security and its underlying anthropocentric ethic (Raskin, 2016). Diverse scenarios and strategies offered in the literature mostly neglect the importance of ecological support; worse, they ignore the influence of pervasive but implicit cultural conditioning towards a hegemonic anthropocentrism. As abundantly documented by the contributors to this Journal, the dominant anthropocentric ethic suffers from internal contradictions as well as from destructive consequences, rendering it unable to deliver on the very aspirations it enshrines. Because of its anthropocentric grounding, human security in its mainstream conception under the four pillars of socio-political, economic, environmental and health-related security offers little help to improve either policy or curriculum.

> "Because of its anthropocentric grounding, human security in its mainstream conception under the four pillars of socio-political, economic, environmental and health-related security offers little help to improve either policy or curriculum."

Corrective attempts to revise our understanding of human security have taken three approaches. First, in recognition of the overriding importance of environmental security it was awarded principal status over the other pillars (Myers, 1993). Secondly, specialists in international relations spatially expanded it into the idea of global ecosecurity, as the essential life-supporting 'space suit' for humanity (*e.g.* Floyd and Mathews, 2013: 9). Thirdly, ecosecurity was reconceptualized into a holistic security model that prioritizes the well-being of the entire biosphere, not only as the prime requirement for the security of its component species and ecosystems but also on the basis of its own intrinsic value. This third approach alone not only addresses all the shortcomings of conventional human security as stated above, but also takes into account the comparisons of complexity, of evolutionary past and potential, and of levels of synergy that have led people to recognize the intrinsic value of the biosphere (or ecosphere) as the most inclusive of systems (Curry, 2011). In its ecocentric orientation, biosphere security goes beyond a revision of means to a revision of ends.

Biosphere security implies a new understanding of sustainability as the collective, just and collaborative efforts by humanity to keep our resource use, population dynamics and waste processing below the boundary thresholds that delimit the secure well-being of the biosphere (Heinberg, 2010).[1] Regionally and locally, sustainability is similarly refocused onto the continued flourishing of key ecosystems and biodiversity. Progress, as well as 'development', is to be understood as our success in those efforts, rather than as some misguided quest for perpetual economic growth. Biosphere security informs the normative ethics of a 'reductive modernity' (Welzer, 2016: 220; Mastini, 2017), a vision of progress without growth, relevant for all aspects of public life, including education.

Education for biosphere security

A transition of the biosphere to some sustainable state is inevitable and can no longer be painless for humanity, but some strategic choices and opportunities remain (Rees, 2014; Wahl, 2016) – including education for sustainability. Instead of a grand collapse we might well face differentiated disintegration, a scenario which creates room for creative counter strategies based on alternative visions. Under the ecocentric perspective, a reductive modernity aims to protect, conserve, strengthen and restore ecosystems and biodiversity. All of those goals depend on a suitably educated humanity. Many anthropocentrists share this agenda (witness the explosion of literature on 'resilience' and 'social–ecological systems'), which renders such political and educational efforts more widely palatable. Unfortunately, only a small fraction of ecocentric advocates of sustainability address the potential contribution of education (Senge, 2014).

Conversely, numerous anthropocentric proposals to revise education towards a Great Transition have appeared since the Club

of Rome sounded the alarm in 1972. These proposals range from half-hearted efforts to disseminate the morally bankrupt ideology of economic growth (*e.g.* in UNESCO's 'Decade of Education for Sustainable Development' [Lautensach and Lautensach, 2014]) to truly innovative programmes that prepare learners to contribute constructively to the Transition and to help avoid the worst consequences of reductive chaos (Orr, 2004; Stone and Barlow, 2005; Shallcross and Robinson, 2006; Parkin, 2010). Those innovative curricula cover the educational environment, methods, materials, resources, design and planning, and, most importantly, aims, priorities and outcomes. Sadly, only a minority of sustainability-minded educationists recognize the importance of ecocentrism, if they recognize value education at all. Most do not clearly acknowledge the intrinsic moral standing of ecosystems and the biosphere. Addressing the scarcity of educational plans to strengthen ecocentric ethics is one aim of this paper. The other aim is to provide some concrete curriculum pointers for educators with ecocentric ambitions.

Only the most insightful curricula pay enough attention to the cultural roots of behaviour on the individual and collective levels (Rees, 2010), and to the diversity of cultural norms that inform the affective determinants of behaviour. In many situations it is cultural contingencies and entrenched ideologies, particularly those that form the dominant anthropocentric culture of consumption and growth, that stand in the way of effective and large-scale behaviour change (Lautensach, 2010; Johansson, 2012; Welzer, 2016). This minority of value-focused curricula for Transition education, which includes a growing number of textbooks (Tracana and Carvalho, 2010), takes it upon itself to confront and change those dominant values, including anthropocentrism, and to promote humility along with empathy and respect for non-human nature.

Focusing on those curricula I will, in the next two sections of this paper, provide a compilation of assessable learning outcomes, followed by key strategies for achieving them. Both sections are derived from the literature and from my own experience.

Curriculum for ecocentric value change

Content and priorities

The learning outcomes are organized here under six major educational aims (see Box 1), hallmarks of a Transition curriculum that I have been involved with for some years (Lautensach, 2010). From the wider literature only outcomes that can address the shift to ecocentrism have been selected (Potter, 1988; Orr, 2004; Stone and Barlow, 2005; Oakes and Lipton, 2007; Bowers, 2009; Parkin, 2010; Cloud, 2014; Senge, 2014; Welzer, 2016). The six aims can and should apply also to teacher education, with a special emphasis on epistemological skills, philosophical foundations, comprehensive content knowledge, well-rounded professional and environmental ethics (ecocentric and comparative) and active participation in professional communities of practice focusing on sustainability education (Cotton and Winter, 2010; Lloyd *et al.*, 2011; Cloud, 2014).

Special challenges and strategies

Given the pervasive dominance of anthropocentric sentiments that exists, getting ecocentrism past the curriculum watchdogs often amounts to a tall order. The struggle against the obstacles of cultural hegemony and status quo bias can trigger political backlash, sometimes from powerful groups with hidden agendas. Particularly vehement opposition can be expected when religious dogma is critiqued for its often radical anthropocentrism (Kivel, 2013). Political expediency demands that teachers who are committed to ecocentric Transition education retain their jobs and therefore avoid confronting entrenched dominant ideologies head-on. Likewise, learners would be ill-served by a curriculum that did nothing more than bury them in moral contradictions and damnations of life as they know it. One challenge for the committed teacher is thus how much, and to whom and at what time, they should advertise their intentions. A justifiable compromise is to be found between minimizing deception and recognizing where subterfuge temporarily serves the pedagogical purpose better than total openness. Another challenge lies

"In many situations it is cultural contingencies and entrenched ideologies, particularly those that form the dominant anthropocentric culture of consumption and growth, that stand in the way of effective and large-scale behaviour change."

in the minds of the learners themselves, where it pays for the teacher to temporarily circumvent certain alarm triggers while pretending to pursue nothing more than logic, science and less controversial kinds of ethics, such as the justice principle. Of course at some point teachers will need to place their cards on the table. In medical bioethics the justification of deceiving a patient, and what exactly constitutes deception, continues to be discussed (Mappes and DeGrazia, 1996: 84).

The strategies presented in Box 2 have achieved some success.[2] They are context dependent and best selected according to the learning outcomes of the day. They are learner centred and inquiry based; that is, they do not rely on the teacher to point out crucial ideas but rather allow learners to discover those ideas for themselves.

Framed in age-appropriate form, the educational strategies presented find application at all grade levels including the

Box 1. Six major educational aims that can underpin a curriculum for ecocentric value change.

A Adopt a concept of progress that is informed by sustainability

Beginning with critically analysing manifestations of the growth paradigm, learners are encouraged to apply ecological principles and the theory of adaptive systems to the dynamics and sustainable well-being of ecosystems, extending the four principles of bioethics (Mappes and DeGrazia, 1996: 35) to ecosystems. Parkin's (2010: 73) question of "what is growing, where, for whom, and at what cost?" is expanded to a notion of progress under the ecocentric perspective. Potter's (1988) notion of acceptable survival defines the ideal human population size and its healthcare within ecocentric contingencies. Respect for nature, for precaution and for sufficiency in the interest of all life forms and of Mother Earth, or Gaia, is shown.

B Replace anthropocentrism with an ecocentric ethic

This aim is obviously central, as are the following inherent learning outcomes: distinguish between statements of value and of fact; distinguish ontologically subjective concepts (*e.g.* the right to a clean environment) from ontologically objective ones (*e.g.* the limits of carrying capacity); progress from 'systems thinking' to 'systems valuing'; adopt a perspective of holistic valuing of nature and of regarding humans as part of nature (as is evident in many indigenous belief systems); describe the function of ecological communities inside and outside of the human body; demonstrate resistance against the dominant custom of commodifying nature (and almost everything else) and exploiting it purely for human ends; learn how to convince others to adopt sustainable ecocentric values; reconcile one's personal freedom with the constraints of environmental justice and ecological limits; describe the natural environment using metaphors of personhood and moral standing, connecting these with indigenous mythologies; and demonstrate empathy, fairness and friendship for non-human animals, other life forms, ecosystems and landscapes.

C Acquire the cognitive and affective skills of eco-literacy to collaboratively meet the challenges

Practise ethical reasoning and meta-ethical analysis; develop ecological vision and emotional relationships with nature; recognize and revise those unquestioned assumptions and habits of thinking that lead well-intentioned people into ecologically catastrophic decisions; acquire learning skills at the individual as well as social levels, learn how to learn better, and extend this skill to teaching others; and prepare to act on one's values.

D Acquire a vision for, and awareness of, the future that includes change and sustainable solutions

Visualize utopias that transcend the 'present-plus' pretences of anthropocentric, 'futuropathic' voices; experience self-efficacy in activist 'communities of practice' committed to ecocentrism; cultivate informed courage over defeatism; recognize and appreciate quality over quantity in human endeavours; and become aware of anthropogenic environmental change and ecological overshoot and how they affect biosphere security.

E Adopt a non-parochialist view of environmental values and academic inquiry

This begins with adopting a practice of caring for entities beyond the 'home group' (Noddings, 2007), which requires 'social–emotional' learning (Schonert-Reichl and Hymel, 2007). Reconcile moral pluralism with ecocentric priorities, *i.e.* the need for behaviour change according to biosphere security norms; show your affiliation to your home place, its resident life forms and ecosystems, but temper it with appreciation for the rest of the human and non-human world, and describe it in terms of interpersonal relations; adopt a global vision of causes, effects and interdependences, and pay attention to local implications; and apply Earth systems thinking and valuing to all academic endeavours.

F Become liberated from exploitative dependencies

Analyse the reasons for the failure of mainstream education to bring about substantial Transition reforms to date (obstacles include anthropocentric value priorities, materialistic consumption ideals, scientific illiteracy and inattention to taboos of overpopulation and overshoot; see Lautensach [2010]); explicate the hidden curriculum and its messages (especially dispositions that perpetuate dependency and the anthropocentric 'prison of separateness' [Albert Einstein]); critique status quo attitudes, norms, beliefs and ideals, especially when they are dictated by the hegemonic 'everything, always' culture of consumption and anthropocentric growth (Wahl, 2016; Welzer, 2016); demonstrate a will to participate in acts of non-violent ecological resistance (Devall and Sessions, 1985) to ideological hegemons that perpetuate anthropocentric dominion over nature (including some organized religions [Kivel, 2013: 57]); learn not to be moved by crowds; and accept the discomfort that can arise from discordant actions and dissent.

Box 2. Educational strategies for ecocentric value change with which the author has had success.

1 **Frequent discussions about ethics and personal values** induce the learners to think about the determinants of human behaviour and to become aware of the naturalistic fallacy and its prevalence in normative public discourse. The primacy of cultural and affective factors as determinants of human behaviour is now widely accepted (Cook *et al.*, 2010). Evidence includes the failure of curricula that overemphasize cognitive outcomes (*i.e.* many traditional school curricula) to effect substantial behaviour changes even towards anthropocentric versions of sustainability (Saylan and Blumstein, 2011); nor has the massive progress in scientific modelling and understanding of environmental problems had much impact on the worsening of global overshoot (Rees, 2014). On the other hand, in some cases changes to dominant cultural and moral priorities have made some impressive behaviour change possible (Welzer, 2016). Comparisons between historical cases of societies that succeeded to cope with sustainability challenges and societies that collapsed as a result of failing to do so indicate that the primary difference between the two lies in their cultural norms and their flexibility in adapting those norms to new contingencies (Diamond, 2005). Narrative fiction (*e.g.* Daniel Quinn's *Ishmael* or Ernest Thompson Seton's animal fiction for younger readers) can be a powerful tool for changing personal values by learning to identify and empathize with non-humans. Another powerful strategy is experiential learning (Cotton and Winter, 2010). An ecocentric curriculum that emphasizes moral distinctions also enables the learner to identify merit where it exists in the diverse literature on 'sustainable development'.

2 Discussions about ethical implications of curriculum content inevitably lead to discussion of the **hidden curriculum**, defined as implicit messages, beliefs, assumptions and value priorities (Giroux, 2007). Focusing learners' critical attention on the hidden curriculum helps raise their awareness of hidden content and encourages its critical analysis. The example of the implicit but pervasive significance of anthropocentrism shows how important a role the hidden curriculum plays in education. Because of its implicitness, the learning that the hidden curriculum accomplishes is subconscious. When discussing innovation the author has used the following two questions with some success for the analysis of hidden messages about human hegemony and entitlement: 'Who benefits?' (*cui bono*?) and 'And then what?' coined by Garrett Hardin (Lautensach, 2013). Examining an anthropocentric environmental politic by asking those two questions can reveal its injustice and futility.

3 Getting the learners to **ask critical questions** about, and extending on, individual concepts in the curriculum, without the teacher having to point out the answers, aids critical thinking. For example, as soon as learners understand what is meant by the term 'resource' they can be asked to apply the concept to the world around them (*e.g.* a glass of juice, a parent, a pet or a tree). The learner decides to what extent the examples can be 'rightly' classified as a resource and soon realizes that, contrary to dominant discourse, not all biological entities should or could be treated as resources. Some ecovillages provide abundant instructional material and models that show how critical questioning can inform sustainable and respectful living.

4 Asking the learners to **connect and synthesize** two or more individual concepts helps them identify contradictions. For example, official curricula are now providing educators with a modicum of support in the two areas of sustainability and social justice. That support falls short where the two areas are not effectively connected, which happens all too often. Education about human rights and social justice rarely takes into account resource constraints and ecological limits (Ehrlich and Ehrlich, 2010). Recognizing the limits of the concepts' compatibility induces learners to backtrack and search for alternative ethics in the direction of ecocentrism. Eventually this is likely to lead the learner into confronting prevalent anthropocentric taboos such as overpopulation.

5 **Science education** has suffered from a profound anthropocentric bias – one that reflects the bias of modern science itself, as inherited from its Cartesian beginnings and the Enlightenment (Beavington, 2016). Obvious evidence of this bias exists in instructional language and in the choice of applications – evidence that is readily discoverable by learners once they are alerted to this implicit dimension of scientific discourse. They will realize that, like all human exploits, science is filled with values and that its anthropocentric bias is often counterproductive as well as unjust; learners will replace the (often explicit) goals of predicting and controlling nature with the goal of appropriate participation in nature (Goodwin, 1999: 125). On the positive side, much of life science education can be connected with earth systems science, natural history and ecology in a way that recognizes their moral dimension – for example, by pointing to ecological dependency, evolutionary equivalence, interspecific justice and capacity for suffering, as well as synergy in complex systems (Beavington, 2016). Instruction in natural history can be particularly conducive to foster an affective relationship with the land. Gaia theory represents a powerful didactic instrument to connect between elements of a traditional, Cartesian–mechanistic philosophy of environmental science (where its origin lies), with elements of holistic and deep green views of the global environment, where many of its ramifications lead (Lautensach, 2010: 166). In other words, Gaian ethics represents the ethical dimension of biosphere security, and science education can be used as the gateway to convince learners of its priority, eventually opening its spiritual dimension to the learner.

6 **Addressing objections** (charges of despair, misanthropy, cultural imperialism *etc.*): Detailed counterarguments are beyond the scope of this paper, but one general approach has often convinced the author's students that we can all change our values through collaborative deliberation. It invokes historical examples of global, negotiated shifts in cultural traditions and the moral norms that underpinned them – shifts such as the abolition of slavery and the outlawing of cannibalism, human sacrifice, infanticide and child mutilation. The charge of value inculcation is rebutted by pointing to the ubiquitous efforts of corporate industry and organized religions to do just that, requiring a counterbalance.

tertiary sector, as well as in teacher education. They are designed to empower learners to assess and compare divergent value positions, to question their own convictions and to recognize the merits of ecocentrism. In this fashion, the anthropocentric notions of property, entitlement and human superiority can be subverted and displaced – first at the rational–cognitive level and subsequently, it is to be hoped, at the affective level. An empirical study to test those effects is being planned.

To be effective, a Transition curriculum (and indeed most other curricula) must strike a balance along several continua (Jones *et al.*, 2010). On the continuum of learning outcomes it must balance between the cognitive, affective and psychomotor domains (Singleton, 2015). On the geographical continuum, the challenge is to include and be informed by global, as well as local, place-based considerations. On the social continuum, it must address various levels of agency from the individual through family, community, regional, national and global dimensions. On the cultural continuum traditional curricula are required to be as safe[3] and inclusive as possible, accommodating diverse cultural views, narratives, metaphors and beliefs. It is this last requirement that an ecocentric curriculum cannot fulfil. Its very mission demands that it depart from the comfort of cultural and political safety and from the inclusive moral relativism that is widely celebrated as particularly 'civilized' and safe. For a curriculum and teacher committed to ecocentrism, there is no compatibility with cultures that insist on the sanctity of human hegemony over the Earth. Many of those cultures do not even recognize the need for an organized Transition away from entrenched norms, as with the 'culture of denial' (Derby, 2010). Others are particularly intransigent about such matters as: taboos around overpopulation and a woman's control over her fertility; axiomatic beliefs about the rights to exploit non-humans and ecosystems solely as means to human ends; individual autonomy; and possibly the question of meat consumption on an overpopulated planet. In those cases confrontation appears more likely than compromise.

Intercultural confrontations about beliefs, assumptions and values are, in any case, becoming more frequent as classrooms and cohorts become culturally less homogeneous (Lautensach and Lautensach, 2011). It is up to the teacher to deal with them in ways that are safe but do not compromise the overall curricular aims. The challenge arises from the fact that the ecocentric aims override the obligation towards cultural safety. If a compromise seems out of reach, the foremost requirement is to agree to keep talking. Maintaining a forum for open discussion with and among students, and encouraging an open mind and a commitment to a secure future, can gradually bring opponents closer.

Conclusions

The above discussion shows that an ecocentric curriculum is not necessarily culturally safe. On the positive side it exerts reverse discrimination in favour of many indigenous worldviews that for centuries were ridiculed and marginalized because of their environmental holism (Turner, 2005). Choosing between the irreconcilable norms of two ideologies is difficult because it requires reasoned objections to the celebrated (though often disingenuous) moral relativism in modern schools, objections that explicitly place some values above others. As difficult as such an endeavour may seem, it is supported by successful historic precedents as mentioned under strategy 6 in Box 2. Those precedents might indicate how the conflict might be reconciled on the basis of shared values, namely by asking which ethics violate biosphere security to the least, or to a lesser, extent.

In this endeavour the educator needs to take a carefully considered approach, respectful of divergences in views, pointing out common ideals and values and their desirability where such commonalities exist, and diplomatically guiding meta-ethical comparisons where priorities have to be chosen. Making every attempt at reconciliation is imperative; a culture that refuses to make any attempts to pursue sustainability by valuing the Earth is unlikely

"A culture that refuses to make any attempts to pursue sustainability by valuing the Earth is unlikely to find cultural safety when cohabiting with others."

to find cultural safety when cohabiting with others. In today's crowded world where cohabitation can hardly be avoided, such a culture would find it increasingly difficult, if not futile, to withdraw and isolate itself to prevent further intercultural conflict, or to live forever in exploitative disrespect of the Earth. More than any anthropocentric ethic of sustainability, the ecocentric Transition necessitates a readiness to accept personal sacrifice and renouncement of privilege (Welzer, 2016: 131); this includes limitations of human rights that were universalized only recently in human history – moral territory that nobody gives up easily.

Learners might more readily accept those sacrifices when attention is directed towards their promise of potential liberation and enrichment. Renouncing our claims to own, manage and dominate nature opens a world of conceptual alternatives – kindred, family, companionship, comfort and peace in a time of turmoil.

In practice, teaching sustainability through ecocentric principles would be pointless at hierarchical educational institutions where quantitative growth, exploitation, capitalist norms and environmental wastefulness are part of the group culture. The affective learning outcomes that the educational process ultimately identifies as universally acceptable must be an unquestioned part of the lived cultural praxis at the institution, and they must be modelled by the staff (Giroux, 2007). Once such implicit and pervasive institutional support is present, the hidden curriculum will reinforce and amplify the teacher's efforts. ■

Notes

1 A team from the Stockholm Resilience Centre headed by Johan Rockström identified nine environmental boundaries that, according to their definition, delimited a 'safe operating space for humanity' (Rockström *et al.*, 2009). Under the biosphere security perspective, the significance of those same boundaries changes as they are reconceptualized as 'a safe operating space for the biosphere' in the face of the human onslaught.

2 Strategy 1 in Box 2 mentions the 'naturalistic fallacy'. This term refers to the fallacious attempt to deduce an 'ought' (*i.e.* a statement about what one should do) from an 'is' (*i.e.* some statement of fact). See Curry (2011: 31) for more on this.

3 Culturally safe education is free of "any action that diminishes, demeans or disempowers the cultural identity and well being of an individual" or group (National Aboriginal Health Organization, 2006: 3).

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