## 1

#### Time fractures the subject. Thinking only affects a subject as a being in time and so is not a transcendent feature. Transcendent subjecthood fails because differentiation through times causes instability

Deleuze 68

[Deleuze, Gilles. Difference and Repitition. Translated by Paul Patton. 1968. Accessed 9/17/21 <https://www.jstor.org/stable/10.3366/j.ctt1g09x57>]

Temporally speaking - in other words, from the point of view of the theory of time - nothing is more instructive than the difference between the Kantian and the Cartesian Cogito. It is as though Descartes's Cogito operated with two logical values: determination and undetermined existence. The determination (I think) implies an undetermined existence (I am, because 'in order to think one must exist') - and determines it precisely as the existence of a thinking subject: I think therefore I am, I am a thing which thinks. The entire Kantian critique [is] amounts to objecting against Descartes that it is impossible for determination to bear directly upon the undetermined. The determination ('I think') obviously implies something undetermined ('I am'), but nothing so far tells us how it is that this undetermined is determinable by the 'I think': 'in the consciousness of myself in mere thought I am the being itself although nothing in myself is thereby given for thought.'8 Kant therefore adds a third logical value: the determinable, or rather the form in which the undetermined is determinable (by the deter­ mination). This third value suffices to make logic a transcendental instance. It amounts to the discovery of Difference - no longer in the form of an empirical difference between two determinations, but in the form of a transcendental Difference between the Determination as such and what it determines; no[t] longer in the form of an external difference which separates, but in the form of an internal Difference which establishes an a priori relation between thought and being. Kant's answer is well known: the form under which undetermined existence is determinable by the 'I think' is that of time ...9 The consequences of this are extreme: my undetermined existence can be determined only within time as the existence of a phenomenon, of a passive, receptive phenomenal subject appearing within time. As a result, the spontaneity of which I am conscious in the 'I think' cannot be understood as the attribute of a substantial and spontaneous being, but only as the affection of a passive self which experiences its own thought - its own intelligence, that by virtue of which it can say I - being exercised in it and upon it but not by it. Here begins a long and inexhaustible story: I is an other, or the paradox of inner sense. The activity of thought applies to a receptive being, to a passive subject which represents that activity to itself rather than enacts it, which experiences its effect rather than initiates it, and which lives it like an Other within itself. To 'I think' and 'I am' must be added the self - that is, the passive position (what Kant calls the receptivity of intuition); to the determination and the undetermined must be added the form of the determinable, namely time. Nor is 'add' entirely the right word here, since it is rather a matter of establishing the difference and interiorising it within being and thought. It is as though the I were fractured from one end to the other: fractured by the pure and empty form of time. In this form it is the correlate of the passive self which appears in time. Time signifies a fault or a fracture in the I and a passivity in the self, and the correlation between the passive self and the fractured I constitutes the discovery of the transcendental, the element of the Copernican Revolution. Descartes could draw his conclusion only by expelling time, by reducing the Cogito to an instant and entrusting time to the operation of continuous creation carried out by God. More generally, the supposed identity of the I has no other guarantee than the unity of God himself. For this reason, the substitution of the point of view of the 'I' for the point of view of 'God' = than is commonly supposed, so long as the former retains an identity that it owes precisely tt. If the greatest tmttattve of transcendental philosophy was to introduce the form of time into thought as such, then this pure and empty form in turn signifies indissolubly the death of God, the fractured I and the passive self. It is true that Kant did not pursue this initiative: both God and the I underwent a practical resurrection. Even in the speculative domain, the fracture is quickly filled by a new form of identity - namely, active synthetic identity; whereas the passive self is defined only by receptivity and, as such, endowed with no power of synthesis. On the contrary, we have seen that receptivity, understood as a capacity for experiencing affections, was only a consequence, and that the passive self was more profoundly constituted by a synthesis which is itself passive (contemplation ontraction). · The possibility of receiving sensations or impressions follows from this. It is impossible to maintain the Kantian distribution, which amounts to a supreme effort to save the world of representation: here, synthesis is understood as active and as giving rise to a new form of identity in the I, while passivity is understood as simple receptivity without synthesis. The Kantian initiative can be taken up, and the form of time can support both the death of God and the fractured I, but in the course of a quite different understanding of the passive self. In this sense, it is correct to claim that neither Fichte nor Hegel is the descendant of Kant - rather, it is Holderlin, who discovers the emptiness of pure time and, in this emptiness, simultaneously the continued diversion of the divine, the prolonged fracture of the I and the constitutive passion of the self.10 Holderlin saw in this form of time both the essence of tragedy and the adventure of Oedipus, as though these were complementary figures of the same death instinct. Is it possible that Kantian philosophy should thus be the heir of Oedipus?

**The aff’s attempt to eliminate difference through a politics of assimilation that solely aggregates in the binary of pleasure + pain justifies genocide in the name of survival**

**EVANS ’10:**

Brad Evans, 2010 “Foucault’s Legacy: Security, War, and Violence in the 21st Century,” Security Dialogue vol.41, no. 4, August 2010, pg. 422-424.

Imposing liberalism has often come at a price. That price has tended to be a continuous recourse to war. While the militarism associated with liberal internationalization has already received scholarly attention (Howard, 2008), Foucault was concerned more with the continuation of war once peace has been declared.4 Denouncing the illusion that ‘we are living in a world in which order and peace have been restored’ (Foucault, 2003: 53), he set out to disrupt the neat distinctions between times of war/military exceptionalism and times of peace/civic normality. War accordingly now appears to condition the type of peace that follows. None have been more ambitious in map-­ ping out this war–peace continuum than Michael Dillon & Julian Reid (2009). Their ‘liberal war’ thesis provides a provocative insight into the lethality of making live. Liberalism today, they argue, is underwritten by the unreserved righteousness of its mission. Hence, while there may still be populations that exist beyond the liberal pale, it is now taken that they should be included. With ‘Liberal peace’ therefore predicated on the pacification/elimination of all forms of political difference in order that liberalism might meet its own moral and political objectives, The more peace is commanded, the more war is declared in order To achieve it: ‘In proclaiming peace . . . liberals are nonetheless committed also to making war.’ This is the ‘martial face of liberal power’ that, contrary to the familiar narrative, is ‘directly fuelled by the universal and pacific ambitions for which liberalism is to be admired’ (Dillon & Reid, 2009: 2). Liberalism thus stands accused here of universalizing war in its pursuit of peace: However much liberalism abjures war, indeed finds the instrumental use of war, especially, a scandal, war has always been as instrumental to liberal as to geopolitical thinkers. In that very attempt to instrumentalize, indeed universalize, war in the pursuit of its own global project of emancipation, the practice of liberal rule itself becomes profoundly shaped by war. However much it may proclaim liberal peace and freedom, its own allied commitment to war subverts the very peace and freedoms it proclaims (Dillon & Reid, 2009: 7). While Dillon & Reid’s thesis only makes veiled reference to the onto-­ theological dimension, they are fully aware that its rule depends upon a certain religiosity in the sense that war has now been turned into a veritable human crusade with only two possible outcomes: ‘endless war or the transformation of other societies and cultures into liberal societies and cul-­ tures’ (Dillon & Reid, 2009: 5). Endless war is underwritten here by a new set of problems. Unlike Clausewitzean confrontations, which at least provided the strategic comforts of clear demarcations (them/us, war/peace, citizen/soldier, and so on), These wars no longer benefit from the possibility of scoring outright victory, retreating, or achieving a lasting negotiated peace by means of political compromise. Indeed, deprived of the prospect of defining enmity in advance, war itself becomes just as complex, dynamic, adaptive and radically interconnected as the world of which it is part. That is why ‘any such war to end war becomes a war without end. . . . The project of removing war from the life of the species becomes a lethal and, in principle, continuous and unending process’ (Dillon & Reid, 2009: 32). Duffield, building on from these concerns, takes this unending scenario a stage further to suggest that since wars for humanity are inextricably bound to the global life-­chance divide, it is now possible to write of a ‘Global Civil War’ into which all life is openly recruited: Each crisis of global circulation . . . marks out a terrain of global civil war, or rather a tableau of wars, which is fought on and between the modalities of life itself. . . . What is at stake in this war is the West’s ability to contain and manage international poverty while maintaining the ability of mass society to live and consume beyond its means (Duffield, 2008: 162). Setting out civil war in these terms inevitably marks an important depar-­ ture. Not only does it illustrate how Liberalism gains its mastery by posing fundamental questions of life and death – that is, who is to live and who can be killed – disrupting the narrative that ordinarily takes sovereignty to be the point of theoretical departure, civil war now appears to be driven by a globally ambitious biopolitical imperative (see below). Liberals have continuously made reference to humanity in order to justify their use of military force (Ignatieff, 2003). War, if there is to be one, must be for the unification of the species. This humanitarian caveat is by no means out of favour. More recently it underwrites the strategic rethink in contemporary zones of occupation, which has become biopolitical (‘hearts and minds’) in everything but name (Kilcullen, 2009; Smith, 2006). While criticisms of these strategies have tended to focus on the naive dangers associated with liberal idealism (see Gray, 2008), insufficient attention has been paid to the contested nature of all the tactics deployed in the will to govern illiberal populations. Foucault returns here with renewed vigour. He understood that forms of war have always been aligned with forms of life. Liberal wars are no exception. Fought in the name of endangered humanity, humanity itself finds its most meaningful expression through the battles waged in its name: At this point we can invert Clausewitz’s proposition and say that politics is the continuation of war by other means. . . . While it is true that political power puts an end to war and establishes or attempts to establish the reign of peace in civil society, it certainly does not do so in order to suspend the effects of power or to neutralize the disequilibrium revealed in the last battle of war (Foucault, 2003: 15). What in other words occurs beneath the semblance of peace is far from politically settled: political struggles, these clashes over and with power, these modifications of relations of force – the shifting balances, the reversals – in a political system, all these things must be interpreted as a continuation of war. And they are interpreted as so many episodes, fragmentations, and displacements of the war itself. We are always writing the history of the same war, even when we are writing the history of peace and its institutions (Foucault, 2003: 15). David Miliband (2009), without perhaps knowing the full political and philo-­ sophical implications, appears to subscribe to the value of this approach, albeit for an altogether more committed deployment: NATO was born in the shadow of the Cold War, but we have all had to change our thinking as our troops confront insurgents rather than military machines like our own. The mental models of 20th century mass warfare are not fit for 21st century counterinsurgency. That is why my argument today has been about the centrality of politics. People like quoting Clausewitz that warfare is the continuation of politics by other means. . . . We need politics to become the continuation of warfare by other means. Miliband’s ‘Foucauldian moment’ should not escape us. Inverting Clausewitz on a planetary scale – hence promoting the collapse of all meaningful distinctions that once held together the fixed terms of Newtonian space (i.e. inside/outside, friend/enemy, citizen/soldier, war/peace, and so forth), he firmly locates the conflict among the world of peoples. With global war there-­ fore appearing to be an internal state of affairs, vanquishing enemies can no longer be sanctioned for the mere defence of things. A new moment has arrived, in which the destiny of humanity as a whole is being wagered on the success of humanity’s own political strategies. No coincidence, then, that authors like David Kilcullen – a key architect in the formulation of counterinsurgency strategies in Iraq and Afghanistan, argue for a global insurgency paradigm without too much controversy. Viewed from the perspective of power, global insurgency is after all nothing more than the advent of a global civil war fought for the biopolitical spoils of life. Giving primacy to counter-­ insurgency, it foregrounds the problem of populations so that questions of security governance (i.e. population regulation) become central to the war effort (RAND, 2008). Placing the managed recovery of maladjusted life into the heart of military strategies, it insists upon a joined-­up response in which sovereign/militaristic forms of ordering are matched by biopolitical/devel-­ opmental forms of progress (Bell & Evans, forthcoming). Demanding in other words a planetary outlook, it collapses the local into the global so that life’s radical interconnectivity implies that absolutely nothing can be left to chance. While liberals have therefore been at pains to offer a more humane recovery to the overt failures of military excess in current theatres of operation, warfare has not in any way been removed from the species. Instead, humanized in the name of local sensitivities, doing what is necessary out of global species necessity now implies that war effectively takes place by every means. Our understanding of civil war is invariably recast. Sovereignty has been the traditional starting point for any discussion of civil war. While this is a well-established Eurocentric narrative, colonized peoples have never fully accepted the inevitability of the transfixed utopian prolificacy upon which sovereign power increasingly became dependent. Neither have they been completely passive when confronted by colonialism’s own brand of warfare by other means. Foucault was well aware of this his-­ tory. While Foucauldian scholars can therefore rightly argue that alternative histories of the subjugated alone permit us to challenge the monopolization of political terms – not least ‘civil war’ – for Foucault in particular there was something altogether more important at stake: there is no obligation whatsoever to ensure that reality matches some canonical theory. Despite what some scholars may insist, politically speaking there is nothing that is necessarily proper to the sovereign method. It holds no distinct privilege. Our task is to use theory to help make sense of reality, not vice versa. While there is not the space here to engage fully with the implications of our global civil war paradigm, it should be pointed out that since its biopolitical imperative removes the inevitability of epiphenomenal tensions, nothing and nobody is necessarily dangerous simply because location dictates. With enmity instead depending upon the complex, adaptive, dynamic account of life itself, what becomes dangerous emerges from within the liberal imaginary of threat. Violence accordingly can only be sanctioned against those newly appointed enemies of humanity – a phrase that, immeasurably greater than any juridical category, necessarily affords enmity an internal quality inherent to the species complete, for the sake of planetary survival. Vital in other words to all human existence, Doing what is necessary out of global species necessity requires a new moral assay of life that, pitting the universal against the particular, willingly commits violence against any ontological commitment to political difference, even though universality itself is a shallow disguise for the practice of destroying political adversaries through the contingency of particular encounters. Necessary Violence Having established that the principal task set for biopolitical practitioners is to sort and adjudicate between the species, modern societies reveal a distinct biopolitical aporia (an irresolvable political dilemma) in the sense that making life live – selecting out those ways of life that are fittest by design – inevitably writes into that very script those lives that are retarded, backward, degenerate, wasteful and ultimately dangerous to the social order (Bauman, 1991). Racism thus appears here to be a thoroughly modern phenomenon (Deleuze & Guattari, 2002). This takes us to the heart of our concern with biopolitical rationalities. When ‘life itself’ becomes the principal referent for political struggles, power necessarily concerns itself with those biological threats to human existence (Palladino, 2008). That is to say, since life becomes the author of its own (un)making, the biopolitical assay of life necessarily portrays a commitment to the supremacy of certain species types: ‘a race that is portrayed as the one true race, the race that holds power and is entitled to define the norm, and against those who deviate from that norm, against those who pose a threat to the biological heritage’ (Foucault, 2003: 61). Evidently, what is at stake here is no mere sovereign affair. Epiphenomenal tensions aside, racial problems occupy a ‘permanent presence’ within the political order (Foucault, 2003: 62). Biopolitically speaking, then, since it is precisely through the internalization of threat – the constitution of The threat that is now from the dangerous ‘Others’ that exist within – that societies reproduce at the level of life the ontological commitment to secure the subject, since everybody is now possibly dangerous and nobody can be exempt, for political modernity to function one always has to be capable of killing in order to go on living: Wars are no longer waged in the name of a sovereign who must be defended; they are waged on behalf of the existence of everyone; entire populations are mobilized for the purpose of wholesale slaughter in the name of life necessity; massacres have become vital. . . . The principle underlying the tactics of battle – that one has to become capable of killing in order to go on living – has become the principle that defines the strategy of states (Foucault, 1990: 137). When Foucault refers to ‘Killing’, he is not simply referring to the vicious act of taking another life: ‘When I say “killing”, I obviously do not mean simply murder as such, but also every form of indirect murder: the fact of exposing someone to death, increasing the risk of death for some people, or, quite simply, political death, expulsion, rejection and so on’ (Foucault, 2003: 256). Racism makes this process of elimination possible, for it is only through the discourse and practice of racial (dis)qualification that one is capable of introducing ‘a break in the domain of life that is under power’s control: the break between what must live and what must die’ (Foucault, 2003: 255). While killing does not need to be physically murderous, that is not to suggest that we should lose sight of the very real forms of political violence that do take place in the name of species improvement. As Deleuze (1999: 76) duly noted, when notions of security are invoked in order to preserve the destiny of a species, when the defence of society gives sanction to very real acts of violence that are justified in terms of species necessity, that is when the capacity to legitimate murderous political actions in all our names and for all our sakes becomes altogether more rational, calculated, utilitarian, hence altogether more frightening: When a diagram of power abandons the model of sovereignty in favour of a disciplinary model, when it becomes the ‘bio-­power’ or ‘bio-­politics’ of populations, controlling and administering life, it is indeed life that emerges as the new object of power. At that point law increasingly renounces that symbol of sovereign privilege, the right to put someone to death, but allows itself to produce all the more hecatombs and genocides: not by returning to the old law of killing, but on the contrary in the name of race, precious space, conditions of life and the survival of a population that believes itself to be better than its enemy, which it now treats not as the juridical enemy of the old sovereign but as a toxic or infectious agent, a sort of ‘biological danger’. Auschwitz arguably represents the most grotesque, shameful and hence meaningful example of necessary killing – the violence that is sanctioned in the name of species necessity (see Agamben, 1995, 2005). Indeed, for Agamben, since one of The most ‘essential characteristics’ of modern biopolitics is to constantly ‘redefine the threshold in life that distinguishes and separates what is inside from what is outside’, it is within those sites that ‘eliminate radically the people that are excluded’ that the biopolitical racial imperative is exposed in its most brutal form (Agamben, 1995: 171). The camp can therefore be seen to be the defining paradigm of the modern insomuch as it is a ‘space in which power confronts nothing other than pure biological life without any media-­ tion’ (Agamben, 1995: 179). While lacking Agamben’s intellectual sophistry, such a Schmittean-­inspired approach to violence – that is, sovereignty as the ability to declare a state of juridical exception – has certainly gained wide-­ spread academic currency in recent times. The field of international relations, for instance, has been awash with works that have tried to theorize the ‘exceptional times’ in which we live (see, in particular, Devetak, 2007; Kaldor, 2007). While some of the tactics deployed in the ‘Global War on Terror’ have undoubtedly lent credibility to these approaches, in terms of understanding violence they are limited. Violence is only rendered problematic here when it is associated with some act of unmitigated geopolitical excess (e.g. the invasion of Iraq, Guantánamo Bay, use of torture, and so forth). This is unfortunate. Precluding any critical evaluation of the contemporary forms of violence that take place within the remit of humanitarian discourses and practices, there is a categorical failure to address how necessary violence continues to be an essential feature of the liberal order.

**The majoritarian logic the aff forces individuals to adhere to is what allows facism to insert itself on the macro level – think about the orders in a totalitarian state – without the saying yes to totalitarianism, we cannot have it. The reason people do consent to it is because of the desire for the complexities to be smoothed out into coherence i.e you’re a real American or of the Aryan race – the K deconstrucst this commitment to an identity – this means the K is a prior question to political action.**

**DELEUZE AND GUATTARI:**

[Deleuze & Guattari 80 (Gilles Deleuze, Felix Guattari “A Thousand Plateaus” pp. 214-215). Print. CEFS]

It is not sufficient to define bureaucracy by a rigid segmentarity with ¶ compartmentalization of contiguous offices, an office manager in each ¶ segment, and the corresponding centralization at the end of the hall or on ¶ top of the tower. For at the same time there is a whole bureaucratic segmentation, a suppleness of and communication between offices, a bureaucratic ¶ perversion, a permanent inventiveness or creativity practiced even against ¶ administrative regulations. If Kafka is the greatest theorist of bureaucracy, ¶ it is because he shows how, at a certain level (but which one? it is not ¶ localizable), the barriers between offices cease to be "a definite dividing ¶ line" and are immersed in a molecular medium (milieu) that dissolves ¶ them and simultaneously makes the office manager proliferate into ¶ microfigures impossible to recognize or identify, discernible only when ¶ they are centralizable: another regime, coexistent with the separation and ¶ totalization of the rigid segments.I0 We would even say that fascism implies ¶ a molecular regime that is distinct both from molar segments and their centralization. Doubtless, fascism invented the concept of the totalitarian ¶ State, but there is no reason to define fascism by a concept of its own devising: there are totalitarian States, of the Stalinist or military dictatorship ¶ type, that are not fascist. The concept of the totalitarian State applies only ¶ at the macropotical level, to a rigid segmentarity and a particular mode of ¶ totalization and centralization. But fascism is inseparable from a proliferation of molecular focuses in interaction, which skip from point to point, ¶ before beginning to resonate together in the National Socialist State. Rural ¶ fascism and city or neighborhood fascism, youth fascism and war veteran's ¶ fascism, fascism of the Left and fascism of the Right, fascism of the couple, ¶ family, school, and office: every fascism is defined by a micro-black hole ¶ that stands on its own and communicates with the others, before resonating in a great, generalized central black hole.1¶ ' There is fascism when a war ¶ machine is installed in each hole, in every niche. Even after the National ¶ Socialist State had been established, microfascisms persisted that gave it ¶ unequaled ability to act upon the "masses." ¶ Daniel Guerin is correct to say ¶ that if Hitler took power, rather then taking over the German State administration, it was because from the beginning he had at his disposal ¶ microorganizations giving him "an unequaled, irreplaceable ability to ¶ penetrate every cell of society," in other words, a molecular and supple ¶ segmentarity, flows capable of suffusing every kind of cell. Conversely, if ¶ capitalism came to consider the fascist experience as catastrophic, if it preferred to ally itself with Stalinist totalitarianism, which from its point of ¶ view was much more sensible and manageable, it was because the egmentarity and centralization of the latter was more classical and less ¶ fluid. What makes fascism dangerous is its molecular or micropolitical ¶ power, for it is a mass movement: a cancerous body rather than a totalitarian organism. American film has often depicted these molecular focal ¶ points; band, gang, sect, family, town, neighborhood, vehicle fascisms ¶ spare no one. Only microfascism provides an answer to the global question: Why does desire desire its own repression, how can it desire its own ¶ repression? The masses certainly do not passively submit to power; nor do ¶ they "want" to be repressed, in a kind of masochistic hysteria; nor are they ¶ tricked by an ideological lure. Desire is never separable from complex ¶ assemblages that necessarily tie into molecular levels, from ¶ microforma-tions already shaping postures, attitudes, perceptions, ¶ expectations, semiotic systems, etc. Desire is never an undifferentiated ¶ instinctual energy, but itself results from a highly developed, engineered ¶ setup rich in interactions: a whole supple segmentarity that processes ¶ molecular energies and potentially gives desire a fascist determination. ¶ Leftist organizations will not be the last to secrete microfascisms. It's too ¶ easy to be antifascist on the molar level, and not even see the fascist ¶ inside you, the fascist you yourself sustain and nourish and cherish with ¶ molecules both personal and collective.¶ Four errors concerning this molecular and supple segmentarity are to be ¶ avoided. The first is axiological and consists in believing that a little suppleness is enough to make things "better." But microfascisms are what ¶ make fascism so dangerous, and fine segmentations are as harmful as the ¶ most rigid of segments. The second is psychological, as if the molecular ¶ were in the realm of the imagination and applied only to the individual and ¶ interindividual. But there is just as much social-Real on one line as on the ¶ other. Third, the two forms are not simply distinguished by size, as a small ¶ form and a large form; although it is true that the molecular works in detail ¶ and operates in small groups, this does not mean that it is any less coextensive with the entire social field than molar organization. Finally, the qualitative difference between the two lines does not preclude their boosting or ¶ cutting into each other; there is always a proportional relation between the ¶ two, directly or inversely proportional.

**The alternative is to dismantle the face --- this undermines the faciality machines that they seek recognition through and their normative value. BIGNALL ’12:**

[Bignall, Simone. “Dismantling the Face: Pluralism and the Politics of Recognition.” University of New South Wales. 2012. LHP MK]

Deleuze and Guattari assert: ‘If the face is a politics, dismantling the face is also a politics involving real becomings’ (1987: 188). While faciality involves a politics of territorialisation and form, dismantling the face involves a politics of deterritorialisation and transformation. The starting point for such a transformative politics is the face itself: ‘the white wall of the signifier, the black hole of subjectivity and the facial machine are impasses, the measure of our submissions and subjections; but we are born into them, and it is there we must stand battle’ (189). For Deleuze and Guattari, battling the face requires the cultivation of an intimate knowledge and awareness about the face one inhabits, and they warn: ‘find your black holes and white walls, know them, know your faces; it is the only way you will be able to dismantle them and draw your lines of flight’ (188). Dismantling the face therefore requires a careful analysis of the signifying discourses and representations that make up one’s social context, as well as a critical and reflexive understanding about how these shape identity. This includes analysis of how it is at times possible for one to selectively constitute one’s own identity in relation to the multiplicity of established significations one is ‘born into’. The ‘ruin of representation’ is a central aspect of Deleuze’s task in Difference and Repetition and indeed forms a consistent thread through his entire oeuvre, including his work with Guattari (see Olkowski 1999). The aim in Difference and Repetition is to shake off the ‘four iron collars of representation: identity in the concept, opposition in the predicate, analogy in judgement and resemblance in perception’ (Deleuze 1994: 262). In A Thousand Plateaus, the discussion of faciality likewise involves a critique of representation; in particular, how faces ‘form loci of resonance that select sensed or mental reality and make it conform in advance to a dominant reality’(Deleuze and Guattari 1987: 168). For Deleuze, at the heart of representation and aligned forms of political practice is the misconception that the established regime of power/knowledge (the face) causally structures the productive force of desire and assemblage. Within this model of causation, an established signifier or set of significations predetermines the possibility of recognition and limits the potential for inventing new configurations of meaning and, hence, of social organisation. The imposition of an already given order of meaning upon an actual variety of subject-forming events reduces them to a limited and predetermined interpretation of experience. This is described, for example, by the limiting formalities that circumscribe and regulate political participation in liberal democracies, which ask citizens to choose between particular sets of already-existing features. According to Deleuze and Guattari, all interpretation then becomes assimilated to an existing structure of meaning: ‘You don’t so much have a face as slide into one’ (1987: 177). Deleuze and Guattari encourage us to understand alternatively that the subject and the signifier are not the (already-given) causes of signifiance, but are in fact themselves reactive effects of a process in which meaning is constructed through the association of elements into a coherent form (see for example Deleuze and Guattari 1983: 129). They assert: ‘concrete faces cannot be assumed to come ready-made. They are engendered by an abstract machine of faciality (visigéité), which produces them’ (1987: 168). This engendering involves the process of ‘facialisation’, in which the face ‘takes shape’ and ‘begins to appear’ as certain regular features are inscribed and emerge as fixed strata upon a mobile ‘surface’, thereby forming the landscape of the face with the repetition of their occurrence over a period of time (ibid.). These features are not inevitable characteristics of the facial landscape, however; they occur according to a particular and contingent coding of elemental conjunctions to define a particular emergence of faciality. Thus, a ‘concrete face’ is always defined by the assembly rules embodied within the ‘abstract machine of faciality’ that causes the face to emerge as such. When the established regime of the face is erroneously taken as the cause of signifiance, it operates as a ‘site of transcendental illusion’ which suggests the apparent inevitability of that regime of signs (Deleuze 1994: 265). When everything must conform in advance to a regime of signification already given, then there is no room for creative divergence in the productive process. There is nothing new, no new desires or alternative associations that might construct different expressions in the established face, which grimly sets its features into a representative order. In this way, in the rigid structures of a formed face, ‘the whole of desiring-production is crushed, subjected to the requirements of representation, and to the dreary games of what is representative and represented in representation’(Deleuze and Guattari 1983: 54). It is helpful to read ‘Plateau 7 – Year Zero: Faciality’ in conjunction with ‘Plateau 5–587BC–AD70: On Several Regimes of Signs’. Here, Deleuze and Guattari analyse ‘a certain number of semiotics displaying very diverse characteristics’ (1987: 135). They explain that there is such diversity in the forms of expression, such a mixture of these forms, that it is impossible to attach any particular privilege to the regime of the ‘signifier’. If we call the signifying semiotic system semiology, then semiology is only one regime of signs among others, and not the most important one. (Deleuze and Guattari 1987: 111) In fact, any particular regime of signs subsists in a milieu where competing regimes circulate. Similarly, any given discourse is not a fixed or closed system of signification, but is flexible and relative to other modes of expression and possible interpretations. An object might occupy many classifications simultaneously, and thus can transfer between meanings. A complex ‘mixture’ of various semiotic regimes constitutes a ‘milieu’ or ‘landscape’ that furnishes material for the constitution of the sense of a particular body. The milieu constitutes an exterior context in which any particular organisation of meaning subsists. At its points of contact with this milieu, a representation is fundamentally unstable, as its elements combine, shift, transfer and pass between other regimes of sense. Thus, there are possible ‘passages’ between regimes of signs, enabling movements of destratification or the mixing and translation of established regimes of signification. Whereas the semiotic regime of the signifier works by capturing and reducing diverse meanings to a uniform representation of ‘truth’, alternative and polyvocal regimes of sense and expression are always possible (136; see also Deleuze 2004). The potential for discovery of these alternative and contesting regimes of sense, however, ‘requires a rethinking of the majoritarian face and a willingness to envisage more than one system of comprehension and function for the face’ (MacCormack 2004: 138). Deleuze and Guattari suggest: when the face is effaced, when the faciality traits disappear, we can be sure that we have entered into another regime, other zones infinitely muter and more imperceptible where subterranean becomings-animal occur, becomings-molecular, nocturnal deterritorialisations overspilling the limits of the signifying system. (Deleuze and Guattari 1987: 115) Fanon writes: I am not a prisoner of history. I should not seek there for the meaning of my destiny. I should constantly remind myself that the real leap consists in introducing invention into existence. In the world in which I travel, I am endlessly creating myself. I am a part of Being to the degree that I go beyond it. (Fanon 1967: 229) Because dominant meanings are always open to a contextualising milieu in which mixed and conflicting regimes of signs subsist, their stability is challenged as they come into contact and are forced to shift and morph in partial destratifications in order to accommodate such conflicting significations. Thus, ‘dismantling the face’ involves locating the points at which meaning shifts and becomes unstable: searching for the points in a collection of social discourses where meaning is contradictory, or the points in one’s own identity where one occupies multiple and contradicting classifications. One may be simultaneously altruistic and selfish, active and passive, free and constrained, wilful and aimless, friend and lover, parent and professional, and so forth. In finding such points of ambiguous identification, one is potentially able to apply pressure to the signifying system in which one is embedded, perhaps provoking an ‘uncertain moment’ where conventional significations collapse and established meanings shift (Deleuze and Guattari 1987: 189). At such moments, the ‘abstract machine of faciality’ that shapes the emergence of particular and concrete facial assemblages may become (partially) transparent. The increased visibility of the constructive mechanisms underlying a set ‘face’ undermines its pretensions to inevitability and stability.

**The role of the ballot is to promote pedagogy of becoming --- it allows us to create a learning environment that account for the flow of forces and the dynamic interaction between values. SEMETSKY:**

[“Deleuze, Education and Becoming” Inna Semetsky. Monash University, Australia. LHP AA]

Deleuze’s pedagogy of the concept, if we situate it in the concrete context of schooling, is therefore an important example of indeed [for] “expanding educational vocabularies” (Noddings, 1993a, p. 5). Because specialization is defined as self- organization, it is accompanied by specific features that, in turn, affect the concept of learning which, in its own becoming-other, cannot but break out from old vocabularies. Communication in an autopoietic mode points towards naturalizing the concept of learning which therefore becomes an emergent property of the transactions between teachers, students and the subject-matter, even in the absence of direct instruction and teaching as traditionally defined. In this respect it is the self-organizing learning process that leads to an increase in complexity and the growth of intelligence: it functions as the process of both intellectual and moral growth that necessarily includes in itself, in accord with Dewey’s philosophy, an added capacity for growth. Folds that are formed in the critical junctions, where different rhizomatic lines cross and interact, are themselves the tightest relations functioning in the capacity of a self-organized criticality and therefore capable of increasing the system’s complexity: they create a perplexity, a novelty, that would have required a decision-making, a choice. Indeed, we “are never separable from the world: the interior is only a selected exterior, the exterior, a projected interior” (Deleuze, 1988b, p. 125). Specialization as making a selection among many available options not only requires that those options are present but also stimulates the mode of thinking and acting so that students would not be horrified by possible contradictions and choices that may seem to oppose each other. Rather than perceiving a sense of failure, students – even when folded in conflicting situations, or precisely when enfolded in such situations – may extract from them forces that vitalize the system by diversifying it, that is, by enriching the system with variations. The tension, or difference, that may exist between seemingly contradictory choices, itself becomes [is] a contingent factor feeding back into the educational process and, according to the dynamic of complex systems, amplifying – and le pli, as we remember, means the fold – its potential for self-organization by acting from within as the quasi-necessary and immanent condition for growth. The value of the idea of interest in education, emphasized by Dewey (1916/1924) represents, [is] within the paradigm of self-organization an immanent condition created by the dynamic and “moving force of objects – whether perceived or presented in imagination” (Dewey, 1916/194, pp. 152-153). The very problematic involved in selecting an alternative and making a choice would, according to Dewey, induce learning. In this respect there won’t be any special educative aim that is imposed from without. The school environment, the milieu per se, would have created conditions to actualize students’ many potentials – and thus having become what Noddings calls an excellent system of education, that is, one that serves “to open opportunities – never to close them” (Noddings, 1993a, p. 13). The absence of any external aim inherent in the self-organizing dynamics functioning in an autopoietic manner also eliminates the hierarchical power structure specific to traditional present-day schooling. What takes place is the heterogeneous distribution of knowledge that, in its shared activity (Dewey, 1916/1924), becomes available to all who are

## 2

#### CP: Text – The International Community ought to craft Data-Centered approach to space-mining regulation – as outlined in our Steffen evidence.

#### This solves the dangers of asteroid mining, and independently cultivates public/private partnerships, and cultivates shared data collaboration.

\*Pretty much solves every conceivable objection (Dual Use, Monopolies, Lack of Market Competition,

Steffen 2021 (Olaf Steffen, Explore to Exploit: A Data-Centred Approach to Space Mining Regulation, Space Policy, December 2 2021, https://www.sciencedirect.com/science/article/pii/S0265964621000515#bib15)//NotJacob

The data gathered in the exploration of a celestial body is not only of value for space mining companies for informing them whether, where and how to exploit resources from the body in question, but also for science. The irretrievability of information relating to the solar system contained in the body that will be lost during resource exploitation carries a value for humanity and future generations and can thus be assigned the characteristic of a common heritage for all mankind as invoked in the Moon Agreement. This characteristic makes exploration data an exceptional and unique candidate for use in a mechanism for acquiring mining rights because its preservation is of public interest and its disclosure in exchange for exclusive mining rights does not place any additional burden on the mining company. The following principles would form the cornerstones of the proposed regulatory regime and rights acquisition mechanism based on exploration data:

• Without preconditions, no entity has a right to mine the resources of a celestial body.

• An international regulatory body administers the existing rights of companies for mining a specific celestial body.

• Mining rights to such bodies can be applied for from this international regulatory body, with applications made public. The application expires after a pre-set period.

• Mining rights are granted on the provision and disclosure of exploration data on the celestial body within the pre-set period, proposedly gathered in situ, characterising this body and its resources in a pre-defined manner.

• The explorer's mining right to the resources of the celestial body is published by the regulatory body in a mining rights grant.

• The data concerning the celestial body are made public as part of the rights grant within the domain of all participating members of the regulatory regime.

• The exclusive mining rights to any specific body are tradeable.

• The scope of the regulatory body with respect to the granting of mining rights is not revenue-oriented.

The international regulatory body would thus act as a curator of a rights register and an attached database of exploration data. The concept is superficially comparable to patent law, where exclusive rights are granted following the disclosure of an invention to incentivise the efforts made in the development process. In the following section, the characteristics of such a regulatory regime are further discussed with respect to the formation of monopolies, market dynamics, conflict avoidance, inclusivity towards less developed countries and the viability of implementation. 4.2. Discussion and means of implementation The proposed regulatory mechanism has advantages both from a business/investor and society perspective. First, it prevents already highly capitalised companies from acquiring exploitation rights in bulk to deny competitors those objects that are easiest to exploit or most valuable, which would otherwise be possible in any kind of pay-for-right mechanism and could result in preventing market access to smaller, emerging companies. Thus, early monopoly formation can be avoided. The use of data disclosure for the granting of mining rights ensures the scientific community has access to this invaluable source of information. In this way, space mining prospecting missions can lead to a boost in research on small celestial bodies at a speed unmatchable by pure government/agency funded science probes. This usefulness to the scientific community could lead to sustained partnerships between prospecting companies and scientific institutions and could even provide a source of funding for the companies through R&D grants and public-private partnerships. The results of the exploration efforts contribute to research on the formation of planets and the history of the solar system and provide valuable insight for space defence against asteroids. The transition of exploration from a tailored mission profile with a purpose-built spacecraft to a standard task in space flight would also lead to a cost reduction of the respective exploration spacecraft through economies of scale. This describes the very benefits Elvis [24] and Crawford [25] imagined as possible effects of a space economy. Thus, there is an immediate return for society from the exploitation rights grant. It also reconciles the adverse interests of space development and space science as laid out by Schwartz [26]. It ensures that, by exploitation, information contained in celestial bodies is not lost for future generations. The application period should not be set in a manner that creates a situation that can be abused through the potential for stockpiling inventory rights. Rather, it is intended to prevent conflict in the phase before exploration data gathered by a mission, as a prerequisite to the mining rights grant, is available. In other words, only one exploration effort at a time can be permitted for a specific body. The time frame between the application and the granting of mining rights (meaning: availability of the required exploration data set) should be tight and should only consider necessary exploration time on site, transit time and possibly a reasonable launch preparation and data processing markup. These contributors to the application period make it clear that the time frame could be dynamic and individualistic, depending on the exploration target (transit time and duration of exploration) and the technology of the exploration probe (transit time). After the expiration of the application period, applications for the exploration target would again be permissible. To prevent the previously mentioned stockpiling of inventory rights, credible proof of an imminent exploration intention would need to be part of the application process, for example, a fixed launch contract or the advanced build status of the exploration probe. Such a mechanism would not contradict the statement in the OST that outer space shall be free for both exploration and scientific investigation. Applications would not apply to purely scientific exploration. An application would only be necessary as a prerequisite for mining. Even resource prospecting could take place without an application (for whatever reason), with a subsequent application comprising in situ data already gathered. For such cases, the application process would need to provide a short period for objections to enable the secretive explorer to make their efforts public. The publication of the application for the mining rights, which is nothing more than a statement of intention to explore, thus provides a strong measure for avoiding conflict. The transparency of where exploration spacecraft are located and, at a later stage, where mining activities take place, provides additional benefits for the sustainable use of space, trust building and deterrence against malign misuse of mining technology. Involuntary spacecraft collisions of competitors in deep space are prevented by the reduction of exploration efforts at the same destination through the application for mining rights by one applicant at a time. As pointed out by Newman and Williamson [20], this is relevant because space debris does not de-orbit in deep space as in the case of LEO. Deep space may be vast, but the velocities involved mean that small debris particles are no less dangerous. Considering NEO mining with fleets of small spacecraft, malfunctions and/or destructive events could create debris clouds crossing Earth's orbit around the sun on a regular basis, presenting another danger to satellites in Earth's own orbit. Thus, by effectively preventing the collision of two spacecraft, one source of debris creation can be mitigated through this regulation mechanism. With respect to Deudney's [11] scepticism of asteroid mining and the dual-use character of technology to manipulate orbits of celestial bodies, it has to be stated that this potential is truly inherent to asteroid mining. An asteroid redirect mission for scientific purposes was pursued by NASA [49] before reorientation towards a manned lunar mission. In one way or another, each type of asteroid mining will require the delivery of the targeted resource to a destination via a comparable technology as formerly envisioned by NASA, be it as a raw material or a useable resource processed in situ, even if this is not necessarily done through redirecting the whole asteroid and placing it in a lunar orbit. However, to be misused as a weapon, space mined resources would have to surpass a certain mass threshold to survive atmospheric entry at the target. This seems unfeasible for currently discussed mining concepts using small-scale spacecraft as described in this article. Redirecting larger masses or whole asteroids would require far more powerful mining vessels or small amounts of thrust over long periods of time. The continuous, (for a mining activity) untypical change in the orbit of an asteroid would make a redirect attempt with hostile intent easily identifiable, effectively deterring such an activity in the first place by ensuring the identification of the aggressor long before the projectile hits its target. The proposed database would provide a catalogue of asteroids with exploration and mining activities in place that should be tracked more closely because of their interaction with spacecraft. This would, in fact, be necessary per se as a precaution to avoid catastrophic mishaps, such as the accidental change of a NEO's orbit to intercept Earth by changing its mass through mining. The data-driven mechanism also addresses another potential risk of an emerging space-based resource economy: the reinforcing of the incontestable market positions of the market leaders based on an advantage in knowledge unattainable by new competitors. Explorations of celestial bodies will have a likelihood of failing from the perspective of the actual value of the explored object vs. the expected value. In this case, the costs of exploration would be a loss for the company, which could be significant and possibly ruinous considering the budgets needed for contemporary space agency-led exploration missions. Sanchez and McInnes [5] explicitly mention the uncertainties in object distribution models used in their asteroid distribution study and for the conclusions drawn concerning reachable object masses with certain delta-v capabilities of spacecraft. With an increasing number of exploration missions led by a company, the data collected may lead to better in-house models and a higher probability of exploring the ‘right’ body for the value/resources aimed at. This may even provide information on the best spacecraft designs for matching the targeted objects’ orbit distribution. This risk is known from the digital platform economy, where the companies that are now leading have an uncatchable advantage in user data compared with market newcomers, translatable to a more refined and comfortable user experience, attracting additional users and thus offering superior services to business customers. This also holds true for space mining companies. Through their lack of legacy mission data, market newcomers would have a higher risk of misallocating exploration missions, making investments in those companies riskier than in established companies. To avoid the preferred investment in a single or a few companies, the risk of the investment in emerging companies is reduced by the proposed mechanism by ensuring the equal access to data for market newcomers and established companies alike. From a prospecting risk perspective, the market entrance of a new company becomes progressively less risky for investors with increasing amounts of publicly available exploration data, promoting progressive and dynamic development. The long lead times of asteroid mining ventures coincide with a long time frame for an ROI. The exclusive mining rights granted after the exploration phase give investors security half-way into their space mining endeavours. The proposed tradability of the rights offers an early chance of gaining investment proceeds. It also offers the possibility of new business models: the classical asteroid mining system concept, as shown by Andrews et al. [43], for example, covers exploration, exploitation and resource transfer. This maximises the investment needed to develop the technologies required for the entire process chain. Giving exploration a value could lead to a division of labour. Dedicated prospecting companies could emerge, providing mining companies with the data and mining rights to a body with the specific resource profile they are seeking. In this way, the investment needed for a successful mining endeavour is divided between different specialised companies. This considerably reduces the risk for investors as well as the investment needed for a company to meet their business goals, which are now aimed at just a particular part of the overall space mining endeavour. Third-party applications for mining rights should be possible to allow a mining company to subcontract to exploration companies. Such a regulatory mechanism design would also be more easily inclusive of less developed countries. They could simply contract exploration missions made affordable through economies of scale to become part of the emerging space mining economy as holders of tradeable mining rights. Through a wise selection of such missions’ targets, they could gain powerful positions of influence. The proposed mechanism also serves the need to accelerate exploration that was noted by Elvis and Milligan [27]. According to them, their proposal to limit resource use in the solar system to 1/8th of the overall useable resources requires as a prerequisite knowledge of what is available, where and at what cost. The ‘on average 15 missions per decade’ [27] of planetary exploration missions would not serve this purpose. The privatisation of exploration and publication of the results, which is incentivised by the granting of mining rights, would accelerate space exploration in general and allow for an overview of currently known resources based on the exploration data, which would otherwise be restricted to internal use within the private companies. In addition to this ‘awareness’ advantage, there is also another economic benefit: the entirety of the disclosed data on celestial bodies and their resource content would allow for an overview of the resources currently claimed and available for mining. This would enable dynamic pricing for the trade of mining rights based on the accessible supply and demand of the associated resources in relation to the necessary exploitation efforts and time frame of availability according to mission timelines andd orbital dynamics. With respect to realising the proposed regulatory mechanism as a functional international regulation, one might argue that recent times show more of a decline in international order than a tendency towards resolving longstanding debates. The core description of the regulatory regime in section 4.1 is an aspirational, idealised version. While an all-encompassing international consensus is desirable, the regulation mechanism can, at first, only be set up by a small number of states. In contrast to many of the other proposals, the data-centred approach to space mining regulation is not restrictive but rather incentivises exploration. Joining this initiative would not only be beneficial for providing legal clarity but is also attractive from a business perspective: being a member state would ensure access to the entirety of the exploration data already available and provide domestic companies with this knowledge. It is also attractive for less developed countries or countries without the technological capability to partake in exploration and mining efforts themselves, since it allows them to actively participate in the space mining economy as owners and traders of mining rights that offer ‘equitable sharing … in the benefits derived from those resources’ as required in the Moon Agreement [30] beyond their more abstract benefit from scientific advancements.

## 3

#### Resource scarcity will cause extinction – only asteroid mining solves

Crombrugghe 18 (Guerric Crombrugghe is a Business Development Manager Brussels @ Brussels Capital Region, “Asteroid mining as a necessary answer to mineral scarcity”, LinkedIn, 1/11/2018, <https://www.linkedin.com/pulse/asteroid-mining-necessary-answer-mineral-scarcity-de-crombrugghe>)//AX

We need minerals, and we always will. Yet, our reserves are finite and a 100% end-of-life recycling rate is impossible to achieve. Eventually, new entrants will therefore be required to sustain our system. While the business case for asteroid mining can obviously not be closed with current technologies, it will someday become a necessity. We may as well start preparing ourselves. Scarcity of resources, the challenge of the 21st century According to the World Bank, in 2016 humanity's growth rate was of 1.18% in terms of population, and 2.50% in terms of GDP. Both of these, in turn, drive our staggering resource consumption: there are more of us, and each of us needs more. On the other, the Earth is a closed system, and resources are only available in a finite amount. We all know by now that there is only this much oil & gas, but the same can actually be said for water, arable land, minerals, etc. These two simple observations have sparkled the debate around the scarcity of resources. Even with the best intentions, mathematics teaches us that it is impossible to indefinitely extract resources from a given finite supply [1]. The problem arising in the short-term is the exhaustion of the existing supply. That limit is actually coming in fast. In a paper published in 2007, Stephen Kessler demonstrates that the global mineral reserves are only sufficient for the next 50 years. The figure on the right shows the ratio of known global reserve to global annual consumption, given a rough indication of adequacy in years. It dates from an earlier paper, published in 1994. Since then, the development of environmental-friendly technologies (e.g. batteries, electric engines, etc.) has drastically increased the consumption rate of high-tech metals such as cobalt, platinum, rare earths, or titanium. On the other hand, exploration programs have allowed to discover new deposits, notably of gold and diamond. We will certainly be able to continue to increase - or at least sustain - our reserves, but only temporarily. Recycling and other temporary fixes An obvious solution is recycling, i.e. rejuvenating our stocks. A popular concept to illustrate this idea is that of urban mining: retrieving the ores present in smartphones and other electronic devices. It may prove to be not only more environmental-friendly, be also safer and more cost-effective. Nevertheless, every solution based on recycling is, again, nothing more than a temporary fix, buying us a finite amount of time. The United Nations Environment Programme studied in a report the current recycling rate of 60 metals. More than half of them have an end-of-life recycling rate below 1%, and less than one-third are above 50%. Nickel, for example, is relatively easy to retrieve, with and end-of-life recycling rate of up to 63% under the best conditions. At that rate, less than 1% of the initial stock is available after only 10 cycle. Even with a staggering 99% efficiency, the same 1% limit is achieved in less than 460 cycles. Not bad, of course, but still not enough. Should our hunger for resources continue, and even with the most optimised recycling techniques, a second problem will arise in the longer term: the amount of resources needed at a given time will simply exceed the total available stock. Unless we manage to find growth vectors that do not require raw materials, that tipping point is an impassable limit. Its proximity obviously depends on our consumption rate. Asteroid mining? No matter which way we look at it, we will thus be short on resources, either through sheer exhaustion (i.e. transformation in an unrecoverable form) or because the demand will exceed the total reserves. We can - and should - talk about recycling, dematerialisation, and other more ethically questionable solutions such as bio-engineering. Nonetheless, no matter how good they are, these are only temporary fixes. If we don't radically change our lifestyle, we will sooner or later have to address the elephant in the room: the Earth is a closed system, we need new entrants. How can space help? Short answer: all these minerals can be found in space. Some are difficult to obtain, others are even more difficult, none are straightforward. The most accessible destination is near-Earth asteroids, a reservoir of over 17,000 known - and counting - giant rocks that regularly cross the orbit of our planet. They are commonly classified in three main families. The most interesting one, for our case, is that of the S-type asteroids. These are metallic bodies, containing first and foremost nickel, iron and cobalt, but also gold, ores from the platinum group. But the list doesn't stop there, many other minerals can be found in smaller amounts: iridium, silver, osmium, palladium, rhenium, rhodium, ruthenium, manganese, molybdenum, aluminium, titanium, etc. How do we get there? Let's take an example: Ryugu, formerly known as 1999 JU3. It's a C-type asteroid measured to be approximately one kilometre in size [2]. In addition to nickel, iron and cobalt, it also contains a fair share of water, nitrogen, hydrogen, and ammonia. Its total value is estimated to be approximately 80 billion USD. Fantastic! But how do we get there and, most importantly, how much does it cost? Well, we may have the start of an answer to these questions. Reaching Ryugu is a technological challenge, but it is feasible. In December 2014, the Japanese space agency has launched a spacecraft, Hayabusa2, heading to the asteroid. Its mission includes the collection of a small sample which will be sent back to the Earth, with a landing planned for December 2020. The target for the sample size is at least 100 µg. The total cost of the mission was projected to be around 200 million USD. That's 2 trillion USD per gram. Let's be optimistic and assume that the sample retrieved is pure gold. At today's rate, it is worth 42.5 USD per gram. That's a difference of over 10 orders of magnitude. Some may argue that Hayabusa2 has many other objectives that retrieving a sample. The mission does indeed include multiple landers, thorough scientific investigations, etc. There is actually another asteroid sample return mission underway, which we could you as a second point of comparison: OSIRIS-Rex, from NASA. It's heading for Bennu, also a C-type asteroid, which it will reach in August 2018. Total cost of the mission: 980 million USD. Target sample size: at least 60 g. We achieve thus roughly speaking 16 million USD per gram. Better, but still 6 orders of magnitude off compared to pure gold. It's pretty much as good as it gets with existing state-of-the-art technologies. Not much of a business case. Should we forget about it? Referring back to our earlier conclusion on resource scarcity, we had two options. Either we drastically reduce our resource consumption, to such a degree that reserves can last for longer than humanity itself, or we extend our closed system, the Earth, to nearby asteroids. In the current state of affairs, I am honestly not sure which course of action is the easiest. As they get increasingly rare, the cost of minerals will go up. On the other hand, as explained in a previous article, we can expect the cost of space activities to go steadily down. Step by step, these 6 orders of magnitude will slowly get munched away from both ends, until eventually asteroid mining becomes a viable operation. In other words: it will only become financially interesting once minerals become a thousand times more expensive and space activities a thousand times cheaper. As a point of reference, the introduction of reusable rockets by SpaceX, widely considered as one of the few truly disruptive changes in the aerospace sector in the last few decades, has "only" brought a cost reduction of 30%. While it's clearly amazing, we still need at least 220 innovations of the same calibre [3] before we can make it work (again: assuming the price of minerals simultaneously goes up by a factor of a thousand). It's therefore quite likely that space mining will not take place within our lifetime [4]. How can we accelerate the process? Firstly, we can only celebrate and support the numerous private initiatives which contribute to make that reality happen, either indirectly (e.g. launchers, space systems, etc.) or directly (e.g. in-space manufacturing, lunar exploration, etc.). Shout out to all the folks who manage to keep the flame of space exploration burning while generating profit for their investors. Secondly, space agencies and other institutional actors should continue to act as promoters of pioneering mission such as Hayabusa2, OSIRIS-REx, or DART. We can only regret that the Asteroid Redirect Mission from NASA and the Asteroid Impact Mission from ESA were not funded. From my perspective, these should actually be amongst the top priorities of our space exploration agenda. Not only are they instrumental to our understanding of the solar system, but they are also essential if we want to avoid the same fate as the dinosaurs. It's a question of survival. As a bonus, they also pave the way towards cost-efficient asteroid mining. In the meantime, we might want to consume existing resources a bit more efficiently.

#### Resource wars go nuclear absent the plan

Wingo 13 - Dennis Wingo is chief executive of Skycorp Inc., a company focused on advanced technologies and systems for space exploration and commercial markets, “Commentary | The Inevitability of Extraterrestrial Mining”, *Space News*, 7/29/2013, https://spacenews.com/36511the-inevitability-of-extraterrestrial-mining/

I am honored to provide the counterpoint to my esteemed colleague Ambassador Roger Harrison’s negative contention concerning the mining of extraterrestrial materials off of planet Earth. Let’s begin with his ending: “The conclusion is inescapable, though liable to be escaped, i.e., that raw materials will never be mined in space and sold profitably within the atmosphere or anywhere else. … Asteroids will continue unvexed in their obits, and the Moon too.” I bring a different quote, from the book “Empire Express,” the story of the intercontinental railroad, from U.S. Army Lt. Zebulon Pike, for whom Pike’s Peak is named: “In various places there were tracts of many leagues, where the wind had thrown up sand in all the fanciful forms of the ocean’s rolling wave, and on which not a spear of vegetable matter existed.” Pike’s visions of sand dunes, pathless wastes and sterile soils were reported, widely read and faithfully believed by geographers. The myth became innocently embellished by subsequent visitors, especially those in the party of Maj. Stephen H. Long, who traversed the whole area in 1820. It was reported to be “an unfit residence for any but a nomad population … forever to remain the unmolested haunt of the native hunter, the bison, and the jackal.” The delicious irony is that Mr. Harrison today lives in the shadow of Pike’s Peak, and the U.S. Air Force Academy where he teaches is in the middle of the confidently prophesied unmolested haunt. When Long’s report was written, the Erie Canal across New York was five years from completion and it was another 31 years before the first railroad was completed across the state. Mr. Harrison’s technical objections are for the most part valid today for his scenario, just as objections to a railroad across the North American continent were valid in the 1820s. However, technology is being developed today that will enable extraterrestrial mining, manufacturing and development just as technology was developed that would enable the creation of the national railroad. Mr. Harrison says it is an illusion that we are running out of resources. He is correct. That is not our claim. The claim is that extraction costs of economically viable terrestrial resources are rising dramatically and may soon exceed the cost of extraction from much more plentiful extraterrestrial sources. Today rapidly advancing costs and diminishing returns are rapidly redefining mining due to diminishing ore grades. This fact is developed in a 2012 distinguished lecture by Dan Wood before the Society of Environmental Geologists, “Crucial Challenges to Discovery and Mining — Tomorrow’s Deeper Ore Bodies.” This is a vitally important issue to solve as resource conflict has been the impetus for most wars in human history. We live in a global civilization of over 7 billion people, which will expand to over 9 billion before plateauing in mid-century. While American politicians are not paying attention to what this means, the rest of the world is noticing. Gross domestic product (GDP) growth and increasing global resource demand are addressed in “Iron Ore Outlook 2050,” a report commissioned for the Indian government. The GDP of the major powers (the United States, Europe, China, India and Japan) is forecast to rise from $48 trillion in 2010 to $149 trillion by 2050. The report’s substance is that with this massive increase in global GDP, an intensifying scramble for metal resources is inevitable. If the trend of resource consumption demand increase continues unabated, there are three likely potential outcomes. The first is collapse, forecast by the “Limits to Growth” school of thought. The second and more likely scenario is fierce national economic competition leading to wars over diminishing resources. The third, and most desirable, is to increase the global resource base by the economic and industrial development of the inner solar system. Mr. Harrison uses cost as the primary reason that extraterrestrial mining will never happen by focusing on a straw man argument related to mining asteroids in orbits far from Earth. Just as the U.S. railroad infrastructure began on shorter routes with lower capital requirements and shorter payback periods, asteroid mining can begin with our nearest neighbor, the Moon, where telepresence robotics, high-bandwidth communications and a short three-day trip for humans negate his premise. We know from the Apollo samples that plentiful metallic asteroidal materials exist in the lunar highlands. We also know from several missions that extensive water, titanium, thorium, uranium, aluminum and native iron all exist on the Moon, in easily separable oxide form. Improvements in remote sensing data from current missions and computer modeling continue to increase the amount of potential asteroidal material on the Moon, increasing confidence in the Moon first premise. The extensive resources of the Moon become the catalyst for an inner solar system-wide economy providing fuel, vehicles and the all-important experience in developing an industrial infrastructure off planet. The asteroids then become the force multiplier of inner solar system development with billions of tons of water, metals and free space energy from solar power. Mars figures in here as well as the second home of humanity, creating further demand for asteroidal resources, and providing something else that is becoming increasingly scarce on the Earth: hope for the future. The technical barriers that Mr. Harrison points to are being overcome just as those of the 19th century were. New technology developments in 3-D printing, additive manufacturing and advanced robotics are breaking down the final barriers to exploiting off-planet resources and indeed the industrial development of the inner solar system. It is not a question if, it is a question of when, and by whom. Just as the Pacific Railway Act of 1862 was a primary catalyst for a century of American economic growth, it should be the role of government to develop policies and concrete legislation to support this development for the continued health of the American economy and the future of all mankind.