Towards Inclusive Multi-Massacre Memorials to Victims of Conflict

Interrelating the opponents, perpetrators and victims of human tragedy -- known and unknown

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References

Introduction

There is currently much discussion of the massacre in Bucha (Ukraine) and the possibility of convicting those responsible for war crimes and/or crimes against humanity -- as these have been defined by international conventions. However there has been virtually no comparison with the massacre in Fallujah (Iraq) or with the possibility of the conviction of those responsible. Indeed there is a fundamental difficulty in naming "massacres" and "genocides", since those in any way complicit lobby intensively to reframe such events as legitimate in some way -- perhaps as being morally consistent with just war theory.

Curiously a "massacre" tends not to be recognized as such -- once it is framed within a just war by the righteous. By contrast, Japan remembers use of the atomic bomb as a massacre by the USA (Timothy Bancroft-Hinchey, Hiroshima and Nagasaki: Worst massacre in the history of Mankind, Pravda, 10 August 2012). Similarly it is questionable whether the Allies perceive the carpet bombing of Dresden to be a war crime, despite its proscription by international law (Allied bombing of Dresden: legitimate target or war crime? DW News 13 February 2020; Is Carpet Bombing A War Crime? LeicesterVillages, 2 December 2021). Carpet bombing was also a feature of the Vietnam war.

The point is well made by the case of Fallujah, which does not feature in the List of massacres in Iraq (below), even though it has been the subject of a documentary (Fallujah, The Hidden Massacre, 2005). There is only a passing reference in the Wikipedia article on Fallujah to that documentary. The current enthusiasm for indicting those responsible for the massacre in Bucha is in no way comparable to the total lack of interest with regard to the potential conviction of those complicit in the massacre of Fallujah -- or others which feature in the lists below. On the contrary, it is striking to note the manner in which the key figures in massacres are variously esteemed and rewarded by positions of authority, knighthoods, Nobel Peace Prizes, or otherwise -- despite extensive documentation regarding their complicity.

It is somewhat tragic to note efforts to distinguish between "war crimes" and "crimes against humanity" (Guénaél Mettraux, War Crimes and Crimes against Humanity, Oxford Scholarship Online, 2006; Ajeet Kumar, What Is The Difference Between Genocide, Crimes Against Humanity and War Crimes? Republic World, 14 April, 2022; Difference Between War Crimes and Crimes against Humanity, Difference Between, 21 January 2011; Difference Between War Crimes and Crimes Against Humanity (With Table), Ask Any Difference).

There is little recognition that war itself merits consideration as a crime against humanity (Butler Shaffer, War as a Crime Against Civilization, Ron Paul Institute, 9 March 2015; Phillip Michaels, The Dawn of Treating War as a Crime, OpEdNews, 4 April 2022). Possibilities have been variously argued by David Swanson (How It Could Finally Be Possible to Prosecute War as a Crime, Information
More generally it is important to recognize that memorials associated with mass killing in warfare are typically dedicated to honouring the military -- especially the unknown soldiers -- who participated in the process. It is relatively rare to discover memorials to genocides, and to the innocent victims of conflict in which the military may have been variously complicit. The International Coalition of Sites of Conscience is exceptional in this respect. Other exceptional examples include:

- Memorial Museums Database (Beyond Genocide)
- Genocide Memorials and Museums (Institute on the Holocaust and Genocide in Jerusalem)
- Museums and Memorials (International Association of Genocide Scholars): on the history, legacy and impact of genocide and crimes against humanity
- Genocide Memorial Project (A project of the Lick-Wilmerding High School)
- Monuments and Memorials within Australia associated with Genocide (Monument Australia)

With the focus of war memorials too readily focused on the military participants, there is therefore a case for exploring the need for memorials to the civilian victims -- instigated by Wikipedia (Category: Monuments and memorials to victims of massacres). The case is all the stronger in the light of the number of massacres which occur during armed conflict -- or otherwise. The following arrangement is entirely derived from entries in Wikipedia -- to which all links refer -- and notably:

- List of events named massacres (a list of events for which one of the commonly accepted names includes the word "massacre")
- List of lists of massacres by country (not to be confused with any list of massacres elsewhere for which another country is held responsible)
- Massacres by year
- List of genocides by death toll

Given the controversy surrounding definitions of "massacre", "genocide" and "unlawful killing", it is to be expected that the lists below will include items for which lobbying against the mention of such events have not had sufficient influence to ensure their exclusion. On the other hand, as with Fallujah, clearly there will be many events which do not feature in such lists because of the success of such lobbies in ensuring their exclusion. Some events may only be recognized as "massacres" or "genocides" many decades after the events in question -- and that recognition may well remain highly controversial, as with the massacres of indigenous peoples. Some may be cynically reframed as an unfortunate feature of warfare -- collateral damage.

The purpose of presenting the following listing is to suggest that there is a case for establishing single memorials to multiple massacres with which parties in potentially latent conflict have been complicit. A Bucha-Fallujah memorial would be one "simple" example.

Again, in contrast to the prevailing focus on military war graves, the proposal emphasizes the victims -- rather than only those who may have been complicit in engendering the fatalities. Clearly "bipartisan" memorials could be envisaged, or memorials by region. Why do bodies like the Council of Europe not give consideration to such possibilities -- especially in the light of the history of conflict, massacre and genocide in some regions? Why the focus on single past events -- where such memorials are indeed officially supported, thereby denying complicity in other such events, possibly ongoing? Is there a case for a multi-faceted global memorial to such human tragedy -- rather than any worthy focus on evocation of peace, potentially to be "re-cognized" as "unmemorable" and exercises in avoidance?

More controversially, the proposal could evoke discussion of the possibility of "repurposing" the existing memorials to soldiers -- known and unknown -- to provide a focus on the victims (known and unknown) and the complicit (unknown and unconvicted). The military war grave memorials, under the auspices of exclusive bodies such as the Commonwealth War Graves Commission, merit reframing to include opponents and the civilian victims buried elsewhere -- even in unknown graves. The phrase "Lest We Forget", widely associated with such memorials, merits a challenge -- especially if it is only selected soldiers (of the victors) whom it is believed should be honoured and not forgotten.

The questionable restriction in framing who should be honoured and commemorated deliberately forgets the civilian victims on either side of any conflict -- as well as the perpetrators of either side, whether victorious or defeated. As a form of conceptual gerrymandering and definitional game-playing, this undermines the human values with which honour is associated (Towards a generic model of definitional game-playing? 2004; Honour Essential to Psycho-social Integrity: challenge to the nameless of dishonourable leadership, 2005). Unfortunately war memorials can therefore serve the purpose of eroding collective memory in a dubious exercise in virtue signalling through which degrees of complicity in slaughter are effectively denied.

As noted below, especially sensitive and controversial is the complicity of the nation states of today in the unacknowledged massacre of indigenous peoples in times past. In distancing themselves in this manner, this failure can be seen as a primary characteristic of virtue signalling -- and the hypocrisy associated with their current protests against current evidence of mass slaughter. Controversially again, the hypocrisy may be all the greater given similarities in the mindset justifying massacre of the indigenous with that justifying the massive slaughter of animals -- especially when indigenous peoples have been framed as animals.

In this argument for memorials to commemorate multiple massacres -- in which opposing parties have been variously and controversially complicit -- a key question for an information-focused global civilization is the form of any such monument. The design challenge could be compared to the iconic painting of Guernica by Pablo Picasso in reaction to one such massacre, as discussed below and separately (Reimagining Guernica to Engage the Antitheses of a Cancel Culture, 2022).

Lists of lists of massacres by country

The number of "massacres" presented below derives from an uncritical count of the number tabulated in the Wikipedia source list by country -- frequently indicated as "incomplete" and clearly based on different criteria. Historians have in some cases been far more
The apparent simplicity of this presentation necessarily obscures the underlying complexity of unresolved differences in criteria and the historical periods covered. Many lists are qualified by methodological reservations. Most challenging is the case of Palestine, which is accompanied by the following notes, as an example:

- For massacres that took place in classical Judea, see List of massacres in Roman Judea.
- For massacres that took place prior to the British Mandate, see List of massacres in Ottoman Syria.
- For massacres that took place in the British Mandate for Palestine, see List of killings and massacres in Mandatory Palestine.
- For massacres that took place during the 1948 Palestine War, see Killings and massacres during the 1948 Palestine War.
- For massacres that have occurred in Israel following its declaration of independence, see List of massacres in Israel.
- For massacres that have occurred in the West Bank and the Gaza Strip since 1994, see List of massacres in Palestinian Territories.

The enumeration for the USA offers another example. Noted as partial, it is accompanied by the mention:
Virtue signalling as questionably honouring perpetration of war psychology?

It is appropriate to ask whether the focus of war memorials is necessarily an exercise in virtue signalling -- at least to some extent, and if only for some. The victors must indeed celebrate their victory as honourable and honour those who died to ensure it. The victors must necessarily claim a high degree of virtue in comparison with those ignominiously defeated and exemplifying all that is to be abhorred. As argued by Tadeg Quillien, proclaiming one’s own goodness is deeply annoying to others, and yet signalling theory explains why it’s a peculiarly powerful manoeuvre (Is virtue signalling a vice? Aeon, 4 April 2022).

Highly problematic is the degree to which those alleged to be perpetrators of war crimes (and crimes against humanity) tend to focus on some countries or individuals -- to the exclusion of others. Little is said of the lack of acknowledgement of perpetrators of such crimes in some countries -- the “usual suspects” -- deemed to be quintessentially honourable by comparison, Are some countries necessarily to be recognized as intrinsically more humane than others?

Any sense of the honourability of an opponent is controversial and readily avoided -- as with the complicity in any associated massacres. This is despite the insights of the subtext of the martial arts (David Stainko, The Code of Honor in Martial Arts, Black Belt). Failure to respect an enemy demeanes a combatant as much as the enemy.

As currently conceived, there is therefore a sense to be explored of the degree to which war memorials cultivate a mindset honouring war and its legitimacy. To what extent do war memorials constitute a form of monopolisation of honour, courage and sacrifice? More problematic is the sense in which they sustain and cultivate a mindset legitimating war and its perpetration.

Do memorials to any single massacres then necessarily sustain a vengeful, vindictive mindset? This then reinforces the tendency to division so characteristic of current global civilization. War memorials are polarizing, promoting a unipolar perspective -- ironically in the light of the architectural preference for cenotaphs.

Following Carl von Clausewitz, war has become renowned as "Politics by other Means" (Eric Fleury, War By Other Means: an examination of Clausewitz and Modern Terrorism, Classics of Strategy and Diplomacy, 1 July 2021). War memorials could then be explored as the perpetuation of war-mongering psychology by other means -- a feature of information warfare and cognitive warfare.

It is curious that flowers are such a key feature in the commemoration of war and to its military fatalities (as noted below). How do flowers feature in relation to the victims of massacres by whichever side they are perpetrated?

Singular memorials as an embodiment of difference and discrimination?

It is curious to note how exclusiveness is evident in both war memorials and war graves -- frequently celebrated as an assertion of a monopoly of virtue as noted above. The dominant international role of the Commonwealth War Graves Commission in 153 countries tends to obscure the fact that it is primarily preoccupied with British military graves. Its biases in that respect have been a feature of a report (Report of the Special Committee to review historical inequalities in Commemoration, Commonwealth War Graves Commission, December 2019; Inequalities in commemorating war dead: CWGC and Government response, 23 April, 2021).

The formal criteria accepted by the Commonwealth War Graves Commission for war grave status (as indicated by the In From the Cold project) are:

- For single-perpetrator events and shooting sprees, see List of rampage killers in the United States, Mass shootings in the United States, Category: Spree shootings in the United States, and Category: Mass shootings in the United States by year
- For Indian massacres, see Indian massacres

That last qualifying note exemplifies the problematic political influences on the methodological challenge. In fact the full title of the proposed link is to the Wikipedia entry on Indian massacres in North America -- thereby skilfully avoiding any specific reference to the USA. The page in question includes both Canada and Mexico. It also includes massacres of colonial settlers by Indians. Presented as "Indian massacres", it offers the implication of both massacres by Indians and of Indians -- which might otherwise have been considered the purpose of any coverage of indigenous peoples. Combining the two forms of massacre also offers the implication that that of the Indians was in reprisal for that by the Indians -- thereby offering a justification for the former despite their encroachment on the territories of the latter.

The lists also raise the question as to what is included or excluded -- and for what reason, most obviously where countries have appeared or disappeared (as in the case of Yugoslavia). Less obvious is the absence of any listing for Portugal and for many African countries.

The absence in the case of one major massacre is justified by the entries relating to the Cambodian genocide, notably the Cambodian genocide denial. Another case is the absence of any listing for Zimbabwe, although its independence was associated with the genocide named as Gukurahundi in a Wikipedia entry. The name of its second city -- Bulawayo -- is a rare example of a city whose name specifically refers to a massacre in the pre-colonial period of its establishment.

The absence of listings for Nordic countries is itself intriguing, mentioned only as Category: "Massacres in Norway". The "List of massacres in Iceland" redirects to Slaying of the Spaniards. There are no entries for Category: "Massacres in Sweden" or for Category: "Massacres in Denmark".

The curation of the lists by Wikipedia is however remarkable and the Wikipedia discussions of categories in each case is valuable in responding to any confusion. Such discussions, and the list above, usefully frames the question as to what is missing and why.
• **Category One:** Commonwealth men and women who were still in military service at the time of their death. These personnel automatically qualify for commemoration provided they died within the qualifying dates as follows (First World War, 4th August 1914 to 31st August 1921; Second World War, 3rd September 1939 to 31st December 1947).

• **Category Two:** Personnel who had been discharged from or retired from the military before their deaths during the same qualifying periods of an injury or illness caused by or exacerbated by their service during the same qualifying period.

• **Category Three:** War grave status and CWGC commemoration is restricted to personnel serving in a Commonwealth armed force but members of certain civil organisations may qualify if they meet various additional criteria.

However the extent of racial bias has been otherwise noted (David Olusoga, *Britain’s failure to honour black and Asian dead is a scandal of the present, not just the past*, The Guardian, 25 April 2021). The issue has been evident in the policy of France towards those who have fought for it, most obviously in Algeria (Adam Bensaid, *France’s silence over colonial crimes ensures confrontation with Algeria*, TRT World, 14 October 2021).

Far less evident is the honourable memorability reasonably due to:

• Non-combatants (namely those with wartime "desk jobs", including defence research)

• Agents engaged in espionage (without being accorded any military rank)

• Conscientious objectors (serving as front-line stretcher bearers, and the like)

• Medical agents, notably on any front-line (Red Cross, etc)

• Civilians actively supporting military action (as with "freedom fighters" and those in any resistance)

• Interpreters (exemplified by their much-publicised vulnerability following the retreat from Afghanistan)

Clearly similar issues regarding criteria for burial in "military graves" obtain in the case of the American Battle Monuments Commission and in the corresponding French and German facilities. It is appropriate to emphasize that any reference to "war graves", in the international treaties pertaining to them, focus on military graves and not on civilian victims of military action (*War Graves for WWI Dead on The Western Front*; Rudolf von Neumann, *In the German Federal Republic: The Maintenance of Military Graves in Accordance with the Geneva Conventions*, 2010).

The application of such criteria may well contrast with the strong emphasis on the sacrifice of the military "for their country" of those buried there -- avoiding any consideration of the sacrifice of civilian victims of any massacre associated with military action. There is therefore an irony to use of *Lest We Forget* when exclusive memorials can be understood as focussing collective memory on "honourable" military action -- *Lest We Remember* the "dishonourable" consequences in the form of massacres.

Questions of principle are of course raised by the right to an honourable military burial for those indicted for war crimes and for those instrumental in enabling military fatalities -- and for those dishonourably discharged. In this respect the USA offers the example of Lieutenant [William Calley Jr.](https://en.wikipedia.org/wiki/William_Calley_Jr.), charged for his role in the [My Lai massacre](https://en.wikipedia.org/wiki/My_Lai_massacre), subsequent to publication of a report on [Alleged Atrocities by U.S. Military Forces in South Vietnam](https://www.jsonline.com/news/article56659870.html) (8 July 1967). Curiously that massacre was investigated by Major [Colin Powell](https://en.wikipedia.org/wiki/Colin_Powell), subsequently United States Secretary of State and renowned for his presentation to the UN Security Council of fallacious evidence justifying the invasion of Iraq with which so many fatalities have since been associated.

Another highly controversial case is that of [Eddie Gallagher](https://www.bbc.com/uk/onedead/46f3f00a-9be7-4edc-83ea-5a0480800f41), a Navy SEAL convicted of a war crime in Afghanistan, but acquitted by a jury of his military peers of numerous charges relating to indiscriminate shooting of civilians (David Philipps, *Alpha: Eddie Gallagher and the War for the Soul of the Navy Seals*, 2021).

### Design considerations for a multi-massacre memorial

Memorials to massacres and their victims offer an unusual design challenge. As noted above, the iconic painting of *Guernica* by Pablo Picasso is one such response to a single massacre -- and recognized as a warning in anticipation of others, as discussed separately (*Imagining Guernica redesigned*, 2022). The painting is regarded by many as the most moving and powerful anti-war painting in history.

Appropriate to the nature of the cognitive challenge -- and its design implications -- interpretations of *Guernica* vary widely and contradict one another (T. J. Clark, *Picasso and Truth: from Cubism to Guernica*, 2013; *Reimagining Guernica to Engage the Antitheses of a Cancel Culture*, 2022). It is indeed with the controversy associated with massacres and genocide which any such monument needs to engage, as being the more fundamental challenge in "commemoration".

Arguably it is then the multi-faceted nature of any memorial design for which multiple massacres call. The cognitive complex of massacres, sustained by contrasting perspectives, is otherwise obscured by singular memorials and the unquestioned blame they each imply (*Interrelating Multiple Ways of Looking at a Crisis: beyond the pandemic discipline of the one right way*, 2021).

The potential comparability of massacres is necessarily controversial and merits appreciation as such. It is a feature of the controversy regarding the mode of argument deprecated as "whataboutism" -- extensively reviewed in *Wikipedia*, and discussed separately (*International law, precedents and "whataboutism"*, 2022).

The architecture of such a memorial could endeavour to honour such contrasting perspectives -- as may be done in exceptional multi-faith places of worship. Would this incorporate features recalling the many massacres in the lists above -- or a selection of them? Given the number, how could this be best achieved to evoke appropriate identification with their victims -- beyond the alienation characteristic of any checklist?

In an information-based civilization, the design challenges could well be far better met by use of web technology and its worldwide accessibility -- especially the 3D virtual reality variants, as argued separately (*Boundary complexification: 3D, 4D, and more*, 2022). This would respond to the obvious current constraint of a single monument in a specific geographical location -- with the very limited...
Information technology could be used to enhance the learning experience of such a multi-faceted memorial beyond enabling access to documentaries regarding individual massacres -- already a feature of many museums. Such technology could be used to identify and juxtapose massacres which were similar to some degree -- provocatively increasing that similarity, if that was desired. More provocatively, this recalls the worldwide engagement with town twinning -- suggesting a case for "twinning" Bucha and Fallujah, for example (Lists of twin towns and sister cities, Wikipedia).

The animation on the left below is an indicative exercise in showing the development of a global pattern of relationships between massacres (the circle of points). The solid lines are a recognition of a link, whereas the dotted lines suggest a direction of observation -- a requisite form of triangulation, as argued separately (Triangulation of Incommensurable Concepts for Global Configuration, 2011). The animation builds a complete pattern -- but then shows how this recognition of connectivity may be lost or eroded -- by reversing the animation. The animation on the right uses the faces of an icosahedron to suggest one means of configuring and interrelating a set of 20 major massacres. The details were derived from a Wikipedia entry which offers further details on each (List of genocides by death toll). The numbers given are the lower and higher estimates of the number of deaths. Other examples of use of polyhedra are given below.

<table>
<thead>
<tr>
<th>Visual pointers to the cognitive challenge of commemoration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicative animation of progressive recognition of interrelationship between 60 massacres</td>
</tr>
</tbody>
</table>

There is the further opportunity for addressing the controversial perceptions of any massacre. For example, visitors could be offered the experience of substituting the name of one massacre in video documentaries regarding another. "Fallujah" could be substituted for "Bucha" in reports of the latter -- and "Bucha" for "Fallujah" in video coverage of the former. The experience could be offered otherwise by using an app to substitute terms in news headlines in mainstream media with regard to the alleged perpetrators of massacres, as for example:

- World leaders have branded George Bush a 'war criminal': what does this mean?
- Will Bush face genocide charges over Iraq atrocities?
- Is George Bush a war criminal, and who decides?
- International leaders are calling George Bush a 'war criminal': here's why charging him might be a long way off
- Calling Bush a war criminal is a bigger deal than you think
- Bush is a war criminal and should be treated as such
- Is Bush guilty of carrying out a genocide in Iraq?

The emphasis of the memorial would then be both to honour the victims of massacres -- too readily forgotten -- and to elicit a transcendent perspective on the behavioural pattern engendering individual massacres. Such concerns are a notable feature of the work of the Danish sculptor Jens Galschiot best known for the Pillar of Shame erected in various versions in cities around the world to protest against infringements against humanity.

https://galschiot.com/en/contact

Massacres of indigenous peoples as a continuing pattern

Historical extent of massacre: Especially controversial are the massacres of indigenous peoples by colonial powers, most notably in centuries past (Genocide of indigenous peoples, Wikipedia). However the latter summary identifies massacres in the very recent past in a range of countries. All such events are highly controversial since many have yet to be formally acknowledged by current authorities and by the international community:

- Africa: Massacres Committed in Africa during Colonial Times (World Council of Churches, August 2021)
- Australia:
  - List of massacres of Indigenous Australians (Wikipedia);
  - Mapping the massacres of Australia’s colonial frontier (University of Newcastle, 5 July 2017)

North America:
- *List of Indian massacres in North America* (*Wikipedia*)
- *Indian Massacre: list of massacres, 1830–1911*
- *Mass Killings of Native Americans* (Equal Justice Initiative)
- *The American Genocide of the Indians: historical facts and real evidence* (Ministry of Foreign Affairs, the People's Republic of China, 2 March 2022)

Latin America:
- Vladislav R Sotirovic: *The Spanish Conquistadors and the First Genocide In Modern History* (*Oriental Review*, 4 February 2021)
- *Venezuela Calls on Spain to Rectify Indigenous Massacres* (*Telesur*, 12 October 2021)

Commemoration of massacres through memorials: Such events are especially relevant in the current period, given the extent of official failure to acknowledge any responsibility whatsoever for those early massacres and the current consequences for indigenous peoples. Ironically many of the countries calling for indictment of Vladimir Putin and Russia are precisely those responsible for large scale massacres of indigenous peoples. The irony is all the greater in that the number and scale of the massacres of indigenous peoples is far greater than that of which Putin is currently accused.

More to the point perhaps is that the mindset framing those massacres has now been redeployed to the framing of slaughter of others on a much larger scale -- considered potentially justified by the interpretations of just war theory, and unconstrained by any principles regarding the number of fatalities.

There are few memorials to the massacres of indigenous peoples (Jack Latimore, *There are few memorials to Australia's bloody history but that's changing*, *The Guardian*, 5 March 2019; *Monuments and Memorials within Australia associated with the indigenous conflicts, Monument Australia*). The concern in Australia, for example, was the focus of an unsuccessful petition (*Australian War memorial Acknowledge the Indigenous Frontier Massacres during Colonisation, Change*). An unusual map indicating the geographical location of massacres has been developed by the Centre for 21st Century Humanities and the Centre for the History of Violence of the University of Newcastle (*Colonial Frontier Massacres in Australia, 1788-1930*, 2017).

The exercises below explore one approach to the design of a memorable mnemonic "device" able to interrelate succinctly a large set of massacres of indigenous peoples, as in the case of the establishment of USA and Australia -- both righteous in their current condemnation of others. The details in each case, linking to descriptive entries on many of the massacres, are provided by *Wikipedia* (*List of Indian massacres in North America; List of massacres of Indigenous Australians*).

### Indicative exercises in interrelating sets of massacres in a single image in 3D for to enable commemoration

(detailed can be reviewed by opening the animations in separate browser windows)

<table>
<thead>
<tr>
<th>Massacres of indigenous people in the USA</th>
<th>Massacres of indigenous people in Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td>(polyhedron is Drilled rhombicosidodecahedron of 80 vertices, with some faces rendered transparent to show suggestive internal structure)</td>
<td>(polyhedron is Drilled truncated icosahedron of 90 vertices, with some faces rendered transparent to show suggestive internal structure)</td>
</tr>
</tbody>
</table>

Animations (above and below) prepared using Stella4D.

**Polyhedral configuration**? The internal structure of the polyhedra above -- revealed by selectively rendering some faces transparent -- highlights the question as to whether there are collective cognitive structures which sustain a pattern of massacres, Being conventionally "hidden" or unconscious -- and readily deniable, it is any such system which merits attentive discussion. Is there a requisite complexity to mapping such a pattern comprehensively?

Whatever is to be understood as a "global brain", there is every possibility that it is likely to be characterized by some form of multidimensional architecture -- as arguments for hypercomputation have effectively recognized (*Imagining Order as Hypercomputing: operating an information engine through meta-analogy*, 2014). Such language merits comparison with the results of recent neuroscience research which indicates the remarkable possibility of cognitive processes taking up even up to 11-dimensional form in the light of
emergent neuronal connectivity in the human brain, as discussed separately \cite{implication_of_3d_representation_of_a_global_brain,2019}:

Using mathematics in a novel way in neuroscience, the Blue Brain Project shows that the brain operates on many dimensions, not just the three dimensions that we are accustomed to. For most people, it is a stretch of the imagination to understand the world in four dimensions but a new study has discovered structures in the brain with up to eleven dimensions - ground-breaking work that is beginning to reveal the brain's deepest architectural secrets..... these structures arise when a group of neurons forms a clique: each neuron connects to every other neuron in the group in a very specific way that generates a precise geometric object. The more neurons there are in a clique, the higher the dimension of the geometric object. ...

The appearance of high-dimensional cavities when the brain is processing information means that the neurons in the network react to stimuli in an extremely organized manner. It is as if the brain reacts to a stimulus by building then razing a tower of multi-dimensional blocks, starting with rods (1D), then planks (2D), then cubes (3D), and then more complex geometries with 4D, 5D, etc. The progression of activity through the brain resembles a multi-dimensional sandcastle that materializes out of the sand and then disintegrates. (Blue Brain Team Discovers a Multi-Dimensional Universe in Brain Networks, Frontiers in Neuroscience, 12 June 2017)

In exploring alternative polyhedra as mapping devices, the key question is how commemoration of multiple massacres is best served. What is the mnemonic keystone which can hold together information when it is otherwise dispersed or presented in lists -- offering no integrative perspective? How best to render a complete set of massacres memorable -- honouring the victims -- as a means of encouraging the collective learning inhibited by singular memorials?

Many polyhedra may variously serve this purpose, as discussed separately \cite{identifying_polyhedra_enabling_memorable_strategic_mapping,2020;mapping_structural_elements_and_principles_onto_icosahedron_and_dodecahedron,2019;polyhedral_pattern_language_software_facilitation_of_emergence_representation_and_transformation_ofPsychoSocialOrganization,2008}.

The Leonardo-style polyhedron used below is explained by George Hart \cite{leonardo_da_vinci_s_polyhedra_virtual_polyhedra,1999}.

\begin{center}
\begin{tabular}{|l|l|l|}
\hline
Indicative use of an alternative polyhedron to interrelate massacres of indigenous people in the USA
\hline
(polyhedron in Leonardo-style (84 vertices) shown with contrasting renderings)
\hline
Screenshot of solid-face rendering & Animation of wireframe rendering & Screenshot of solid-face rendering
\hline
\end{tabular}
\end{center}

The strong focus on military war graves relating to World War I and II, in which the former colonial powers were such active participants, thus serves as a much-valued distraction from their complicity in those earlier massacres, and their continuing propensity in that regard. The commemorative priorities with respect to military war graves, together with the focus on the indictment of current perpetrators, could be construed as a deliberate avoidance of collective learning \cite{societal_learning_and_the_erosion_of_collective_memory,1980}.

\textbf{Incitement to massacre tacitly sanctioned by authority}

Historically authorities have been actively or passively associated with incitement to massacre, most especially in the distant countries which were a feature of colonial exploitation. The incitement may well have been entangled and justified by projects for religious conversion and any resistance to that. It is appropriate to recognize the extent to which a bounty has been awarded by authorities for the location, capture or killing of those framed as outlaws.

The bounty process was central to the elimination of the Aboriginal population of Tasmania \cite{how_the_British_nearly_eliminated_the_entire_Aborigine_Tasmanian_population_of_Australia_In_the_1800s,liberty_writers_africa,1800s;namibia_the_forgotten_Bushman_genocide,anafournews,2021}. In South Africa it was used as late as the 1980s as a feature of the Koevoet counterinsurgency process there \cite{bounties_koevoet_bounty_system_during_the_south_african_wars,feral_jundi2021,2021}. The bounty process there \cite{koetvoet_bounty_system}, especially if war is indeed construed as a crime against humanity -- this frames the
long-standing debate regarding the complicity of the arms industry in massacres, or its tacit enabling of them (Linde Bryk and Miriam Sauge-Mansa, Individual Criminal Liability for Arms Exports under the ICC Statute: a case study of arms exports from Europe to Saudi-led Coalition Members used in the War in Yemen, Journal of International Criminal Justice, 17, 2019, 5). The denial of that complicity is naturally a dimension of the debate -- to whatever degree it is authoritatively reframed, by just war theory, for example.

Whilst the provenance of weapons may feature in propaganda, less evident is the reluctance to clarify the chain of responsibility for any given fatality through indication of the source, as argued separately (Identification of Bullets: human right and human responsibility? 2009). This failure contrasts curiously with the modern tendency to label individual apples as a means of identifying their precise source in the event of any problematic consequences in their consumption.

More evident has been the indifference (or tolerance) of authorities in response to violent action by groups against minorities. A classic example is the cover-up regarding the Elaine massacre of 1919 (Nan Elizabeth Woodruff, The Forgotten History of America’s Worst Racial Massacre, The New York Times, 30 September 2019). This was most evident in the covert actions of the Ku Klux Klan in the USA (Penny Starr, KKK Lynched 3,446 Blacks in 86 Years, CNS News, 15 May 2013; Lynch mobs and the Ku Klux Klan). Ironically it has taken many decades for the US authorities to recognize the criminal nature of lynching (Joe Biden signs landmark law making lynching a hate crime, The Guardian, 30 March 2022; Joe Biden signs anti-lynching bill in historic first, BBC News, 29 March 2022).

The Russian intervention in Ukraine, and notably the extensive reporting of the alleged massacre at Bucha, has given rise to an array of assertions by world leaders:

- Bucha atrocities show Putin is ‘war criminal’, Biden says (Aljazeera, 4 April 2022)
- Biden urges Putin war crimes trial after Bucha killings (Reuters, 5 April 2022)
- Australia labels Russian President Vladimir Putin a ‘war criminal’ (ABC News, 5 April 2022)
- Boris Johnson calls Vladimir Putin a war criminal (EuroWeekly, 2 March 2022)
- Biden accuses Putin of genocide, wanting to ‘wipe out’ Ukrainians (Euronews, 13 April 2022)

These blithely and naïvely neglect any indication of complicity in the unprecedented use of propaganda in framing support for either side. Especially problematic is the manner in which the "evidence" is then taken at face value, leading to a prejudicial conclusion -- deliberately bypassing any requirement for due legal process:

- Is Vladimir Putin a war criminal, and who decides? (The Guardian, 17 March 2022)
- Here's how war crimes prosecutions work (CNN, 3 March 2022)
- World leaders have branded Vladimir Putin a ‘war criminal’: what does this mean? (SBS, 24 March 2022)
- Will Putin face genocide charges over Ukraine atrocities? (The Guardian, 13 April 2022)

In contrast to such irresponsible knee-jerk adjudication, the problematic nature of any indictment for war crimes is helpfully clarified by Scott Ritter (Russia, Ukraine and the Law of War: Crime of Aggression, Consortium News, 29 March 2022; Russia, Ukraine and the Law of War: War Crimes, Consortium News, 1 April 2022)

Potentially more problematic, especially given the pattern in the USA in respect of assassination and "extrajudicial killing", are the calls for Putin's "removal":

- Outcry after US senator Lindsey Graham suggests Putin’s assassination (The Guardian, 5 March 2022)
- Lindsey Graham AGAIN Calls For Putin’s Assassination (Summit News, 14 March 2022)
- President Biden calls for Putin to be removed from power (Yahoo News, 27 March 2022)
- Biden Won’t Apologize for Calling for Vladimir Putin’s Removal (Newsweek, 28 March 2022) lynching.

The pattern of communications sustained by the American media then curiously echoes that for which supporters of the Ku Klux Klan have been notorious -- in framing the case for lynching and massacres. Should Putin indeed be "lynched"? Should the Russian leadership be "massacred"? As argued by Bryan MacDonald, however: Putin's Russia' didn't create the Ku Klux Klan (RT, 15 August 2017).

The delays of many decades in legislative approval of the Emmett Till Antilynching Act (mentioned above) are then suggestive of a strange historical irony, especially given the timing in relation to calls for Putin's "removal". Between 1882 to 1968, 200 similar anti-lynching bills were pushed through Congress but none of them was approved by the Senate (What is lynching and what is the Emmett Till Anti-Lynching Bill? Sun, 29 March 2022).

**Collective fatalities unrecognized as massacres**

Attention was drawn above to the variety of events named as "massacres" and to the confusion of criteria in that regard. There is however one criterion that tends to be shared by those perceptions, namely the relatively short time in which they are perpetrated. Of course those that are conflated with genocide may indeed take place over an extended period. But even in such cases death is assumed to be relatively rapid.

Of further relevance however are the forms of fatality which are engendered over extended periods of time, most obviously through starvation or through engendered illness and disease. Death is then the culmination of a gradual process whose nature may well go unrecognized. The process is readily understood as a consequence of imperceptible forms of structural violence, whereby some social structure or social institution may harm people by preventing them from meeting their basic needs

Massacres are then misleadingly understood as "fast violence" alone, when the forms of "slow violence" merit recognition. In such cases the harm is slow, ill-defined, and often perceptible only in retrospect, when its perpetrators are long gone, if they were ever physically present at all (Rob Nixon, Slow Violence and the Environmentalism of the Poor, 2015; Richard Fisher, The unseen ‘slow violence’ that affects millions, BBC Future, 1 February 2021; Ben Shread-Hewitt, Slow Violence, Uneven Earth, March 2021). As articulated by
Nixon, this acknowledges the inattention paid to the attritional lethality of many environmental crises, in contrast with the sensational, spectacle-driven messaging that impels public activism today -- as in the case of "massacres".

Current concerns with loss of biodiversity (as highlighted below) suggest that reference to the "extinction of species", "deforestation" and "desertification" merit recognition as "slow massacres" through the insidious destruction of livelihoods and lives that they engender. Perversely absent from reference to "extinction", for example, is any responsibility for perpetration of the massacre -- only too evident in its conventional framing. Species do not extinguish themselves, although this is indeed one scenario envisaged for *homo sapiens*. Responsibility for such massacres is diffuse and readily deniable.

Far more controversial is the perception by some that the massive deployment of vaccines -- with their associated injuries and deaths -- constitutes a massacre:

- Depopulation by ‘vaccination’, the massacre continues... (R for Resistance); *The Injection Massacre Goes On* ((R for Resistance, 15 May 2021)
- High-profile cartoonist Leunig is axed over cartoon comparing... vaccine mandates to the Tiananmen Square massacre (Daily Mail, 25 October 2021)
- The COVID-19 "Vaccine" and the Nuremberg Code. Crimes Against Humanity, Genocide (Global Research, 16 September 2021)
- Fact check: There is no scientific evidence that mRNA vaccines will reduce the population (Reuters, 3 March 2021)
- The Corona Crisis: Has "Depopulation" Already Begun? (Europe Reloaded, 14 May 2021)
- The Great Depopulation Begins: 40% Jump in the Death Rate of the Vaccinated (Institute for Political Economy, 4 January 2022)
- Depopulation Agenda: most vaccinated countries are all suffering an extraordinary rise in excess deaths (The Exposé, 21 November 2021)
- *How the Depopulation COVID Vaccines Will Start Working in 3-6 Months* (State of the Nation, 12 February 2021)

Especially obvious is the comparison with the Holocaust and the forms of denial characteristic of the identification of many past massacres, exemplified by the so-called history wars in Australia:

- Vaccine Holocaust: now accelerating: VAERS data show nearly 4,000% increase in vaccine deaths in 2021 (so far) vs. the entire year of 2020 (Natural News, 6 May 2021)
- The COVID-19 "Vaccine Holocaust": the latest antivaccine messaging (Science-based Medicine, 10 May 2021)
- Vaccine Holocaust: the wildest antivaccine conspiracy theory ever (Respectful Insolence, 19 July 2017)
- Who Will Survive the Vaccine Holocaust? (Titlus, 16 October 2021)
- Robert F Kennedy Jr slammed for comparing vaccines to Holocaust at anti-vaxx rally (Indy100, 24 January 2022)

With little known about their long term effects, deployment of vaccines may indeed become comparable to a "slow massacre". However the controversy in that regard usefully highlights the extent to which perception of "massacre" may well be in the eyes of the beholder -- with any deaths reframed as negligible and acceptable as "collateral damage". Ironically the failure to ensure equitable distribution of the vaccines -- if recognized as a vital remedy -- could itself be understood as having the effects of such a massacre (Reserving coronavirus disease 2019 vaccines for global access: cross sectional analysis, BMJ, 15 December 2020)

The extension of understanding of massacre is also to be recognized in references to cultural massacre. In such cases the fatality is not so much physical as psychosocial. References are made to "massacre of the mind" for example. These highlight the possibility of "massacres of the spirit" of groups and cultures -- "breaking the spirit" -- potentially a focus of cognitive warfare.

**Remembering and commemorating in a forgetful cancel culture**

Memorials are necessarily understood to have a vital role in relation to collective memory. Hence the widespread use of the phrase *Lest We Forget* in relation to war memorials (as mentioned above). Memorials constitute a collective call to remember. Whether from a religious perspective or otherwise, the process of "re-membering" is associated with a form of reconstitution in memory -- even one of raising the dead to life.

The continuing pattern of massacres, which memorials may serve to recall, merits recognition in terms of the aphorism of George Santayana: *Those who cannot remember the past are condemned to repeat it*. The failure of memory in inhibiting such repetition could therefore be understood as a failure of memorials as currently conceived -- and of the cognitive engagement they currently elicit.

Memorials may well be a focus for commemoration through which stakeholders, variously complicit in the fatalities of the past, engage in rituals of remembrance -- strangely enhanced by the ceremonial use of flowers. Has the mnemonic role of flowers in this respect been adequately explored, as might be suggested by the study of Keith Critchlow (*The Hidden Geometry of Flowers: living rhythms form and number*, 2011)? Does meaningful "co-memoration" still remain an elusive process, given its current failure in inhibiting further massacre? How might stakeholders more fruitfully "re-member" together -- especially when their relationships continue to be characterized by latent conflicts?

The example of the massacre of Bucha in relation to that of Fallujah exemplifies the challenge. Bucha is a focus of the news cycles of the present moment. Fallujah has effectively been cancelled from collectively memory. There is no effort to recall the earlier tragedy, as is typical of many massacres of the past. There is no "co-memoration" of equivalent massacres. Still worse, there are processes in a cancel culture which ensure that such collective memories are suppressed -- leading to a dangerous erosion of collective memory, as noted above (*Societal Learning and the Erosion of Collective Memory*, 1980). Hence the relevance of Santayana’s aphorism to the continuing perpetration of massacres.

Commemoration has a curious place in modern culture -- secondary to the array of strategic priorities. Engagement in that process is
restrict the use of "massacre" in relation to massacres then merits recognition in the light of the curious commercial process of remanagement. Rather than the disposal of waste of what is left over when parts of higher value are removed, what remains is then devalued for those attracted by the reduced cost. Especially suggested by the challenge of waste in modern society, it might then be asked whether there is a case for recognizing the Omnipresence of the remaindered in global society (2011). Any memory of the array of massacres might then be explored from that perspective. The implications of the more general argument are explored separately (Reintegration of a Remaindered World: cognitive recycling of objects of systemic neglect, 2011). Massacres are then to be recognized as the consequence of systemic neglect.

Memorials to those complicit in massacres and to the unconvicted?

Whilst history may choose to name those complicit in massacres, there is no sense in which memorials to their complicity are warranted in any way -- as a focus for collective learning. Identifying and naming such complicity is of course highly controversial, even decades and centuries after the massacre. In the short term it may even be avoided by non-disclosure agreements and the threat of libel action.

Where the massacre has effectively been authorised by governmental authorities, legislation may provide for the immunity of those who might otherwise be held to be responsible in some way. Distance from complicity may be achieved by arms-length involvement in measures enabling the massacre. Proxies may be used -- whether rewarded indirectly or simply encouraged.

The challenge of recognizing and naming the complicit is variously evident in the cases of:

- philosophers framing the legitimacy of such action, as was evident with respect to Nazi action
- theologians molding the moral and ethical issues fundamental to just war theory
- judicial authorities framing the legitimacy of the action by interpreting the law such as to determine the innocence of the complicit
- academics engaged in defence research, and specifically in the development of weapons of every greater destructive power
- weapons manufacturers benefiting from advances in defence research which they may actively fund
- arms salesmen focused on dissemination of weaponry wherever profits may be derived
- organized crime actively enabling processes leading to massacre
- politicians framing strategic agendas justifying the elimination of any opposition or irritant
- military services happy to fulfil their function, free from any need to question policies formulated by higher authority
- media, subservient to authorities, and benefiting from the development of their audiences through massacre-related news

All the above are readily held to be blameless in practice -- or effectively unidentifiable -- especially given the unfruitfulness of blame-games. More intriguing are those actively promoting and sustaining massacre in any form. This has been most evident in the case of Iraq. As noted above, such people remain unconvicted to whatever degree they may be indicted. Rather they tend to be rewarded in some manner -- and awarded the highest honours, even statues. Any collective perception of their shamelessness may only be acceptable decades later, or in a later century -- as is currently evident with respect to those associated with the slave trade.

The tragedy of the situation is epitomised by the case of Julian Assange as is now variously noted:

- John Pilger: Assange: Exposed War Crimes, Imprisoned for 1000 Days; Blair: Committed War Crimes, was Just Knighted (Institute for Public Accuracy, 6 January 2022)
- Caitlin Johnson: The US Cries About War Crimes While Imprisoning A Journalist For Exposing Its War Crimes (SGT Report, 22 April 2022)
- Paul Knaggs: We live in a country where alleged 'War Criminals' receives knighthoods while those that exposed their crimes languish in Her Majesty’s Prison facing extradition and a 175-year sentence (Labour Heartlands, 2 January 2022)

As a service to collective learning, there is therefore a case to be argued for memorials to the complicit and the unconvicted -- possibly in some manner -- and awarded the highest honours, even statues. Any collective perception of their shamelessness may only be acceptable decades later, or in a later century -- as is currently evident with respect to those associated with the slave trade.

Indicative human mindset framed by the massacre of animals and trees

The term "massacre" as used in the context above is totally unrelated to any reference to the "massacre" of animals as variously recognized. This is somewhat unfortunate given widespread concern with the massive extinction of animals as a consequence of human activity -- otherwise know as the Anthropocene Extinction.

Ecologically, humanity has been noted as an unprecedented "global superpredator" that consistently preys on the adults of other apex predators, and has worldwide effects on food webs. The extinctions of species can be linked to the human impact on the environment over centuries -- continuing at the present time as a consequence of human population growth, increasing per capita consumption and meat production being the primary drivers.

Whereas "slaughter" may indeed be used with reference to the "unacceptable" massacre of humans, it is however "slaughter" which is more commonly used in relation to animals -- and then deemed to be "acceptable". The term "killing of animals" avoids many regrets with respect to the quantities of animals slaughtered.

A striking example of the non-use of "massacre" is offered by the human approach to the American bison, ironically named as the
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Ourselves: Genocide Studies

ridiculous, although the effort to exterminate those held to be pests is of some relevance (biodiversity, use of consumption or medical experimentation -- whether or not it results in the extinction of species. With reference to the massive loss of It is appropriate to acknowledge the significance of the absence of any effort to commemorate the slaughter of animals for human consumption -- with little sense that they are the victims of "massacre" or that the process is in any way questionable. Humans are naturally skilled in reframing their treatment of animals. This is notably justified by particular interpretations of religious scriptures held to be beyond question, as with interpretations of the Bible regarding human dominion over all animals (Bible Verses About Dominion). These interpretations are also held to justify the extent to which animals may be consumed by humans, as well as the treatment accorded to them to enable this, possibly prescribed as ritual practices involving their sacrifice.

There is a degree of awareness of the number of animals used in biological laboratories for a wide variety of purposes -- whether the testing of any drug or product that may be fatal to humans or in preparations for biochemical warfare. It has been estimated that the annual use of vertebrate animals in animal experimentation -- from zebrafish to non-human primates -- ranges up to 100 million per year. In the European Union, vertebrate species represent 93% of animals used in research, and 11.5 million animals were used there in 2011. By one estimate the number of mice and rats used in the United States alone in 2001 was 80 million. Mice, rats, fish, amphibians and reptiles together account for over 85% of research animals. In addition there is extensive experimentation on invertebrates typically excluded from such statistics.

The proportion of animals specifically used in the development of a vaccine for COVID-19 is seemingly either unknown or unavailable -- but may emerge in years to come. Descriptions of the experience of animals in such laboratories, and the manner of their death, have been dramatically presented by those specifically opposed to such treatment, notably People for the Ethical Treatment of Animals (PETA), Humane Society International, and Cruelty Free International. There is a degree of sensitivity on the part of some laboratories to such treatment and the possibilities of alleviating suffering through alternatives to animal testing.

Especially perverse has been the manner in which indigenous peoples have been defined as subhuman -- thereby enabling their treatment as animals. Such reframing was extended by the Nazi regime to non-Aryans: Untermensh (underman, sub-man, subhuman) is a Nazi term for non-Aryan "inferior people" often referred to as "the masses from the East", that is Jews, Roma, and Slavs (Poles, Serbs, Ukrainians, and later also Russians). The term was also applied to Mixed race and Black people. Jewish, Polish and Romani people, along with the physically, and mentally disabled, as well as homosexuals and political dissidents were to be exterminated in the Holocaust. (Untermensch, Wikipedia)

The Noble Savage stereotype, therefore, was used to justify considering Indigenous peoples as subhuman. Since Indigenous peoples were viewed as a subhuman part of nature, the land on which indigenous peoples lived was considered pristine and untouched by man, no more than a vast landscape waiting for European society to "conquer".... Thousands of years of Indigenous history, notably the significant ways in which indigenous people manipulated the natural environment, were erased. (Dismantling Indigenous Stereotypes: Indigeneity and the Environment, Few for Change, 23 November 2021)

In the early years of the twentieth century, Social Darwinism was also popular in Australia. The Racial Theories of Social Darwinism were used to justify settler treatment of the indigenous Australians, as ‘subhuman’, ‘primitive’ and an ‘inferior race’. Social Darwinism accelerated the death of indigenous Australians. (Theory of Social Darwinism and the Impacts on Indigenous Australians, UK Essays, 2018)

Whilst the relative absence of memorials to massacres and the human victims of warfare may be deplored, the pattern extends to the animals associated with warfare. This is most obvious in the case of horses in the period when they were vital to the processes of war. Curious exceptions include memorials to pigeons in Brussels and Lille, extensively used for communication purposes in World War I and II (Winged Warriors: the pigeons of the Australian War Memorial, The Mandarin)

It is appropriate to acknowledge the significance of the absence of any effort to commemorate the slaughter of animals for human consumption or medical experimentation -- whether or not it results in the extinction of species. With reference to the massive loss of biodiversity, use of “massacre” could indeed be deemed appropriate. Clearly any sense of animal genocide is readily to be considered ridiculous, although the effort to exterminate those held to be pests is of some relevance (Animal Genocide, Facing History and Ourselves: Genocide Studies, 18 October 2007; Kirstin Walkloeng, Can Nonhumans Be Victims of Genocide? Graduate Student Theses, Dissertations, and Professional Papers, 11401, 2019). For the latter, however:

"Genocide" appears commonly in critical animal studies literature and sparsely in philosophy to describe human-caused violence against nonhuman beings. However, such uses of the term have rarely been informed by relevant work in genocide studies, nor otherwise formally substantiated. This thesis explores what is at stake when employing the term and proposes a model for appropriate application to nonhuman contexts.
The comparability of the massacre of humans with that of the massacre of animals remains a matter of debate. As usefully argued in a review by Rhys Southan:

One of the most provocative tactics used by opponents of animal exploitation is to draw an analogy between human and animal suffering. Marjorie Spiegel's *The Dreaded Comparison: Human and Animal Slavery* finds parallels between white oppression of African slaves in America and human exploitation of nonhumans. Spiegel asserts that like human slaves, nonhuman animals are subjected to branding, restraints, beatings, auctions, the separation of offspring from their parents and forced voyages. We dominate and slaughter plants, but few people care because it is assumed that our plant victims don’t perceive any of it.

Charles Patterson’s *Eternal Treblinka: Our Treatment of Animals and the Holocaust* mines another human tragedy for comparisons to animal husbandry. The "eternal" of the title hints at one difference between the Nazis’ attempted eradication of Europe’s Jews and the raising of animals for food -- the latter is an ongoing cycle of breeding and killing and not a hate-fueled extermination campaign -- but genocide and animal farming can both involve objectification and efficient mass killing. (*The Enigma of Animal Suffering* The New York Times, 10 August 2014)

There is however a degree of sensitivity on the part of humans to animal welfare, to the conditions of transport of live animals, and to slaughterhouse procedures. This extends to the procedures of animal husbandry, especially in regard to the conditions experienced by animals in intensive farming installations.

The definitional game-playing in which humanity indulges may well be called into question by any confrontation with extraterrestrials, as can be speculatively explored (*Anticipation of Judicial Inquisition of Humans by Extraterrestrials: potential consequence of failure to adhere to universal principles of intelligent life*, 2020).

There is some probability that ETs might "re-cognize" the current levels of massive deforestation as a form of massacre comparable to the destruction of other species -- calling into question the restriction of "massacre" to that of humans or non-human animals. Between 15 million to 18 million hectares of forest, an area the size of Bangladesh, are destroyed every year. On average 2,400 trees are cut down each minute. The term "massacre" is less readily applied to this process -- even in the case of "old forests" -- although there are many references to the "massacre of trees". The term is however readily applied in reference to the slaughter of iconic animal species such as whales, dolphins and seals.

The "Red List" methodology of the International Union for Conservation of Nature (IUCN), with respect to the authoritative *Red list of Endangered Species*, suggests a proactive way of reframing vulnerability of groups to human massacre. The methodology has been extended to ecosystems (Becky Oskin, *Criteria for 'Red List' of Endangered Ecosystems Released*, LiveScience, 9 May 2013). With the current destructive progress of authoritarianism, this suggests the need for a "Red List of Vulnerable Cultures" -- namely those predictably vulnerable to some form of massacre -- especially in a cancel culture.

An inclusive memorial to animals and plants -- to the species participating in the planet's biodiversity -- might well constitute a prudent preemptive initiative.

**Bearing witness to the enablers, perpetrators and victims of massacres**

This argument can be taken further with a degree of speculation and poetic licence appropriate to the mnemonic role of the poppy so significant to the fatalities of warfare -- if not to its associated massacres. There is a tragic irony to the role of flowers in the commemorative process focused on military participants -- and eliciting widespread civilian participation, as with Poppy Day, otherwise also known as Remembrance Day (Ann Elias, *War and the Visual Language of Flowers: an antipodean perspective*, War, Literature and the Arts, 20, 2008).

The irony is all the greater in the light of an early genocide -- named as "the first in modern history" -- perpetrated by Western civilization against the Aztec civilization (*Spanish conquest of the Aztec Empire*). Aside from its culture of violence, with its renowned sacrificial massacres, that civilization is known for the unusual value it attached to flowers (William Edwin Safford, *Sacred Flowers of the Aztecs, Volta Review, 14, 1912, 2; Aztec Flowers, Aztecs and Tenochtitlan, 2022; Fondness for flowers..., Aztecs at Micticcolo*).

The decline of the Aztec civilization is known to be associated with a ritual "flower war" (Barr L. Isaac, *The Aztec "Flower War": a geopolitical explanation, Journal of Anthropological Research, 39, 1983, 4; *Aztec Flower War, Aztec History*). The commemorative use of flowers in the celebration of conquest may therefore be intimately related (if unconsciously) to the rise and fall of civilizations, as may be speculatively explored (*Flowering of Civilization -- Deflowering of Culture*, 2014).

The question is whether floral structure, and specifically the poppy, offers a reminder of a subtle cognitive configuration? Can the Remembrance Day poppy be "repurposed" -- to a degree consistent with its current symbolism? The question is of some relevance to the other function of one species of poppy, *Papaver somniferum*, as the source of the narcotic drug opium and of morphine -- ironically associated with forgetfulness when used as a recreational drug. As suggested above with regard to *Lest We Forget* and massacres, should the Remembrance Day poppy also be associated with *Lest We Remember*?

As noted above, the geometry of flowers and their petals has been widely explored (Keith Critchlow, *The Hidden Geometry of Flowers: living rhythms form and number*, 2011; *Botany - The Geometry of Plants: Flowers, Cosmic Core*, Part 8, Article 185). Their possible cognitive appeal and significance therefore justify further exploration.

A point of departure for the exploration is the form of the poppy petals shown below. They offer a memorable resemblance to the curve-sided *Reuleaux triangle* (*What Is The Reuleaux Triangle? Science ABC*, 17 January 2022; Indra Adhwa, *Reuleaux Triangle: cool shapes you have never heard of*, 11 July 2021). This can be constructed geometrically from a configuration of three circles, as shown in the...
central image below.

As a mnemonic device this configuration has long been interpreted as a 3-fold Venn diagram, widely used to show the logical relation between sets (John Venn, *Symbolic Logic: diagrammatic representation*, ch. 5, 1881). Such diagrams are used to teach elementary set theory, and to illustrate simple set relationships in probability, logic, statistics, linguistics and computer science. Use of 2-fold Venn diagrams is discussed separately (*Variety of "ways of looking" -- binary or otherwise*, 2021), with the suggestion that they might offer a memorable means of systemic representation of the UN's disparate Sustainable Development Goals.

As a Venn diagram, the 3-fold form offers a means of configuring the relationships so fundamental to massacre, namely that between the perpetrators, the victims and the complicit enablers (as noted above). However the Remembrance Day poppy is 4-petalled, not 3-petalled, as suggested by the 3-fold Venn diagram depicted. This usefully suggests a missing dimension to the massacre narrative -- with the implication that the poppy flower has been somehow "compressed" from 3 dimensions to 2.

In geometrical terms however, the construction of the Reuleaux triangle suggests that a more complex form could be constructed by the intersection of 4 spheres, namely a 4-fold Venn diagram -- the so-called Reuleaux tetrahedron (shown in the animation below right).

### Massacre participation relevance of relating poppy flower to 3D Reuleaux tetrahedron through Venn diagram construction of curve-sided Reuleaux triangle in 2D

<table>
<thead>
<tr>
<th>Remembrance Day poppy</th>
<th>Venn diagram construction of curve-sided Reuleaux triangle</th>
<th>Reuleaux tetrahedron animation</th>
</tr>
</thead>
</table>

![Remembrance Day poppy](https://creativecommons.org/licenses/by-sa/3.0, via Wikimedia Commons)

The 4-fold configuration offers the provocative possibility of adding a fourth perspective to the massacre configuration -- otherwise compressed into the 4-fold poppy with its memorable implications. The animations below show the four spheres by which the Reuleaux tetrahedron is constructed in 3D. Using the colours of the 3-fold Venn diagram above for three of them, a fourth can be coloured white. The suggestion here is that in addition to the enablers, the perpetrators and the victims, this sphere is that of those who bear witness. Bearing witness is necessarily a function of the 4-fold Remembrance Day poppy.

A particular merit of the animations, with their contrasting renderings, is the variety of narratives which they might evoke. One animation indicates the manner in which a single perspective is hidden -- in the case of the animation on the left, it is that of those who bear witness. Whereas the media coverage of the Bucha massacre is extensive in the case of the perpetrators, the victims and the enablers -- very little is offered from those who bear witness, although many are forced into that position.

However any 2D representation of 3D, with or without animation, necessarily conceals (partially or completely) a fourth perspective as shown by the central animation and that on the right. Hence the valuable reminder offered in 2D by the four petals of the poppy. This would seem to be the case however the transparency of the spheres is adjusted to make more visible the Reuleaux tetrahedron they together engender.

Possible narratives enabled by the animations could address the conditions in which one perspective or another is dominant in the media - or suppressed. More sophisticated animations might have the dimensions of each sphere vary, thereby indicating how the configuration as whole would lose the coherence suggested by the integrative function of the Reuleaux tetrahedron they form together.

### Contrasting animations of a configuration of 4 spheres

colour-coded to indicate perpetrators, victims and enablers of massacre -- and those who bear witness

---

[DIAGRAM: Reuleaux tetrahedron constructed from 4 spheres, with animations showing the 4-fold configuration.]

---

[DIAGRAM: Contrast between 3-fold and 4-fold configurations, highlighting the missing dimension in the 3-fold Venn diagram.]

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[DIAGRAM: Animation showing the 4-fold Remembrance Day poppy with colour-coded spheres.]
Whereas the animations above present the 4 sphere with a degree of transparency, this can be increased to a greater degree as shown in the corresponding wireframe renderings below. The Platonic tetrahedron is then more visible, although less evident is the manner in which the spheres ensure the curved surfaces around it to form the Reuleaux tetrahedron.

<table>
<thead>
<tr>
<th>Wireframe renderings corresponding to the animations above</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Wireframe renderings" /> <img src="image2" alt="Wireframe renderings" /> <img src="image3" alt="Wireframe renderings" /></td>
</tr>
</tbody>
</table>

This speculative exploration with its animations literally frames the question as to the potential psychosocial significance of the Reuleaux tetrahedron with respect to the incidence of massacre. Of potential relevance to the quest for coherence and memorability, one historical pointer is the construction by Leonardo da Vinci of an early map based on the configuration of eight Reuleaux triangles in an octant projection -- the Leonardo World Map (1514).

<table>
<thead>
<tr>
<th>Leonardo World Map based on two sets of Reuleaux triangles</th>
</tr>
</thead>
<tbody>
<tr>
<td>(each reminiscent of the Remembrance Day poppy and potentially foldable into a terahedron)</td>
</tr>
</tbody>
</table>

![Leonardo World Map](image4) 

Source: [Wikimedia Commons](https://commons.wikimedia.org)

Rather than being a simple historical or geometrical curiosity, it is appropriate to note modern mechanical applications of the Reuleaux triangles which may be suggestive of unexplored insights into their psychosocial analogues, in the spirit of technomimicry ([Reimagining Tesla's Creativity through Technomimicry: psychosocial empowerment by imagining charged conditions otherwise, 2014](https); [Engendering a Psychopter through Biomimicry and Technomimicry, 2011](https)).

| Rotation of a Reuleaux triangle within a square, showing also the curve traced by the center of the triangle | Equivalence of round and triangular wheels | Reuleaux triangle as the central bubble in a model of a 4-bubble planar bubble cluster |
In this respect the central image indicates the use of a cylinder, with the cross-section of a Reuleaux triangle, to show how it would roll as smoothly and flatly as a conventional wheel -- although an axle attached to Reuleaux triangle wheels would bounce up and down three times per revolution. Given the fundamental importance of the wheel, how relevant is its "reinvention" (Claudia Masferrer Leén, et al, *Reinventing the Wheel: Non-Circular Wheels*, The Mathematical Intelligencer, 27, 2005).

With governance understood in terms of wheel-enabled locomotion, it is therefore appropriate to explore innovations in wheel design for clues to models of value to governance, as discussed separately (*Reframing the Square Wheels of Global Governance: transcending vain hopes of squaring the circle in global decision-making*, 2017).

As indicated in the latter, a set of possibilities is summarized by *Minds Eye Design (7 Incredible Wheel Designs You Have to See to Believe, YouTube*, 3 August 2017). Two of these are of immediate relevance to the argument here:

- **Omni-Crawler**: A Japanese team has developed the Omni-Crawler, a crawler-type vehicle that can move in all directions. The "wheel" is essentially spherical rather than circular. Given preoccupations with "global" governance, this can readily be claimed to offer insights into how governance could be enabled to move in all directions.

- **Loopwheels**: In this radical innovation, "spokes" are replaced by "loops", as separately described (*Reinventing the wheel for a smoother ride; How does it work?*). This offers a shock-absorbing wheel with integral suspension, "for enhanced performance and greater comfort". Governance could certainly benefit from both shock-absorption" and "enhanced performance". Ironically, with respect to governance, a major initial application of loopwheels is for wheelchairs. Governance could indeed be understood as effectively wheelchair-bound in this period. The loopwheel has been featured by Richard Quest (*A 21st century bike, CNN*, 31 May 2013).

What conditions might analogues to the Reuleaux tetrahedron be able to address with respect to the enthusiasm of global civilization for massacre? One possibility is indicated by the occurrence of that curve-sided tetrahedron at the junction of bubbles -- typical of foam -- as indicated by the image on the right above. Arguably those variously associated with massacre exist in metaphorical bubbles -- the enablers, the perpetrators, the victims and those bearing witness. (*Reality "bubbles" -- forming a psychosocial "foam"?*). With respect to massacre, should such bubbles be "pricked", as discussed separately (*Pricking the Bubble of Global Complacent Complicity: hyperdimensional insights from the physics of bubble blowing, bursting and collapse?* 2017).

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