Introduction: Covid and Climate Crises

The corona virus pandemic has brought home, in no uncertain terms, the vulnerability of human society and the human species to self-induced crisis caused by human misadventure through human impact on the biosphere. It has also shown us how a simple agent on the very edge of being a living system can both threaten the health and lives of a significant percentage of the human population and at the same time cause a world-wide economic shutdown to avoid runaway mortalities. By being both highly infectious and potentially as deadly as Ebola to a vulnerable elderly sector of humanity, Sars-CoV-2 has shown us how human misadventure can strike simultaneously at our public health systems and economic house of cards.

Two forms of misadventure due to human impact on biodiversity. Mass graves in Manaus, capital of the Brazilian Amazonas, due to a pandemic caused by a zoonotic viral transfer between species, driven by trafficking in wild animals in cramped conditions, is a fast-acting crisis complemented by the slowly developing crisis of destruction of the rain forest, which has suffered severe burning in 2019 under Jair Bolsonaro’s presidency in Brazil and also in neighbouring countries, threatening to cause a tipping point catastrophe for the planet’s climate and biodiversity. At the same time Bolsonaro, a signature right-wing populist leader using confrontational politics, is systematically downplaying the threat to human life, by undermining social distancing. We thus need to consider how we, as a climax species, have arrived at this situation of human induced biodiversity crisis, both threatening planetary stability and inducing pandemic threats to our own health and survival, due to relentless exploitation of nature.
This scenario, with a lightning fast time-scale, exploding exponentially into new crisis dimensions by the day, has intimate parallels to the climate and biodiversity crisis, which we also witness, but on a much more gradual time scale of years, which allows governments and business leaders to fool us into thinking we can somehow carry on with business as usual and address the consequences later.

This article seeks to get to the roots of this phenomenon and why governments, politicians and business leaders worldwide find themselves unable to address issues directly connected to human survival and the survival of the ongoing biological diversity of the planet, on which we are utterly and completely dependent as a species.

To understand this, we absolutely have to come to terms with what humanity is as a sexual species and how our political systems grew out of a reproductive conflict between the sexes, driven by a prisoners’ dilemma in which the ongoing generations of humanity arise from the inescapable paradox of fertilization and parenting that requires both sexes, despite having divergent reproductive strategies, to coexist in sustainable survival over evolutionary time.

The prisoners’ dilemma is a classic paradox of game theory, in which two prisoners are tempted to defect and betray one another, and pass the blame to get off the charge, rather than incur a light or moderate sentence if they both cooperate and stay silent. This is a temptation into mutual jeopardy because mutual defection causes both to get a dire penalty by implicating one another. Virtually all strategic social encounters in which the players endure to fight another day are prisoner’s dilemma games of strategic competition between defection and cooperation, in which temptation into mutual defection is a tragic outcome.

**Homo Sapiens: An Optimally Sexually-polarised Climax Mammalian Species**

The diversity of cellular life falls into three great domains – the archaea, bacteria and the eucaryotes, from which all the complex multicellular organisms evolved. The archaea are primarily geological organisms occupying extreme environments while the bacteria are metabolically active, both as photosynthesizers and decomposers. The eucaryotes arose from a symbiosis, in which an archaeal species began engulfing respiring bacteria, living off their metabolic energy. A later symbiosis with photosynthetic bacteria also gave rise to the plants. These respiring endosymbionts still exist in every cell of our bodies in the form of mitochondria, the energy batteries that perform respiration converting oxygen to carbon dioxide making sugars and other molecules possible and giving us the energy to walk, to run and to think using 40% of our energy for our brains alone. Ultimately the archaeal cell became the information centre of our nucleus and the vast majority of the bacterial genes on which we depend migrated to the nucleus. This arrangement is shared by all higher organisms from amoeba, and protists, to plants animals and fungi.

Fig 1: All multi-celled organisms arose from a symbiosis between the two complementary prokaryotes arising from the common ancestor of all life on Earth, an archaeal and a bacterial cell. All branches of the eukaryote tree contain sexual members, making sexual reproduction also a founding eukaryote characteristic.

Very early on in the evolution of eucaryotes, the incestuous forms of sexuality driven by viral exchange of genes used by bacteria and archaea gave way to sexual reproduction. The origin appears to run all the way back to the last common ancestral eukaryote which wiped all its predecessors off the face of the Earth, as every branch of eukaryote life, including single celled species, appear to have active or cryptic sexuality. Sexual reproduction enables the
evolution of vastly more complex organisms because sexual recombination enables the shuffling of individual genes between the parental genomes to make new combinations which still contain a full indexed set of the required genome of the organism, so the degradation of mutational change can be offset by some of the offspring retaining a fully viable or sometimes an even more successful genetic complement.

Many of the features necessary for the evolution of nervous systems are also founding eukaryote characteristics, including excitable ion channels, receptor proteins and the neurotransmitter molecules we associate with the conscious brain, which occur also in single celled eucaryotes as social signalling molecules.

There are two forms of eukaryote sexuality, conjugating and dyadic. Fungi use conjugating tubes to exchange genetic material and can have any number of sexes, but the majority of organisms, including all animals have dyadic sex, in which two cells fuse to make a zygote. However, this merging immediately gives rise to a protoplasmic sex war, because the paternal and maternal mitochondria can fight to the death when fusion takes place, with the zygote losing up to 90% of its resources in the ensuing war for genetic survival between the two parental strains of mitochondria. Thus only a few protist species, such as the slime mould oomycota, have isogametes that look alike.

In the majority of eucaryotes, one sex, the female, has an ovum consisting of a large cytoplasm-filled cell and the other sex, the male, contributes only its chromosomal genes and perhaps the kinetochore forming the flagellum in the form of a sperm. This means the endosymbiotic mitochondria and their genomes are inherited exclusively down the female line, thus securing their own immortality and the complex organism can continue to flourish. Even simple single-celled protists such as apicomplexa have such sperm-ovum fertilization. This applies to all animals and to plants as well, where cycads and ginkgos have sperms and ova.

From this point on, the reproductive strategies of the sexes become polarised, with males principally investing in fertilization and females having a major investment in parenting to ensure their genes survive. There are endless exceptions to this polarization. In animals with external fertilization, this polarisation is less significant and either or both sexes may share parental duties in ways which involve major responsibilities taken by males alone, particularly in fishes and amphibians. In birds, which like mammals are warm blooded, most species have a cooperative relationship often involving social monogamy in which both sexes share food gathering, and egg warming roles.

However, with the emergence of warm-blooded mammals, evolution proceeded from marsupials like the platypus laying eggs, through to pouched animals, like kangaroos with milk glands nurturing tiny offspring, to the internal fertilization and live birth of placential mammals. Internal fertilization and live birth threw off the constraints seen in birds, leaving the males free to focus almost exclusively on fertilization as a reproductive strategy and females more heavily invested in parenting in a way which has led to only 3% of mammals being socially monogamous and given rise to classic sexual conflicts, both in violent reproductive conflicts between male animals for access to the fertile females and continuing risks of infanticide of offspring.

Mammals have also inherited XY chromosomal sexual determination which adds to this picture. The males are XY having a unique X chromosome and a degraded male-determining Y which was originally the other X, but has shrunk to the point where it contains only a few functional genes in addition to the male-determining SRY. By contrast, the female XX has two X copies. In all cells in a female, except for the sex cells, one or other X has to collapse or the female would suffer a toxic overdose of X genes, so one collapses at ‘random’ in somatic cells. This means that human females are X chromosome chimeras, with some parts of their body, including parts of their brains having the

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Fig 2: Sex becomes gender. The slime mould myxomycota has flagellated isogametes, while apicomplexa, although a simple single celled protist, exemplified by the malaria plasmodium, has sperms and ova.

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paternal X and others the maternal X, exactly like the patches on a female tortoise-shell cat, which arised this way.

Several of the X-linked genes have important functions in brain development and human intelligence, so this means that males have a much wider variance of individual prowess than females, resulting in some very acute men and some very obtuse ones. This in turn feeds back on the male investment in fertilization to strongly select for the X-linked genes uniquely expressed in males which promote intelligence, while the same genes in females may promote astute reproductive choice, provided the females are able to make these choices.

Finally, we come to the climax of the evolutionary story, in humanity, in which this runaway process a little like the peacock’s tail, leads to increasing brain size, then limiting humans to predominantly a single birth at a time, with significant risks of mortality to the mother and a long period of subsequent breast feeding and early child-rearing, either supported by a male partner, or her maternal family. The menopause in humans, which does not exist in the chimpanzee, appears to be likewise an evolutionary adaption to aid the survival of human offspring, avoiding a reproductive conflict between mother and daughter, in favour of long term matriarchal family support.

This places humanity in the position of being one of the most sexually polarised species of vertebrate, with a massively different female reproductive investment, hugely tilted towards avoiding mortal risks in childbirth and with a huge long term burden to feed and care for a slowly growing family, having one child at a time, travail and vulnerable, while the men can sew wilds oats to abandon, either by being a resourceful husband, or by philandering deceit, or by gaining power and resources over and above other men in their immediate sphere.

Out of the African Eden

Many of these discordant, yet complementary motifs appear to be intrinsic to the emergence of Homo sapiens in a gatherer-hunter context, where the human population was small, resources were abundant and the women provided up to 85% of the diet through collective gathering of plant foods, while the men focussed on the hunt and securing meat for sexual favours. Thus the birth of spoken language is consistent both with females gathering plants and other
food and talking together about social issues, and through mothering conversations with their infants where the growing child learns to speak. While the women engaged many conversations on the grape vine about the character of their social relationships and sexual partners, the men spent many hours in hushed, or silent pursuit of the prey.

This also spills over into some of the most endearing family characteristics of mutual sexual selection, we all gravitate to, with men bringing home skilfully caught game, playing entrancing music, telling entertaining fables and securing the respect of their womenfolk through good husbanding and consistently providing security and resources to enable young families to prosper, and fending off male intruders, while the women are able to make astute reproductive choices, forming the cultural fabric of society and teach their children how to live sustainably in a way which has been described as requiring only a few hours of hard work each day, complemented by long hours of social activity round the camp fire to keep track of the social intrigues of coexistence and who can be trusted to be of continuing good character in fluctuating circumstances.

There is considerable evidence that the emergence of human social creativity, language and super-intelligence occurred because neither sex had the ultimate upper hand in reproductive strategy and that both had to run while standing still in the red queen race of a prisoners’ dilemma, which we will call sexual paradox, because, in the sustained unstable equilibrium between the reproductive strategies of the two sexes, evolution of human intelligence and social existence emerges.

Fig 5 Left: Fulton cave drawing 1000 BC celebrating the first menstrual rite, Drakensberg Mountains, Natal. The central figure is a young enrobed woman undergoing her first menstruation ceremony in a special shelter. Circling her are clapping women, female dancers and (in the outer ring) men with their hunting equipment. Two figures hold sticks; the women bend over and display ‘t tails’ as they imitate the mating behaviour of elands. Among living San, such rituals are intimately connected with success in hunting. Top centre: Scored ochre block. Blombos (c 77,000) possibly used cosmetically. Lower centre: Pea-sized shell ‘jewelry’ pierced and showing wear from leather thongs. Blombos cave (c 75,000). Similar shells have been found at Skhul in Israel dating back to 100,000 years. Right: Venus of Laussel, Gravettian Upper Paleolithic culture (c25,000). In her right hand the figure holds a crescent moon notched with thirteen markings: the number of lunar cycles in a year. Her other hand, as if to instruct us of the relationship between the cycles of the moon and women’s menstrual cycles, rests on her uterus.

Many of the unique features of human sexuality, from a large but pernicious erectile penis without a supporting bone as in other primates, standing as a genuine indicator of sexual fitness to the female, complemented by cryptic ovulation opposed by menstruation, with no pronounced oestrus to keep the men guessing, ecstatic clitoral orgasm supporting the strength of female choice, suspected tendencies toward menstrual synchrony and lunar priming in females living by natural sun and moon light all add up to an evolutionary emergence driven by astute female reproductive choice mediated by mutual partner selection through male displays of prowess and character, consistent with mammalian XY chromosomal inheritance.

There is clear evidence, spread from Africa to Europe (fig 5), that female fecundity was celebrated as a pivotal and highly sacred respected foundation of the ongoing fabric of life. In the culture of the San Bushmen, a girl’s first menstruation was and is celebrated as a pivotal rite of passage, in the same way we celebrate births deaths and marriages, an epochal event having profound psychic influence over the success of male hunters, as well as celebrating incipient fertility, as confirmed in the rock drawings in fig 5 and accounts photographed and documented in the current era.
Sarah Hrdy\(^7\)'s comments regarding Marjorie Shostak's "Nisa"\(^8\): "Hunter-gatherer societies like the !Kung San are as egalitarian as traditional societies ever get, as also noted by Draper\(^9\). "Nisa's husbands were physically stronger than she, able to dominate her, but if she was unhappy enough, Nisa could always vote with her feet and leave. Several of Nisa's marriages dissolved under the strain of infidelities, either her husband's or her own. In addition to her four husbands, eight lovers pass in and out of her life. Nisa is quite obviously in love with several of them. Even when Nisa was caught by her husband in flagrante delicto with a lover and beaten and threatened with murder, others stood up for her, and life went on. In more patriarchal societies, her perpetual adulteries would have been lethal." Shostack notes: "!Kung fathers are affectionate, indulgent and devoted and form intense mutual attachments with their children. Although they do not spend as much time with their children as the mothers. Fathers, like mothers are not viewed as figures of awesome authority and their relationships with their children are intimate, nurturant and physically close'. Because the women do not need the assistance of men at any stage in the production of gathered foods the prime motive of hunting is not the food resource itself, but the social status among neighbours, and sexual favours it elicits from the women. There is evidence that granting sex for meat also took the form of a sex strike\(^9\). A 19\(^{th}\) century anecdote from Smith's notebook\(^10\) states of the southern San in South Africa: "The Bushmen when they will not go out to steal cattle, are by the women deprived of intercourse sexual by them and from this mode of proceeding the men are often driven to steal in opposition to their better inclination. When they have possessed themselves by thieving a quantity of cattle, the women as long as they exist appear perfectly naked without the kind of covering they at other times employ."

In !Kung San society, all manner of sexual liaisons occur, from partnership and serial monogamy, through open polygyny, to a variety of affairs pursued with passion by some members of both sexes, although extramarital sex is 'forbidden' by the male elders unless to entertain an age mate of the husband. There is at least begrudging respect for a woman's determination to love whom she will, with some intermittent male violence, often mediated by the group. Wife sharing has also been reported. The infrequent custom of /kamberi allows men to exchange wives for a while if the women agree. 'If you want to sleep with another man's wife first let him sleep with yours'. However, a husband may be enraged if he finds his wife has been unfaithful and may kill the competitor with a poisoned arrow.

The San have been immortalised by anthropologists as 'the gentle people', and indeed they have fought no wars that anyone can still recall, but this does not mean that retaliatory violence is alien to them\(^12\). Accounts of 22 homicides which had taken place among traditional foraging !Kung San during a 50-year period, amount to about 29.3 homicides per million persons per annum, a figure common to large Western cities. Bearing in mind that the men are lethally armed with poisoned arrows, and there is no central authority, this is hardly surprising. There is no 'government' to keep men in awe, no impersonal authority to decide who is right and who is wrong. As one of the !Kung men in an argument about a marriage put it to his adversary, their dispute could be quickly settled with an arrow. Just one little (expertly poisoned) arrow!

The Sandawe, another ancient African culture, who also speak a click language and share deep evolutionary roots with the San, celebrate dances of phek'umo at sunset, the only illumination allowed being the light of the moon. The women carry their arms high in a stance representing the horns of the moon, and the horns of game animals. The women select their partners from among the opposing row of men by dancing in front of them with suggestive motions. The selected partners then come forward and begin to dance in the same manner as the women do. The movements become more and more erotic; some of the women turn round and gather up their garments to expose their buttocks to the men. Finally, the men embrace the women and they lift one another up in turn, embracing tightly and mimicking the act of fertilization. The women are the moon; the men, the sun. The whole rite has the explicit purpose of 'making the country fertile'.

Likewise, we see in the many venus figurines of Europe dating back 25,000 years a clear tradition of sacred respect for female fecundity, also associated with the horns of the moon (fig 5), echoed in the culture of Catal Huyuk, with both goddess fertility figures, and representations of the hieros gamos as sacred sexual union leading to the birth of offspring, as in fig 7. This relationship of mutual sacredness continued through to the time of Sumer, which formed a founding urban culture in the fertile crescent based on the union of the shepherd kings and the planter queens.
However, there is indelible evidence in the human evolutionary record of a significant difference in a polarised reproductive strategy, complementary features of male and female brains and homicidal differences between the sexes which has left a semi-permanent mark on the human genome and with it carries a continuing record of an evolutionary feature of human sexual polarisation that because it has occurred over much longer evolutionary time scales than the urban cultures of antiquity, remaining embedded in our genetic nature to this day.

The Evolutionary Brain on Steroids

Some of these themes of gatherer-hunter evolution have been cited in terms of sexual differences in the brains\(^{13}\) and cognitive and emotional processes of males and females, still underlining all of us in modern society because the gatherer-hunter phase is still the longest phase of human emergence and has thus had the greatest evolutionary influence. While it is naïve to claim that “men are from Mars and women are from Venus”, and individual variations can far exceed average sexual differences, there are nevertheless noticeable differences in the way the sexes tend to operate, for example contrasting navigation by landmark in females with mental rotation and tracking descriptions used by venturing males, in the same way accurate targeting contrasts with and complements a detailed knowledge of which plants and locations make good food and medicine amid foraging that can continue to sustain families over successive seasons.

![Fig 8 (1) Overview of some notable sexual differences in the human brain\(^{14}\). (2) Connectome studies show higher proportions of connections in males are within each cortical lobe while in women there are more between left and right lobes\(^{15}\). (3) Active areas in language tend to be more bilateral in female brains(right) than male (left)\(^{16}\). (4) Incidence of aphasia in stroke tends to affect females more in frontal regions and males in parietal regions\(^{17}\). (5) Response to an unpleasant experience, in the amygdala, differs between men, who respond in the right amygdala and are drawn to central features, and women who respond in the left amygdala and remember more of the context\(^{18}\). (6) Individual male and female brains are highly variable, so that individual differences in brain function, compounded by neural plasticity are greater than average sexual differences\(^{19}\). (7) In an experiment involving elicitations of empathy watching a person in pain when they have either played fairly or unfairly in a prisoners’ dilemma game shows men are less empathic than women with cheating, consistent with higher levels of male altruistic punishment\(^{20}\).]
This polarisation is not just physical but extends to the psychic in terms of major structural differences in average brain structure that extend beyond the obvious sexual differences in attraction to the opposite sex. We understand hormonally and genetically derived heterosexual orientation has a clear biological and evolutionary basis in ensuring the continuity of the species, as in all animals, but it is also true that all socially intelligent species evolve in ways which optimize each sex’s brain and behaviour, both to sustain the species as a whole, and through the opposing forces of sexual selection, favour characteristics that ensure the survival of each sex. Humans are in no way and exception to this and, like the extremes of human pregnancy, humans have highly articulated processes of sexual selection, making for highly significant differences in male and female brains as a function of the complex sexual societies humans form.

This is a highly emotive topic that is debated back and forth between proponents of cultural viewpoints that humans are maximally adaptive cultural beings with few determining influences on their personal autonomy and those for whom sexual differences including those in the brain are intrinsic to our biological nature as organisms.

Cerebral lateralization is a feature which was initially studied in men, particularly those suffering from wartime brain injuries which affected a person’s ability to speak, or form verbal concepts, leading to our understanding of Broca’s and Wernicke’s areas in the left cortex for verbal articulacy and semantic fluency. This has in turn led to notions of the left and right brain as centres of ordered cognitive power as opposed to creative impulse or intuitive hunch, with the right hemisphere consigned to a subsidiary role in articulate cognition. However, as the brain scans in fig 8(3) show, these patterns can be more bilateral in some women, who may combine creative and analytical use of language. It is notable that girls often exceed boys at socio-linguistic development during childhood and adolescence.

The evidence that cerebral lateralization, which is clearly more accentuated in men, has deep mammalian evolutionary roots is clear from studies of rats, where male’s right cortices are thicker with statistical significance in areas 17, 18a, and 39, but the slight left increase in female rats is not significant. Notably if the female has their ovaries removed at birth, they adopt the male pattern, indicating this is a sex hormone driven developmental pattern. Moreover, the brain circuitries involved are similar in rodents and humans. A dopaminergic asymmetry in basal ganglia function appears to underlie the process. We can thus conclude that cerebral lateralization is not a specific hallmark of human cognitive supremacy, but a deep evolutionary characteristic of mammalian sexual dichotomy. These studies show that sexual differences in the human brain have a deep evolutionary basis in mammals, extending beyond sexual orientation into highly significant differences in cortical organisation between the sexes, affecting major features of structural organization.

Another feature in which women differ from men is shown in fig 8(7), where men are more prone to altruistic punishment when observing cheaters in a prisoners’ dilemma game. In altruistic punishment, which is also associated with specific neural processes, one strategically defects against a perceived defector even though one will not benefit and indeed might suffer, to maintain the integrity of the social order. This is the basis of the rule of law, but it is also an unholy truth of morally prescriptive religions, as noted in fig 11. In studies of evolutionary strategies involving prisoners’ dilemma games, tit-for-tat, which is the basis of altruistic punishment, proved to be one of the most highly effective strategies. However, it is also prone to potentially endless cycles of retaliation that are endemic in inter-clan strife. “An eye for an eye” sums up the brain the Achilles heel of unmitigated altruistic punishment.

By contrast, in a brain experiment in which women played prisoners’ dilemma games, mutual cooperation was associated with consistent activation in brain areas that have been linked with reward processing, consistent with activation of this neural network positively reinforcing reciprocal altruism, motivating female subjects to resist the temptation to selfishly accept but not reciprocate favours. This has again been linked to food-sharing in gatherer-hunter societies, where women collected most of the diet and a social win-win arises from cooperative behaviour. One can immediately see that if an emphasis is placed on altruistic punishment to the exclusion of reciprocal altruism, we will end up with repressive societies driven by punishment, rather than cooperation.

Nevertheless, human individual differences are significantly greater than average sexual differences, so that humans are not genetically programmed as individuals to have type-cast male or female brains and are sufficiently neuroadaptive as individuals to be able to undertake a full variety of social roles – the hallmark of human autonomy and adaptive intelligence. Nevertheless, these differences, particularly when not recognised or understood for their deep significance, can have a major and potentially devastating effect on human societies, spanning coercive social moralities and punishments, genocidal violence and war and deep differences of how much to invest in winner-take-all short-term advantage, as is the male reproductive strategy, by comparison with long-term survival in an enclosing ecology, key to the female strategy of survival of the continuity of life across hard-won generations of her offspring.
Notwithstanding sexual differences, uniting both sexes in one experiential universe is the fact that the human brain is also the crucible of the fundamental mystery of subjective consciousness. This remains the most central and the deepest paradox in the scientific description of reality and likely has a cosmological basis, in the complementarity between subjective and objective descriptions of reality. While we have now come to understand the structure of the complex natural world around us, we access this purely through our subjective conscious experiences, from waking life, through dreaming to visionary and psychedelic experiences complementing, but often dissociated from, our experiences of the physical world. This is also the motivating force underlying religious systems, in which unphysical realms, from heaven and hell to the afterlife are entertained as potentially cosmological and utopian descriptions of the conscious condition.

As noted, the structures supporting brain function also have a very deep evolutionary basis, with the earliest eucaryotes, exemplified by *Naegleria gruberii*, a free-living amoeba close to the root, possessing key components necessary for brain function, including excitable membranes, ion channels, and the G-linked protein receptors key to neurotransmitter function, used in single-celled organisms as social signalling molecules.

**The Deep Evolutionary Evidence of Human Psycho-Sexual Dichotomy**

Tracing human evolutionary history in terms of female and male patterns of genetic inheritance depends on investigating the evolution of the Y-chromosome which is carried exclusively down the male line and the mitochondrial genome which passes almost exclusively down the female, leading to the concept of the African ‘Eve’.

![MtDNA, Y-DNA and X-divergence evolution trees](image)

**Fig 9:** MtDNA, Y-DNA and X-divergence evolutionary trees. Both mtDNA and Y-DNA trees show exceptionally deep roots for San bushmen and to varying degrees the Western (Baka/Biaka) and Eastern (Mbuti) pygmies. Deep analysis of the location of the African “Eve” deduced by mtDNA traces her to around 200,000 years ago in the Okavango wetlands. The Y-DNA tree also has deep roots to the San, but there are also deep Y linkages to people from the horn of Africa, implying a migration south east involving several other peoples, now in Tanzania such as the Sandawe who also speak click languages like the San.. The X-divergence tree also establishes that human emergence has occurred in a context of moderate polygyny of the founding populations, consistent with a 2 women to 1 man reproductive sex ratio. The age of “Adam” is subject to more uncertainty with ages ranging from 120,000 years upwards, but is likely to be more recent, given the wider variance of male reproductive success. The inset tree of polygyny based on X divergence top right, shows a tree of human peoples descending from a polygynous root.

Because we expect that men have a greater variance in reproductive success than females since they depend on fertilization, we expect there to be a shorter number of generations back to ‘Adam’ the last ancestor of all existing males, than the number back to ‘Eve’. This will in turn mean that the average reproductive ratio will be more than one woman to a man because some men have no children and others many often by more than one partner. Over long time scales, this results in an effective reproductive sex ratio of about 2 women to each reproducing man.

Comparisons between mitochondrial and Y-chromosome inheritance support a somewhat older African “Eve” -
mother of all living people, with San Bushmen having genotypes closest to the root going back up to 200,000 years ago also closely linked to pygmy populations, such as the eastern Mbutu and western Baka/Biya. The L0 branch of mtDNA shows evidence of extremely old divergences between two Khoisan types L0k and L0d going back 140,000 years, suggesting a separation of some 100,000 years, possibly caused by long term drought in Africa.

Estimates of the ‘Adam’ are much more uncertain and vary from somewhat younger, around 120,000 years ago, to very much older due to the discovery of additional divergent Y-haplotypes. The root of the tree suggests an Adam possibly coming from groups having links to populations in the horn of Africa who may have, with the San, formed an ancient population before the Bantu expansion, and then migrated south east, including the Sandawe, who like the San have click languages, and the Burunge, Gorowaa and Datog of Tanzania. It is not essential that the male and female progenitors came from the same group, because migrating males can end up reproducing with local females in populations they come to dominate, or mingle with, during migration, as evidenced genetically in pygmy populations. The overall picture is consistent with a reproductive sex ratio of about 1 man to 2 women, due both to greater variance in male reproductive success and to polygyny throughout the last 150,000 years of human emergence. It is also consistent with more genetic differences in the X chromosome between human groups compared with the non-sex chromosomes than would be expected if equal numbers of males and females tended to mate over human history, due to men having only one X and some men not managing to sire a daughter.

However more recently, between 10,000 and 5,000 years ago, a detailed study comparing Y-chromosome evolution with mitochondrial genome evolution has found that there was a catastrophic collapse in Y-chromosome diversity, leading to a reproductive sex ratio of 1 man to no less than 17 women. One can fantasize that this was a result of many instances of the Genghis Khan phenomenon of several generations of leader having huge harems, as about one in 200 men today sport a Khan Y-chromosome. But this massive culling of Y-chromosome diversity happened earlier and across all continents, implying a second more devastating cause – male inter-clan genocidal warfare, in which dominant clans wiped out the men of neighbouring clans, taking the women as sexual hostages and dealing to the children as they saw fit.

![Fig 10: Left The ‘Mariana trench’ in Y-chromosome diversity across human societies between 10,000 and 5,000 years ago leading to an effective reproductive sex ration of 1 male to 17 females attests to a huge homicidal culling of male-male homicide knocking out whole lineages, believed to be driven by inter-clan conflict, in which the men were killed and the women taken as sexual partners. Right: The sustained vastly higher rate of male-male homicide is clearly evidenced across existing human cultures, with 96% of the perpetrators being male and 79% of the victims.](image)

First, patrilineal corporate kin groups produce a population structure through a culturally transmitted ideal, resulting in high levels of Y-chromosomal homogeneity within each social group due to common descent, as well as high levels of between-group variation. Second, the presence of such groups results in violent intergroup competition, preferentially taking place between members of male descent groups. Casualties from intergroup competition then tend to cluster among related males, and group extinction is effectively the extinction of lineages. As success in intergroup competition is associated with group size and as larger group size may be associated with increased conflict initiation, positive returns to lineage size would accelerate the loss of minor lineages and promote the spread of major ones, further increasing the speed of genetic drift.

This interpretation, dependent on the accentuated social consequences of patriarchy on the existing sexual differences between men and women, can be immediately reinforced by asking the troubling question of what the world-wide homicide rate is for each sex, as both perpetrator and victim, which appears in a United Nations report as shown in fig 10 right, where men are 95% of the perpetrators and 79% of the victims. Again, this is a pattern
repeated across the continents, so it isn’t just a cultural feature alone. We need to come to terms with this in our own cultures, not just in the disproportionate incarceration rates of the under-privileged, or the questionable notion of deterrent sentences, but the policies and institutions entrenched in our own dominantly patriarchal cultures.

We like to pride ourselves in our personal autonomy and freedom of choice and bridle at the thought of any form of genetic determinism which dooms us to activities, especially homicidal tendencies we have little or no control over. This is again a deep evolutionary trait going back to gather-hunters like the San who move in small bands priding their ability to fend for themselves and make their own decisions, while depending also on immediate neighbours in their social orbit for a sustainable life. But none of these features are deterministic as such. Individual variation exceeds any such genetic differences and we remain free to seek our own destinies, as autonomous human beings, but deeply evolved sexual differences can nevertheless become devastatingly evident both in the way whole societies shape their institutions and moral imperatives, and particularly in times of stress, and manifestly in times of conflict.

Paternity Uncertainty and Patriarchal Dominion

Of all the sexual differences that are most profound and dangerous to human life and safety, and are the key to the whole human dilemma, are those involving reproductive choice. Men have throughout history suffered unrelenting paternity uncertainty, while women absolutely know the children they have given birth to are their own flesh and blood. This is a raw truth that remains as fierce for humans as it is for chimpanzees and lions. It results in extreme sexual jealousy on the part of males, homicidal retaliation against intruding males, physical violence against female partners suspected of infidelity and an unrelenting desire to monopolize and repress female reproductive choice.

Human societies have resolved this question in two ways. In the matrilineal process, women don’t necessarily live with their sexual partners and the children are reared in the maternal family, with the uncles taking major roles. In the more predominant patrilineal system, a woman lives with her husband, generally with the paternal family, except perhaps for delivering her first child with her mother, and from this point a regime of suppression of female reproductive choice ensues. Marriage, whether monogamous or polygynous then becomes an instrument to repress female reproductive choice in favour of obedience to the husband, and the husband’s family and clan, so that honour and the paternal gene line is preserved.

We can see the very beginnings of a transition to patriarchy in San culture, where although a young woman would likely have her first child with her mother’s family, there are inherited male positions, such as the 'headman', having the same social status as those members of "aged years", although these are said to be essentially empty of real power over others. Thus although the headmen may admonish a woman for infidelity and try to arrange an outcome favourable to the husband, this is not directly enforced. "Of course we have headmen! In fact, we’re all headmen... Each one of us is headman over himself." The San deities are also males representing the creative principle and the vagrancy of misfortune with shadowy female consorts, although they have no moral imperative but stand philosophically in the existential dreamtime rather than, prescriptively ordering human affairs.

The transition to patriarchal dominance, which has spread across the planet since Neolithic times forces female reproductive choice underground. While men regard it as an entitlement to sew wild oats as widely as they may, constrained only by another man’s jealousy, women also have major genetic needs for reproductive choice. If they get pregnant to a man it means a significant mortality risk, and a long time of time-consuming commitment to nurturing and raising a slowly growing offspring. In all socially monogamous mammals and birds, social monogamy doesn’t mean genetic monogamy, or one sex’s entire evolutionary strategy becomes knocked out and the species natural selection will suffer. Thus occasional covert sexual relations are the norm to enable a female to choose the best genes she can find for at least some of her offspring, as well as the necessary survival benefit of a resourceful partner common to socially monogamous species.

With the transition to patriarchal dominance we thus enter into all those features of historical and present human societies, in which violent repressive measures are enshrined in religion and culture, from female genital mutilation designed to cut off female sexual desire physically, to lethal invocations of stoning for adultery, sequestering and chaperoning women, honour killings, immolating the widow under suttee, foot binding, and requiring hymens to be intact at marriage and showing the blood of first intercourse, cemented in Western culture through the original sin of Eve, doomed to be obedient to her husband as he is to be to God because she harkened to the serpent, thinking it would make them wise, so that they lost their sexual innocence and donned fig leaves because of their carnal knowledge, in what is described instead as the primordial knowledge of good and evil, seeking to become as Gods.
The transition to patriarchal culture is covertly documented in Genesis, as a confirmation of patriarchal sovereignty, where Jacob, in fear of his brother Esau, has to sojourn for twice seven years with Laban, the maternal family of his mother Rebecca, to secure firstly Rachel and by Laban’s intrigue, the elder Leah as well, before eventually escaping with the best cattle and his brides, and children. When Laban comes in hot pursuit to seek to regain the teraphim (house gods signifying the family line) stolen by Rachel, she hides them under her menstrual skirt, thus acting as the female ‘agent’ using her very fecundity to transfer female sovereignty to the patriarchal line, which became the twelve tribes of Israel. Yet to this day, Jewish inheritance still passes through the mother, rather than the father.

In Judges, the concubine of Bethlehem-Judah is accused of ‘whoring’ by going back to live with her father-in-law for a period. When the Levite returns to claim her, the father-in-law keeps saying to tarry longer. When the couple eventually leave and turn into a Benjaminites town, men of Belial ask to ‘know the man within’. In an attempt to avoid sodomy, the host offers his daughter, which they refuse. He then offers his concubine, who is raped and abused and dies on the doorstep, while her master sleeps peacefully. He cuts her in twelve pieces and sends them to all the coasts of Israel setting off the Benjaminites wars, which are eventually resolved by moving four hundred virgins of Jabesh-Gilead to their husband’s homes, capped by the abduction of the daughters of Shiloh to satisfy the remaining Benjaminites men. As noted by commentators, the story is a glaring affront to those matriarchal traditions which expected the son-in-law to stay with the wife’s family, as Jacob did.

We know that successive historical urban ‘civilizations’ have been shaped by the rise and fall of empires, often driven by huge assemblies of male warriors, with huge loss of life, right through to major genocidal wars in the last century involving male leaders with single-minded political ambitions. Since the emergence of large urban civilizations based on extensive agriculture and animal husbandry, we have been living in a patriarchal paradigm beset by male violence, accompanied by an expanding population driven also by the male desire to procreate, so as to dominate neighbouring societies. Indeed, the foundation of patriarchal morality is the requirement to suppress intra-social advantages to increase inter-social dominance.

Hence the moral deity has become a spiritual driver of frequently oppressive social systems seeking military supremacy, extrapolated to the point of utopian dominion, generally accompanied by in invocation to reproduce as a sacred duty, to out-populate the unbelievers, exemplified in both Christianity and Islam and still evident today in the
differential reproduction rates of adherents to these major religions in an already overpopulated planet upon which habitats, climate and biodiversity we are increasingly driving to a deleterious tipping point of potential no return.

Fig 12: Differential reproduction rates of major religions and unaffiliated

So the question now arises in the current context of what in the world we can do to enable humanity to develop a genuine paradigm of long term future goodness in ensuring our survival in our enclosing biosphere upon which we depend, rather than exploiting it to the point of collapse or long term attrition.

Hence we turn to the forms of government, policy formation, social influence, knowledge and opinion formation and the cultural paradigms of electoral democracy and venture capitalism that shape at least those countries we have some power to influence and change.

**Democracy is a Dynamically Unstable Prisoners' Dilemma**

The Evolution of the Greek Model

Democracy originates from ancient Greece, established in 508/7 BC by Cleisthenes, an Athenian noble, in response to the endless struggles between conflicting tyrants of the noble families, themselves the strong men of family clans tracing their origins back into mythological antiquity. It arose as a compensating antidote to these patriarchal clan struggles, in the form of an electoral coalition of all the Athenian men of fighting age. In most of antiquity the benefit of citizenship has been tied to the obligation to fight war campaigns. Women, slaves and foreigners were specifically excluded, meaning only about one in ten Athenians were citizens, but it was still a fundamental innovation, resulting in the most direct form of pure democracy in history, in which the citizens decided all policy matters directly, rather than electing representatives to form a government, and in which officials were chosen from the citizens by random lot - both being devices to bypass the corruption in clan and later aristocratic dealings.

Democracy didn’t come about by a single revolution, but by an unstable dynamic, in which vying parties, through the very process of their strategic dissonance gave rise by degrees to a more refined political system through a succession of governmental crises. These crises take the form of a recursive series of prisoners’ dilemma encounters of polarized coexistence, in that the participants are opposing complementary forces contained within one political, economic and social system. In particular, Greek democracy arose from two sets of opposing forces both integral to civic life: (a) a struggle between strong leaders who tend to become tyrants and a court or assembly, of powerful landholders protecting their collective interests and (b) a struggle between rule by the aristocracy and collective decisions by the common people. In the historical ebb and flow of these asymmetric forces, in which mutual defection is a lose-lose, more complex and structurally sensitive forms of government arose.

Athenian democracy grew out of village assemblies. The Demos of Democracy is the Greek word for “village”, or “deme”, also meaning “the People”. Young men, who were 18 years old presented themselves to officials of their deme and, having proven that they were not slaves, that their parents were Athenian, and that they were 18 years old, were enrolled in the “Assembly List.” As a member of the Demos, this young man could participate in the Assembly of Citizens that was the central institution of the democracy. So the Athenian Demos was the local village, the population generally, and the assembly of citizens that governed the state.

In the earliest history of the Greek world, as far as anyone can tell, the political landscape consisted of small-time “kings” ruling over their own homes and immediate surroundings. In certain places, individual kings acquired power
over larger territories, and influence over neighbouring kings. Theseus, when he had gained power in Athens, abolished the local governments in the towns; the people kept their property, but all were governed from a single political centre at Athens. The Attic peninsula thus became a unified political state, with Athens at its centre.

During the 8th and 7th centuries BCE, Athens moved from being ruled by a king to being ruled by a small number of wealthy, land-owning aristocrats. Aristotle’s Constitution of the Athenians, a description of Athenian government, says that the status of “King” became a political office, one of three “Rulers” or “Archons” under the new system. “Appointment to the supreme offices of state went by birth and wealth; and were held at first for life, and afterwards for a term of ten years.” Later, six other Archons were added to the role.

Around 620 BCE, the Athenians enlisted Draco to make new laws. The new Constitution gave political rights to those Athenians “who bore arms,” in other words, those Athenians wealthy enough to afford the bronze armour and weapons of a hoplite. Draco’s laws were most notable for their “Draconian” harshness - there was only one penalty prescribed, death, for every crime, from murder down to loitering.

Poor citizens, in years of lean harvests, had to mortgage portions of their land to wealthier citizens in exchange for food and seed to plant. Having lost the use of a portion of their land, they were even more vulnerable to subsequent hardships. Eventually, many lost the use of their land and became tenant-farmers, effectively slaves to the wealthy. The resulting crisis threatened both the stability and prosperity of Athens. In 594, however, the Athenians selected Solon to revise their laws.

Solon took steps to alleviate the crisis of debt and to make the constitution of Athens more equitable. He abolished the practice of giving loans with a citizen’s freedom as collateral. He gave every Athenian the right to appeal to a jury, thus taking ultimate authority for interpreting the law out of the hands of the Nine Archons and putting it in the hands of a more democratic body, since any citizen could serve on a jury. Otherwise, he divided the population into four classes, based on wealth, and limited the office of Archon to members of the top three classes.

Formerly, the Council of the Areopagus, which consisted of former Archons, chose the Nine Archons each year — a self-perpetuating system that ensured that the office of Archon was held only by aristocrats. Solon had all of the Athenians elect a short-list of candidates for the Archonship, from which the Nine Archons were chosen by lot. The office was still limited to citizens of a certain class, but it was no longer limited to members of a few families. There was an Assembly, in which every citizen could participate, a Council of 400 citizens chosen probably from the top three property classes, with the Areopagus being charged with "guarding the laws". So Athens under Solon had many elements that would later be a part of the radical democracy – democratic juries, an Assembly and a Council, selection of officials by lot rather than by vote – while retaining many oligarchic elements in the form of property qualifications and a powerful Council of the Areopagus.

Tyrannies were common in the Greek world during the 6th century, as certain individuals made themselves champions of the poor in order to seize power. The city descended back into a state of strife, with various factions, each with its own interests, vying for power. This state of affairs continued until an Athenian named Pisistratus, after several failed attempts, finally established himself as Tyrant over the Athenians. Like all tyrants, Pisistratus depended to a certain extent on the goodwill of the people for his position, by ensuring that both rich and poor Athenians received fair treatment, but his sons were in the end despots who were forcibly overthrown.

After the end of the tyranny, two factions led by Isagoras and Cleisthenes competed for power to reshape the government of Athens. When Isagoras and the Spartans occupied the city and tried to disband the government and
expel seven hundred families, the Athenians rose up against them and drove them out. Cleisthenes’s ensuing reforms aimed at breaking the power of the aristocratic families, replacing regional loyalties (and factionalism) with pan-Athenian solidarity, to prevent the rise of another tyrant.

Cleisthenes made the “deme” or village into the fundamental unit of political organisation. The peninsula of Attica consisted of the coast, the countryside, and the urban area around Athens. To encourage Athenian politics to focus on interests common to all Athenians, rather than regional interests, Cleisthenes re-organised the population. Each of the 139 demes he assigned to one of thirty “Thirds”. Ten each of the Thirds were coastal, inland, and in and around the city. These Thirds were then assigned to ten Tribes, in such a way that each Tribe contained three Thirds, one from the coast, one from the inland, and one from the city. Each of these ten Tribes sent 50 citizens each year to serve on the new Council of 500.

But, with the Demos newly unified and the authority of the older, more aristocratic system undermined, the danger of tyranny remained. Cleisthenes sought to avert this danger by means of his most famous innovation. Every year the Assembly of Athenian citizens voted, by show of hands, on whether or not to hold an ostracism. If the Demos voted to hold one, it took place at another meeting of the Assembly. Then, each citizen present scratched a name on a broken piece of pottery, called ostraka. If at least 6000 citizens voted, the names on the pot shards were tallied, and the “winner” was obliged to leave Athens for a period of ten years. He did not lose his property or his rights as an Athenian citizen, but was banished. The Athenians used the process to remove the leaders of various factions, both champions of the democracy and those who favoured more aristocratic controls.

A final reform occurred after the Persian war, when less wealthy citizens, by serving in the navy had saved the city. Under Solon, the Court of the Areopagus had retained its role as overseer of the constitution; it could punish citizens, fine them, and spend money itself without answering to any other governing body; and it oversaw cases of impeachment. Ephialtes brought about a reform of the Court of the Areopagus by denouncing the Court before the Council and the Assembly, which resulted in the archons (the future members of the Court of the Areopagus) being chosen by lot, not by vote, and it lost some of its authority. It retained authority over trials of murder, wounding, death by poison, but not for lesser serious crimes, and also also investigations of political corruption, presenting its findings to the Council and Assembly for any further action.

The office of “General”, or Strategos, was one of the few in the Athenian democracy that was elected, rather than chosen randomly by lot. It was also the only office which an Athenian could hold for multiple successive terms. And, the Generals – ten in each year – enjoyed certain powers that made this office potentially a platform from which an Athenian could wield extraordinary influence over the affairs and policies of the city. A general could introduce business for discussion in a meeting of the Assembly on his own authority. This led to several futile wars.

In 411 BCE, the Athenians brought an end to their democracy and instituted an oligarchy by, first, appointing ten “Commissioners” who were charged with re-writing the constitution. These Commissioners proposed a new Council, consisting of 400 men, with service limited to the wealthier citizens. Five men would be selected as “Presidents”, and these would choose 100 men for the new Council, and each of those 100 would choose three others, thus creating the Council of “400”, or in fact 405. This new government claimed that a Council of 400 was “according to the ancestral constitution” and would have the power to choose 5000 Athenians who would be the only citizens eligible to participate in assemblies. The new Council collected an armed gang, confronted the democratic Council, paid them their stipends, and sent them home. A series of short-lived governments followed, including one in which the power was in the hands of 5000 Athenians, until democracy was again briefly restored.

In 404 BCE, the Spartans destroyed the Athenian fleet. After a period of siege, while the Spartans blockaded the harbors of Athens, the city surrendered, and its fortunes fell into the hands of the so-called Thirty Tyrants. These were Athenians selected by the Spartans to form a puppet government. This lasted only one year before pro-democracy forces regained control of the city’s affairs. After the tyrants were overthrown the city returned to democratic rule.

On the motion of Teisamenus the People decreed that Athens be governed as of old, in accordance with the laws of Solon, and the statutes of Draco. Such further laws as may be necessary shall be inscribed upon tables by the Law-Givers elected by the Council and named hereafter, exposed before the Tribal Statutes for all to see, and handed over to the magistrates during the present month. The laws thus handed over, however, shall be submitted beforehand to the scrutiny of the Council and the five hundred Law-Givers elected by the Demes, when they have taken their oath. Further, any private citizen who so desires may come before the Council and suggest improvements in the laws.
When the laws have been ratified, they shall be placed under the guardianship of the Council of the Areopagus, to the end that only such laws as have been ratified may be applied by magistrates.

The Athenians also passed a law of general amnesty, to prevent an endless cycle of retribution for wrongs committed on both sides of the civil strife. An inscription survives that records a law limiting the Council’s authority. After two anti-democratic revolutions, this law says that in matters of war and peace, death sentences, large fines, disenfranchisement (loss of citizenship), the administration of public finances, and foreign policy the Council cannot act without the approval of the Assembly of the People. With this restoration, Athens re-established a radically democratic government.

Athenian society was however one which extolled the virtues of men above women. Greece was a patriarchal class-driven society with slavery, in which women were excluded from political life and were lifelong minors under the guardianship of a male.

When Zeus the male high god at the centre of the pantheon overthrows Kronos he swallows his own first wife Metis thus preventing her bearing a son, fearing she would give birth to powerful children, in the same process, assimilating to himself her power of procreativity, so that he is able to give birth to Athena. We thus see, not just woman or female reproductive choice, but the very capacity of women to contribute to the nature of the offspring unravelled by the patriarchy. Of course there is a hidden twist to the tale because Metis anticipated this becoming pregnant to Athena who then burst out of Zeus’ head.

![Fig 14 Far left: Hoplites the citizen soldiers of ancient Greek city states. Left: Priapos (god Bes) c500 BC from a brothel in Ephesus. Right: Zeus abducts his great-grandson Ganymede in an incestuous homosexual act of paedophilia to become his lover and cup bearer on Olympus. 470 BC Temple of Zeus, Olympia. Far right: Cleisthenes.](image)

In the Athenian cosmology, woman becomes an empty vessel for male procreativity:

"The mother is not the true source of life.  
We call her the mother, but she is more the nurse,  
The furrow where the seed is thrust.  
The thruster, the father is the true parent:  
The woman but tends the growing plant".  
Apollo in Aeschylus’ “Eumenides” or “Furies”

The idea that only the male was procreative spilled over into excessive absorption with male sexuality in men loving men, and ‘passing on one’s manhood’ to under-age boys. Pederasty was an institution sanctioned by the Olympian gods and mythical heroes. Zeus, Apollo, Poseidon and Heracles all had pederastic experiences. So did many of the most illustrious real-life Greeks including Solon, Pythagoras, Socrates and Plato. The act was part of the foundation of an elitist, military culture that elevated the idea of the penis beyond biology and religion to the rarefied heights of philosophy and art. The pederastic act was the culmination of a one-on-one mentoring aimed at passing on arete a set of manly virtues including courage, strength, fairness and honesty. Believing Anaxagoras, in a bid to father only sons, men even had their left testicle removed.

However, the pure democracy of the original Greek model was possible only because the number of arms-bearing males forming the decision-making body were small enough to be able to meet and make collective decisions together. These pure forms of direct democracy have survived to this day only in situations where such a public meeting can be held and constructive business completed. Appenzell, the last Swiss cantonment to give women the vote in 1990, and then only when compelled by the federal government, is one of the last two cantonments operating the Landsgemeinde or “cantonal assembly”, dating from the middle ages. Eligible citizens of the canton meet on a
certain day in the open air to decide on laws and expenditures by the council. Everyone can debate a question. Voting is by those in favour of a motion raising their hands. Until the admission of women, the only proof of citizenship necessary for men to enter the voting area was to show their ceremonial sword or Swiss military bayonet. This gave proof that you were a freeman allowed to bear arms and to vote, as in the Athenian male-military coalition model.

The Evolution of Electoral Democracy in England

All democratic national governments currently operate through forms of electoral democracy where the people do not make decisions directly but elect representatives to a parliament who make the policy. To understand the emergence of parliaments we need to examine the convoluted history of how one of the founding parliaments that of England struggled with on-going social conflict to arrive at the sorts of government we have today.

We now look at the evolution of the English Parliament as a democratic system, again to explore the dynamics that, by a series of contradictions, has led to what has become a central model of electoral democracy in the current era. Again we explore this as an unstable dynamical system leading to a uniquely responsive complex system refined by the very dissonances that led to its evolution.

Under a monarchical system of government, monarchs usually must consult and seek a measure of acceptance for their policies if they are to enjoy the broad cooperation of their subjects. Early kings of England had no standing army or police, and so depended on the support of powerful subjects. Under the feudal system instituted by William the Conqueror, in 1066, he sought the advice of a council of tenants-in-chief, people who held land, and ecclesiastics before making laws. The laws of the Crown could not have been upheld without the support of both the nobility, who had economic and military power bases of their own through major ownership of land and the feudal obligations of their tenants, including military service The clergy were likewise a law unto themselves, as the church had its own system of religious law courts.

In 1215, the tenants-in-chief secured the Magna Carta from King John, establishing that the king may not levy or collect any taxes (except the feudal taxes to which they were hitherto accustomed), save with the consent of his royal council. First drafted by the Archbishop of Canterbury to make peace between an unpopular King and a group of rebel barons, the Magna Carta Libertatum or "Great Charter of Freedoms" promised the protection of church rights, protection for the barons from illegal imprisonment, access to swift justice, and limitations on feudal payments to the Crown, to be implemented through a council of 25 barons. The charter became part of English political life and was typically renewed by each monarch in turn. Lord Denning has described it as "the greatest constitutional document of all times – the foundation of the freedom of the individual against the arbitrary authority of the despot."

The Great Council evolved into the Parliament of England. The term (French parlement or Latin parlamentum - an occasion for speaking) came into use during the early 13th century and first appears in official documents in the 1230s. Initially, parliaments were mostly summoned when the king needed to raise money through taxes. After Magna Carta, this became a convention. When King John died in 1216 and was succeeded by his young son Henry III,

Fig 15 Left: Magna Carta Libertatum 1215 text. Right: A mediaeval parliament.
leading peers and clergy governed on Henry's behalf until he came of age, giving them a taste for power that they would prove unwilling to relinquish.

When Henry III took full control of the government, leading peers became increasingly concerned with his style of government, specifically his unwillingness to consult them on decisions he took. In 1258, seven leading barons forced Henry to swear to uphold the Provisions of Oxford, superseded, the following year, by the Provisions of Westminster. This effectively abolished the absolutist Anglo-Norman monarchy, giving power to a council of fifteen barons, and providing for a thrice-yearly meeting of parliament to monitor their performance. In 1264, after protracted conflict with the King, Simon de Montfort, Earl of Leicester summoned the first parliament in English history without any prior royal authorisation partly to head off dissent of the nobility that he had overreached. The archbishops, bishops, abbots, earls and barons were summoned, as were two knights from each shire and two burgesses (an inhabitant of a town with full rights of citizenship) from each borough. Knights had been summoned to previous councils, but the representation of the boroughs was unprecedented.

During the reign of Edward I, which began in 1272, the role of Parliament in the government of the English kingdom increased due to Edward's determination to unite England, Wales and Scotland under his rule by force and to unite his subjects in order to restore his authority and not face rebellion. Edward therefore encouraged all sectors of society to submit petitions to parliament detailing their grievances in order for them to be resolved.

Montfort's scheme was formally adopted by Edward in the so-called "Model Parliament" of 1295. The attendance at parliament of knights and burgesses historically became known as the summoning of "the Commons", a term derived from the Norman French word "commune", literally translated as the "community of the realm".

In 1341 the Commons met separately from the nobility and clergy for the first time, creating what was effectively an Upper Chamber and a Lower Chamber, with the knights and burgesses sitting in the latter. The Upper Chamber became known as the House of Lords from 1544 onward, and the Lower Chamber became known as the House of Commons, collectively known as the Houses of Parliament.

During the reign of the Tudor monarchs, the modern structure of the English Parliament began to be created. The Tudor monarchy was powerful, and there were often periods of several years when parliament did not sit at all. However, the Tudor monarchs were astute enough to realise that they needed parliament to legitimise many of their decisions, mostly out of a need to raise money through taxation legitimately without causing discontent. Thus they consolidated the state of affairs whereby monarchs would call and close parliament as and when they needed it. By the time Henry Tudor (Henry VII) came to the throne in 1485 the monarch was not a member of either the Upper Chamber or the Lower Chamber. Consequently, the monarch would have to make his or her feelings known to Parliament through his or her supporters in both houses. Proceedings were regulated by the presiding officer in either chamber. From the 1540s the presiding officer in the House of Commons became formally known as the "Speaker". A member of either chamber could present a "bill" to parliament. Bills supported by the monarch were often proposed by members of the Privy Council who sat in parliament. In order for a bill to become law it would have to be approved by a majority of both Houses of Parliament before the monarch gave their royal assent or a veto.

After his succession in 1625, Charles I quarrelled with the Parliament of England, which sought to curb his royal prerogative. Charles believed in the divine right of kings, and was determined to govern according to his own conscience. From 1642, Charles fought the armies of the English and Scottish parliaments in the English Civil War. After his defeat in 1645, he surrendered to a Scottish force that eventually handed him over to the English Parliament. Charles refused to accept his captors' demands for a constitutional monarchy, and temporarily escaped captivity in November 1647. In January 1649 he was executed for treason.

The House of Lords was abolished and the purged House of Commons governed England until April 1653, when army chief Oliver Cromwell dissolved it after disagreements over religious policy and how to carry out elections to parliament. Cromwell later convened a parliament of religious radicals in 1653. The House of Lords was abolished and the purged House of Commons governed England until April 1653, when army chief Oliver Cromwell dissolved it after disagreements over religious policy and how to carry out elections to parliament. Cromwell later convened a parliament of religious radicals in 1653. Cromwell gave a huge degree of freedom to his parliaments, although royalists were barred from sitting in all but a handful of cases. He ended up dissolving each parliament that he convened when he found it became troublesome.
The revolutionary events that occurred between 1620 and 1689 all took place in the name of parliament. After the death of Cromwell there were a series of parliaments convened by contesting groups. The "Rump Parliament" recalled the earlier full "Long Parliament" which then voted to dissolve themselves and call new elections, arguably the most democratic for 20 years although the franchise was still small. This led to the calling of the "Convention Parliament" which was dominated by royalists. This parliament voted to reinstate the monarchy and the House of Lords. Charles II returned to England as king in May 1660. The word Tory designated early supporters of strong royal power. Tories were monarchists and traditionalists, especially at the time of the Restoration of the monarchy in 1660.

In the seventeenth century, the English parliament consisted of aristocrats and wealthy men who formed alliances and majorities based on personal interests and loyalties. During the years from 1678 to 1681, and the constitutional crisis known as the Exclusion Crisis that most members of the English parliament, formed into two "parties", the Whigs and Tories, forming the basis of ensuing two party systems worldwide.

In the summer of 1678, Titus Oates's made the revelation of a "popish plot" to murder Charles II and massacre English Protestants. The plot was a fabrication, but because Charles had no legitimate children and the heir to the throne was his Catholic brother, James, duke of York, Oates's revelations provoked anxieties about what would happen should the king suddenly die and be succeeded by his brother. The English associated Catholic rule with religious persecution and tyrannical government.

Between 1679 and 1681 opponents of the Catholic succession (soon to be christened the Whigs) introduced three bills into successive Parliaments to exclude James from the throne. Initially, the Whigs were the party of the liberal and reforming aristocracy. In contrast to the Tories, who tended to support the monarchy and conservatism, the Whig Party attracted people more favourable to constitutional reforms. The Whigs conducted their campaign against the duke of York, not just in Parliament, but also in the press, at the polls, and in the streets, whipping up popular anti-Catholic sentiment to try to convince Charles of the necessity of diverting the succession and organising mass rallies and petitioning campaigns in support of their position. Three bills were presented but none passed due to various intrigues including Charles proroguing parliament before they could pass legislation, or refusing to call it.

James II, who was openly Catholic, married to Mary of Modena, attempted to lift restrictions on Catholics taking up public offices, bitterly opposed by Protestants in his kingdom. They invited William of Orange, a Protestant who had married Mary, daughter of James II to invade England. William assembled an army. When many Protestant officers defected from the English army, James fled the country. Parliament then offered the Crown to his Protestant daughter Mary. Mary refused the offer, and instead William and Mary ruled jointly, with both having the right to rule alone on the other's death. As part of the compromise in allowing William to be King – called the Glorious Revolution – Parliament was able to have the 1689 Bill of Rights enacted.

After the Treaty of Union in 1707 the Parliament of England was dissolved to form the Parliament of Great Britain. During the early eighteenth century, the Whigs dominated British politics. At general elections the vote was restricted to freeholders and landowners, in constituencies that had changed little since the Middle Ages, so that in many
“rotten” and “pocket” boroughs seats could be bought, while major cities remained unrepresented, except by the Knights of the Shire representing whole counties. Reformers and Radicals sought parliamentary reform, but as the French Revolutionary Wars developed the British government became repressive against dissent and progress towards reform was stalled. The Tories re-emerged as a major force in British politics in 1770 - as a more modern party of traditional values supporting the opportunities created by the industrial revolution and commercial expansion. The American War of Independence ended in defeat for England in 1783 and in the wake of the French Revolution of 1789, Radical organisations sprang up to press for parliamentary reform, but as the French Revolutionary Wars developed, the government took extensive repressive measures against feared domestic unrest aping the democratic and egalitarian ideals of the French Revolution and progress toward reform was stalled.

The United Kingdom of Great Britain and Ireland was created on 1 January 1801, by the merger of the Kingdoms of Great Britain and Ireland. The principle of ministerial responsibility to the lower House did not develop until the 19th century – the House of Lords was superior to the House of Commons, both in theory and in practice. Members of the House of Commons (MPs) were elected in an antiquated electoral system, under which constituencies of vastly different sizes existed. Thus, the borough of Old Sarum, with seven voters, could elect two members, as could the borough of Dunwich, which had almost completely disappeared into the sea due to land erosion. Many small constituencies, the pocket, or rotten boroughs, were controlled by members of the House of Lords, who could ensure the election of their relatives or supporters. During the reforms of the 19th century, beginning with the Reform Act 1832, the electoral system for the House of Commons was progressively regularized. No longer dependent on the Lords for their seats, MPs grew more assertive.

The claim for the women’s vote appears to have been first made by Jeremy Bentham in 1817 when he published his Plan of Parliamentary Reform in the form of a Catechism, which was taken up by William Thompson in 1825, when he published, with Anna Wheeler, An Appeal of One Half the Human Race, Women, Against the Pretensions of the Other Half, Men, to Retain Them in Political, and Thence in Civil and Domestic Slavery: In Reply to James Mill’s Celebrated Article on Government, which had stated: “all those individuals whose interests are indisputably included in those of other individuals may be struck off without any inconvenience ... In this light also women may be regarded, the interests of almost all of whom are involved in that of their fathers or in that of their husbands.”

In 1832 the Whigs led the most significant modernization of the British Parliament the Representation of the People Act, that introduced wide-ranging changes to the electoral system of England and Wales. There had been calls for reform long before this, but without success. It met with significant opposition from the Pittite factions in Parliament, who had long governed the country and was especially pronounced in the House of Lords. Nevertheless, the bill was eventually passed, as a result of public pressure. The Act granted seats in the House of Commons to large cities that had sprung up during the Industrial Revolution, and removed seats from the “rotten boroughs”: those with very small electorates and usually dominated by a wealthy patron. The Act also increased the electorate from about 400,000 to 650,000, making about one in five adult males eligible to vote. It has been argued that it was the inclusion of the word "male" in the 1832 Act, thus providing the first explicit statutory bar to women voting, which provided a focus of attack and a source of resentment from which, in time, the women's suffrage movement, to fight for women's right to vote, grew.

The Tory party became the Conservative Party in 1834. In the 1850's, the Whig Party became the most important element in a union with the Radicals to form the "Liberal Party, which eventually in 1988 merged with the Social Democratic Party to form today's Liberal Democrats. The first Labour MPs were elected in 1900 as representatives of the Independent Labour Party.

The supremacy of the House of Commons was reaffirmed in the early 20th century. In 1909, the Commons passed the so-called "People's Budget," which made numerous changes to the taxation system which were detrimental to wealthy landowners. The House of Lords, which consisted mostly of powerful landowners, rejected the Budget. On the basis of the Budget’s popularity and the Lords’ consequent unpopularity, the Liberal Party narrowly won two general elections in 1910. Using the result as a mandate, the Liberal Prime Minister, H. H. Asquith, introduced the Parliament Bill, which sought to restrict the powers of the House of Lords. (He did not reintroduce the land tax provision of the People's Budget.)

The Parliament Act 1911, prevented the Lords from blocking a money (taxation) bill, and allowed them to delay any other bill for a maximum of three sessions (later reduced to two), after which it could become law over their objections. However, the House of Lords retained the unrestricted power to veto any bill outright which attempts to extend the life of a parliament. When the Lords refused to pass the bill, Asquith countered with a promise extracted
from the King in secret and requested the creation of several hundred Liberal peers, so as to erase the Conservative majority in the House of Lords. In the face of such a threat, the House of Lords narrowly passed the bill.

Fig 17 Left: Heavily outnumbered by men, women turn out to an Auckland polling booth in November 1893 to vote in their first election after securing the right to vote. The overall turnout of female voters was unexpectedly high. Centre: Kate Sheppard promoted women's suffrage by organising and public meetings, writing letters to the press, and developing contacts with politicians, culminating in a successful petition to NZ parliament with 30,000 signatures. Right: Suffragettes on their way to Women's Sunday, 21st June 1908. This was the first major, country-wide demonstration for women's suffrage. Between 200,000 and 300,000 people gathered in Hyde Park, making it one of the largest ever single demonstrations up to that time.

Proceeding from the avowedly patriarchal origin of ancient Greek democracy, it is thus a proof of patriarchal principle that women only began to gain the democratic vote a full two and a half millennia later. The first was at the end of the 19th century, when New Zealand gave women the vote in 1893, underlining the deep relationship throughout history between patriarchal dominance and democracy. In the UK women's suffrage finally succeeded through two laws in 1918 and 1928. In 1918 after the war, a coalition government passed the Representation of the People Act, enfranchising all men over 21, as well as all women over the age of 30 who met minimum property qualifications. This act was the first to include almost all adult men in the political system and began the inclusion of women, extending the franchise by 5.6 million men and 8.4 million women. In 1928 the Conservative government passed the Representation of the People (Equal Franchise) Act equalizing the franchise to all persons over the age of 21 on equal terms. Two years after the UK, the 19th Amendment to the U.S. Constitution granted American women the right to vote, ratified on August 18, 1920, ending almost a century of protest. France had instituted universal male suffrage abolishing all property requirements to allow men to vote in 1792, but ironically, woman didn't get the vote in France until 1945 and in Switzerland women gained the vote in 1971 and in cantonal elections only in 1990, underscoring how deep and long the association between patriarchal dominance and democracy has been.

Neither have individual woman leaders in this avowedly patriarchal tradition necessarily been willing or able to transform the situation for the better when in power, with leaders from Margaret Thatcher to Indira Gandhi taking the authoritarian path of the authoritarian right.

This again goes to prove that individual variations are great enough that individual variation exceeds sexual differences so that a person of either sex can display features in contradiction to their own sex's reproductive strategy, with a female leader acting to support a right-wing patriarchal ideal of unrestrained private enterprise, or institute a state of emergency providing for imprisonment without trial.

Fig 18: Indira Gandhi with her sons Rajiv and Sanjay. A classic example of an Indian high-born woman whose reproductive investment in her two sons aligns with the hypergamic patriarchal system.

However there are also evolutionary features supporting these contradictions. Although we have been shaped for some 150,000 years by gatherer-hunter natural and sexual selection, we have also had 4,000 years of sometimes oppressive patriarchy applying its own selective pressures. In societies where boys are preferred, with stratified classes such as India, there is a pattern of hypergamy, where lower-class daughters endeavour to ‘marry up’ to higher-born sons. There is thus a selective advantage in high-born women preserving the patriarchal status quo so that her sons will have the added cultural opportunity of siring more offspring, thus securing her own reproductive fertility through the patriarchal system that favours her position.
For a time, New Zealand had two alternative female leaders, both of who became prime minister. Jennifer Shipley was renowned for divisive right policies such as dissolving family trusts to make elderly people pay for their health care, despite a national health service. Helen Clark led a labour government for three terms, which was socially conscious and humanitarian, but she did so by holding her cabinet in line with strict leadership discipline, leaving no strong contender to fill her shoes when she moved on, after losing her fourth term election, to head the UN Development Program. It was thus only after several terms of right-wing government that New Zealand again has a female prime minister Jacinda Ardern, heading an MMP coalition government leading us through the Covid-19 crisis, using a mix of empathy and firmness to bring the people as a whole on-side with a nationwide lockdown, from which we are only emerging as the cases drop to single figure digits, with two days in a row of no positive cases to report.

By examining the histories of ancient Greece and the English Parliament, influential as it has been as a founding catalyst for Western democracy, we have confirmed that democracy did not arise as a sudden revolution, but by contrast, has arisen from chaotic events in which various parties caught in a prisoners’ dilemma of social coexistence, through their own dissonant investments have gradually brought about increasing levels of democracy as a complex system, evolving at the edge of chaos, as much of biological evolution also has done. By contrast, the extremes of the sudden revolutions of France, Russia, and China have led either to civil war and loss of life or to sustained periods of totalitarian and oppressive leadership, again amid pogroms and significant loss of life and liberty.

Democracy, in its modern forms, is a product of the age of enlightenment, which induced examination of the standards by which people ruled and gave validation to the idea of human rights, and has in turn become a facilitator of free-thinking ideas and opportunities in society and commerce, but it can become subverted by populism, disinformation and political propaganda, leaving the major issue of survival on an enclosing biosphere unattainable so far, because of underlying patriarchal motifs ingrained in the institutions of capitalist society, which we shall address.

**Democracy and its Subversion in the 21st Century**

This brings us to the current epoch, in which the forms of electoral democracy we are all too familiar with hold sway in the uncertainty of unfolding world events.

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**Fig 19:** The diversity of modern political systems forms a spectral ring of variations. Systems of government, from soft to hard, form a graduated spectrum, where increasing polarisation on either side leads ultimately to totalitarian autocracy. The dynamics are driven by opposing social forces, of the left and right, forming shades of socialist, or capitalist government. Totalitarian systems form one extreme pole – a regime of top-down order which becomes oppressive, by resisting change from below. By contrast, in democratic societies, elections are periods of maximum uncertainty, leading to unstable land-slide swings of government, thus representing the opposite unstable, chaotic pole at the front. With the exception of some mixed member proportional representation (MMP) systems, which favour coalitions, democratic societies are dominated by two-party systems. In their first-past-the-post forms, these constitute the two adversarial forces, involved in prisoners’ dilemma paradoxes of betrayal for advantage. The winner-take-all nature of first-past-the-post is constitutionally prone to tyranny of the majority, or a minority in a where the winning party may not even secure the popular vote overall, due to a majority of electorates not necessarily reflecting the popular vote particularly given gerrymandering. This adversarial conflict has deep parallels with male reproductive combat, where there is a winner-take-all struggle for genetic possession of the females of the herd. At face value the dichotomy between left and right is a reflection of the age old asymmetric struggle between the commoner and the aristocrat that runs back to Greece. Populism and the politics of social division seeks to subvert the democratic process, by cultivating a strategic minority as a “base” that can, through their leader, achieve power for their own ends.
In autocratic systems, we have a single regime of authority by a tyrant or single dominant party. Electoral democracy disrupts this regime of oppressive order by subjecting government to an electoral process in which the will of the people holds sway, leading to government through periodic dynamical instability, as pictured in fig 19. As we have noted in the evolution of the English parliament, this evolved into a contest between two dominant parties, the Whigs and Tories. The British parliament is also a first-past-the-post system in a winner-take-all electoral decision, in which the party winning the most seats in parliament becomes the government and the losing party becomes the opposition, tasked with holding the governing party to account. This has the advantage of making a clear-cut decision, but it has fundamental pitfalls which can rapidly lead to injustice.

First-past-the-post electoral democracy is constitutionally inclined to result a tyranny of the majority, in which the policies and legislation of the winning party act to protect the interests only of those supporting the government in power to the exclusion, or outright detriment of the opposing minority. Given the fact that the electorate tally does not necessarily represent the majority vote, it is also constitutionally liable to result in a tyranny of a strategic minority if this minority can secure a majority of the electorates, especially given gerrymandering by the party claiming victory. It is also generally oppressive to the cultural diversity of complex human societies.

The tendency to adversarial party positions results in a major polarization pervading democratic politics across the world stage, between the right, which leans towards a set of patriarchal beliefs in individual enterprise for winner-take-all gains, in its harder forms veering towards fascist dictatorship of the strong leader. In opposition to this is the left, espousing support for the working class and the ‘nanny society’ of the welfare state, which in its extreme forms we again find a totalitarian tendency, turning social equality into a big-brother society maintained through the illusion of class warfare run by nepotistic cliques of one party state officials. Democracy thus survives as an unstable system, caught between the extremes, with autocratic tendencies held in check by the very chaos of uncertainty of the electoral process.

In its first past the past adversarial competing two-party form, democracy becomes a veritable male reproductive combat ritual for the winner-take-all spoils of the blind lady justice of the voting population. This underlines that fact that the two party system has arisen from male-only representation in which traditionalist and reformist aristocrats have vied for control of the future of government. Male reproductive combat is a winner-take-all defection against other males for the reproductive command of the female ‘herd’ in precisely the way first-past-the-post is a winner-take-all defection between two parties for the electoral vote. In this sense, it is reproductively predatory.

Bearing in mind that democracy has been an exclusively male dominated process until the turn of the 20th century, this needs to be recognised as more than a mere analogy and represents a subtle play of the human male desire to command exclusive power played out in the political arena. Laying bare how central male reproductive combat is to democratic electoral systems, Klofstad et al. found that the deeper the voice of a contestant of either sex the more popular they were, with the deeper voices gaining between 60 and 80% of the vote, indicating markers of testosterone dominance are more influential than a candidate’s policies and trustworthiness.

In our founding gatherer-hunter societies, by contrast, there was an unstable equilibrium between the reproductive and social investments of coalitions of women, who gathered the majority of the diet and were not dependent on their men folk and the men seeking to adopt the tokens of culture amid paternity uncertainty while providing meat, hunting and story-telling skills to secure sexual favours. In this founding dynamic, it is the prisoners’ dilemma of complementary driven by asymmetric reproductive investments that provided a sustainable context for the emergence of human super-intelligence. This prisoners’ dilemma paradox forming the key to human cultural emergence, was a red queen race, in which neither sex had the upper hand, rather than a male-driven adversarial reproductive conflict over the spoils of the herd. We can thus see that our enshrined political system of democracy, on which we depend for our rights and freedoms remains poisoned by a ‘spermatogenic’ patriarchal dynamic ingrained so deeply that neither sex can comprehend or appreciate its devastating effect on our capacity to address fundamental issues of survival in the enclosing biosphere, let alone the collective responses required to successfully fend off without internal conflict a debilitating pandemic caused by the effect of these very patriarchal imbalances on the biosphere.

Populism, which is also a prominent feature of first-past-the-post electoral combat is a process in which a confrontational politician harnesses a strategic minority of voters, sometimes with extreme, unrepresentative views to strategically subvert the electoral process often through a campaign of misinformation aiming to secure control over the democratic process and carry it towards a position of absolute power of the populist leader.
To compensate the glaring pattern of perpetual conflict, of adversarial two-party winner take all contests, societies have sought a variety of means to modify the divide-and-rule of adversarial democracy. The US federal government has a written constitution and three houses President, Senate and House of Representatives to provide a set of checks and balances against the potential tyranny of any other branch. This has many parallels to the three British houses of Commons, Lords and the Monarchy. However, in practice, it doesn’t remedy the problem but creates an expensive cumbersome top-heavy governmental system, prone to intractable conflicts between the houses, and an opacity more easily served by business interests and professional lobby groups than the average citizen. Because the president is elected by electoral college, there is no guarantee that they secure the popular mandate.

Other countries have sought to dilute the adversarial two-party combat of first-past-the-post with various forms of proportional representation, such as STV (single transferrable vote) and particularly MMP (mixed member proportional), in which each party has list members in addition to their electorate members up for re-election to include to ensure membership of each party in parliament is proportional to the popular vote, leading to coalitions of smaller parties and more representative forms of government. Although this advantage is sometimes parried by a rise in back-room deals between parties, includes un-elected list candidates and has a tendency to unstable alliances, MMP does serve to provide a more ecosystemic form of democratic process, which has a greater probability of serving the interests of diverse minorities and is much better positioned to deal with the two problems we are addressing – pandemic crisis and climate and biodiversity crisis. It also comes some way to reflecting the more cooperative reciprocal altruism of female social coalitions.

As of 2020, in New Zealand, we have an MMP government formed by a coalition of three parties Labour, New Zealand First and the Greens with a formal coalition between the first two, in which the Greens provide confidence and supply, after NZ First rejected a coalition with the largest party National holding at the time 45% of the vote, due to loss of trust between that party and NZ First. This arrangement appears to be working well although naysayers would claim the largest party was robbed of the right to govern. It demonstrates a refreshing counterpoint to Trump’s divisive confrontational politics of deceit, abuse, and misinformation, particularly when our Prime Minister brings her newborn child to the UN, as both a leader and a nursing mother.

Electoral theory shows that changes in an electoral system can produce almost any outcome in a closely fought election. Economist Kenneth Arrow discovered one of the most fundamental paradoxes of voting. He set out four general attributes of an idealised fair voting system - (1) that voters should be able to express a complete set of their preferences; (2) no single voter should be allowed to dictate the outcome of an election; (3) if every voter prefers one candidate to another, the final ranking should reflect that and (4) if a voter prefers one candidate to a second, introducing a third candidate should not reverse that preference. However Arrow and others went on to prove that no conceivable voting system could satisfy all four conditions. In particular, there will always be the possibility that one voter, simply by changing their vote, can change the overall preference of the whole electorate.

In “Electoral dysfunction: Why democracy is always unfair”, the mathematician Ian Stewart shows that virtually all voting systems lead to paradoxes of one sort or another. First past the post ranks well in stability and accountability, but is a dud in fairness. With several candidates a candidate can win without even getting a majority, so most votes are literally wasted. A runoff doesn’t solve this either because the two highest candidates may come from the same political side of the spectrum if there were a multiplicity of opposing candidates. Preferential voting can lead to paradox in which everyone wins because the preferential order of the voters chases its tail. MMP avoids such paradoxes but leads to list candidates and unstable coalitions of government so it is fairer but less stable and sometimes less accountable.

Although elections to the US House of Representatives use a first-past-the-post voting system, the constitution requires that seats be “apportioned among the several states according to their respective numbers” - that is, divvied up proportionally. In 1880, the chief clerk of the US Census Bureau, Charles Seaton, discovered that Alabama would get eight seats in a 299-seat House, but only seven in a 300-seat House. In the proportional paradox, increasing the total number of seats available to balance the parties to their proportional vote can reduce the representation of an individual constituency, even if its population stays the same because the way the proportions are rounded down and then compensated for by an integer number of additional seats can change the balance in the rounding so an electorate loses representation.
Central in all these systems is the allocation of electorale boundaries, because many elections such as GW Bush’s first election was won against Al Gore with less than half the popular vote, as was Donald Trump’s in 2016 against Hilary Clinton. Gerrymandering, choosing election boundaries to favour a candidate or party, is named after a 19th-century governor of Massachusetts, Elbridge Gerry, who created an electoral division to bias the vote whose shape was so odd as to remind a local newspaper editor of a salamander. Gerrymandering has become a continuing and increasing feature of the underlying corruption of the US electoral system, which is dependent on first past the post and electoral college voting which can be manipulated to frustrate the common will. Disputes rise to the Supreme Court amid constitutional issues. A variety of methods devised by mathematicians\(^{50, 51, 52}\) try to assess objectively the degree to which political parties undermine the democratic principle in a way which can convince the courts.

In many ways Winston Churchill’s comment\(^{53}\) thus remains true: “Many forms of Government have been tried, and will be tried in this world of sin and woe. No one pretends that democracy is perfect or all-wise. Indeed it has been said that democracy is the worst form of Government except for all those other forms that have been tried from time to time....”

In response, given the access to information flows facilitated by the internet age, some advocates seek a return to forms of direct democracy not interfaced by elected, or unelected party representatives, including forming decision-
making committees by lot as we saw in the early Greek democracies. In a position piece on such developments in Europe, Nathan Gardels’ comments: For the first time, an Internet-based movement has come to power in a major country, Italy, under the slogan “Participate, don’t delegate!” All of the Five Star Movement’s parliamentarians, who rule the country in a coalition with the far-right League party, were nominated and elected to stand for office online. And they appointed the world’s first minister for direct democracy, Riccardo Fraccaro. “Referenda, public petitions and the citizens’ ballot initiative are nothing other than the direct means available for the citizenry to submit laws that political parties are not willing to propose or to reject rules approved by political parties that are not welcome by the people. Our aim, therefore, is to establish the principles and practices of direct democracy alongside the system of representative government in order to give real, authentic sovereignty to the citizens.” However the five star are now struggling to hold a mandate, amid a resurgence of a nationalistic populist movement with whom they initially cooperated to form a government.

Another participatory tool being used around the world from Iceland to India, is “crowdlaw” — “a form of crowdsourcing that uses novel collective intelligence platforms and processes to help governments engage with citizens. In Taiwan, the new Referendum Act that took effect in January 2018, means the public has “more say than ever in the country’s future.” Running against this trend, the idea of direct democracy has retrenched instead of advanced in the Netherlands. After a non-binding 2016 referendum that expressed euroskeptic sentiment, the Dutch Parliament abolished the referendum law, worried that it would lead to populism.

The difficulty with government by referendum is that there are few safeguards against absolute tyranny of the majority, even it is when razor-thin, or achieved through a campaign of misinformation and foreign interference, as with Brexit. The process is also prone to populist sentiments, as there are no constitutional, or institutional safeguards of accountability for the decisions made, and no moderating influence of a governing track record to establish trust in the proposed agenda, which could become irreversibly repressive on cultural diversity, causing diverse minorities to suffer disproportionately.

Capitalism, Patriarchy and Ecological Survival

Many features of venture capitalism, particularly those that lead towards a tragedy of the commons and a tipping point into climatic crisis, also display graphic features of human reproductive imperatives - distinctively those of the spermatogenetic reproductive strategy of males to accumulate resources exponentially in a winner-take-all venture strategy central to the tragedy of the commons, in the absence of a contravening and complementing female long-term investment strategy across multiple generations.

The classic Tragedy of the Commons, enunciated by Garret Hardin, is a laissez-faire prisoners' dilemma of mutual economic disaster in which it serves everyone who can, to pillage the commons to its extinction, because if they don’t, someone else will. The notion of “Rape of the Planet” – a male sexual crime against Mother Nature – is a central manifestation of patriarchal venture capitalism lacking a balancing long-term out-front feminine reproductive nurturing strategy to maintain the viability of a closing circle of the biosphere. It is this balancing strategy we need to incorporate integrally into our ongoing processes to avoid capitalism threatening our economic and biological viability. The patriarchal competitive winner-take-all investment environment in the electronic age leads to an ever sharpening set of instabilities in which instruments such as futures, originally intended as arbitrage to mediate commodity price fluctuations, themselves become heightened volatility instruments of rapid trade, leading to instabilities, especially in volatile times such as the triple witching hour - the last hour of the stock market trading session on the third Friday of every March, June, September, and December when three kinds of securities: Stock market index futures, Stock market index options and Stock options expire together.

Capitalism is based strategically advantageous use, or misuse, of monetary resources, just as male reproductive investment has a major component of the resource-bearing male securing the sexual commitment of one or more female partners, or by spreading wild oats by enticement and deceit. Classically a majority of ethnic societies are polygynous, with a man able to secure sufficient income to support two wives, frequently doing so. Thus the proportion of men in polygynous marriages in such societies is around one in eight or 1/2, reflecting the inverse cube power law noted in the distribution of capital in human societies. Thus the distribution of financial wealth in capitalist societies is closely tied to the human male reproductive imperative. Nowhere in natural ecosystems do we find one individual possessing a million or a billion times the resources of another member of the same species, except in terms of male reproductive imperatives, where an alpha male bearing the right resources in bulk, display, fighting prowess or monetary or military capital can capture 100% of the reproductive resources of all the females he can command, just as Genghis Khan and his sons did resulting in 1 in 200 men today still having the Khan Y-chromosome.
Another patriarchal feature of capitalist economics is an obsession with exponential growth, to the exclusion of any understanding of how to benefit long-term from inevitable cyclic changes and non-linear feedbacks that arise in natural systems. An exponentiating resource, by its very nature, is unsustainable long-term in any finite environment such as a planetary biosphere. While natural growth is a feature of all living systems, the universal application of exponentials to the economic condition in terms of expectations of an endlessly increasing gross national product, or share and futures markets as an indicator of health has parallels only with male reproductive resource seeking. The health of an economy is not measured by exponential growth, but by long term robustness and the quality of human life it can sustain. An exponentiating economy, like the population explosion, is a long-term threat to our survival through habitat destruction, resource depletion and an unsustainable dynamic that has no day after tomorrow. It is literally a pandemic upon the biosphere with significant risks for human survival as the unrestrained predator. Economics also needs to be able to model itself on the non-linear feedback principles linking natural populations of species to be able to respond intelligently long-term to fluctuating market and natural conditions.

Economics also needs to be able to model itself on the non-linear feedback principles linking natural populations of species to be able to respond intelligently long-term to fluctuating market and natural conditions.

Fig 21: Gross domestic product (top-left) and world population (top-right) have both tracked exponentially between 1300 and the present. These are both unsustainable trends in terms of an enclosing biosphere, and represent a patriarchal fixation with winner-take-all resource expansion, especially at the expense of the long-term resources able to sustain life and humanity. Human population is behaving as a biosphere pandemic exactly as the Covid-19 pandemic (lower-left) in its exponential climb in the US before social distancing began to reduce the infection infectivity coefficient. Notice that the more Covid cases in NY results in a population decrease, illustrating how two biological populations interact, just as in the black death dip (top-right). A model system (lower right) with three interacting species, each reproducing exponentially, shows how living populations fluctuate sustainably.

Human populations are always subject to such fluctuations, through famine, disease or violent conflict. Sustainable future strategies depend on including the carrying capacity of the biosphere and its genetic and biological diversity and non-renewable planetary mineral resources into the feedback system to enable sustainable economic and ecological planning for the future. This cannot occur while short-term patriarchal imperatives dominate world decision-making. It also takes the long-term investment strategy of female reproductive investment as an integral part of the mutual decision-making process to be a viable undertaking.

Other features of capitalist investment, including winner-take-all intellectual property rights, the tendency to short term boom and bust investment at the expense of long-term sustainability, the reckless risk-taking preparedness to pass irreversible tipping points unless damage is exhaustively proven in advance, all reflect the male reproductive imperative’s venture risk strategy - preparedness to die to secure reproductive immortality. This is well illustrated in the ballad of Matty Groves facing the risk of death to fertilize Lady Arlen, thus possibly siring a high-born child who will have riches, the choice of many eligible women and thus many offspring. No woman can afford to intentionally risk her life to reproduce because she can only give birth if she is alive, although in this tragic, tale having invited Matty in as a desirable party while her husband is away, as women are wont to do as part of their genetic reproductive insurance, she curses the Lord for his violent deed and is also murdered.
Fig 22: “Matty Groves” is a ballad probably originating in Northern England that describes an adulterous tryst between a young man and a noblewoman that ends when the woman’s husband discovers and kills them. The song dates to at least 1613, under the title Little Musgrave and Lady Barnard and illustrates the fact that male reproductive investment to get a high born lady pregnant is still a survival strategy if his offspring survive and grow up to a privileged situation.

Steady state economists such as Herman Daly, Richard Heinberg and Brian Czech try to make clear that growth pursued over and above what the natural environment and non-renewable resources can sustain is unsustainable bad economics, which may benefit the perpetrator but overall reduces our long-term collective wealth. However, nature itself is stable amid climax diversity and natural fluctuation. This leads to ecological economics, in which the priority is modelling our economic system on natural principles to enable society to coexist over time with the biosphere on which we depend for our survival.

Fig 23: Preface to “The Subjection of Women” by John Stuart Mill.

Penetratingly John Stuart Mill, one of the founders of economics, both hypothesized that the “stationary state” of an economy was the desirable condition, and at the same time, in his work “The Subjection of Women” claimed that society and gender construction was holding women back and that the oppression of women was one of the few remaining relics from ancient times, a set of prejudices that severely impeded the progress of humanity.

Edmundo Braverman’s blog "Go get Somebody Pregnant" has an interesting insight into the sexually charged relationship between sowing wild oats, ramped up personal debt and a competitively hungry trading drive. Commenting on an associate’s incipient fatherhood honing his approach to business he notes: "It instantly brought me back to my old stockbroker days because, believe it or not, management encouraged knocking someone up all the time for this very reason. ... Management understood the correlation between outside pressure and increased production, and you never saw this more pronounced than when one of the guys had some girl pull up pregnant. ... That’s [also] why they wholeheartedly supported guys getting into enormous amounts of consumer debt ... you’d see a level of motivation and resourcefulness come out in them that you hadn’t seen before. ... There was certainly no altruistic intent behind my old firm encouraging guys to have kids, but the end result was the same: increased production."

And there is clear evidence from a 2008 research study for sexually physiological responses in male stock traders, whose testosterone levels soar on days they make above average profitable trades. This has led to concern they may then become susceptible to excessive risk taking due to a continuing rise in hormones in the “winner effect” useful for ongoing sexual conquests but which in a trading situation could lead to whiplash losses. However, exposure to market volatility and the resulting stress elevated cortisol levels, can potentially lead to a psychological state known as “learned helplessness” where risk aversion may lead to stasis. In men these opposing forces could lead to sentimental boom-bust instability. Paradoxically another study has shown that both high and very low testosterone lead to heightened risk taking, possibly for opposite reasons. Men on the bottom of the social heap need to take risks to reproduce because they have no other choice. Low serotonin is thus also associated with male delinquency.

By contrast with male boom and bust short-term investment another more recent survey in 2012 by Rothstein Kass found that the few hedge funds led by women far outperformed the global hedge fund index. This pattern has continued. In 2018 hedge funds run by women outperformed the industry average by 20% over the previous decade.
The HFRI Women index, which pulls in the performance of hedge funds run by female managers, showed these funds returned 9.4% on average in 2017, pushing 10-year returns to over 70%. By comparison, hedge funds across all strategies and genders returned an average of 8.5% last year, and have generated returns of 50% since 2007, according to HFR.

Women hedge fund managers have substantially less assets, because it is harder for a woman to win the money. Jane Buchan, chief executive of Paamco, a $24bn fund of hedge funds notes "To get that same level of assets as a man, you have to outperform by 200 basis points". KPMG, the accounting firm that acquired Rothstein Kass in 2014, in 2017 found 79 per cent of US hedge fund professionals believe it is harder for women to attract capital from investors than for their male counterparts. The disparity between the number of men and women working in the industry is one of the highest in finance, the Northeastern study found. Only 439 hedge funds employ a female portfolio manager, compared with 9,081 that employ a male investment manager. However, as of 2019, many of the highest-profile hedge fund launches this year are led by women.

The reasons attributed to this success were that women are more averse to high risk strategies than men, making them potentially “better able to escape market downturns and volatility” and thus make better long term investors. Author LouAnn Lofton, whose book title states “Warren Buffett invests like a Girl” says women “trade less and their investments perform better, that they are more realistic, that they are more consistent investors, and that they tend to engage in more thorough research and ignore peer pressure”. Notably when it comes to the higher risk, venture capitalist arena, women are harder to find - just three women ranked at positions 36, 47 and 82 in the latest top hundred 'Midas list' in Forbes magazine.

However, the presence of women in prominent positions in major corporations doesn’t necessarily lead to a change in the capitalist zeitgeist any more than it has in adversarial politics. Business as usual is built on a complex edifice of patriarchal institutions, from company and corporate structures, through banks, commercial law and regulatory regimes all designed to keep the flow of business as usual operating. We cannot thus expect the appointment of Ginni Rometty as CEO of IBM (now executive chairman), Sheryl Sandberg to Facebook, or Marissa Mayer to Yahoo (now of Lumi Labs after resigning when Yahoo was sold to Verizon) to result in iconic qualitative changes in the way these corporations operate in the competitive business environment.

There are also poignant lessons to be learned from the history of radical feminism, which show unbridled female-only strategies can have every bit as disquieting outcomes. Susan Faludi notes in the New Yorker that virtually every feminist who founded a radical movement was subsequently banished from the group. Shulamit Firestone was forced out of New York Radical Women after she and two associates were accused of being ‘defensive’ and ‘unsisterly.’ Marilyn Webb was forced out of Off Our Backs - because she was the only one with journalistic experience, being told ‘You can’t write at all; you have to help other people’, and banned from accepting public-speaking engagements. Jo Freeman was ostracized by members of the group Westside she had helped found. “There were dark hints about my ‘male’ ambitions – such as going to graduate school,” she said. Carol Giardina was ousted from her Florida group by “moon goddess” worshippers who accused her of being “too male-identified.” “I don’t know anyone who founded a group and did early organizing” who wasn’t thrown out. It was just a disaster, a total disaster.”

The emerging lesbian wing browbeat Kate Millett into revealing that she was bisexual, and then denounced her for not having revealed it earlier. Millett had a breakdown and was committed to a mental hospital. Firestone, who had been denounced by feminists for violating the “We’re all equals” ethic by accepting a small book advance, when the
women wanted to collectively own the copyright, and for appearing on “The David Susskind Show”, developed schizophrenia and eventually died alone in her apartment, apparently from starvation.

Anselma Dell’Olio, founder of the New Feminist Theatre, in New York warned that women’s “rage, masquerading as a pseudo-egalitarian radicalism under the ‘pro-woman’ banner,” was turning into “frighteningly vicious anti-intellectual fascism of the left.” After Ti-Grace Atkinson resigned from the Feminists, a group she had founded in New York, she declared, “Sisterhood is powerful. It kills. Mostly sisters.”

In parallel with the evidence of the Neolithic culling of the Y-chromosome (fig 10), is evidence for increasing inequality in large old-world urban civilizations. The research team worked with archaeologists around the world to collect data from 62 sites in North America and Eurasia dating from before 8000 B.C.E. to about 1750 C.E. (They also included one modern hunter-gatherer group, the !Kung San in Africa). From the distribution of house sizes, they calculated each site’s Gini coefficient, a standard measure of inequality, discussed below.

Gini coefficients, fig 26, represent the area of total income taken by a population, ranging from zero, indicating that each person has exactly the same amount of wealth, to one, representing a society in which a single person has all the wealth. The researchers found that inequality tended to gradually increase as societies transitioned from hunting and gathering to farming, supporting long-held hypotheses about how agriculture intensified social hierarchies. In a gatherer-hunter society such as the San, a rough estimate of the variance in male resource accumulation suggests an inverse cubic law where 1 in 8 = 23 males accumulate twice the average male resource. This coincides reasonably with the incidence of polygyny of about 1 in 8 and corresponds to a Gini coefficient of about 0.3. About 2500 years after the first appearance of domesticated plants in each region, average inequality in both the Old World and the New World hovered around a Gini coefficient of about 0.35. This figure stayed more or less steady in North America and Mesoamerica. But in the Middle East, China, Europe, and Egypt, inequality kept climbing over time, topping out at an
average Gini coefficient of about 0.6, roughly 6000 years after the start of agriculture at Pompeii in ancient Rome and Kahun in ancient Egypt. The authors propose that domestic animals may explain the difference between the New World and the Old World: Whereas North American and Mesoamerican societies depended on human labour, Old World societies had oxen and cattle to plough fields and horses to carry goods and people.

Consistent with these findings, another study demonstrates that, in contrast to men, rigorous manual labor was a more important component of prehistoric women’s behaviour than was terrestrial mobility through thousands of years of European agriculture, at levels far exceeding those of modern women. Humeral rigidity exceeded that of living athletes for the first ~5500 years of farming, with loading intensity biased heavily toward the upper limb. Inter-limb strength proportions among Neolithic, Bronze Age, and Iron Age women were most similar to those of living semi-elite rowers.22

Gini coefficients in the modern world range similarly from as low as 0.3 in egalitarian societies such as in Scandinavia up to 0.7 in countries having both a rich elite and a low level of income for the bottom half of the population. Gini coefficients in developed capitalist economies are higher with an extreme excess of income in the very top categories, resulting in a hard J-shaped distribution, but the highest of all are in developing countries with an elite. The top six countries are all African: Lesotho 0.632, Botswana 0.63, Sierra Leone 0.629, South Africa 0.625, Central African Republic 0.613 and Namibia 0.597. The US with 0.47 is high but not as high as Mexico at 0.483, or surprisingly Costa Rica with a strong democratic record at 0.503. The UK has a lower value at 0.324, but has very entrenched land ownership in which aristocracy and gentry own 30%, corporations 18%, oligarchs and bankers 17%, the public sector 8.5% and the public only 5%. The lowest is Slovenia at 0.237 with Scandinavian and several other European countries in the mid-twenties, with Germany on 0.27 and France on 0.31.

Gini figures are subject to instability, both because of grainy low levels of sampling among the highest income earners and because of ambiguities of how to tally negative income at the bottom end due to debt. Both ends also tend to misreport their figures, leading to the use of relative measures, such as the Palma ratio, of the richest 10% share divided by the poorest 40% share, on the basis that middle class incomes tend to represent about half of gross national income, while the other half is split between the richest 10% and poorest 40%. However, all the above estimates are probably too soft, because the richest are extremely adroit at hiding their incomes in convoluted corporate dealings, opaque trusts and offshore tax havens, as the Panama and Paradise papers aptly demonstrate. The true figure is thus likely to correspond more closely with the harder G figures quoted by Chinese research, Oxfam and the UN for world values of 0.7 – 0.8, despite efforts to reduce extreme poverty in developing countries.

What the Pandemic Teaches us about Female Leadership

As noted in the introduction, the world crisis caused by the Sars-CoV-2 coronavirus is a crisis of human misadventure due to exploitation of wildlife habitats driving species into crisis and bringing varieties of wild species into unnaturally close contact due to trafficking and animal markets, where species with endemic viruses such as bats, come into close proximity with animals from civets to pangolins. The misadventure of this crisis has been compounded by human negligence in the face of such impact because we already suffered threatening outbreaks of related corona viruses SARS and MERS, both with high death rates, with infections of each reaching over 20 countries before they were contained, so a third and more devastating pandemic is the wages of negligence.

Humans are subject to an ever richer spectrum of epidemic diseases because of their intimate interaction with many different wild and domesticated species often under highly unnatural cramped and stressed conditions where outbreaks are a natural consequence. Other diseases such as measles have also come from a zoonotic origin in that case from rodents via rinderpest disease in cattle. HIV and ebola have also been transferred from animal hosts. Plague has also been transferred multiple time from rodents, including the rat and last century the marmot used for fur. Given the exponenitiatig human population, with mass global travel and densely packed urban populations, Homo sapiens remains a sitting duck for Malthusian epidemics correcting the imbalanced human population impact on the biosphere.

In this situation, Sars-Cov-2 represents a uniquely strategic potential threat to human health, economy and quality of life which remains unresolved. The ACE-2 receptor that is its binding target is widely expressed, not just in the upper airways, but deep in the lungs, the endothelial cells that line the blood vessels and is thus expressed in organs from the kidney and liver to the heart and brain. It combines both the high infectivity of the common cold, able to be turned to an epidemic in days if uncontained, because a single ‘superspreader’ with a huge viral load just before they
begin to feel ill can spread it to up to 200 people in a large gathering, combined with the severe lethality of SARS when it infects the lungs or enters the bloodstream, as it does in 12% of people, particularly those over 65.

Consequently, as of 10th April 2020 as I write, it has infected over 4 million people with over 200,000 deaths to date, with deaths in New York City soaring over 3400 per million, three times worse than the highest epidemic peak of smallpox in the 19th century.

The other confounding thing about the about Sars-CoV-2 is that it has bought the entire economic activity of the world to a virtual standstill except for food and medical supplies. It constitutes the first time in world history that half the world’s population has been placed in effective house arrest in a lockdown spanning countries planet wide. Hence it is the most devastating challenge to business-as-usual the planet has ever faced.

This also highlights the fragility of the capitalist economy, where competitive business practices mean that many industries, such as the airlines, have to operate on borrowed capital to survive in the concrete jungle of competing routes and the moment travel, or other activities like the hospitality industry, are curbed for health reasons, many sectors of the economy literally go bankrupt overnight, and go down like a house of cards, in a complete contrast to ecological survival of living species where fluctuations due to predators, diseases, famine and flood require all species to have resilience to adverse conditions, cemented through the cumulative nature of genetic evolution mutation and natural selection. This is completely absent in the patriarchal model of venture capitalism, for which split seconds on the future market, hours in the stock market, days in production industries and three months in terms of economic planning, constitute the only horizons in competitive focus.

This also means that predictions of economic doom are ill-founded, because rebounds from short term health crises, where the death rate is contained, can result in a quick rebound recovery, but the lesson remains that cumulative continuity of life should be the basis of the economy rather than vice versa. The one proviso is that countries in recovery accept a responsibility to alleviate any ensuing consequences such as a third world famine.

![Fig 27: (1) The Sars-CoV-2 viral structure. (2) The spike protein open reading frame and folded structure. With one of the three linking points to the ACE-2 receptor in the open (binding) state. (3) The ACE-2 blood pressure receptor and the cellular TMPR protein which activates the binding process. (4) The ACE-2 receptor permeates the body and organs lining the blood vessels. (5) The RNA replicase in resting conformation. An associated protein in corona viruses also provides proof-reading capability. (6) Unrooted evolutionary tree of Sars-CoV-2 mutational strains coloured by locality. Purple is China, yellow is Europe and red is the US which shows several divergent strains on different branches, which have arrived from both Asia and Europe.](image)

There are a number of reasons why the virus is a worthy adversary. Its large genome largest of RNA viruses at 30,000 bases is supplemented by a unique error-correction mechanism which allows a single stranded RNA virus to have a larger genome without suffering a mutational collapse. While this may mean it evolves more slowly, potentially aiding a vaccine, it also means it can edit out mutation-inducing antivirals such as ribavirin which are nucleotide analogues. It is also prone to structural genetic recombination events with other corona viruses when different species are brought into close proximity and which may become sicker due to ill-treatment in transit. Recombination means that
whole evolutionary features such as the particular spike protein that binds far more effectively to the ACE-2 receptor than other corona viruses can be coupled with other core genomes, resulting in a highly noxious chimera.

As humans have no immunity to this virus and there is so far no vaccine and no fully effective antivirals, with the best only providing some alleviation, the only way to stop the pandemic completely overwhelming emergency facilities, leaving a percentage of the human population to simply die in the street, is to activate social distancing and with it shut down the economy for all but essential activities involving food supply and urgent medical treatment. This is where the majority of the world has found itself for the last two months.

While the intense focus on developing a vaccine may produce a way to hold the pandemic collectively in check in future, we have no certainty at this point that an effective vaccine that can handle all the emerging strains effectively will be developed and certainly not in a matter of weeks. Vaccine trials for SARS and MERS gave equivocal results and vaccines for several other diseases, including both HIV and the common cold corona viruses have never been forthcoming.

Hence the world has had to fall back on social distancing lockdowns of various intensities to attempt to flatten the pandemic’s exponential and ultimately bell-shaped curve to avoid hospital systems becoming overwhelmed. The difficulty with this is that even if infection rates are much higher than the number of confirmed positive tests, they are still far lower that the 60% plus needed for herd immunity to slow down the infection rate to sustainable levels. Although people do seem to establish an immune response sufficient to recover from the disease if they don’t succumb, we have no idea how long-lasting this will be. The corona viruses causing the common cold which also originated from zoonotic transmission from bats and rodents continue to cause mild disease on an annual basis because effective immunity is short-lived. Indeed, some Covid cases have had up to three recurrent bouts of infection, raising questions over effective immunity. This means that reopening has to be done very carefully, or we will have one or more pandemic rebounds and protracted shutdowns, or a high mortality.

Fig 28: Deaths rates and patriarchal defection: Death rates per million people (centre) are already way above the worst peak of smallpox in the and those of scarlet fever and pertussis 19th century (right), before the covid-19 pandemic has anywhere nearly run its course. Trump issuing tweets “LIBERATE MICHIGAN” AND “LIBERATE VIRGINIA Save your great 2nd Amendment. It’s under siege!” in contradiction to his own medical teams, and supporting the protesters entering the Michigan State Chamber armed, describing them as “good people” who were angry and should be given a deal attests to the patriarchal approach – to care less for the value of life than the greed of economic opportunity – in Trump’s case for his own re-election prospects.

One can also hope that the virus will evolve to become milder, as influenza has done since the 1918 flu epidemic which caused 50 million deaths worldwide, but there is no guarantee that mutations will selectively degrade the very high affinity the spike protein has for the ACE-receptor, which is pivotal to both its infectivity and its lethality.

So the key question running in the thread through this entire article re-emerges. How well does the patriarchal culture handle this pandemic crisis highlighting humanity’s precarious survival relationship with the biosphere?
Looking at the pandemic response internationally, the right wants to get business-as-usual back in business as quickly as possible, even if it means sacrificing the health of its citizens, at the expense of mass mortality. Having failed to prepare for the pandemic and having disbanded the government’s pandemic response as a non-priority Donald Trump then claimed virus would just “go away” or was like the flu, but finally had to admit his CDC medical advice that the pandemic could cause 100,000 deaths and many more without social distancing.

However, before the curve had been flattened he said “We can’t allow the cure to be worse than the problem itself” and having tried to order the states to begin opening when this exceeded his presidential powers over the states, despite the death toll rising currently to nearly 79,000 as of today, he has incited his base protesters to open up states by blocking the legislatures, including armed protesters entering the Michigan state house during session and withholding the federal health guidelines from states trying to make a decision whether it is safe to reopen.

This means that the USA is continuing to experience rates of infection in many states that are not actually containing the epidemic and that reopening is premature. It is also a decision that risks front line workers, including medical personnel at the expense of right-wing legislators and business leaders, who can stand aloof from immediate risk of infection, even though the elderly who are most severely at risk are supporters of the right.

While many male world leaders, from Narendra Modi in India to Scott Morrison in Australia, despite some early mixed messages, have made an effective response to the pandemic, the response of male world leaders has varied. While Spain and Italy were experiencing severe epidemics due to early undetected cases causing a runaway before effective measures were put in place and have now successfully contained the worst phase by stringent social distancing lockdowns, the UK under Boris Johnson shambled its way, at first banking on herd immunity and then doing a U-turn too late before Boris himself came down with a severe case requiring intensive care, and the UK epidemic has now grown to be one of the most devastating in Europe with nearly 32,000 deaths. In Brazil, Jair Bolsonaro has done everything he can in Trump’s image to unravel the social distancing instituted by states and cities to protect their population again in the name of the economy and again claiming it was “just a little flu”, despite the burgeoning mass graves in Manaus and other cities.

So it serves as a fitting comparison to look at the way a notable number of female leaders have addressed this crisis. Not all have succeeded completely, it is highly significant that the woman leaders of Germany, Finland, Iceland, Denmark, Taiwan, New Zealand, Slovakia, Norway and the State of Michigan have put on and outstanding performance with high levels of public support for sometimes very severe lockdowns, which have been announced in both a clear and consistent way to support the protection of life as the first priority, and with a level of empathy that has brought their populations onside in strong support of their actions.

New Zealand, Taiwan, Iceland and Slovakia, through a combination of social distancing, accelerated testing and careful contact tracing have almost brought their epidemics to the point where the disease could be stamped out entirely, permitting a gradual emergence without high risk of repeated epidemics. Not to forget Jung Eun-kyeong, the head of Korea’s Centers for Disease Control and Prevention, whose management of the response has made her a national hero(ine), and an inspiration for virus-fighters worldwide Denmark, the one partial exception, still has a significant continuing rate of infection, although early preventive action was taken and the death rates are comparatively lower there.
1. Angela Merkel’s personal approval ratings have gone through the roof due to her firm but fair handling of the crisis in Germany. “It was very direct, it was very straightforward, down to earth, empathetic and personal.”

2. Sanna Marin is the Social Democrat prime minister of Finland. On 8 December 2019, at age 34, she became both the world’s youngest serving state leader at the time. She has had an 85% approval rating among Finns for her preparedness for the pandemic.

3. Led by Prime Minister Katrín Jakobsdóttir, and deCODE Genetics, a joint initiative has allowed roughly 11.7 percent of Iceland's population to be tested. Iceland also launched an intensive contact tracing initiative that helped quickly isolate people who may have been exposed to the virus.

4. While many of her European neighbours were fumbling around for a response, Mette Frederiksen closed her country’s borders on 13 March. A few days later she closed kindergartens, schools and universities and banned gatherings of more than 10 people. This decisiveness appears to have spared Denmark the worst of the pandemic.

5. President Tsai Ing-wen and her vice president, an epidemiologist, took assertive early measures to limit the spread of the virus, restricting many visitors and implementing new mandatory health checks. Months later, the island of around 23 million people is reaping the benefits with a very low death rate.

6. Jacinda Ardern shut New Zealand's borders swiftly saying “act hard act fast” and prepared citizens for protracted measures. Her messaging left no room for confusion. “To be absolutely clear, we are now asking all New Zealanders who are outside essential services to stay at home and to stop all interaction with others outside of those in your household. Act towards others as if you have Covid-19”. Currently we have it almost eradicated.

7. Photos of Slovak President Zuzana Čaputová and representatives of the new Slovak government all wearing facemasks at the swearing in ceremony of the new coalition government literally travelled around the world. On 16 March, the largest cities introduced the first regulation on compulsory (cloth) facemasks in public transport, the very first such legislation in Europe. It now has one of the lowest death rates in Europe.

8. After weeks of lockdown, Norway’s infection rate has slowed so much the country has introduced plans to loosen restrictions. Prime Minister Erna Solberg, made a point of "letting scientists make the big medical decisions" and says an early lockdown was the key to their success in combating the coronavirus crisis.

9. Gretchen Whitmer, Governor of Michigan, has faced a severe wave of US casualties and has earned high poll ratings for her firm policy to protect life, despite attacks from Donald Trump and both gridlock protest blockages of the main thoroughfares and then armed protests in the State Chamber.
This shows in graphic detail how female long-term life-centered investment in a time of acute crisis combined with a more empathic response to the plight caused by human populations in lockdown can excel at protecting their populations and realizing the prospect of actual recovery from the epidemic and hence an earlier and cleaner economic recovery as well.

This is also a lesson about what is possible for the future of Earth and issues, from climate crisis to biodiversity extinction when female leadership has the power to focus on critical decisions for a sustainable human future.

We thus urgently need affirmative worldwide action, particularly from the women of the world, to fully regain female reproductive and decision-making sovereignty, to ensure that the female strategy of long-term investment in the quality of life is incorporated into our cultural decision-making and political judgments to counterbalance the patriarchal emphasis on short-term financial gain, based on winner-take-all resource accumulation.

Climate and Biocrisis: The Striking Power of the Young

The Covid-19 pandemic has shown us that a world which cannot realistically modify business as usual exploitation to address human impact on the biosphere, risking a planetary tipping point can be stopped in its tracks by a mere virus. By comparison with dealing with a pandemic, the cumulative problems of human impact are far more deleterious to both future quality of life and to the world’s economic viability, and could result in the mortality of many more people than Covid-19. The problems are made all the more intractable because action requires international cooperation to transform our energy economy, but this is mired by national interests and resolve will can be unravelled all too easily by a single defector in a position of power, disrupting the capacity of the world to act cogently and scientifically.

Donald Trump’s announcement of intention to withdraw the US from the Paris Accord stands as an act of dereliction, constituting a tragedy of the planetary commons far more crippling than Covid-19, unless the world can collectively put an end to the politics of dissolution for personal political gain. With climate change, the same patriarchal sacrifice of health and life for immediate gain abets climate denial in favour of the status quo, which others can worry about later. Incited by Trump’s strategic eclipse of its own conservative values, the Republican party has also sacrificed its credibility and respect by collectively entering into a Faustian pact of climate denial for political ends.

However, underlying the climate crisis is a much more serious and potentially devastating one for humanity’s future quality of life, economic future and survival as a species, and that is the mass extinction of biodiversity being driven both by whiplash climate change and wholesale habitat destruction further exacerbated by deforestation and the burning of both the tropical rainforests and temperate forests of Earth, as well as the conversion of vast wilderness areas to monoculture.

Solving climate change doesn’t involve a lockdown bringing the world economy to a standstill, just moderated consumption economics and investing in a smooth transfer to sustainable power generation, so the inertia and inability to make devolving from the carbon economy a world strategic imperative is both bad long-term economics and detrimental to human future viability. The economic factors favouring an easy transition to renewable energy, which is already available and increasingly cost efficient, is being hampered by intentional policies both by the Trump administration and oil producing countries and companies to subsidise continuing polluting forms of energy generation which also depletes non-renewable resources needed by future generations.

The issues of biocrisis and mass extinction are more serious and require a combined strategy of mitigation of habitat destruction, replanting of wilderness areas, conversion of food production and consumption to less polluting and carbon-intensive practices and collecting as much genetic diversity as possible in gene banks to at least conserve plant, bacterial, and fungal diversity. The fate of insect and other small multi-celled animals is also highly important for overall planetary fertility.

A clear dedicated aim of protecting half the Earth from human impact and allowing diversity to replenish in the wilderness is essential for the long-term robustness of the human species over evolutionary time scales. We are very small on the face of the planet. Planetary changes crossing tipping points, if they occurred, would have a much more serious long term impact on the viability of human species, let alone the economy, than adopting the precautionary principle. Changes in the ocean level, once initiated will continue for up to 1000 years due to changes in the planetary
albedo as the white polar caps melt. They could also destabilize oceanic floor methane hydrates causing a rapid exacerbation of global heating. They could render vast land areas uninhabitable to humans and for food production reducing the economic carrying capacity of the planet for human life for millennia to come.

Fig 30: (1) World population is predicted to continue to rise through to 2100\textsuperscript{90}, with the majority of the increase in sub-Saharan Africa, while Europe and the Americas are stabilizing and Asia will also do so by 2050, however this will increase the world population to 10 billion, with immense pressure on the African continent’s carrying capacity and pressure of migration on all continents. (2) Predicted long term effects of climate change\textsuperscript{91} could lead to a catastrophic cumulative heating over millennia, taking the planet back to the previous hot period 50 million years ago, placing many of the plant and animal species on which we depend well out of their evolved climate zone, potentially leading to human extinction because of our continuing dependence on highly evolved plant species. (3) Human intrusion into all available habitats means that the biomass\textsuperscript{92} of livestock is over 14 times that of all wild animals and the biomass of humans is over 8.5 times that of all wild animals. (4) This situation is unsustainable and leads directly to mass extinctions of biodiversity which takes up to 50 million years to be addressed by subsequent evolution, as exemplified by previous mass extinctions. (5) The incipient sixth mass extinction that started in the Late Pleistocene has already erased over 300 mammal species\textsuperscript{93} and, with them, more than 2.5 billion years of unique evolutionary history. Detailed calculations of mammalian species indicate a time frame of millions of years to recover from the current mass extinctions, by evolving new life forms, but those lost will never be recovered. (6) Species losses of a wider variety of animal and plant phyla. Insects are also suffering catastrophic population decline due to habitat destruction. (7) Scorched-earth clear felling for palm oil plantations. Such wholesale habitat destruction is even worse than burning the rainforest (fig 1) because all living diversity is eradicated in favour of one monoclonal species. (8) Coral bleaching shows how climate change alone can lead to wholesale mass extinction of species in some of the most intense oceanic biodiversity hotspots, leading to a barren ocean.

Finally, we still remain in a situation of mutually-assured destruction due to a massive overkill of nuclear destructive power which could also lead to a human and biodiversity genocide. This remains a key challenge and a dark comment on the patriarchal winner-take-all death-risking reproductive strategy extrapolated to utopian proportions, which urgently needs to be addressed for the safety of the human species and the biosphere.

All this might seem too difficult a nexus of problems to be solved, except for the unexpected wild card of a young school-age girl with a riveting attention, fuelled by using her tendency to Asperger’s as a ‘super-power’, to create a
viral ‘pandemic’ of school strikes spanning all the planet’s continents in a single coherent transformation, rejecting business-as-usual’s calculated inertia, in favour of a liveable future for an otherwise-to-become-stolen generation.

Fig 31 Generational transformation: The activism of Greta Thunberg, by leaving school and standing outside the Swedish parliament demanding action on climate change, galvanised the younger generation into a spontaneous world movement of climate activism. These pictures from around the world show the school strike for climate, from Brisbane, Marovo, New York, Tokyo, Oslo, Kathmandu, London, Paris, Cambridge, Birmingham, Venice, Durban, Sydney, Maastricht, La Paz, Bangkok, Manila, Berlin, Ankara, Dhaka, Rome, Auckland, Wellington, Hamburg, Nairobi, Mumbai, Washington, Munich, New Delhi, Lahore and Athens. They demonstrate that this is a generational issue in which the future generations of humanity know they are being robbed of their heritage and can, despite their younger age rise up to protect themselves, the planet and the future of the human species. Greta’s continuing tenacity and cutting articulacy took her, by sail power to the UN Climate Action Summit, where she made an impassioned statement of the injustice to future generations of the current generation stealing the next generations carbon footprint, being named Time person of the Year in the process. This proves beyond a doubt that child activism has become an integral and necessary world force for change.

Here is the full transcript of Greta Thunberg’s speech to the U.N.’s Climate Action Summit in New York City, beginning with her response to a question about the message she has for world leaders:

My message is that we’ll be watching you. This is all wrong. I shouldn’t be up here. I should be back in school on the other side of the ocean. Yet you all come to us young people for hope. How dare you! You have stolen my dreams and my childhood with your empty words. And yet I’m one of the lucky ones. People are suffering. People are dying. Entire ecosystems are collapsing. We are in the beginning of a mass extinction, and all you can talk about is money and fairy tales of eternal economic growth. How dare you! For more than 30 years, the science has been crystal clear. How dare you continue to look away and come here saying that you’re doing enough, when the politics and solutions needed are still nowhere in sight.

You say you hear us and that you understand the urgency. But no matter how sad and angry I am, I do not want to believe that. Because if you really understood the situation and still kept on failing to act, then you would be evil. And that I refuse to believe. The popular idea of cutting our emissions in half in 10 years only gives us a 50% chance of staying below 1.5 degrees [Celsius], and the risk of setting off irreversible chain reactions beyond human control. Fifty percent may be acceptable to you. But those numbers do not include tipping points, most feedback loops, additional warming hidden by toxic air pollution or the aspects of equity and
climate justice. They also rely on my generation sucking hundreds of billions of tons of your CO2 out of the air with technologies that barely exist. So a 50% risk is simply not acceptable to us — we who have to live with the consequences.

To have a 67% chance of staying below a 1.5 degrees global temperature rise — the best odds given by the [Intergovernmental Panel on Climate Change] — the world had 420 gigatons of CO2 left to emit back on Jan. 1st, 2018. Today that figure is already down to less than 350 gigatons. How dare you pretend that this can be solved with just ‘business as usual’ and some technical solutions? With today’s emissions levels, that remaining CO2 budget will be entirely gone within less than 8½ years. There will not be any solutions or plans presented in line with these figures here today, because these numbers are too uncomfortable. And you are still not mature enough to tell it like it is.

You are failing us. But the young people are starting to understand your betrayal. The eyes of all future generations are upon you. And if you choose to fail us, I say: We will never forgive you. We will not let you get away with this. Right here, right now is where we draw the line. The world is waking up. And change is coming, whether you like it or not. Thank you.

These events show that it is possible to address climate crisis and biocrisis, despite the difficulties, and that the children of the world have a key role to play in unravelling the Gordian knot of the business and political leaders of the planet turning the other way, sleepwalking in the status quo for convenience, and failing to address the need to act to protect the future, for the tempting gains of the present.

We thus urgently need to support the children of the world, taking their rightful place in strategic decisions over the world’s economic and ecological future, to ensure that human long-term investment in the quality of life is a truly cross-generational engagement and no longer threatens to steal resources from future generations to support an unsustainable adult life style as this generation has done.

Three-way Consensuality: Children, Women and Men

I set out on this journey to highlight the example of how well several women leaders have handled this crisis to make clear that the Gordian knot of our planetary dilemma has a profound sexual basis in the patriarchal dominance of world institutions and decision making, suppressing the long-term investment in the continuity of life that is at the source of the human female reproductive investment.

But as I came to the climax — the most difficult problems of all — climate crisis and biodiversity crisis — I realized that it is not enough just to try to restore the missing feminine component of human consciousness to its rightful place in the evolutionary paradox of sexual selection, because it’s already too late! It is clearly going to take a third generational component to seal the fate of the two adult sexes, and that is the rights of the children of the planet to hold their forebears to account for their profligate misuse of the resources of the Earth amid the literal rape of the living diversity of the planet.

So the protection of the human future now rests on three agencies – man, woman and child – forming a mutual compact of agreement towards a political solution, in which each of their interests are protected from now on by their own ability to determine their fate in mutual coexistence with the other two and to side with the wiser of the other parties in a situation of unresolved conflict, so that at least two of the parties can agree the best path forward, avoiding the domination by one aptrly over another that has blighted the patriarchal epoch.

The men of the world already have effective control, through the patriarchal institutions of capitalism and democracy and their dominance in world politics. If the women of the world can form a consensus to regain their right to hold the patriarchal short-term venture-risk investment in check by forming a world consensus for change, recognising the need for the future of human life to do so, then half the work is done. But from now own, we need to respect that the children of the world hold the key to a viable human future, so this is now a three-way engagement to find the way forward for the sustainable future of life.

I think we can all understand that if the women and children of the planet decide to work together to ensure the future of life, given that they form a majority of the three, and act decisively to make this a reality, the men will have to fall in line for their own survival. Effectively this provides a consensus for survival of the human species, both uniting the two sexes, on which the future of life depends, and uniting the generations, through which the continuity of life flows. This way humanity can perhaps come to understand its role as a protector, rather than a destroyer of life, in the flowering of the universe.
Three guiding principles:

1. Incorporate women’s reproductive investment in life as integral in political planning and decision-making. No strategic decision should be made to exploit the biosphere without their explicit agreement.
2. Include and respect the opinions and concerns of the children of the world in all future planning. No strategic decision should be made to exploit the biosphere without their explicit agreement.
3. Apply our innate skills of establishing verifiable trust to all personal and political decisions (see Postscript)

Verifiable Trust - Thinking like a Bushman

Key to good judgment, including electoral decisions, in evolutionary time, is an understanding of our deep roots in the long-term survival of the oldest cultures on Earth, which is why this article is dedicated to Nisa, as well as Greta. One of the key evolutionary features we have honed over at least a hundred thousand years of human emergence is the astute judgment of who to trust from life experiences and long conversations down the grape vine over the affairs of others and the betrayals and misfortunes that occur in the vagaries of existence and through the Machiavellian intelligence that also permeates human social interactions.

Every truly sane human being will tell you that their most central concerns are to provide for the future and for a future world in which their loved ones and especially their children and grandchildren can have a viable world to survive. Yet we are currently entering into a situation where none of us have any real confidence that the world will be here in a fertile and viable form capable of sustaining the future generations, because of what we are currently doing to planet Earth as a species. How is it that something so basic that human peoples have, throughout our evolutionary emergence, held it central to our sense of meaning and fulfilment, has become an unattainable dream which we all feel helpless to do anything about?

Unravelling this Gordian knot is the key to our survival and the survival of the diversity of life itself. It is the one thing we all need to regain to make sense of the world in which we find ourselves, without which we are helpless and adrift, hoping for some kind of miracle in the face of impossible odds. The Covid-19 pandemic shows us both that unforeseen crisis can become a whiplash before we realize it and that some female leaders have achieved what others have abysmally failed to do in bringing their populations firmly on side with sufficient empathy to hold a disaster in check. The school strikes for climate have also shown us that the children of the world have the maturity to make the right choices for the future, when the adults have failed to address the critical decisions.

Here is a short clear route to regaining our autonomy and capacity to take responsibility for our futures and the caring, power and understanding to help it actually happen.

Since the dawn of human culture some 200,000 years ago, humans have been evolving astute tests of human character, to figure out who are our reliable friends and partners, and who may spin us deceptive tales, or let us down, or exploit us at the critical moment. We are a social species and the main strategic risks to our survival and successful reproduction have for a long time been members of our own species who we can only withstand by our keen social intelligence to understand who might betray us when the chips fall and who might try to seduce our partners, leaving us to care for their offspring rather than our own.

The Bushmen, who form, alongside the Forest Pygmies, one of the oldest sustainable human cultures, with a record going back over 150,000 years, spend long nights talking about their human relationships around the camp fire, just as the women have endlessly discussed their social comings and goings and the tales overheard by others on the grape vine. This has established within our genetic nature, both a capacity for empathy characterised by the mammalian limbic neural system with its palette of emotions from love to hate and from delight to disgust, which enables us to socialize without strict genetic imprinting. Complementing this is an innate capacity to judge human character through personal contact over a series of social encounters.

Thus the sexual selection of falling in love, good mate selection and resourceful partnership, which is the foundation of the human family, are balanced by astute social selection of who we trust and place faith in, from our close experience of the character of those around us, who we know closely over a period of time. This forms an original virtue of astuteness complemented by astuteness on the part of women, in reproductive choice - who to become intimate with and get pregnant to in the affinities of love and tenderness.

While our judgment of good character has a deep evolutionary basis, we also have means to make quick emotional assessments in real time, by gut reaction and these can be subverted, based on innate fears, or being seduced by immediate tangible rewards, so that we can become unintentionally exploited. There have always been defectors and freeloaders, who in addition to cheating on the sly, may use power plays of spin to entice the unwary in to costly misadventure, or violence and intimidation to take advantage by attacking vulnerable parties, stealing their resources or abducting their womenfolk, so the prisoners' dilemma of cooperation and defection has always been with us. Some of these issues have been handled by moral notions, such as not to murder, steal, or commit adultery, but the key to human survival is not moral prescription, but dealing with the people around us by verifiable trust from good knowledge of the character of those with whom we personally associate.
So the answer to this existential crisis is to re-establish our evolutionary sense of true faith - verifiable trust in good character. Our faith in a relationship depends on being one with a party of verifiable good character. Blind faith is not true faith. We need to consciously know that a party of good character to invest true faith in the relationship. The flip side of faith is betrayal. Hence verifiable trust is necessary on both sides in the prisoners’ dilemma of life.

By making real tests of other people and particularly potential leaders, verifiable trust can create a climate of opinion and a real avenue for making major future decisions protective of the planet’s future, both by engaging new forms of collective decision-making where critical long-term decisions can be addressed and by exposing political leaders, social institutions and decision-making processes to accurate astute scrutiny. The free press has a central role to play in this.

The achievable way to be able to get from here to there is by making the waters transparent again through re-establishing verifiable trust. It doesn’t matter if you are a Republican or a Democrat at heart, because both want their grandchildren to survive and prosper. The test is an acid test and a fair test, but it also has some very difficult and uncomfortable things to say about current human institutions.

In the modern political climate, people have become influenced by spin and suspend better judgment over the behaviour of populist politicians, who tell invertebrate lies compounded by doubling down and accusing others, including the free press, of being fake news, or of mounting a witch hunt, while manifestly obstructing justice and caring only for their own re-election over the lives of a hundred thousand people, as a cult reality TV spectacle propelled by their avid base of supporters, who have suspended all critical judgment and abandoned their own religious principles to pretend their leader is a gift from God as a ‘tarnished angel’ who blatantly declares his right to grab women by the pussy, as a TV star. These are manifestly inconsistent with any form of verifiable trust and should set off all the alarm bells of tyranny which the Greeks refined democracy to avoid. Do NOT vote for any person who tells unrelenting lies, while also falsely accusing everyone else of being “fake news”.

This way we can enter an epoch of long-term future goodness, where humanity can begin to understand our cosmological role in the universe as conscious protectors of the continuity of life, so long as Earth shall live – a condition I call resplendence – “to shine brightly” as an antidote to the term religion – “to bind together”, echoing the dark patriarchal implications of the Roman fasces.

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