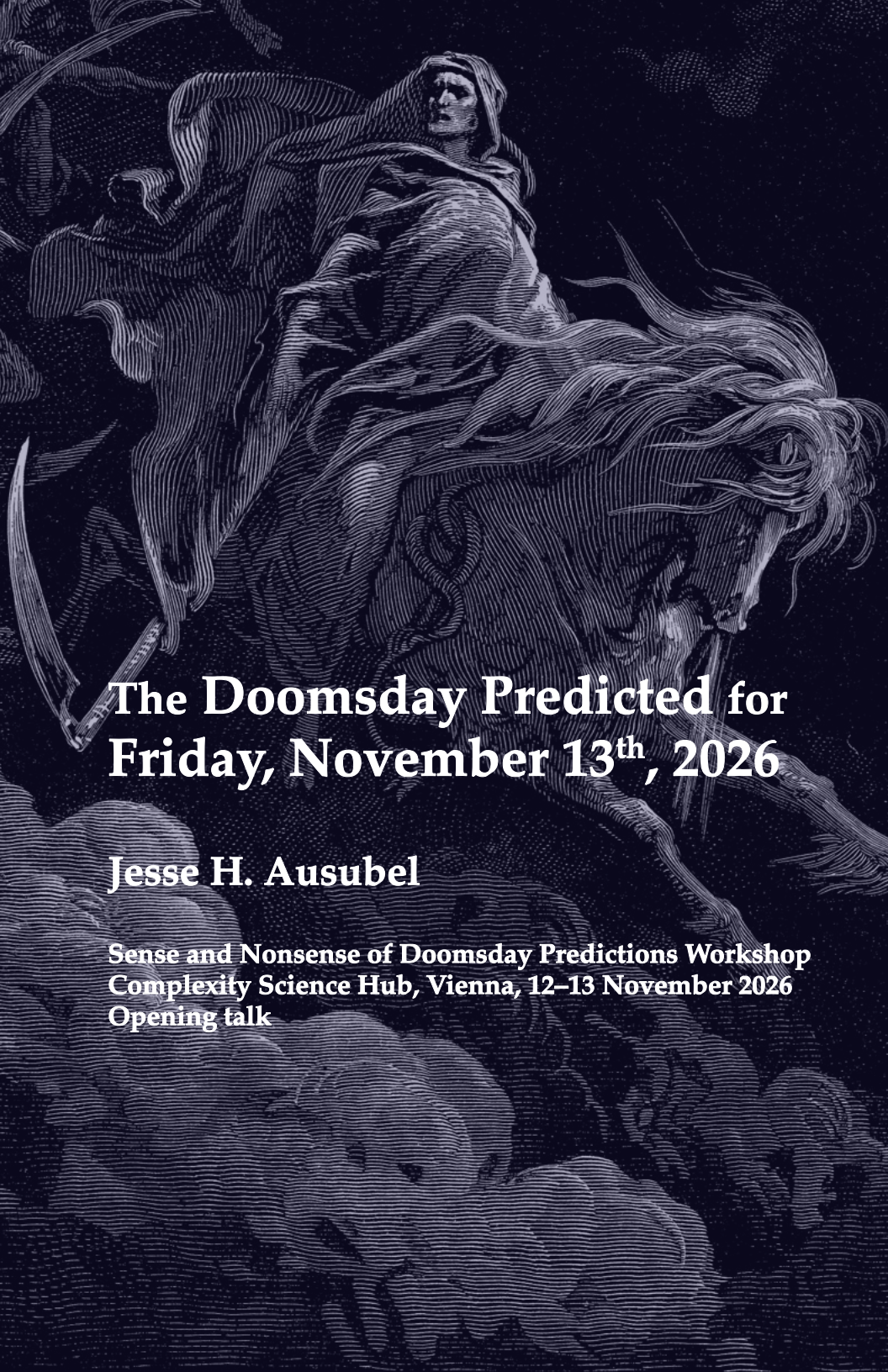


The Doomsday Predicted for Friday, November 13th, 2026

Jesse H. Ausubel

Sense and Nonsense of Doomsday Predictions Workshop
Complexity Science Hub, Vienna, 12–13 November 2026
Opening talk



On the covers

Front: Death on the Pale Horse. Wood engraving made by Gustave Doré, c. 1865. Source: Public domain, via Wikimedia Commons.

Back: The Four Horsemen of the Apocalypse. Woodcut made by Albrecht Dürer, c. 1498. Public comain, via Wikimedia Commons.



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We gather in Vienna on 12 November 2026 because in 1960 an Austrian, Heinz von Foerster (1911–2002), then a professor of electrical engineering at the University of Illinois, with two colleagues predicted Doomsday from hyperbolic growth of human population in a paper in the prestigious journal *Science*.[2] **Figure 1.** The cover of the magazine showed a glowing Buckminster Fuller geodesic dome, an emblem of technological optimism. Hyperbolic growth means a quantity increases faster and faster, heading toward infinity at a specific, finite point in time called a singularity. *Hyperbole*, a rhetorical companion to the *hyperbola*, is a figure of speech and a device that



FIGURE 1. Cover of issue in which von Foerster's Doomsday article appeared; Missouri Botanical Garden's new Climatron, a geodesic dome greenhouse, reflected in a lily pond.

[1] Director, Program for the Human Environment, The Rockefeller University, https://phe.rockefeller.edu

[2] Von Foerster, Heinz, Patricia M. Mora, and Lawrence W. Amiot. "Doomsday: Friday, 13 November, A.D. 2026: At this date human population will approach infinity if it grows as it has grown in the last two millenia," Science 132.3436 (1960): 1291-1295. Co-author Lawrence Amiot enjoyed a long career in the computer science division of the Argonne National Laboratory but did not sustain an interest in Doomsday as far as we know. Patricia Mora, a student of von Foerster, disappears from the historical record, doomed in that era like many women in math and engineering.

uses extreme, intentional exaggeration to make a point, add humor, or express strong emotion. Hyperbole is not meant to be taken literally. Twining hyperbola and hyperbole, von Foerster picked his birthday in 2026, Friday 13 November, as the date of singularity, plus or minus 5.5 years, when human population would be merely 179 billion, plus or minus 14 billion, compared with about 3 billion when the paper appeared.

To set the stage for discussion of the sense and nonsense of doomsday predictions, I suggest six respects in which von Foerster was right, some more literally than others. First, he jolted demography by bringing the perspectives of physics, biology, and cybernetics to bear on a field that had largely overlooked the dynamics of positive feedback. Second, he recognized a hyperbolic trajectory in human population and had the audacity to project it to its mathematical limit, the singularity. **Figure 2.** Third, by calling that limit "Doomsday," he connected a scientific conjecture to humanity's ancient and enduring anxieties about catastrophe and the possibility that the apparent triumph of a growing system may contain the seeds of its own destruction. Fourth, he helped open the way to more systematic study and

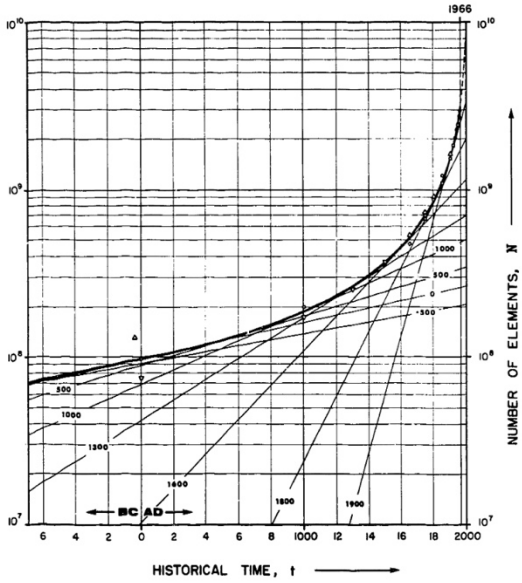


FIGURE 2. Linear-logarithmic representation of estimates of the human population N by various authors and interpolated (solid curve) over the last 25 centuries. Straight lines tangent to the curve at various instances in historical time represent exponential growth as apparent only in the vicinity of these instances. (Von Foerster, 1966)

modeling of collapse. Fifth, his work challenges what anthropologist Joseph Tainter calls the "Progressivist Narrative": the assumption that human history is a story of continuous improvement rather than cycles of growth, complexity, and collapse. And sixth, his warning may prove more timely than ever. Whether we look to *The Lancet's* recent inventory of threats to human health, the extraordinary reversal now unfolding in China's population, or the prospective proliferation of androids, we can discern new candidates for a Doomsday—or at least for a singularity. These are the propositions I want to explore.

Charting the hyperbola, sensing Doomsday

Let me begin with population within academia. Demography in 1960 was largely a subfield of sociology and focused on the "demographic transition" from high to low rates of birth and death and the social and economic development to follow. Von Foerster, educated in physics and funded for cell biology, jolted the field. One of America's foremost demographers, Ansley Coale of Princeton, led the defense of the *status quo* with an immune response to von Foerster. But von Foerster introduced important variables into the discussion, particularly those we now routinely call positive feedback. In 1964 a *geologist*, Roger Revelle, became the first director of the new Harvard Center for Population Studies. Revelle had famously started the direct monitoring of greenhouse gases during the International Geophysical Year 1957–1958, whose time series now often epitomizes Doom.

Second, von Foerster reasonably fitted a hyperbola and projected the singularity. He simply charted changing estimates by earlier experts and interpolated a curve, a hyperbola. Empirically, the curve represented the sum of the evolving expertise of prior authorities. Von Foerster et al. gave it a mathematical, theoretical, and cybernetic basis. An outsider noticed a trajectory that insiders had missed. His projection was the logical culmination of prior scholarship, however horrifying to its practitioners, and it fit well for the next 25 years.

Third, choice of the word "Doomsday" shows von Foerster understood the tradition in which he was working. Veteran Manhattan Project physicists had introduced the Doomsday Clock at 7 minutes to midnight on the cover of the *Bulletin of the Atomic Scientists* in 1947. Referring only to the Western tradition, I would hark back to the Roman author Tertullian, who worried human numbers in 200 CE were already too numerous (**Figure 3**), about 100 years after the Apostle John reportedly received the visions that became the biblical Book of Revelation. Since then, visual artists such as printmaker Albrecht Dürer and painter Victor Vasnetsov have competed to bring to life the Apocalypse or, one might say, singularity. Now the pale horse might be AI. **Figure 4.**



FIGURE 3. Tertullian, circa 200 CE. "What most frequently meets our view (and occasions complaint), is our teeming population: our numbers are burdensome to the world, which can hardly supply us from its natural elements... In very deed, pestilence, and famine, and wars, and earthquakes have to be regarded as a remedy for nations, as the means of pruning the luxuriance of the human race."(From his Apology, Chapter 37/40)



FIGURE 4. Viktor Vasnetsov's 1887 depiction of the Four Horsemen of the Apocalypse. White Horse (Conquest): rider with bow and crown, traditionally symbolizing conquest, military victory. Red Horse (War): rider wielding massive sword, representing bloody, devastating warfare and civil strife. Black Horse (Famine): rider holding pair of weighing scales. Pale Horse (Death): rider explicitly named Death.

Von Foerster had one Jewish grandfather, making him a "Mischling zweiten Grades" under Nazi racial laws. This status put him at risk, yet during the war he moved to Berlin to work at the firm GEMA (Gesellschaft für elektroakustische und mechanische Apparate) on radar and related technologies. The war-essential work exempted him from military service, and employers reportedly chose not to press him for full documentation of his ancestry. In 1944 he submitted a dissertation on plasma oscillations at the University of Breslau and completed the required examinations, but the formal PhD was denied because he could not provide the required "Aryan certificate." After the war, back in his devastated home city of Vienna, he worked as culture and science editor at the American-run radio station Rot-Weiß-Rot and managed to write a book on "Memory: A Quantum-Mechanical Investigation," published in 1948. The work proposed a quantum-physical model of memory and forgetting. The book helped enable his migration in 1949 to the United States, entry into circles of neurophysiology and the new field of cybernetics, and long employment at the University of Illinois. This biography is not a digression. I speculate that von Foerster may have felt he had witnessed, or at least glimpsed, Doomsday in Berlin and Vienna.

Modeling collapse, challenging the progressivist narrative

While Doomsday is eternal, von Foerster may have helped stimulate its systematic study. I particularly like Otto Friedrich's 1982 book *The End of the World*, which spans the sack of Rome, Black Death, Lisbon Earthquake, and Auschwitz.[3] Other notable books in the Doomsday literature include Cline's *1177 BC* on the concurrent collapses of Mediterranean civilizations[4] and Jared Diamond's *Collapse*, which ranges across Greenland, Mayan Mexico, and Easter Island.[5] Of this literature, the study that von Foerster might have

[3] Friedrich, Otto. *The End of the World: A History*. New York: Coward, McCann & Geoghegan, 1982. ISBN 978-0-698-11128-8.
[4] Kline, Eric H. Cline, Eric H. *1177 B.C.: The Year Civilization Collapsed*. Princeton, NJ: Princeton University Press, 2014.
[5] Diamond, Jared. *Collapse: How Societies Choose to Fail or Succeed*. New York: Viking Press, 2005. ISBN 978-0-14-303655-5.

liked best is Tainter's 1988 classic, *The Collapse of Complex Societies*, which now has well over 5,000 citations in Google Scholar.[6]

Tainter importantly argues a theme of von Foerster, not withstanding his engagement with cybernetics and engineering, that one must challenge what Tainter calls the Progressivist Narrative. I quote from Tainter:

> "We have been raised in the ideology of modern industrial societies, which emphasizes progress. So we write about how our ancestors tamed fire, developed agriculture, invented the wheel and writing, established metallurgy and cities, and created states all the while improving human life… Within this narrative, collapses and dark ages have presented troubling contradictions to the story of humanity's continual progress. If the arc of history leads to inexorable improvement of the human condition, how could that trajectory ever be interrupted? Equally troubling, if collapses happened in the past, could one happen again?"

Answers to that question are likely to be a major theme of this workshop. Though political anathema in liberal academia, I think one must consider both the populist–nationalist and religious viewpoints very widespread in the West. Is the meme of the singularity truly a global singularity or is it, to use Spengler's title, more narrowly The Twilight of the West?[7] Spengler has many descendants in fiction and nonfiction, for example, in Jean Raspail,[8] Patrick Buchanan,[9] and Michel Houllebecq.[10]

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[6] Tainter, Joseph A. *The Collapse of Complex Societies*. Cambridge: Cambridge University Press, 1988. ISBN 978-0-521-38673-9.

[7] Spengler, Oswald. *The Decline of the West*. Published in 1918. Translated by Charles Francis Atkinson, edited by Arthur Helps and Helmut Werner, Oxford University Press, 1991.

[8] Jean Raspail, *Le Camp des Saints.* Paris: Éditions Robert Laffont, 1973. Translated by Norman Shapiro as *The Camp of the Saints* (Charles Scribner's Sons,1975).

[9] Buchanan, Patrick J. *The Death of the West: How Dying Populations and Immigrant Invasions Imperil Our Country and Civilization*. New York: Thomas Dunne Books/St. Martin's Press, 2002.

[10] Michel Houellebecq, *Submission,* translated from the French by Lorin Stein (William Heinemann, 2015). The French original, *Soumission,* was published by Flammarion on 7 January 2015.

With regard to narrative, "prophecy-fiction" has itself become a genre, ordained by Hal Lindsey's *The Late Great Planet Earth* (1970), which we might call creative nonfiction.[11] The book sold more than 35 million copies and popularized "dispensational premillennialism," which divides human history into distinct eras or "dispensations" in which God tests humanity under different rules or responsibilities before a Great Tribulation, a framework not unlike von Foerster's *Science* curve-fitting. Because we meet in Vienna, I will mention that the 1978 film adaptation was narrated in documentary style by Orson Welles, only 29 years after he played Harry Lime in *The Third Man*. The climax includes the Rapture, the rise of the Antichrist, a devastating global war, and the return of Jesus Christ. Speaking of the Rapture, which has the abruptness of the singularity, the fictional book series initiated in 1995 by LaHaye and Jenkins, "Left Behind," sold more than 65 million copies.[12]

While populism and rapture are disreputable in academic discussions of Doomsday, ecological collapse earns every imaginable prize, already two Nobels for climate and one for ozone depletion. While von Foerster himself seems to have been agnostic about which horseman would bring the apocalypse, much apocalyptic thinking has migrated from theology into scientific modeling, without entirely abandoning its original psychological and cultural foundations. Broadly speaking, the ecological community might be said to have adopted him as offering the math of climax forests or other ecosystems ripe for rapid destruction by fire, pests, or other nemeses. C.S. Holling devoted decades to elaborating a "Figure 8" theory of ecological succession in which steep growth and accumulation invoke collapse, followed by what one might call a slow rapture as seedlings rise.[13] **Figure 5.** Imagine a forest (**Figure 6**) that, in the upper right

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[11] Lindsey, Hal. *The Late Great Planet Earth*. Grand Rapids, MI: Zondervan, 1970.

[12] LaHaye, Tim, and Jerry B. Jenkins. *Left Behind: A Novel of the Earth's Last Days*. Tyndale House Publishers, 1995.

[13] Holling, C.S. "Two cultures of ecology," *Conservation Ecology*, 1998; 2(2), article 4.

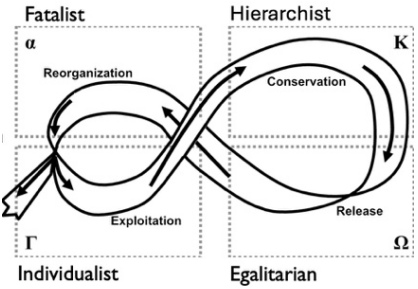


FIGURE 5. C.S. Holling's "Figure 8" of ecological succession with four cultures of "Cultural Theory."

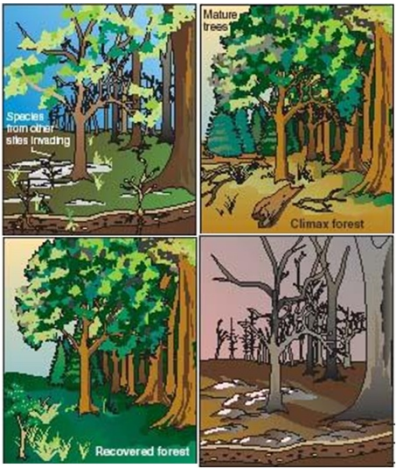


FIGURE 6. Climax forest (upper right) destroyed by wildfire (lower right) and its eventual recovery. After The Gale Group.

quadrant of Holling's diagram sprouts from buried seeds and has space for invading species from other sites, grows in the lower left into a moderately dense wood, then in the upper right into a mature, dense climax forest before, on the lower right, collapsing from fire or pests into an ash-laden open area, when recovery begins again.

Anthropologists Mary Douglas[14] and Michael Thompson[15] elaborated a homologous four-part "Cultural Theory" in which individualists, hierarchists, egalitarians, and fatalists persist as viable states and cycle similarly (see Figure 5). In many nations, the hierarchists are now seeing their climax forests of administration and regulation torched. For the hierarchists the salient risk or doom is loss of control, or, one might say, public trust. The egalitarians insistently envision catastrophic, irreversible, and inequitable developments, the most familiar cartoon of doom. For the individualists, by contrast, the apocalyptic rider invades with threats to the functioning of the market. For fatalists, life is a lottery with very bad odds and prone to

[14] Douglas, Mary. "Four cultures: The evolution of a parsimonious model." *GeoJournal*, 1999; 47:411-415.
[15] Thompson, Michael, Richard Ellis, and Aaron Wildavsky. *Cultural Theory*. Westview Press, 1990, ISBN 9780813378640 / 0813378648

failure of the technical infrastructure; every day is Doomsday and Doomsday is only a particular darkness in the night.

Circling back to human populations, Russian Sergei Kapitsa authored papers extending von Foerster's line of thought through the lens of a physicist.[16] He plotted time before the present as well as human numbers on a logarithmic scale making our population look like half an arch soon to reach its central peak. Kapitsa also analyzed a final superfast hyperbolic growth of the world population. He proposed the surviving rural populations of predominantly poor countries and the urban populations of predominantly developed countries as keys to the coming phase transition. Plotting time before the present as well as human numbers on a base 10 logarithmic scale makes the most recent 10 years equal to the prior 100 years and in turn to the prior 1,000, suggesting an acceleration of human experience, another theme of Doomsday forecasts. Kapitsa would have been an apt consultant for films like *Mad Max* and *Children of Men*.

Doomsday 2026 to 2100

Surveys of films as well as the books and other arts mentioned may give a reliable ranking of factors or risks that could end the hyperbola. Prediction markets such as Kalshi and Polymarket might also reveal how people assess probabilities of destruction. More traditional efforts by expert groups also earn analysts a living. The UK medical magazine *The Lancet* convened a 21st Century Commission on Threats to Health. To ease both ranking and summation, the commission measured all threats in *disability adjusted life years*.[17] **Figure 7.** The year 2026 lay 66 years in the future for von Foerster; 66 years takes us to 2092, roughly the time horizon of *The Lancet*. While *The Lancet's* list spans obesity to nuclear conflict, Douglas and Thompson might tease *The Lancet's* listmakers

[16] Kapitza, Sergei P. "The phenomenological theory of world population growth," *Physics-Uspekhi,* 1996; 39(1):57-71.
[17] Murray, Christopher J.L., Natalia Kanem, Shameran Abed, et al. "The *Lancet* Commission on 21st century global threats to health," *The Lancet,* October 2026; 408(10564): 1603-1661.

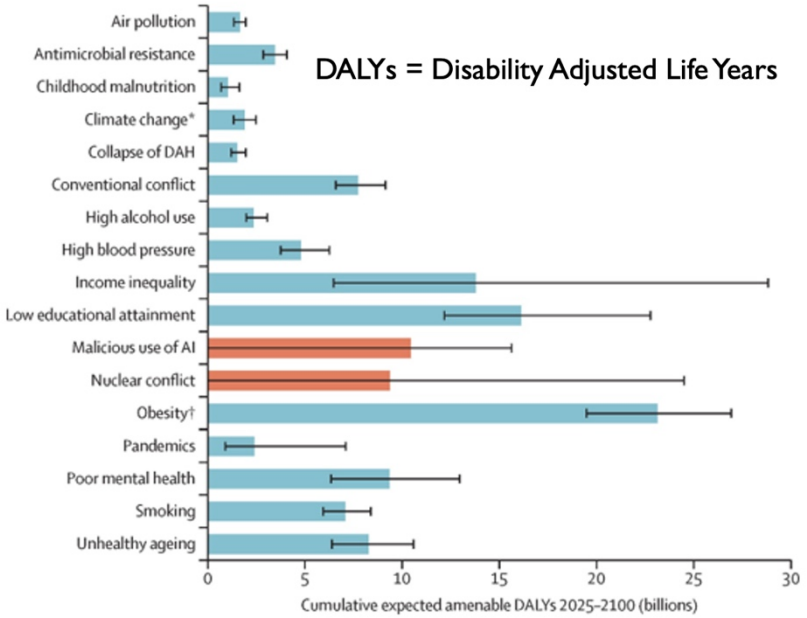


FIGURE 7. Predicted global disability due to various causes, measured in Disability Adjusted Life Years (DALYs), 2025–2100. Source: The Lancet *Commission on 21st century global threats to health.* October 2026.

for addressing only risks chosen by hierarchists and egalitarians. Even if biased and incomplete, the list suggests that von Foerster was right to worry. The Progressivist Narrative does not extinguish extinction. On the contrary, the perpetuity of Doomsday suggests humans abide with a Law of Conservation of Concern.

Let me conclude with two emerging cases that support von Foerster's hyperbola and hyperbole. Many would argue that the hyperbolic rise on Earth since his paper has been China's, embracing population and also other indicators of growth. China's GDP in 2025 was almost 400 times that of 1960. What happens to China after 13 November 2026 is therefore especially fateful. Yi Fuxian, a Chinese-born demographer and senior scientist in the Department of Obstetrics and Gynecology at the University of Wisconsin–Madison,

asserts China's total fertility rate has already fallen to 1.05 or lower.[18] He notes that in 2025 births plummeted to around 8 million from a peak of about 30 million in the early 1960s and projects that China's population could drop to about one billion by 2050, 620 million by 2075, and 320 million by 2100. The human population of China may plummet from Peak China even without the famines and civil wars that cost China tens of millions of lives in earlier centuries.

But not the population of robots, including the robots caring for the aging human residents of China. My colleagues Alessio Zaccone and Thomas Tunstall and I have recently posted to arXiv When will androids outnumber humans?, the first paper, so far as we now, projecting seriously the populations of both humans and humanoid robots.[19] **Figure 8.** While humans may peak at or below 10 billion this

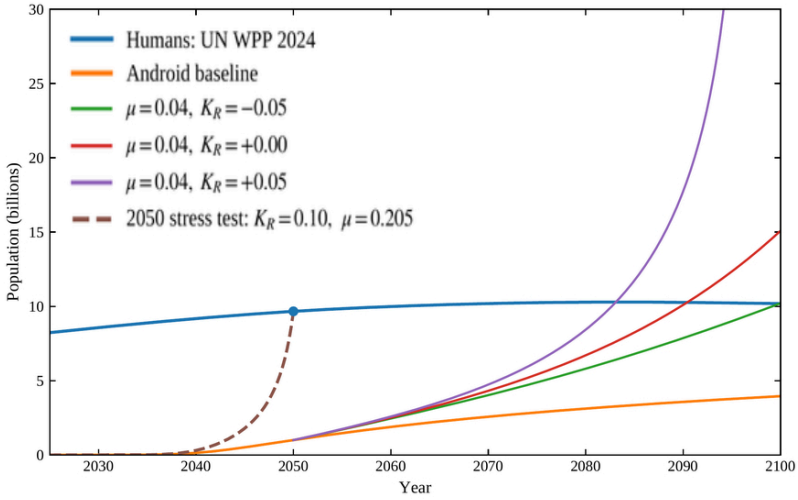


FIGURE 8. Five scenarios of growth of android populations, compared to central US forecast of humans. K_R describes how the gross productivity per active android changes once androids themselves materially contribute to the production chain. When >0, it is the positive feedback that von Foerster emphasizes.

[18] Yi, Fuxian. "China's population data manipulation." *Contemporary China Review* 8 (Summer 2026).

[19] Zaccone, Alessio, Thomas Tunstall, Jesse H. Ausubel. "When will androids outnumber humans?" arXiv preprint arXiv:2611.03242, 2026•arxiv.org

century, androids could go hyperbolic and outnumber humans in many scenarios by 2100, and in one scenario even by 2050, particularly if androids inherit some of the positive feedback mechanisms that von Forester identified. Moreover, androids will require many of the same resources that worry those who worry about Doomsday. We, like former UN Population Chief Joseph Chamie,[20] think demographers better get serious about counting and projecting android populations. Perhaps von Foerster was right about the singularity after all. He simply counted the wrong population.
Figure 9.



FIGURE 9. Heinz von Foerster and a possible future. Source: AI generated.

Acknowledgements: Thanks to Helga Nowotny and Stefan Thurner for the invitation to prepare this essay and to H. Dale Langford for editorial help. This version also benefits from comments received during the workshop.

[20] Chamie, Joseph. "The rise of androids among human populations." Global Issues, September 2025.

