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Critically endangered Iberian wolf (*Canis lupus signatus*), Portugal © M. C. Tobias

Combating the Darkness: Is There Any Hope for Biological, Multi-Species Redemption amid Such Data?

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An Essay/Review on The Annihilation Of Nature – Human Extinction of Birds and Mammals, by Gerardo Ceballos, Anne H. Ehrlich, and Paul R. Ehrlich, With Original Art by Ding Li Yong, Johns Hopkins University Press, Baltimore, MD, 2015

With photographs of just a few of the species and habitats highlighted in the book.

"The Legacy," "Natural Extinctions," "The Anthropocene," "Long-Silenced Songs," "Birds In Trouble," "Mammals Lost," "Vanishing Mammals," "Why It All Matters," "Drivers Of Death," and "Beyond Mourning." These are the ten devastating, illuminating chapters in this new groundbreaking convergence of critical data by Gerardo Ceballos, Anne H. Ehrlich and Paul R. Ehrlich. In fewer than 200 pages this courageous and magnificently illustrated work of a lifetime will deeply impact anyone who has a heart and a brain and the willpower to study it.

Moreover, the book should be mandatory reading for every member of every Congress and Parliament; for every student of possible age. If you think it unlikely that politicians would take out time from their busy schedules, think again. It has been 25 years since Prime Minister Margaret Thatcher made unprecedented news with her alarming speech about ozone depletion. A chemist by training, PM Thatcher had conferred with

numerous scientists and was deeply alarmed, indeed taken by surprise at the pace of acceleration of the ozone crisis. On June 27th, 1990, she spoke in the direst possible terms to representatives of 100 nations that ozone depletion was happening even faster than scientists had initially feared and a worldwide cessation of all chlorofuoro carbon chemicals was essential. A US independent observer from the World Wildlife Fund, Richard Benedick, who had previously been the lead U.S. delegate in 1987 at the Montreal Protocol negotiations, admitted to astonishment at the urgency of Thatcher's conveyance.

"'We're seeing something completely unprecedented in the history of diplomacy," said Benedick. "Politicians from every bloc and region of the world are setting aside politics to reach agreement on protecting the global environment. Governments are backing off hardened positions to get an agreement, and even the customary disagreements between North and South –the developed nations versus the developing nations– lack their usual edge." And that was just about the fear of skin cancer and reduced food supplies for populated cities of the North.[1] And yes, that kind of thinking almost sounds too good to be true. Politicians who are chemists and concerned, at the same time, about the global environment.

75-Mile Long Nabesna Glacier, Alaska's and the World's Longest Interior Valley Glacier
© M. C. Tobias

Now we have much more to worry about than skin cancers and declining krill populations (we did in 1990, as well, to be clear; nor is that to in anyway underestimate both problems). But what **The Annihilation of Nature** has now provisioned everyone's working vocabulary with, is a deeply sensitive, informed context and a scientific

[1] "Ozone Fading Fast, Thatcher Tells World Experts," By Malcolm W. Browne, Special to The New York Times, Published: June 28, 1990.

overview of the daunting challenge before us all which is, unambiguously, those untold numbers of ecological holocausts occurring every day throughout this planet.

For decades the Ehrlichs, in particular, have been writing and warning of vast extinction patterns across the biosphere, but in **The Annihilation of Nature**, with their colleague Ceballos (as well as the late conservation biologist Navjot Sodhi, who tragically passed away before the book could be completed), they have summarized the state of the world's biological disasters in a methodical manner no one before them has accomplished.

Orangutan (*Pongo pygmaeus*) Kalimantan, Indonesia © J. G. Morrison

It is an unnerving, heart-stopping analysis of just what exactly is going on with respect to the sixth extinction spasm. The images are poignant to the extreme –beauty that is our burden– and from every corner of the globe. A two-page color spread showcasing one astounding vantage point on Guadalupe Island, just off the coast of Baja California, the Galapagos of Mexico, and as much a Lost World as one could ever envision, though efforts are in place to preserve some of this island's amazing native and endemic species. An image of the Southern Muriqui, still being hunted for food in Brazil quite close to the outskirts of São Paulo, despite this gorgeous primate numbering fewer than 1,500 individuals being Brazil's largest species other than humans; the recently extinct and once gorgeous Inca rat; the Sumatran (hairy) rhinoceros, the world's smallest, rarest and least known rhino; the now extinct in the wild Hawaiian crow – the alala; and the first mammal known to have gone extinct in the past fifty years, the "goddess of the Yangtze," the baiji, one of – what was – six known freshwater dolphin species in the modern world.

The authors describe a 2006 international team of scientists who explored 2,175 miles of the Yangtze hoping to find the baiji still surviving. They did not. The leader of the expedition is quoted upon seeing footage taken of one, in 2002, a baiji named Qi Qi who had been kept in captivity for twenty-two years: "I consider myself a strong man, but when I saw that footage [of Qi Qi] I cried for several minutes. It's just so terribly sad."[2] One other solitary baiji was seen in 2007, but by 2008 the species was officially deemed to be Extinct. Several years into Mao Zedong's PRC, in the 1950s, it is estimated there were still probably 5,000 baijis enjoying the Yangtze. But that was all before China's "great economic transformation" and nearly 1.4 billion Chinese consumers.

And thus the dizzying tale wends mournfully, from location to location, an ecology of cemeteries.

American bison (*Bison bison*) © M.C. Tobias

At least 50% of all wildlife has been lost worldwide in the last 40 years: as much as 70% in South America.[3] Given that among the 5,500 or so known mammals on earth, only 100 of them have been biologically detailed in any depth[4], the gaps in data are as chilling as the numbers in general are galling. The International Union for the Conservation of Nature (IUCN) recognizes that since about the year 1500, eight mammals have gone extinct, with another 27 "possibly extinct"[5]. But on top of that, the IUCN declares that "at least 188 mammals are critically endangered, 450 are endangered, and 493 are threatened with extinction."[6] All of these mammals –

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[2] **The Annihilation,** op.cit., p.73.

[3] ibid., p.135.

[4] See "In vitro puppies offer hope for rare wildlife," by Melissa Healy, Los Angeles Times, Sunday, December 13, 2015, P. A14.

[5] **The Annihilation**, op.cit., p.69.

[6] ibid., p.80.

approximately 20% now threatened – are descended from others of their nurturing kind who first co-evolved on earth during the Triassic Period, some 245 million years ago, our collaborative ancestors.

But the IUCN is also a vast work in progress. As of 2014, of the approximately 71,576 species studied (out of a minimum of at least 1.8 million species identified by science), 20,614 species – including the aforementioned mammals– have been placed in the "threatened" category, which translates somewhere between "vulnerable, endangered, or critically endangered."

And that 1.8 million number is more likely to be in excess of 10 million species. Some have suggested 100 million (taking into account all forms of life, including the bedazzling bacterial and viral species). In fact, at one point, the authors of **The Annihilation** hint at one wild suggestion that there could well end up being a billion species on earth. Whichever power-of-ten proves to be closer to the truth, the scientific gap analyses are vast, and tell us that if it is that bad for 20,614 species out of a most modest sampling of 71,576 species, the implications are dire for the rest, and for the habitats upon which those species, populations and individuals (many of them pollinators, soil, marine and atmospheric stabilizers, not to mention the source of food for everyone) depend.

One of the last poached tigers of Singapore (*Panthera tigirs jacksoni*) © M. C. Tobias

In previous research publications the Ehrlichs and colleagues have made clear that something like 44,000 populations are going extinct every single day. In looking at the "Drivers Of Death" (Ch. 9 of **The Annihilation**) the authors provide 4 examples more than telling: "In Brazil more than 24 million animals are estimated to be hunted every year. In Sulawesi, one of the larger islands in Indonesia, 90,000 animals are sold in a single market every year. And in Borneo 108 million are killed every year in Sabah, one of the smaller territories on the island. In Mongolia in 2004 hunters killed 3 million marmots and 200,000 gazelles, mostly illegally."[7] The aforementioned Brazilian statistic is amplified by an additional estimate which shows "60 million birds and mammals" being killed every year in Brazil (whose human population exceeds 203 million, a causal relationship that is clearly key to the book's fundamental proposition that *Homo sapiens* are intensively at fault for this senseless and colossal tragedy of local, regional and global biodiversity loss).[8]

[7] **The Annihilation**, op.cit., p.152.

[8] ibid., p.152.

Two extinct freshwater fish from Lake Biwa, Shiga Prefecture Japan
Amur ninespine stickleback (*Pungitius sinensis*) © M. C.Tobias

The mortality and extinction statistics in **The Annihilation** may seem astronomically abundant (the phrase *over-kill* would be an insult to this massive synthesis of data) but, in fact, they are merely emblematic, and, if anything, conservative. The authors have been sparing in their survey. For the jaded, unwary, or only mildly interested, that might be difficult to imagine. Read the book. The many numeric mind twisters visited upon the reader are not cumulative for accumulation sake. Rather, each instance of grim or perilous encounters between other species and *Homo sapiens* comes with a terse, accessible story or explanation that is characteristically heartbreaking, enraging, or – in a few cases, encouraging.

But what is inescapable in this remarkably lean yet comprehensive book is the plain-speaking narrative that directly pertains to personal experiences with the species and ecosystems described by three of the world's preeminent ecologists/biologists. Their convictions and feelings derive from arduous odysseys and assiduous field research over many decades, the sum conveyance of which needs no embellishment. Writing from Ground Zero, they have carefully measured the epitaphs, while underscoring the fact that calculations lead us only so far. And then all the zingers in the world become sad, usually criminal history.

New Zealand South Island takahē (*Porphyrio hochstetteri*) © M. C. Tobias

Thoughtful, pragmatic action is the only rational, empathetic and realistic option open to us. The authors carefully recommend scores of conservation measures: every conceivable refuge configuration –parks, corridors, translocations; forceful legislation to combat further chemical adulterants, hundreds-of-thousands of toxins and endocrine disrupting chemicals into the global commons, like those pesticides (DDT – dichlorodiphenyltrichloroethane) first elaborated upon by Rachel Carson in her book **Silent Spring** (1962); more genetic research to understand sub-species, as in the case of the four sub-species of gorilla, all under siege at various levels; stepped up efforts to cope with bio-invasives and – as last resorts – the inevitability of preservation of some species within, alas, glorified zoos.

Borneo orangutan orphans being raised for reintroduction into the wild, Indonesia
© M.C. Tobias

In addition to the obvious benefits of responsible eco-tourism, the authors call for a ramping up of the "rewilding" movement. For some years it has been gaining traction across much of Europe and now, more and more, in North America, as well. In one version of the rewilding initiative, the Al-Wabra Wildlife Preserve in Qatar is working to re-populate several captive macaws back onto 5,437 acres of land it has purchased in Brazil, at the very location where the last wild Spix's macaw was observed.[9]

Additionally, the authors take great pains to clarify why keystone species, such as the re-introduced wolves of Yellowstone, or of prairie dogs, are so exemplary of the very basic natural downstream capital all human economics, and the economies of nature depend upon at their functional quintessence. It is a matter of natural logic, interdependency and, ultimately, the sheer mystery and majesty of how nature functions, from photosynthesis to evolution herself.

California condor (*Gymnogyps californianus*) © M. C. Tobias

But with a title like **The Annihilation Of Nature**, one can largely anticipate that this book is not meant to excite any Christmas cheer, although the intelligence and clarity should give any reader some level of hope that the scientific community worldwide is savvy enough and well on track to saving whatever and whoever can be saved. We basically know how to do it, whether with buffalo or California condor. But as our policy makers

[9] **The Annihilation**, op.cit., p.49.

return from COP21 in Paris, that knowledge is not going to be easily translated. Take, for example, the near immediate response by Senate Majority Leader Mitch McConnell (R-Ky) to Obama's optimism on the climate deal: "The president is making promises he can't keep, writing checks he can't cash, and stepping over the middle class to take credit for an 'agreement' that is subject to being shredded in 13 months."[10]

And so it goes. More non-binding treaty congestion, while, in countries like Indonesia, the authors predict a loss of some 40% of all bird species by 2100, but recognize that such predictions are actually more than likely underestimates because there are so called "zombie" populations given the fact of those forests suffering from hard-to-gauge "Anthropocene defaunation," forests that appear to be healthy but, in fact, have lost most of their ground-birds and other seed dispersers, a fact discernible by "carpets of seedlings surrounding parent trees at their bases."[11]

Male proboscis monkey (*Nasalis larvatus*), Borneo © M. C. Tobias

Moreover, the authors recognize that their "extinction predictions reported above may be optimistic as they do not consider the likely cumulative effects of other drivers of biodiversity change such as the increasing prevalence of huge fires in tropical forests (and other consequences of climate change), overharvesting, and invasive species."[12] Nor has poaching been singled out, in this instance. And with respect to overharvesting the authors mince no words when it comes to palm oil plantations ("blood palms") whose resulting transformations of indigenous primary tropical forests are "biological deserts" with "the near disappearance of the vast majority of birds, mammals, butterflies, and other animals that evolved to live in the forests." The "greed" and the

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[10] "A global first step on the climate," by Alexandra Zavis, Chris Megerian and William Yardley, Los Angeles Times, Sunday, December 13, 2015, pp.A1 and A12.

[11] **The Annihilation**, op.cit., p.133.

[12] ibid., p.138.

zeal of oil palm expansion "is difficult to overestimate," say the authors, who also nail the "worldwide campaign of disinformation" intended, as with so many deleterious industries, to "increase their markets."[13]

Such difficulties are exacerbated by the "walking dead" phenomenon. For example, a parrot in Puerto Rico, the Iguaca, numbered some 2,000 in the Caribbean National Forest but as that habitat was continually degraded, despite the mantle of alleged protection, with disappearing complex interdependent food-source eco-dynamics, ultimately the populations were doomed and the numbers plunged within sixty years, to twenty individuals. On any given day, however, even the keenest observer might be hard-pressed to recognize the trend. "Millions of years of evolution going down the drain…"[14]

Other "overharvesting data" as recently as 2009, from the NGO Traffic, suggests more than $300 billion in legally killed wildlife, and does not begin to account for the illegal trading. One example given, "In the once-splendid Nairobi National Park…some 19,000 mammals are killed every year for the illegal bushmeat trade."[15] And Kenya is a country famed for its progressive stance – thanks, in part, to the formation in 1989 by Richard Leakey of the Kenya Wildlife Service, famed among all the nations in Africa for its attempted tough stance on poachers, unlike the majority of African countries.

The individuals caught up in this gruesome killing for human profit and in some cases subsistence – a function of absolute poverty and desperation– is bewildering, to be sure.

There are few causes for optimism in this book, and rightly so. While, for now, plans for a most imprudent road that would have bisected the Serengeti has been stopped (inhibiting easy access to Tanzania's coltan deposits, a critical ore that is then refined into tantalum and goes into all the cell phones sold around the world[16] elsewhere, in the U.S. for example, between "600,000 and 900,000 bats" are killed annually by wind turbines, whilst millions of migratory birds en route to places like Tanzania from Scandinavia and boreal forests are slaughtered each winter from Cyprus to Albania. Moreover, at least half of all birds (more than 5,000 species) are vulnerable to climate disruptions.[17]

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[13] **The Annihilation**, op.cit., p.131.
[14] ibid., p.138.
[15] ibid., p.151.
[16] ibid., p.154.
[17] ibid., p.159.

Paradise Bay, Antarctica © R. Radin

One could rightly say, 'This is too complicated' and be absolutely correct. But, ultimately, the authors make the saving of biodiversity for future generations of all species crystal clear, providing a sensible divining rod for students and educators, people of faith, of hope, of no faith, of no hope, activists, scientists, policy makers, legislators, philanthropists, and everyone else you can think of:

> *The only real hope is taking direct action to reduce the key drivers of extinctions and environmental degradation: over-population and overconsumption. The only effective measure is a rescaling of the human enterprise.*[18]

I could not agree more.

Michael Charles Tobias is the President of the Dancing Star Foundation, a nonprofit public benefit corporation based in California. DSF's mission is focused on international biodiversity conservation, global environmental education, and animal protection. Find more of Michael's contributions to the MAHB here, and learn about the Dancing Star Foundation through its MAHB Node.

[18] **The Annihilation**, op.cit., p.175.