

Fifty Years after “How to Wreck the Environment”: Anthropogenic Extinction of Life on Earth

ABSTRACT

Aims: Fifty years ago geoscientist Gordon J. F. MacDonald penned a book-chapter entitled “How to Wreck the Environment” in which he described how a nation might alter the environment so as to covertly inflict harm on an enemy nation. Our objective is to review MacDonald’s suggestions of environmental warfare strategies in light of subsequent technological advances and in the context of actual deployment of the war methods he described.

Methods: We review the interdisciplinary scientific and medical literature.

Results: MacDonald discussed overt and covert weather warfare based upon seeding clouds to cause rainfall. Subsequently, a method was developed for inhibiting rainfall by jet-emplacing pollution particulates where clouds form. For at least two decades citizens have observed such particulate trails occurring with increasing frequency. Forensic scientific investigations implicate toxic coal fly ash as their main constituent. About 2010 the aerial particulate spraying ramped-up to a near-daily, near-global level. Presumably a secret international agreement mandated the aerial spraying as a sunshade for Earth. However, aerial spraying, rather than cooling, heats the atmosphere, retards Earth’s heat loss, and causes global warming. MacDonald also discussed destroying atmospheric ozone and triggering earthquakes and volcanic eruptions, activities now possible with high-frequency ionospheric heaters.

Conclusions: The military’s ongoing decision to weaponize the environment for national purposes was accurately forecasted by MacDonald. But he failed to realize that national militaries could and would be co-opted by a secret international agreement the consequence of which, however unintentional, was to wage war on planet Earth, on all its biota and on its natural, biogeochemical processes. Unless and until politicians, news media, scientists, and others in our society face the truth of what is happening before their very eyes and collectively demand a halt to these covert technological activities, we will march onward – to the first anthropogenic-caused mass extinction.

Keywords: *trigger earthquakes, climate modification, ozone depletion, ionospheric heater, Gordon J. F. MacDonald, coal fly ash, geoengineering*

1. INTRODUCTION

In 1968 the politically powerful geoscientist Gordon J. F. MacDonald (1929-2002) wrote an influential essay titled “How to Wreck the Environment,” that was published in a book called *Unless Peace Comes* [1]. At a time when the military’s focus centered on nuclear warfare, MacDonald prophetically suggested: “Among future means of obtaining national objectives by force, one possibility hinges on man’s ability to control and manipulate the environment of his planet.” MacDonald, a top presidential science advisor and participant in national science-policy discussions, was well qualified to address subject of future environmental warfare possibilities.

Much of what MacDonald predicted or speculated about has come to pass, not with the technology he described, but with potentially far more effective and devastating technology developed during the succeeding fifty years.

As MacDonald noted in 1968: “The key to geophysical warfare is the identification of the environmental instabilities to which the addition of a small amount of energy would release vastly greater amounts of energy.” MacDonald discussed purposefully triggering instabilities in such large-scale natural systems as the weather, the climate, the oceans, and the human brain, including such

30 phenomena as hurricanes, earthquakes, and tsunamis for use in warfare. He was aware, considering
31 the limitations of geophysical understanding, that one should also anticipate unforeseen adverse
32 consequences that could arise from deliberately disturbing complex natural systems that have
33 unknown “tipping points.”

34 During the fifty years since MacDonald’s landmark publication [1], the technology necessary for the
35 weaponization of the environment has undergone major advances well-known to those who have
36 funded the research. In tandem the scientific understanding of Earth’s behavior has likewise
37 undergone major advances over the last half-century.

38 However, major new concepts in geophysics – such as those being developed by the military
39 industrial complex – are typically ignored in the geoscience community for decades. It is not surprising
40 therefore that deployment of radical environmental warfare technologies that alter fundamental natural
41 processes of our planet is proceeding without scientific warning or a full understanding of the
42 underlying geodynamics and dangers such technologies pose to human and other life.

43 Here we review some of the ideas expressed by MacDonald in “How to Wreck the Environment” [1] in
44 the light of subsequent technological developments. We also review evidence that environmentally
45 destabilizing military technologies are being deployed on a global scale. Where applicable we discuss
46 potential risks to our planet and its biota that likely are underappreciated by those responsible.

47 **2. METHOD**

48 We reviewed interdisciplinary scientific and medical literature.

49 **3. RESULTS AND DISCUSSION**

50 The long-held dream of military planners to control the weather began to become reality with the
51 discovery in 1946 that clouds, when seeded with silver iodide or dry ice (solid carbon dioxide), under
52 appropriate circumstances could result in rain or snow [2]. MacDonald [1] discussed that form of cloud
53 seeding and its military potential both for causing rainfall to impede enemy ground operations and for
54 covertly causing long-term drought by forcing clouds to release their moisture before they reached the
55 targeted nation. These have been matters of serious concern to the U. S. military then and now.

56 Weather became a weapon of war during the Vietnam War when cloud seeding operations were
57 conducted to extend the monsoon season over the Ho Chi Minh Trail to impede movement of
58 supplies and troops (Operation Popeye) [3]. As well, the military seeded clouds approaching Cuba in
59 an attempt to cause drought to spoil the sugarcane harvest [4].

60 Seeding clouds to cause rain, as described by MacDonald [1], was only the first step in weather
61 manipulation. Subsequent research produced the technology to impede the fall of rain. For clouds to
62 yield rain, tiny droplets need to nucleate and then coalesce to form drops sufficiently massive to fall to
63 Earth. The technology for impeding rainfall is known from pollution investigations. A sufficiently large
64 number of pollution particles, dispersed into the region where clouds form, poses impediments to the
65 tiny droplets, blocking and keeping them from coalescing to become massive enough to fall as rain.
66 Eventually, the moisture burden becomes unbearable and clouds release their moisture in deluges.

67 In the late 1990s alert citizens became concerned about the aerial particulate trails that extended from
68 horizon to horizon in the skies above them. With the passage of time these aerial trails became more
69 frequent while at the same time the public was being deceived that these were harmless contrails, ice
70 crystals formed from exhaust vapor [5]. By about 2010 the aerial spraying ramped up to a near-daily
71 activity over much of the globe [6]. (Figure 1)



72

73 Figure 1. Climate manipulation particulate trails. (Photographers with permission) Clockwise from
 74 upper left: Paris, France (Patrick Roddie); Karnak, Egypt (author JMH); London, England (author IB);
 75 Northern California, USA (Patrick Roddie); Geneva, Switzerland (Beatrice Wright); Yosemite,
 76 California USA (Patrick Roddie); Jaipur, India (author JMH).

77

78 Weather modification is a phenomenon limited in duration and geographical extent, whereas climate
 79 modification is necessarily global. Certainly the current near-daily, near-global aerial spraying
 80 represents an attempt at climate modification, which MacDonald also discussed [1] and likely involves
 81 weather modification activity as well. As MacDonald noted: "...climate is primarily determined by the
 82 balance between the incoming short-wave from the sun (principally light) and the loss of outgoing
 83 long-wave radiation (principally heat)." He goes on to list the three factors that dominate this balance:
 84 1) sun's energy; 2) Earth's atmospheric transparency to different forms of radiated energy; and 3)
 85 Earth's surface characteristics. Alteration of any of the three can modify climate.

86 Altering the sun's energy output is not technologically feasible even today, but there are various ways
87 of affecting radiant energy transport through Earth's atmosphere. Among the possibilities mentioned
88 by MacDonald [1], albeit without specificity, is the idea of placing material into the upper atmosphere
89 that would "absorb either incoming light (thereby cooling the surface) or outgoing heat (thereby
90 warming the surface)." In speculating about such a possibility, MacDonald noted: "At present we know
91 too little about the paradoxical effects of warming and cooling, however, to tell what the outcomes
92 might be." That statement is as true today as when published 50 years ago.

93 The behavior of material placed into the upper atmosphere, as stated above by MacDonald, is
94 simplistic and incorrect. So too is the oft-repeated proposition by members of the geoscience
95 community who now discuss the possibility of placing material in the upper atmosphere to reflect a
96 portion of sunlight back into space, often under the rubric "sunshades for the Earth." As we discuss
97 below, particles placed in the atmosphere exhibit behavior in response to incident radiation that is
98 considerably more complex than described by MacDonald, as are their physical and chemical
99 reactions in the atmosphere and at Earth's surface.

100 As noted above, the U. S. military has been engaged for decades in aerial spraying of particulates
101 into the regions where clouds form to modify weather and for other reasons, such as the
102 enhancement of communication systems associated with electromagnetic radiation programs.
103 Sometime around 2010 the aerial spraying *became an international operation* and is presumably
104 based upon a secret international agreement. At face value it would seem that the real objectives and
105 geophysical consequences of such covert military operations would be inconsistent with an
106 international program that supposedly benefits humankind, *unless that secret international agreement*
107 *was based upon misrepresentations*. If so, a strange dichotomy marks the subject of weather/climate
108 modification – a blatant contradiction between intent and consequence or mean and ends.

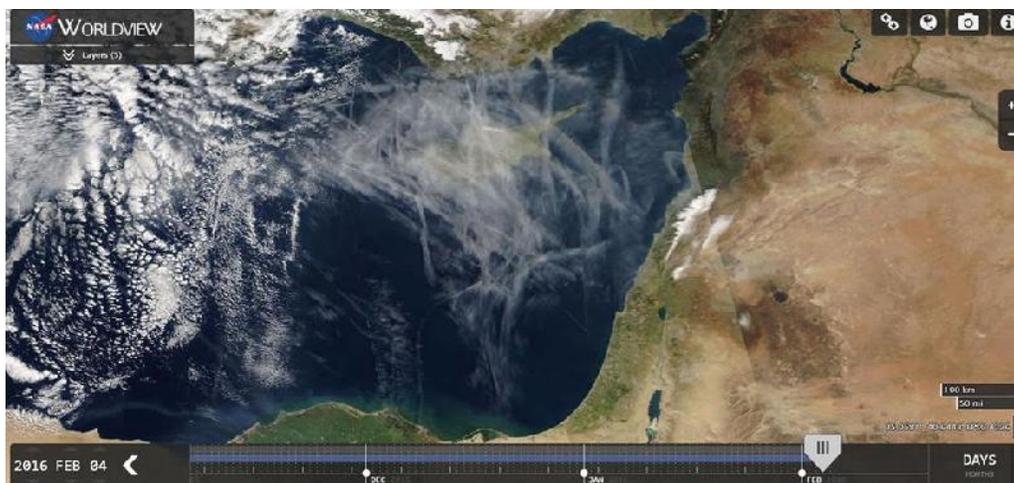
109 Science should be based upon truth as best it can be discerned, but mal-administration of science
110 funding has corrupted science's integrity [7]. Since 1989 the United Nations' Intergovernmental Panel
111 on Climate Change (IPCC) has remained silent about the military aerial particulate spraying, and
112 failed to take into account its geophysical consequences in its climate models [8]. At present aerial
113 particulate emplacement can only legally take place under the aegis of military entities, but there is a
114 global effort to encourage governance that permits non-military entities such as universities and for-
115 profit companies to also engage in climate intervention [9].

116 So, what reason was given to national governments sufficiently powerful to get them to agree to
117 become willing parties to near-daily, near-global aerial particulate spraying into the atmosphere – into
118 the air we breathe? Few government leaders, politicians, and bureaucrats are trained in science.
119 Have they been told that the aerial emplacements of particulates will act like a sunshade to cool Earth
120 to compensate for alleged anthropogenic greenhouse-gas global warming?

121 If so, they have been conned into the greatest "science-based" scam ever perpetrated [10]: Cause
122 global warming and climate chaos by daily aerial spraying and then blame the warming result on
123 anthropogenic greenhouse gases to eclipse the authority of nation states and erect new world
124 governance structures required to regulate anthropogenic, transnational greenhouse gas emissions.

125 **3.2 The Real Consequences of Aerial Particulate Spraying**

126 The original military purpose of aerial particulate dispersal into the regions where clouds form was to
127 impede precipitation and to cause drought in an unfriendly country. Indeed, Iranian President
128 Mahmoud Ahmadinejad accused Western countries of doing just that [11]. Figure 2 shows particulate
129 trails blanketing the Republic of Cyprus whose citizens, so far unsuccessfully, sought an explanation
130 from their government for the deliberate obscuration of their skies [12]. There is no information
131 available to the public about the extent that this form of undisclosed weather warfare has been
132 applied. Interestingly, covert environmental warfare was predicted by MacDonald [1]: "...removing
133 moisture from the atmosphere so that a nation dependent on water...could be subjected to years of
134 drought. The operation could be concealed by the statistical irregularity of the atmosphere. A nation
135 possessing superior technology in environmental manipulation could damage an adversary without
136 revealing its intent." Not only its adversary but the aggressor nation's own citizens would be clueless.
137 MacDonald argued that "one can conduct covert operations using a new technology in a democracy
138 without the knowledge of the people."



139

140

141 Figure 2. NASA Worldview satellite image from February 4, 2016 showing jet-laid trails blanketing the
 142 air above the Republic of Cyprus but nearly absent in surrounding regions. The Cyprus Environment
 143 Services Department, part of the Cyprus government, promised to investigate the aerial spraying
 144 following the February 2016 presentations made to the Parliamentary Environmental Committee, but
 145 to date no response.

146

147 Presumably the use of readily available, inexpensive particulate matter was considered a practical
 148 necessity without regard for its possible adverse health effects. We know this was done in Vietnam
 149 [3]. The undisclosed international agreement for near-daily, near-global aerial spraying and its
 150 concomitant funding has allowed military entities to indiscriminately expose millions of uninformed
 151 citizens to the dispersed particulate matter day after day, year after year, *inside their own sovereign*
 152 *countries*. Moreover, the aerial spraying has been accompanied by a concerted disinformation
 153 campaign to deceive the public, as well as the scientific community, about its adverse health
 154 consequences [5,13-15]. In the following subsections, we review various consequences of aerial
 155 spraying.

156 **3.2.1 Aerosolized Particulate Composition**

157 The composition(s) of the military aerial particulate sprayed into the atmosphere has long been a
 158 closely held secret. At the beginning of the 21st century, concerned citizens took samples of post-
 159 spraying rainwater and had them analyzed at commercial laboratories. Usually only aluminum
 160 analysis was requested; occasionally both aluminum and barium; rarely aluminum, barium, and
 161 strontium. The presence of those elements in rainwater indicated to one of us (JMH) that the
 162 particulate matter sprayed into the atmosphere was capable of being rapidly leached by atmospheric
 163 water, just as the toxic waste product of industrial coal-burning, coal fly ash (CFA) is readily leached
 164 by water.

165 By comparing laboratory CFA leachate [16,17] with samples of post-spraying rainwater [6,18,19] we
 166 showed that the aerosolized particulate is consistent with coal fly ash. We further showed that
 167 element-ratios measured in post-spraying air-suspended dust collected outdoors and in matter
 168 brought down by snow are consistent with similar ratios measured in CFA [16,17].

169 Coal fly ash forms in the vapors above the coal-burner. Typically CFA forms as spheres, 0.01 – 50 μm
 170 in diameter [20]. Readily available throughout the world at low cost, the fine grain-size of this major
 171 industrial waste product means that little further processing is necessary before it is deployed in
 172 aerosolized form in the atmosphere.

173 A large proportion the toxic heavy metal and radioactive elements originally present in coal end up
174 concentrated in CFA [21]. Because of its toxicity, regulations in Western nations require CFA to be
175 trapped rather than allowed to exit smokestacks. The circumstances of CFA formation are unlike
176 circumstances found in the natural environment (except burning coal beds), condensing and
177 accumulating in the hot vapors above the burner. Because the chemical reactions during formation
178 are different from those usually found in nature, many of the elements present in CFA are partially
179 extracted by exposure to moisture [16].

180 For the military this is advantageous as CFA aerial spray makes atmospheric water more electrically
181 conductive, because of the many dissolved elements, and thus more responsive to electromagnetic
182 radiation. But for the humans, plants, and animals exposed to these toxins the consequences are, in
183 the longer term, devastating.

184 **3.2.2 Public and Environmental Health Concerns**

185 Epidemiological investigations of particulate aerosol pollution in the same particle size range as CFA
186 provide some guidance as to the adverse health effects of the particulate matter jet-sprayed into the
187 troposphere and lower stratosphere, even without considering its specific identification. Pollution
188 particles in the size range (PM_{2.5}) [22] are associated with morbidity and premature mortality [23-25],
189 Alzheimer's disease [26,27], risk for cardiovascular disease [28], risk for stroke [29], lung cancer [30],
190 lung inflammation and diabetes [31], decreased male fertility [32], reduced renal function in older
191 males [33], onset of asthma [34], increased hospital admissions [35], and low birth weight [36].

192 The adverse health consequences of aerosolized CFA are even more dire. Ambient air pollution, as
193 considerable evidence indicates, contributes to the growing global burden of respiratory disease and
194 lung cancer [37,38]. Inhaled, aerosolized CFA, with its complement of carcinogens, such as arsenic,
195 chromium VI, and radionuclides, settles deep in terminal airways and alveoli where it remains for
196 considerable time posing risks for a lung cancer pandemic in the not-so-distant future [39].

197 Spherical exogenous magnetite (Fe₃O₄) nanoparticles, recently discovered in brain tissue of persons
198 with dementia [40], suggests an origin in the kind of air pollution produced by CFA which is
199 characterized by such spherical particles. Iron oxides and aluminosilicates, primary components of
200 CFA, are all found in the abnormal proteins that characterize Alzheimer's dementia, which lead to
201 oxidative stress and chronic inflammation of brain tissue [41].

202 Coal fly ash, when exposed to moisture or body fluids, releases numerous toxins, including aluminum
203 in a chemically mobile form, which is an environmentally and biologically unnatural state [16].
204 Chemically mobile aluminum is deadly to plants and trees as well as to amphibians [42]. Aluminum is
205 associated with neurological disorders [6], and has been found in high levels in bees [43].

206 **3.2.3 Thermal Consequences of Aerial Particulate Spraying**

207 In addition to inhibiting rainfall by interfering with moisture droplet coalescence, particles sprayed into
208 the troposphere and lower stratosphere reflect a portion of sunlight back into space. But a portion of
209 the incident sunlight is absorbed by the particles as heat. That heat can be transferred to the
210 atmosphere by molecular collisions or can be re-radiated in any direction, not simply returned to
211 space. Meantime the aerosolized particulates also act to restrain infrared radiation loss from Earth's
212 surface and thus *become a source of atmospheric heating – global warming* [44].

213 Iron oxides, a significant component of CFA, absorb strongly in the ultraviolet range but reflect in the
214 infrared range [45]. Most of the airborne iron oxide particles observed in the continental outflows of
215 anthropogenic origin consist of magnetite nanoparticles or iron-bearing particles in CFA [46]. Strongly
216 light-absorbing aerosols, such as CFA, *directly heat the atmosphere* and indirectly reduce snow
217 albedo by their warming effect [47]. As the aerosolized particulates fall to Earth, especially in far
218 northern and far southern regions, they change the albedo of the ice/snow, which allows more solar
219 energy to be absorbed by Earth [48]. This behavior, especially when considered in the context of
220 near-daily, near-global aerosol spraying clearly leads to global warming, not global cooling.
221 Consequently, the thermal state of Earth is biased toward warming, *the exact opposite* of official
222 claims for geoengineering.

223 There are other consequences of the deployment of CFA particulate matter into the troposphere and
 224 lower stratosphere that further lead toward warming, not cooling. For example, CFA particles can
 225 cause super-cooled droplets of moisture high in the atmosphere to form ice crystals, which then
 226 become cirrus clouds whose effect is to retard Earth's infrared heat loss [49,50]. Current levels of CFA
 227 emissions are estimated to contribute 0.1-06W/m² of extra warming through their role in cirrus cloud
 228 formation [51]. This estimate, however, does not take into account the massive quantities of CFA
 229 used in aerial particulate spraying.

230 With all of the concern expressed in the press and elsewhere about global warming, it seems
 231 inconceivable that political leaders would sign a secret international agreement that promotes global
 232 warming. The alternative is that political leaders were deceived into believing that they were agreeing
 233 to an activity that would cool the Earth, when in fact the net effect of the activities warm the Earth *and*
 234 *will destroy life* if permitted to persist.

235 **3.2.4 Ozone Destruction**

236 In 1968 MacDonald [1] warned: "More sudden, perhaps much briefer but nevertheless disastrous,
 237 effects are predictable if chemical and physical means were developed for attacking one of the natural
 238 constituents of the atmosphere – ozone." In the intervening years, such means have been developed
 239 and deployed. The chemical means are principally manifest in the form of deliberately aerosolized
 240 CFA; the physical means, by radiofrequency ionospheric heaters.

241 Many assume that the protective ozone layer in the stratosphere is slowly recovering primarily due to
 242 the international ban on chlorofluorocarbons (CFC's) by the Montreal Protocol [52] and that the
 243 Antarctic ozone hole is slowly healing [53]. However, it is coming to light that these assumptions may
 244 be wrong. There is new evidence for the continuous loss of ozone in the lower stratosphere [54]. It is
 245 thought that a reduction in ozone in the tropical stratosphere, where most of the ozone is formed,
 246 leads to transport of this ozone-poor air to the mid-latitudes via the Brewer-Dobson circulation [54].

247 Ozone column losses at high latitude are in the range of 6% [55]. Previously, depletion of lower
 248 stratospheric ozone has been attributed to rapidly increasing anthropogenic (and some natural) short-
 249 lived substances that contain chlorine or bromine [54]. However, the aerosolized CFA used for climate
 250 modification, now conducted on a near-daily, near-global basis, places *massive quantities* of chlorine,
 251 bromine, fluorine, and iodine into the atmosphere (Table 1), including *highly reactive nano-*
 252 *particulates*. These are probable destroyers of ozone [56].

253 **Table 1.** Range of halogen element compositions of CFA [57].

Chlorine (µg/g)	Bromine (µg/g)	Fluorine (µg/g)	Iodine (µg/g)
13 – 25,000	0.3 – 670	0.4 – 624	0.1 – 200

254

255 There is a disquieting parallel for this ecosystem degradation: Despite strengthened mercury emission
 256 regulations, mercury measured in rainwater is increasing [58]. As the upper troposphere has now
 257 been found to contain oxidized, particle-bound mercury [59], it is not unlikely that covert aerosolized
 258 CFA, which contains up to 2 µg/g mercury, is a major source of mercury pollution when sprayed into
 259 the atmosphere [19].

260 In addition to the chemical destruction of stratospheric ozone, there are indications that the largely
 261 secret high-frequency ionospheric heaters, now globally dispersed on land and sea, may adversely
 262 affect stratospheric ozone. Russian scientists have discovered a new physical phenomenon of the
 263 decrease of the intensity of microwave emission from the mesosphere in the ozone line upon the
 264 modification of the ionosphere with high-power high-frequency (HF) radio waves [60,61]. The SURA
 265 190MW effective radiated power transmitter operated in the 30 min on/30 min off mode. Thermal
 266 radiation of the atmosphere in the ozone spectral line, at a frequency of 110836.04 MHz, decreased
 267 in intensity during the heating-on portion of the cycle by an average of 10±2% over all sessions of
 268 measurements in March, 2009, as shown in Table 2.

269 **Table 2.** Comparison of O3 number density x109 reduction during the thirty minute heating facility
 270 emitted high-power X-polarization radio waves at 4.3 MHz. Data from [60].

DATE>>>	3/ 14/ 2009	3/ 15/ 2009	3/ 16/ 2009	3/ 17/ 2009
Night		12.1±0.7	13.6±0.7	13.6±0.5
Day	9.37±0.48	9.60±0.50	9.55±0.40	9.82±0.35
HF Pumping	8.03±0.38	8.31±0.29	7.32±0.47	8.97±0.49
Day	9.09±0.42	9.23±0.21	9.01±0.24	9.67±0.30
Night	12.8±0.6	14.4±0.7	11.9±0.6	12.2±0.5

271

272 **3.2.5 Turning the Environment against Humanity**

273 The Russian discovery may be a bellwether of severe problems to come. For 60 years the military,
 274 without regard for ozone destruction or for destruction of life in general, places great emphasis on
 275 exploiting ionospheric modification to serve its multiple interests that range from communications with
 276 submarines to controlling, utilizing, and weaponizing the environment. In 1968 MacDonald [1] foresaw
 277 the possibility that in the future the military might develop the means to trigger on-demand covert
 278 environmental modifications to cause storms, floods, droughts, earthquakes, and tidal waves.
 279 Although one would not expect an admission from the steeped-in-secrecy military, an email to then
 280 Secretary of State Hillary Clinton [62] appears to indicate that the time of a 6.3 magnitude earthquake
 281 in New Zealand was known in advance, presumably an indication that the earthquake was
 282 deliberately triggered:

283

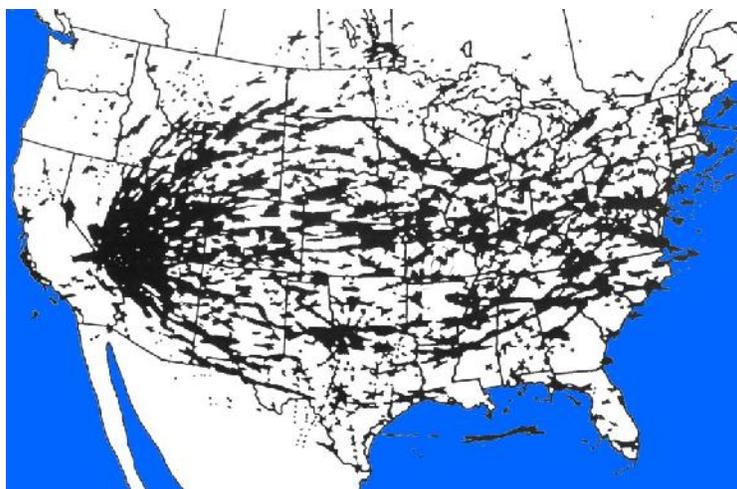
284 Fourteen years prior, in 1997 Secretary of Defense William Cohen directly stated [63]: “Others are
 285 engaging...in an eco-type terrorism whereby they can alter the climate, set off earthquakes, [and]
 286 volcanoes remotely through the use of electromagnetic waves....It’s real, and that’s the reason why
 287 we have to intensify our efforts.”
 288

289 Fifty years ago MacDonald [1] noted: “The enhanced low-frequency electrical oscillations in the earth-
 290 ionosphere cavity relate to possible weapons systems through the little-understood aspect of brain-
 291 physiology....No matter how deeply disturbing the thought of using the environment to manipulate
 292 behavior for national advantage is to some, the technology permitting such use will very probably
 293 develop within the next few decades.” With ionospheric heater transmitters scattered throughout the
 294 world, that time might be close at hand – half a century after MacDonald’s forecast.

295

296 **3.2.6 Extinction of Life on Earth**

297 Historically, the military has exhibited little or no concern for the health and wellbeing of its own
 298 citizens when what it perceives as “national security” goals are at stake. During the 1950s and 1960s,
 299 more than one hundred nuclear devices were detonated above ground in New Mexico (USA) [64].
 300 Without being told of the potential health risks, thousands of military personnel were deliberately
 301 exposed to nuclear blasts, including “war game” maneuvers that took place directly beneath the
 302 atomic clouds [65,66]. Nor were local residents clearly informed of the risks or provided with ways to
 303 minimize those risks [65]. Radioactive fallout occurred not only in the area near the nuclear blasts, but
 304 as winds propelled the radioactive cloud across the United States, fallout occurred along the paths,
 305 shown in Figure 3, that depended upon weather conditions.



306

307 **Figure 3.** U. S. Department of Energy image showing areas of the continental United States crossed
 308 by more than one nuclear cloud from aboveground detonations as indicated in black during the
 309 1950s-1960s.

310

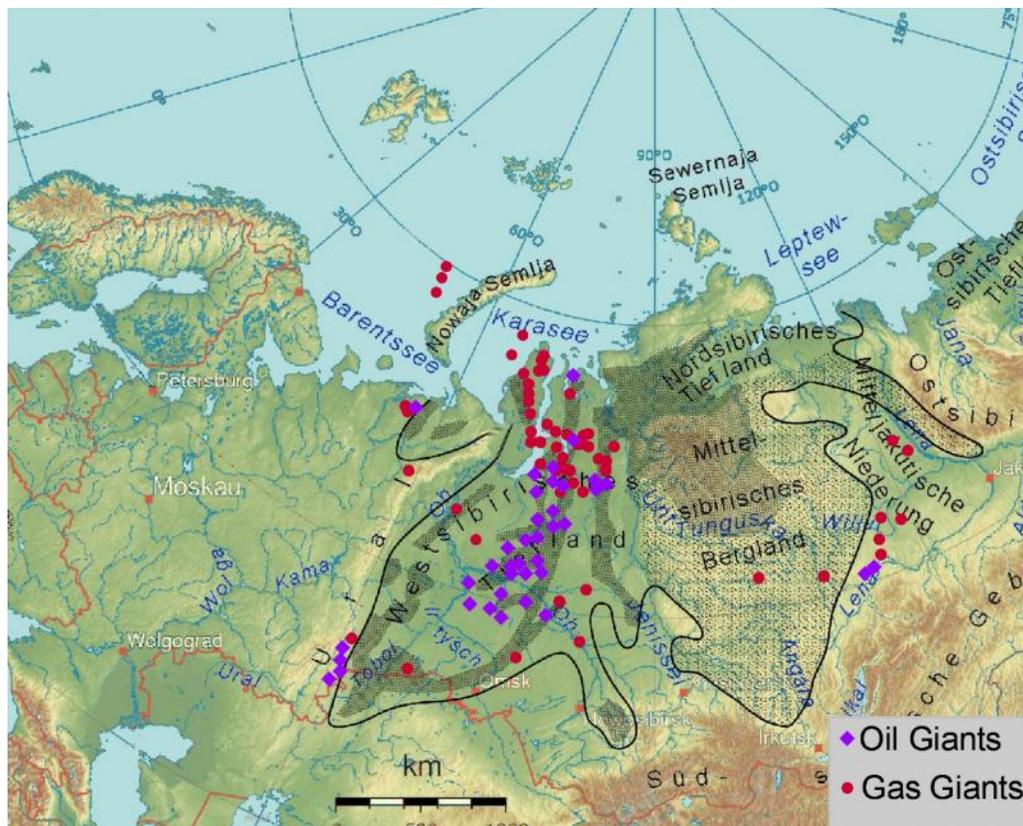
311 Eventually, atmospheric nuclear aboveground testing came to an end only as the result of public
 312 outcry over news reports that bomb-produced radioactive strontium-90, found in cows' milk, posed
 313 dangers of being incorporated into the teeth and bones of infants and children especially [67]. Now,
 314 more than a half-century later, scientists turn a blind eye to vast military experiments while news
 315 media worldwide have been coerced or co-opted into silence about these same experiments. Yet the
 316 dangers of aerial particulate spraying and ionospheric heating activities, taken as a whole, *may be as*
 317 *serious as nuclear testing*. Continued without abatement, these covert activities pose the very real risk
 318 of extinction of life on Earth.

319 Mass extinction as defined when the Earth loses more than three-quarters of its species in a
 320 geologically short period of time has happened only five times in the last 540 million years [68].
 321 Common features of the "Big Five" suggest that key synergies may involve unusual climate dynamics,
 322 atmospheric composition, and global ecological stressors that affect multiple lineages [69]. In just the
 323 past 500 years, humans have triggered a wave of extinction, threat, and population declines already
 324 comparable in rate and magnitude with previous extinctions [70]. Earth is now experiencing a huge
 325 wave of population declines and extirpations with cascading consequences on both ecosystem
 326 functioning and resources vital to modern civilization. A recent study, for example, documents an
 327 alarming decline, a 75% reduction, in insect populations (biomass) over the past three decades in
 328 protected areas of Germany [71]. The term "biological annihilation" has been used to highlight the
 329 current state of Earth's ongoing Sixth Great Extinction [72].

330 **3.2.7 Geophysical Ignorance, Arrogance, and Secrecy**

331 Earth's great extinctions correlate with epic volcanic phenomena called Large Igneous Province (LIP)
 332 [73]. Earth's most extreme mass extinction, at the end of the Permian (or "Great Dying"), 250 million
 333 years ago, coincided with the Siberian Traps LIP, a massive outpouring of lava and intrusion of
 334 underground magma. The underground magma mixed with thick coal seams and this hot coal-basalt
 335 mixture extruded at numerous surface locations, producing plumes of pyroclastic fly ash, soot, sulfate,
 336 and basaltic dust which ascended to the upper atmosphere [74]. This material was dispersed globally,
 337 and the resulting char deposits in Permian-aged rock have been found to be remarkably similar to
 338 modern coal fly ash [75]. The Permian was characterized by high levels of carbon dioxide, methane
 339 gas and rapid global warming to levels lethal to most living organisms [76]. A period of deadly
 340 ultraviolet radiation stress during the Permian period may have resulted from depletion of
 341 stratospheric ozone by massive output of hydrothermal organo-halogens from the vast Siberian Traps
 342 volcanism [77].

343 The rifting that occurred east of the Urals 250 million years ago resulted in one of the world's largest
 344 petroleum and gas deposits, as shown in Figure 4 [78]. There is considerable frozen methane trapped
 345 in the permafrost in that extensive northern area [79]. Anthropogenic global warming, caused by the
 346 near-daily, near-global aerial particulate spraying, poses a serious risk of massively thawing and
 347 releasing that entrapped methane to the atmosphere. The potential for another mass-extinction event,
 348 should this happen, cannot be dismissed.



349

350 **Figure 4.** The relationship between major petroleum and natural gas production wells and the
 351 boundary of the Siberian Traps, indicated by the black line. Methane hydrate deposits currently locked
 352 in the permafrost within this extensive area upon melting pose a major catastrophe. From [78].

353

354 Military activities aimed at manipulating Earth's environment by polluting the atmosphere with CFA
 355 and utilizing ionospheric heaters to cause earthquakes, volcanic eruptions, and other undisclosed
 356 purposes are, we submit, causing great harm to life on Earth. The military, like the Sorcerer's
 357 Apprentice, is toying with forces of great potential destruction about which it has neither
 358 understanding nor concern for the harm inflicted.

359 4.0 CONCLUSIONS

360 The military's decision to alter the natural workings of our planet, to pollute the air we breathe, to
 361 disrupt natural climate, to weaponize natural geophysical processes, to disrupt the ionosphere that
 362 protects us from the sun's deadly electromagnetic radiation, and to deceive the public about the
 363 health risks involved was accurately forecasted in 1968 by Gordon J. F. MacDonald in his essay aptly
 364 entitled "How to Wreck the Environment." But MacDonald's vision was not 20-20. He imagined that a
 365 nation would develop the technology for the benefit of its natural national interests. MacDonald failed
 366 to realize that the world's militaries could and would be co-opted by a secret international agreement
 367 the perhaps unintentional consequence of which is to wage a first-ever war on planet Earth, on all its
 368 biota and on its fundamental life-support, biogeochemical processes.

369 Unless and until politicians, news media, scientists, and others in our society face the truth of what is
370 happening before their very eyes and collectively demand a halt to these covert technological
371 activities, we will march onward – to the first anthropogenic-caused mass extinction of life on Earth.

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