

New Model Federalist No. 13 – On Great Works

That human civilization must grow and expand – That mankind must conserve the natural world as it extends its dominion – That conservation must admit the needs of human progress – That global warming ought to be halted and reversed – That humans ought to explore outer space and settle new worlds – That conservation and exploration support the general welfare of the Union – That policies for them ought to work with the free market and local governments – That a tax on carbon emissions ought to be enacted – That geo-engineering ought to be considered – That the Moon ought to be revisited and Mars reached – That ethics and foresight must accompany new technologies – That our Union may work with Russia in exploration and China in conservation

*For more than three years I have spoken about the New Frontier. This is not a partisan term and it is not the exclusive property of Republicans or Democrats. It refers, instead, to this Nation's place in history, to the fact that we do stand on the edge of a great new era, filled with both crisis and opportunity, an era to be characterized by achievement and by challenge. It is an era which calls for action and for the best efforts of all those who would test the unknown and the uncertain in every phase of human endeavor. It is a time for pathfinders and pioneers. —John F. Kennedy, **Speech Dedicating the Aerospace Medical Health Center, Nov. 21, 1963.***

In our previous essay, we offered a reform of international institutions so as to harness the collective might of several countries toward achieving the great works of this century. In this, our final essay, we shall elaborate on the foremost of those works: the conservation of the Earth, the exploration and settlement of outer space, and the development of new technologies that could either expand or constrain the sovereignty of mankind. Their importance arises from fundamental principles of morality, and their urgency from self-interest. For we, as people, must either finish these tasks or else someday the consequences of having left them undone will finish us;¹ and our best chance to advance them is now, in the present. We therefore call for action, and shall here propose several means by which these great tasks may be accomplished.

It is the nature of human society to grow and expand; in fact, to do so is imperative to our survival. We cannot rely for our well-being on the mercy of some yet-undiscovered alien species nor on the unfeeling mechanisms of nature, which might through some disaster one day ruin the Earth and all upon it.² Thus, just as republics must expand their power and influence in the world to secure their liberty from the exactions of a conqueror, so must the civilization of all mankind expand its power and influence in the universe to preserve all which we as people hold dear.³ For though it is the nature of life that we never entirely control our fate, by expanding beyond one planet we may nonetheless extend the control we do have and so increase the likelihood of our continued existence and independence. We are made for action, and passivity does not befit us; or else we would have remained content to be prey for lions and wolves, and would never have crafted the tools that allowed us to overcome them and achieve our present supremacy on Earth.

¹ “One distinguishing characteristic of really civilized men is foresight; we have to, as a nation, exercise foresight for this nation in the future; and if we do not exercise that foresight, dark will be the future!” Theodore Roosevelt, Opening Address to the 1st Governors’ Conference, May 13, 1908.

² There are a thousand ways to imagine such an apocalyptic event. Yet one requires no speculation because it has already occurred: the meteor impact that brought an end to the dinosaurs, of whom nothing but bones remain.

³ “Every one, as he is bound to preserve himself, and not to quit his station willfully, so by the like reason, when his own preservation comes not into competition, ought he, as much as he can, to preserve the rest of mankind.” John Locke, *Second Treatise of Government*, Ch. 2, Para. 6.

Yet if while expanding in this world and beyond it we ravage everything we touch, then we are but a race of parasites, undeserving of such empire. Our nations must grow in might and wealth, but we must govern them justly, or else we are not civilized, but barbarians; likewise, our population and the industry to support it must grow, but we must also conserve all that we can of nature. Conservation is in this way a moral duty.⁴ As mankind expands into outer space, we must conserve, as best we can in accordance with our needs, the natural state of the worlds we settle.

This logic may seem to create a paradox. Man has a duty both to expand and to conserve, yet the two are in some ways inherently opposed, for in every place where man is present, nature is affected. This is true, and thus the conservationism we uphold necessarily differs from certain environmentalist creeds which argue that the greater good can be served only through mankind ceding the dominance it has attained over nature. Such a philosophy, which calls for humanity to live primitively and shrink in population, is an invitation to man's extinction and we reject it; so too do we reject disproportionate obstruction of human progress for narrow ecological concerns.⁵

Rather, both duties – advancement of civilization and conservation of nature – must be taken seriously, and a balance struck between them. This notion is not paradoxical if examined closely. Mankind, after all, depends on natural resources; those resources are sustained by the Earth itself, which is of such complexity that the ruin of a small part can cause the depletion of a much wider section; and so a failure to conserve as much of the natural world as practical will ultimately result in exhaustion of resources on which civilization depends, thus causing hardship for future generations.⁶ Our guiding principle, therefore, is to not be wasteful.⁷ Mankind ought not to deprive itself of what it needs, but it ought to use only what it needs; and it ought to use the things it needs for as long as they can be used before discarding them. On this principle, our Union set aside great areas of wilderness in the 20th century while also improving agriculture and industry so as to draw more resources from less land, and it widely succeeded in this regard.

In this 21st century, however, it is not the management of land that is of primary concern, but rather the management of the Earth's atmosphere. Of all the matters of conservation, there is none today of such dire and urgent consequence as the phenomenon of global warming.⁸ It is even now causing the polar ice to melt, the sea to rise, and fire to spread. To avert the dangers

⁴ "But though this be a state of liberty, yet it is not a state of license: though man in that state have an uncontrollable liberty to dispose of his person or possessions, yet he has not liberty to destroy himself, or so much as any creature in his possession, but where some nobler use than its bare preservation calls for it." John Locke, *Second Treatise of Government*, Ch. 2, Para. 6.

⁵ Under current law, the U.S. Army's largest exercises may grind to a halt if they encounter certain endangered species. This is absurd: the defense of the Republic is more important than the preservation of a woodpecker.

⁶ "Disregarding for the moment the question of moral purpose, it is safe to say that the prosperity of our people depends directly on the energy and intelligence with which our natural resources are used. It is equally clear that these resources are the final basis of national power and perpetuity. Finally, it is ominously evident that these resources are in the course of rapid exhaustion." Theodore Roosevelt, Address to the 1st Governors' Conference.

⁷ "As a people we have the right and the duty, second to none other but the right and duty of obeying the moral law, of requiring and doing justice, to protect ourselves and our children against the wasteful development of our natural resources, whether that waste is caused by the actual destruction of such resources or by making them impossible of development hereafter." Theodore Roosevelt, Address to the 1st Governors' Conference, May 13, 1908.

⁸ It is now referred to as climate change; that there may be scientific reasons for this change in nomenclature, we do not dispute. But this is a political essay, not a scientific one. We find global warming to be clearer and more vivid: it cuts to the problem's core, the inexorable rise in temperature, and conveys its worldwide character. It is also less tainted by partisan rancor. Both parties once feared global warming; only one now worries about climate change.

that this chaos presents to our civilization, and to show mankind's fitness to rule on Earth and expand into the universe, we must halt this menace and repair the damage it has already caused.

Human industry brought this threat upon the Earth; human ingenuity can surely overcome it; and today the sole question is whether human will can be summoned to meet it. A sordid few, who pursue their immediate and private interests ahead of the well-being of their Republic, have sought actively to obstruct this object. They have been aided in this pursuit by skepticism among the public. This quality, insofar as its general function is to scrutinize authority, can ordinarily be counted as an essential republican virtue; but in this instance it is liable to result in negligent inaction. To those who doubt that global warming is occurring, we say to go north and witness it yourself: it has reshaped the land, leaving only rocks and dirt where great bodies of ice stood not forty years before. To those who doubt its human cause, we say that mankind ought to confront it nonetheless. Humanity is bound both to conserve the natural world and to attain mastery over it; if you do not see this matter as the former, you ought to see it as the latter. Nature has bestowed on us a free will. If this menace to our world was initiated by nature, let man and woman end it.⁹

Having so established the logic that leads us to our ends, we shall now endeavor to define them more clearly. First, our Union ought immediately to slow and then to halt global warming. The first step toward this goal is for the United States to rejoin the Paris Accord and make good its promises therein; and the main effect of doing so shall be to demonstrate to other nations that our Republic means to do its part, and expects them to do theirs. Yet the terms of that agreement, even if faithfully adhered to, are insufficient to the task at hand. Further effort shall doubtlessly be needed, and even then, the task will not end once warming is only halted. Our Union's next aim, by century's end, ought to be to restore the world to the temperatures it averaged in the middle part of the past century, prior to the acceleration of warming that marked the start of the present crisis. Over a longer period, the aim ought to be to restore, as far as practicable, the atmospheric conditions that existed prior to the Industrial Revolution, and thereby rectify the harm that mankind has wrought on the Earth through the industrial emission of carbon dioxide.

Second, the United States, in cooperation with other countries, ought to chart the universe with the aim of discovering habitable planets; then, on developing the necessary technical ability, it ought to send human astronauts to explore and ultimately to settle them. The obvious first steps toward this end are for U.S. astronauts to return to the Moon and thenceforth journey to Mars.¹⁰ Although those destinations are not themselves likely to yield immediate and tangible benefits, the act of reaching them shall advance our Republic toward the more distant and rewarding ambition. Voyages to the Moon and Mars will, out of necessity, prompt advances in spaceflight and in the sustenance of astronauts on distant travels; and those locations, once infrastructure is constructed on them, may serve as waypoints for fueling and provisioning further exploration.¹¹

These goals are, in the long term, mutually supporting: in shifting some population and industry off the Earth, the pressure on this planet will ease. In the interim, they require sustained effort on a grand scale, which can be done only with the combined resources and authority of

⁹ "We want to take action that will prevent the advent of a woodless age, and defer as long as possible the advent of an ironless age." Theodore Roosevelt, Address to the 1st Governors' Conference, May 13, 1908.

¹⁰ The present administration has, rightly, again made exploration of the Moon and Mars into a formal objective.

¹¹ That the Moon has no atmosphere and less gravity than the Earth might also make it a more efficient launchpad for expeditions deeper into the solar system and beyond.

many nations. Nature does not recognize human boundaries, nor do the consequences that result if its maintenance is neglected. It is thus necessary and proper that final authority in our Republic for conservation and exploration rest with the federal government, for those matters are vital to the general welfare of the United States. Our Union ought also, when necessary, to confer some authority over these affairs on international bodies that satisfy the criteria in our previous essay.

That federal and international bodies ought to direct such efforts, however, does not mean that the policies made to attain them ought to be monolithic. Rather, as excessively centralized approaches are ineffective as a general rule, it is best that higher governments allow some local discretion in the particulars of implementation. Nor should policies ignore or run contrary to the working of the free market, because they would then be wasteful and doomed to eventual failure. Instead, any public plan ought to make use of the flexibility and innovation of private enterprise, and ought to be structured so as to encourage such enterprise, rather than stifle it.

Ultimately, the tide will turn on global warming when it becomes profitable for industry, without subsidy, to mass-produce clean energy;¹² the next era of space exploration will begin in earnest when a technological breakthrough allows for rapid manned spaceflight. Yet efforts can and ought to be made now to prepare for and encourage those shifts. To that end, we propose that projects related to these great works be prioritized in the ordinary allocation of federal funds for research and development.¹³ Support to research, if it is properly accounted for, functions as an investment rather than a subsidy: it is needed only until a breakthrough is reached, and any breakthrough has the potential to produce a return far greater than the original investment.

As regards global warming, we second the proposal, already made from several quarters, for a tax on the emission of carbon.¹⁴ If such a tax is of substance but not excessive, it could alter the calculations of energy firms such that they do a public good by investing in clean fuels while continuing to grow their business. Contrast this approach to a ban on dirty energy. A prohibition would bankrupt companies for a reason unrelated to their competitiveness, which is both callous and foolish: it would wrong their employees by suddenly casting them out of work, and it would surrender the world market to foreign firms that are unbound by any limitation on the amount of carbon they may emit. Contrast it, too, with a subsidy for clean energy, which would drain public funds to keep uncompetitive firms in business. A moderate carbon tax shall divert competitive enterprises into new channels of industry, while collecting public revenue to invest in research.

To repair the damage caused by global warming, however, it is not sufficient to produce clean energy now: the world has already warmed, and vast swathes of the Arctic, and to a lesser extent the Antarctic, have melted and cannot be retrieved by a reduction of emissions. Indeed, as the polar regions have warmed faster than the rest of the world, and as carbon dioxide lingers in the skies for decades or more, they would continue to thaw even if mankind ceased its emissions today; and because the polar ice itself, by reflecting sunlight from its surface, has so far slowed the planet's warming, its further deterioration will only exacerbate the world's plight. Yet its recovery, if achieved, shall in the same manner speed the recovery of the entire Earth.

¹² Clean being defined herein as emitting less carbon dioxide. Natural gas has promise; cleaner than oil and coal, it is becoming less expensive to produce. Such is also the case with wind and solar power, but only where the climate is advantageous: it might make good economic sense to maintain solar panels near Tucson, but not around Seattle.

¹³ It need hardly be said that at the moment an extraordinary need for research funds is presented by the COVID-19 pandemic, which is of more immediate importance than the two matters referred to here.

¹⁴ Well-defined suggestions for a carbon tax have been put forth by *The Economist* newspaper, among others.

When wisdom fails, ingenuity must be resorted to. Therefore, to restore the Earth to what it was and ought still to be, we propose the use of geo-engineering: in this case, action to cool the polar regions by removing carbon directly from the atmosphere using human inventions. Such an attempt, it is claimed by some, would constitute a dangerous and unprecedented intervention by mankind in the affairs of nature. Yet this claim overlooks the truth that global warming is itself geo-engineering on a vast scale, albeit unwitting; and that it is unintended, and thus uncontrolled, renders it far more dangerous to man and nature than a deliberate, limited effort to cure the blight it has wrought. Technologies employed to this end ought to be studied carefully and tested incrementally, lest they produce unintended effects, and their development and use ought, so far as practical, to be in concert with other countries. Nonetheless, geo-engineering offers mankind a way to heal the world that we, as people, know and cherish; it ought not to be shunned.

As for space exploration, it is first necessary that the United States regain the ability to send astronauts to space. It is poor policy, not only for our Union but for the world, to rely solely on the Russian government to convey mankind into the cosmos. Our Republic, being as it is the greatest world power, has long had the capacity to right this deficiency; recently, it has lacked only the will.¹⁵ NASA's Orion spacecraft and Space Launch System, which were once planned to replace the Space Shuttle upon its retirement in 2011, ought to be made spaceworthy without further delay; so, too, ought the spacecraft being built on contract by private American firms.

Indeed, NASA need not explore outer space entirely on its own: our Republic is home to several private enterprises that seek opportunity beyond the bounds of the Earth. The federal government ought to work with them as it did with the railroad firms during our Union's western expansion, and as Britain did by granting royal charters in its early days of American settlement. The U.S. government ought to persist in employing such companies to launch its satellites; it is right to contract them to build a new generation of spacecraft; and it ought to aid in insuring their efforts to develop the final frontier, replete as those ventures shall be with financial risk. Moreover, just as the Royal Navy protected the settlement of the Thirteen Colonies, and as the U.S. Cavalry guarded the routes West, so ought the U.S. military today to redouble its efforts to protect American and allied interests beyond Earth. We thus endorse the proposal, advanced by the present administration, to establish a military service responsible for operations in space.

Here we must recall, however, the principled argument for partial privatization that we made in an earlier essay. NASA must have its own means of accessing outer space, or else its contractors shall, in the spirit of oligopoly, come to offer poor services for exacting prices. To avoid complete redundancy, however, labor ought to be divided – as, wisely, is now being done. NASA is right to focus on exploring the distant reaches of space, in which it may invest the superior resources of government, whereas private firms ought to develop routes and resources nearer to Earth, in which their greater efficiency may bring both public and private benefit.

So, too, ought our Union and its fellow republics to deliberate on how new worlds, once explored, shall be governed. It will be to the eternal credit of mankind if our most enlightened forms of government are the ones which we extend beyond the Earth; but it will be to mankind's

¹⁵ "There will be, as there always are, pressures in this country to do less in this area as in so many others, and temptations to do something else that is perhaps easier. But this research here must go on. This space effort must go on. The conquest of space must and will go ahead. That much we know. That much we can say with confidence and conviction." John F. Kennedy, Remarks at the Aerospace Medical Health Center, Nov. 21, 1963.

eternal shame if we instead extend those which are most tyrannical. In view of this consideration, it is significant that republics are not the only nations engaged in space exploration. China, which makes no pretense of its despotism, has made substantial progress in this field, such that it threatens to overtake the United States by being the first to land human explorers on Mars. Our Republic ought not to yield the initiative, but rather seize the opportunity to compete. It ought to return its astronauts to the Moon forthwith, before China's arrive there; and by the time China lands its pioneers on the Moon, our Union's ought already to be on their way to Mars. We thus endorse wholeheartedly NASA's Artemis plan, whose object is to return Americans to the Moon in 2024; and we expect that that venerable institution will soon thereafter turn its sights to Mars.

As our Republic and other countries labor on the great works of this century, however, they must soberly weigh the means they employ. Development of new technologies that alter the possibilities of human society cannot reasonably be shunned, nor should it be. It is at the core of human nature to inquire and experiment, and the inventions that result from this activity, when guided by common ethics, have been and shall continue to be of immense benefit to mankind. Yet blind faith in technology, and reckless and unethical development of it, is one of the greatest follies that man is liable to fall into, and it is one which may yet bring humanity's destruction. Advances in two areas, artificial intelligence and human genetics, warrant concern on this count. The former, if pursued uncritically, risks ceding mankind's control over its own fate; the latter risks placing in mankind's hands far more control over its fate than it ought ever to have.

In designing machines which are ever more capable and aware, we must beware that they could replace us: either swiftly and violently, as in the horror stories of science fiction, or slowly and peacefully, as we, in indolence, neglect to think or to work for ourselves. To prevent such an occurrence, our Republic ought to employ the same means to limit the power of robots that it has long used to limit the power of men: dividing authority among independent bodies, instituting checks and balances between them, and establishing laws that limit the extent to which power may be exercised. We thus propose that artificial intelligence never be given full autonomy over weapons that can be used to slaughter humans;¹⁶ and this restriction ought to be codified in law. We further propose that reasonable limits to the interconnectivity of items that are connected to the internet be established, so that no single artificial intelligence is afforded the opportunity to infiltrate an unlimited array of devices which it could employ to effect a sudden coup.

In the case of genetics, if people were to be given a discretionary and unlimited ability to alter their genes or those of their offspring, disaster would certainly follow. Even if the risk of gruesome defects caused by unforeseen effects of such meddling could be eliminated, mankind, in its rush to usurp the prerogatives of nature by seeking a flawed ideal of perfection, would edit out of existence the natural diversity that enables our species to thrive. Humanity would become monochrome and stagnant; though the friction that comes with difference would fade, so would the flashes of brilliance that result from it. Bereft of such dynamism, civilization would decline. We therefore propose that gene-altering technology ought to be used on humans only in cases of severe need, and only as a last resort;¹⁷ and that laws be passed prohibiting such technology from being made available, on any account, for cosmetic or eugenic purposes.

¹⁶ For AI to control electronic weapons, such as signal jammers, that can only harm other machines, is acceptable.

¹⁷ Such as for severe genetic disorders or cancers that do not respond to other treatment. The use of gene-altering technologies on crops is another matter. It is indispensable to feeding the present world population of seven billion; and by increasing the crop yield per acre of land, it supports the aim of conservation.

Several other technologies with potential for misuse no doubt exist, but it is beyond our scope to identify and expound on them all; we say only that our Republic ought to apply ethics and foresight to each. Yet it will be of little use that there are laws governing such technologies in the United States if our Union fails to maintain itself as a leading inventor of them. China has declared its intention to compete with our Republic in this regard, and it has so far used its advances not for the common good of mankind, but for the oppression of its citizens. It is thus a moral imperative, somewhat in tension with itself, for our Republic both to regulate carefully its own inventions and to compete effectively with its rivals, who almost certainly shall not regulate theirs. To reconcile and thereby fulfill these parallel ends, we urge our Union to press its natural advantages in education, openness, and critical thought, which are the foundations of invention.

Finally, though we caution against dependence on them or unwarranted trust in their good intentions, there does exist some potential for our Union, as a gesture of common humanity and goodwill, to cooperate with its two foremost adversaries on the great works of conservation and exploration. At the end of the Cold War, the United States began a joint endeavor in space with Russia. Together they built the International Space Station that several countries use today; and despite the present tension between the two on Earth, well-warranted on account of Russian encroachments, their combined efforts in space have proceeded constructively. China, though it is a declared rival in space, may prove an able partner to our Republic in halting global warming on Earth. The government in Beijing has suffered the ills of environmental damage at home and so has some interest in addressing matters of conservation that affect the world. It is reasonable for the United States and China to work together in that field for the common good, and thereby balance the rivalry that shall otherwise mark their relations in this century.

Mankind needs a frontier in which to constructively expend its energies;¹⁸ it also needs a home, consistent and recognizable, that it may treasure and from time to time withdraw to.¹⁹ By rejecting passivity and setting our minds to great works, we can reopen the frontier and preserve our home. This essay will nonetheless feel incomplete, for to fully craft the policies necessary to attain its goals requires technical knowledge that we do not possess. Yet we have endeavored to identify vital ends, to explain the moral logic behind them, and to offer some proposals that we consider to have a chance of success and that are consistent with principles expressed elsewhere in this series. We thus ask you, fellow citizens: What shall you leave to your grandchildren?

—U.S. Citizen

¹⁸ “Frank O’Connor, the Irish writer, tells in one of his books how, as a boy, he and his friends would make their way across the countryside, and when they came to an orchard wall that seemed too high and too doubtful to try and too difficult to permit their voyage to continue, they took off their hats and tossed them over the wall – and then they had no choice but to follow them. This Nation has tossed its cap over the wall of space, and we have no choice but to follow it. Whatever the difficulties, they will be overcome. Whatever the hazards, they must be guarded against. ...with the help and support of all Americans, we will climb this wall with safety and with speed – and we shall then explore the wonders on the other side.” John F. Kennedy, Remarks at the Aerospace Health Center, Nov. 21, 1963.

¹⁹ “Finally, let us remember that the conservation of our natural resources, though the gravest problem of today, is yet but part of another and greater problem to which this Nation is not yet awake, but to which it will awake in time, and with which it must hereafter grapple if it is to live – the problem of national efficiency, the patriotic duty of insuring the safety and continuance of the Nation. When the People of the United States consciously undertake to raise themselves as citizens, and the Nation and the States in their several spheres, to the highest pitch of excellence in private, State, and national life, and to do this because it is the first of all duties of true patriotism, then and not till then the future of this Nation, in quality and in time, will be assured.” Theodore Roosevelt, Opening Address to the 1st Governors’ Conference, 1908.