Science, Migration, and Our Ever More Global Society

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Abstract

Nation states once contained distinct groups of people based on a common heritage, language, religion, or ethnicity. Today, the nation state is largely a political and economic entity. In the past, migration from one part of the world to another occurred only rarely, and usually on an individual basis. Now, mass migrations are becoming more frequent, and for a greater number of reasons. While genocide and ethnic cleansing are nothing new, migrations now occur (and are expected to occur more often in the future) for political, economic, and environmental reasons as well. Natural disasters – like earthquakes and droughts – as well as those intensified by human behavior – such as resource depletion or rising sea levels – will only exacerbate the likelihood of mass migration. The need for large groups of people to move from one part of the planet to another has never been greater, and yet their ability to do so is still seriously hindered by national divisions. Of course, cooperation among nations has grown enormously since the end of the Second World War, but mass migrations like the recent crisis faced by refugees from Syria show that *division based on national distinction is preventing our common humanitarian efforts*. The argument put forth in this paper is that the nation state (along with the fighting it engenders) has outlived its usefulness, and now hinders human progress more than helps it. Here the scientific community is seen as a model for cooperation across national frontiers, showing that the goal of "people without borders" (*les être humains sans frontières*) is not only attainable, but is itself a necessary means toward greater human achievement in the future. For scientists are themselves merely people who base their decisions on empirical findings and group consensus – and their international cooperation is a model which the rest of the world would do well to emulate.

Keywords: Science, immigration, globalization

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"A new type of thinking is essential if mankind is to survive." – Albert Einstein[1]

We human beings got our start as a distinct species on the continent of Africa, separating from the ancestors we share with chimpanzees roughly 7.5 million years ago. Somewhere between 200,000 and 60,000 years ago, we reached the anatomically modern state we recognize as *Homo sapiens* today. And, based on mitochondrial genetics and archaeological finds, our earliest migration out of Africa occurred during that same time. That is, once people began to develop tools and gain control over their environment, they were able to fare well in diverse settings, and so, were more willing to venture out into new frontiers. Since that time, our species has spread around the globe, now occupying every habitable land mass on Earth. And regardless of where each of us finds ourselves today, we are descendants of those same original migrants. Had they not left our ancestral homeland, you and I would know little of the many wonders this planet holds for anyone wishing to see them today. And there were a number of reasons for those ancestors to migrate: from the pursuit of food to the avoidance of predators, from a need to find more habitable climes to the desire to seek out mates beyond one's own kin. For while a natural curiosity about "what's around the next corner" might have played a role from time to time, the number one priority would always have been survival and reproduction. Once people establish family ties and bonds of friendship, moving away from home would never be taken lightly. The trust and cooperation of others could mean the difference between life and death, so that exploration for the sheer fun of it would only have occurred in times when our ancestors felt relatively secure.

As various groups settled in different regions around the globe, they developed cultures conducive to their environment, and made changes at a pace dictated by the abundance of food, proximity of water, and the density of their population. Competition between groups varied from place to place and the acceleration of cultural change was determined as much by geographic location or situational circumstance as by anything like genetic or intellectual difference.[2] Over tens of thousands of years, waves of human beings moved out of Africa and into Europe and Asia, crossed Siberia to the Americas, finally reaching New Zealand via Australia. Once people had occupied every continent on Earth, there was no place they could then go which was not at least partially inhabited by others. And with the advent of

[1] From "Atomic Education Urged by Einstein", *New York Times* (25 May 1946).
[2] Jared Diamond's *Guns, Germs, and Steel* (1997) depicts in great detail the differences in cultural advancement in terms of geographical situation and circumstance, rather than genetic or intellectual variance.

agriculture – roughly 10,000 years ago – humans were able to sustain themselves in a single area, investing their time and effort in raising livestock and planting crops. With a less nomadic lifestyle and more dependable food source, they were then more likely to remain near the place of their birth and, given the increased food supply, to reproduce more frequently as well. As their numbers increased – from extended families to clans and tribes – people needed to organize their labor and protect their provisions. A territory inhabited by a particular group would come to be regarded as *belonging* to that group (as would the den or burrow of *any* species occupying such a space). Should anyone from outside the group venture into this territory, all of its members would recognize them as strangers or foreigners – and as such, a possible threat to the group. "You," they might say, "are not one of us, and our survival depends on maintaining the group and the resources on which it depends."

During the time of recorded history – during which ever larger groups diversified their labor and developed the very means of recording history – people devised various technologies for controlling their environment. Different surroundings required different technologies, and while one society made advances in one area, another made progress elsewhere – so that, over time, human groups differed not only because of physical traits due to sexual selection, but because of the particular circumstance and history of each culture. When groups live in close proximity, cultural differences often determine the group to which one rightly belongs. And given the speed with which culture evolves (compared to that of biology), it becomes ever more likely that members of the in-group will be distinguished from those outside the group by cultural markers (linguistic differences, familiarity with particular practices, and so on). Also, as groups get larger, it becomes less likely that anyone in the group will be acquainted with all of its members, making signs of allegiance to the group more necessary than ever. Since each member is dependent upon the group, each is naturally inclined to maintain its integrity – so that trust among members becomes paramount, leading to suspicion of anyone who might disrupt the social order and endanger its citizenry. There is strength in numbers (provided they are all on the same side). United we stand, divided we fall – this is the gist of the comment made by Benjamin Franklin to his fellow revolutionaries at the signing of the Declaration of Independence: "We must all hang together, or assuredly we shall all hang separately."[3] Without the cooperation of others, we stand little chance of succeeding on our own. Knowing we can rely on others not only makes us feel more

[3] Francis Fukuyama details this societal necessity well in his *Trust: The Social Virtues and the Creation of Prosperity*, Free Press, 1995.

secure, but inclines us to help them in turn (since they are part of the society on which we ourselves depend).

In more recent times, human tribes around the world have grown in number, becoming kingdoms and empires vast enough to require elaborate organization. From commonwealths to democracies, monarchies to republics, increased population has required that human societies become less familial and more bureaucratic. Today, we recognize members of our group more by the identification papers we are issued than by our physical resemblance. In the aftermath of the Industrial Revolution, our concern is more with efficiency than intimacy – in principle, we might like to meet everyone in the group, but in practice there just aren't enough hours in the day. After all, it was only increased productivity and trade between groups that made our recent surge in numbers possible. While our agricultural ancestors maintained a relatively stable population, with the advent of modern machinery (and now robots) the human population has risen from roughly one billion in 1800 to nearly eight billion today. *Not everyone on Earth may be a member of the group with which we most closely identify, but the cooperation of everyone on Earth is necessary for the perpetuation of society as it is now configured for everyone on Earth.* In other words: we need each other – and regardless of where on Earth we happen to have been born, who our closest relatives are, or which group we feel most comfortable in, we now recognize that cooperation between groups is as important today as cooperation within groups has always been. We also better understand the confines of the planet we occupy: that, despite our growing numbers, the size of Earth is non-negotiable.[4] If we are to survive on this planet together, we would do well to remember our common roots in that initial group out of Africa. For not only do we share a common origin, but a common biology: *we are all genetically related to each another*. The people of Earth may only be brothers and sisters in a metaphorical sense, but we are all *literally* related to one another as cousins, all members of one big extended family.

Over the last few hundred years, we have organized our growing tribes into nation-states. And until recently, these states were comprised not only of people who lived in the same area, but who shared the same traditions, spoke the same language, worshipped the same gods, and were even members of the same race or ethnicity. Today, the nation-state serves

[4] The relation between increased production and population was first outlined during the Industrial Revolution. See Thomas Malthus' *An Essay on the Principle of Population*, 1798. Though a cleric, Malthus emphasis was on our physicality: "That the increase of population is necessarily limited by the means of subsistence, that population does invariably increase when the means of subsistence increase, and that the superior power of population is repressed, and the actual population kept equal to the means of subsistence, by misery and vice." (p. 61, end of Chapter VII)

less to indicate a person's allegiance than to signify their location. Once an emblem of personal identity, the state has become less a religious or ideological affiliation, and more an economic or political one. People can now move away from the place of their birth, be educated in different countries, study in new languages, and develop technologies which no individual state had ever known (and might possibly never have achieved had it not been for their combination). People fall in love with others from various backgrounds, marry into families with varied traditions, mix both their genes and cultures together by having children, and adopt others from all over the world. Once upon a time, the nation-state served to unify and protect a select group of people; today it serves more to divide – and thereby – often harm them. For in the past, our place in the world was essentially fixed – we rarely ventured beyond sight of our countrymen, and faced together dangers we likely would not survive on our own. Individual vulnerability required our collective cooperation, and we prospered to the extent we were able to fend off threats from outside our borders. Today, the dangers we face threaten everyone on the planet, and *our confines are no longer the imaginary lines we draw on a globe, but the vastness of space which quite literally surrounds this one*. Cooperating now as a single group, the people of Earth may achieve what each nation-state attempted earlier in isolation. By removing barriers we imposed in the past, we have a chance of overcoming many of the challenges we will face in the future. But in order to do so, we will have to think of nation-states less as distinct empires and more as inter-dependent parts of a greater whole. For the nation-state to be more of a help than a hindrance, we will need to treat it as one of many pieces in a very complex puzzle – a puzzle that is complete, and whose beauty is fully revealed, only when all of its pieces are fitted together to form a single image.

Whose Child Is This?

Few things illustrate the need to change our perspective on the nation-state like the little boy from Syria whose lifeless body lay face down in the sand on the shores of Greece after a failed attempt by his family to escape the fighting in their homeland. Like so many others who have met with the same fate, this little boy symbolizes what happens when we let our differences overshadow everything we have in common. Such tragic images force us to question ourselves, make us wonder at our own priorities. For example, when are issues regarding the nation-state superseded or no longer relevant? When does it begin to matter more that a child is human than that he or she is Syrian? When does being human take precedence over having allegiance to a particular subset of people? Is *this* shore just for Greeks? *That* chunk of ground only for Turks? What if the little boy (or girl) were

from North Africa or Europe, from the Americas or Asia? Is there *any* group of children who should suffer such a fate? Any group of children who should be driven to an early death by the inability of adults to put aside their lesser allegiances and work together for all of the children of our species? If one were to ask "Whose child is this?" should they wait to find out before trying to help? *Why does it matter which nation the child is from?* Which nation's children should *not* be helped? After all, if the child were yours, is there any coast on which they might wash up where they should not be helped, where they do not belong? Is there anywhere on Earth where a child – your child – should not be accepted and helped?

This little boy, and countless others like him, show us what we are capable of when confronted by such devastation. Throughout the region, people of various countries have been working to help in whatever way they can, taking in refugees, feeding and caring for displaced families, even transporting them to more distant locations around the world. When faced with such large-scale catastrophes, people realize that what matters most is caring for those affected (regardless of what part of the world they are in). Whether the cause be a natural disaster – like the recent earthquakes in Nepal or Haiti – a war between rival factions – as in Syria and Rwanda – or a calamity of both natural and man-made causes – as with the Fukushima tsunami in Japan – people understand that nationality has its limits, and that we share a physical relation which transcends political boundaries. Today, whether in neighboring countries or elsewhere, we find it hard to imagine anyone being able to help, but *not* helping. *In an ever more global community, we are finding it increasingly difficult to justify discrimination based on national affiliation.* While we might once have said, "The people from that country are not to be trusted," we now realize that those people – whoever they are – are just like we are: trustworthy to the extent that we feel we belong to one another. Once we know that they are on our side, that they are "one of us," it actually behooves us to help them (as it always has to help members of one's own group).

This was arguably more intuitive when everyone in a group shared the same religion, ethnicity, or language. Now that nation-states are more obviously economic and political entities, the pay-off is a little harder to calculate. "If outsiders come in, they will use resources that have been reserved for insiders." True, but only if they continue to be considered outsiders. Once we treat the child as "one of us," the child has no reason to think of us as strange or foreign – and with the growing recognition that "there's nowhere else to go," that we inhabit a lone planet in the middle of space, no one will have reason to treat *any* child as if they come from "somewhere else". For *there are no aliens among us* – everyone we have ever met was born right here on Earth, and all of the resources anyone ever

uses have come from here as well. To deny others access to those resources is to deny our physical ties to them, to treat them as if we have no responsibility toward them because they live on a different part of the globe. We rightly disparage mass killings, but are sometimes willing to prevent others from acquiring the goods they need to survive. However, as the people of Syria have more recently reminded us, it can be quicker and less painful to drown than to starve to death. Letting people die may be more passive than killing them, but just as effective at bringing about the same end. More importantly, our passivity not only hides our complicity in the deaths of "foreigners," but makes it more likely that others will passively accept *our* deaths as "foreigners". Our nation-states are a way of passively asserting that we do not care about the fates of others unless they are "one of us". But as the lifeless body of that little child – and so many others – attests, the time has come when we must acknowledge that *there is no one on Earth that is not "one of us,"* that *there are no more foreigners.* The "final solution" to the problem of immigration is not killing people (or simply letting them die), but eliminating the obstacles that stand in their way: the walls, fences, and borders which "passively" make them foreigners in the first place. In the grand scheme of things, the answer to the question "Whose child is this?" can only ever be: "One of ours."

Our Collective Enterprise

The idea of "a new world order" has been emerging for some time – seen by some as the promise of global unity, and by others as the threat of worldwide dystopia. This new order actually began to take shape nearly a century ago, with the founding of the League of Nations. Established in the wake of the First World War, the League was founded with a singular mission of promoting world peace, its primary goal being to prevent war through mutual cooperation and the assurance of collective security through negotiation and arbitration. Just a generation later, following the Second World War, the League of Nations was replaced by the more robust United Nations, whose aim was not only to maintain peace and security in the world, but to promote social and economic development, protect the environment, and provide humanitarian aid in cases of famine, natural disaster, and armed conflict. While its focus was on the relations between nations, it quickly became obvious that, in order to achieve its goals, attention would also have to be paid to relations between individuals (regardless of nationality). As a result, in 1948 the General Assembly of the U.N. adopted a "Universal Declaration of Human Rights," which proclaimed there to be basic civil, political, and economic rights common to all human beings. However, the problem of ensuring those rights still remained – for example, what if a country is not a member, or is one but refuses to

cooperate? Though most countries have since become members, there is still the question of which body should take precedence: the particular nation-state or The United Nations. That is, what happens to a nation's sovereignty when they disagree with this larger body or fail to treat their citizens as the U.N. claims they should?

Here, fears of "Big Brother" in the form of a World Government suggest that an even greater form of totalitarianism might emerge if there are no checks and balances to the power wielded by these United Nations: that individual state sovereignty is necessary to prevent the U.N. from becoming a dictatorship of unprecedented proportions. Of course, were the U.N. a single individual, or small group people conspiring together, such a danger might be very real. However, the fact that all member nations work together as a confederacy of sorts – as an assemblage of territories which understands the need for their mutual cooperation – makes such a coup extremely unlikely. As democracies all over the world attest, checks and balances work to the extent that each member is considered part of the government, part of what is being checked and balanced – when the "rule of the people" is by and for the people as well. As a fledgling global democracy, the United Nations cannot disregard the interests of any of its members, since it consists of nothing beyond the collective involvement of those member states.

Granted, there are nations which hold more sway at the present moment, but the equality of all members is one of the goals the U.N. constantly seeks to address. In order to achieve this, individuals must ultimately take precedence over the nation-states to which they have been said to belong, and must in turn think of their countries as part of this larger confederacy. The United States and China, for example, may be more powerful than other nations at the moment, but that should not mean that people in other parts of the world can be denied any of the rights which the people in these more powerful countries enjoy. By declaring human rights to be universal, we – that is, all members of The United Nations – have begun the process of reducing the power that individual nations wield which prevent individuals around the world from exercising those same rights. In doing so, we recognize that the sovereignty of any individual nation has its limits. When a country's citizens are mistreated, for example, we no longer think it legitimate to hide behind the passive excuse of national sovereignty. Whether people are killed or tortured, or simply left to starve or drown trying to find safe haven, we are now more united in thinking of them as members of our own group, as individuals who have the same rights as we do. Today, when injustice occurs anywhere in the world, we no longer expect to be told to mind our own business (no matter who we are or where we live) – for *there is nowhere in world that is not all of our concern, no place on Earth where the people of Earth do not belong* – and so, no nation-state in which

the rights and responsibilities of others are less (or more) important than our own.

Of course, this move toward a more unified human population did not begin with organizations like The League of Nations. It has been growing for millennia, prompted first by the conquest of others for resources and mates, and then through the trade of goods and exchange of ideas. Today, with conquest no longer a viable option and markets opening up to everyone in the world, our global society has reached a point where it can no longer pretend to be living in disconnected territories. That is not to say that we must all dress the same way, eat the same foods, or speak the same language – for our diversity is precisely where our greatest interest lies, providing both the content of our individuality and the grist for our mills of collective innovation.[5] But it does mean that we must acknowledge that we share the planet with one another, that in addition to a common heritage, we are all united in one fragile ecosystem, dependent not merely on its bounty, but on the other members of our extended family as well. The divide-and-conquer strategies that worked before must be put behind us, replaced instead by those which acknowledge our singular situation and mutual responsibility. For *the sorts of problems our children will face in the future will require solutions which can only be achieved through our joint effort and collective concern*. Idealistic though it may sound, the human race can only be won if everyone understands that we are in it together, if everyone accepts nation-states as names of particular regions, rather than distinctions between kinds, or castes, of people.

Such idealistic hopes are only attainable, though, when tempered by a realistic appraisal of the situation. And that is the business of science. For while we might dream of living forever, travelling across the entire universe, or turning back the hands of time, whether such visions are simply delusional can only be told through the hard work of experimentation and observation. If our dreams are to be anchored in reality (and so, made achievable), we need to know how and why the world actually behaves as it does, which events are predictable, and which goals are then attainable. Since the earliest days of our species – but with ever greater acceleration over the past few centuries – the collection of practices we now call "science" has enabled us to do things our ancestors would have considered pure fantasy. But all of our scientific achievements could never have come about were it not for the open, public nature of its practices and the collective efforts of its critical enterprise. For scientists state their various opinions clearly, criticize each other's theories openly, and argue for what each believes to be right – yet all

[5] Matt Ridley's book *The Rational Optimist* makes a compelling case for ideas mixing in cultural evolution in a way analogous to genes combinations in biology, providing greater cultural variation from which we may then select.

of their work is directed toward a common goal: determining what actually is and is not the case regarding a particular issue. They may each have a personal bias in favor of a particular group of people, or against a certain region, but all of them cooperate toward a collective understanding (and, in the process, reduce the biases with which they began). Out of a love for the subject, they work with people from all over the world, never considering that a theory's "country of origin" might prove the theory to be true or false.[6] Despite taking pride in their homeland, they work diligently to find solutions to questions raised in every corner of the globe, knowing that the results will be applicable everywhere, that the laws of nature work right through national boundaries, binding us all in a unified natural order. The Stoic philosopher, Marcus Aurelius, pointed this out years ago – for though he was the Emperor of Rome, he realized that it is ultimately the rule of nature which governs us all: "So then there is a world law; which in turn means that we are all fellow-citizens and share a common citizenship, and that the world is a single city."[7] We don't have to call it "Rome," of course, but whichever name we choose, this global city is still "home, sweet home" to everyone *we* know. And if we still feel elitist or xenophobic, we can all agree that *this is the greatest planet in the world (no matter what anyone "else" in the universe might think)!*

To that extent, the scientific community might well be thought of as a prototype for our modern global society, as it epitomizes the ability to disregard national borders in order to find solutions to problems common to us all. It shows that we can all work together toward a shared goal while still having a strong competitive spirit – just as sports teams do, we can wear different colored shirts, award prizes at the end, and finish better off as a result of the encouragement we get from being members of the league (only now, as a league of nations). After all, scientists are now more likely to compete as individuals, or representatives of a team or university, than those of a nation-state. And their collective endeavors belong to us all. Sure, Galileo was Italian, and Newton English, but we all benefit from their genius and all take pride in their contributions. For we know their pursuits were never aimed at discovering the truths of Italian astronomy or the laws of English physics. Their work – like scientific thought in general – transcends petty nationalistic divisions and brings out the best our species is capable of: individuals working with pride on a project we know to be bigger than ourselves, one we can contribute to now only because of all those who have gone before us – the giants on whose shoulders we so gratefully stand. In

[6] The preeminent historian Herodotus claimed that "everyone without exception believes his own native customs…to be the best….There is abundant evidence that this is the universal feeling about the ancient customs of one's country." – *The Histories*, bk. 3, sec. 38. We just need to think of all of humanity's culture as our own.

[7] Aurelius, *Meditations*, bk. 4, sec. 4.

this way, we each contribute to an enterprise which we are free to criticize, and in turn gain strength from the critical insights of our fellow scientists.

When grappling with the affairs of human society, we would do well then to follow these same practices. Using the scientific community as a model for working across borders can help in resolving such "extra-national" problems as global warming, resource depletion, and our own escalating population. For all such issues require a type of cooperation which is only hindered by our division into nation-states. And while this might conjure the idea of a government comprised of a panel of scientists – leading to that dystopian Big Brother scenario – a United Nations which employed *procedures* similar to the empirical methods of science would merely have less regard for national interests and more concern for our global welfare. The more we view the scientific community as a model for cooperation across national frontiers, the more likely it is that we will one day be a "people without borders" (*les être humains sans frontières*): *a goal that is not only attainable, but is a necessary means toward greater human achievement in the future*. For due to our increasing involvement as ever more global society, it is becoming easier to recognize both the challenges we face and the goals we all share. To the extent that we see ourselves as a single people will we be able to find solutions to some of our most daunting problems. And with a steady reduction of national division, working together will grow still easier in the future. At some point, these current divisions may seem as archaic as the tribalism and feudalism of old: an evolutionary stage along the way to more refined human cultures.

In some respects, of course, we are already well on our way to global cooperation. For we increasingly acknowledge the need to work together on issues which no nation can possibly resolve alone. To do so, individual nations regularly concede more authority to the United Nations, since they realize not only that there is strength in numbers, but that *solutions aimed at resolving problems on a global scale are more likely to mean stability for each individual nation*. One of the greatest examples of such cooperation is the *International* Space Station, where people from all around the world work together – both in space and on Earth – in the kind of collaborative effort that will be ever more necessary as we venture farther out into *our* galaxy. Ever since we first saw pictures of this little blue planet nestled in the vastness of space, we have realized how much our collective survival depends on cooperation among us all. Recently, the *American* astronaut Scott Kelly reminded us just how unimportant our national distinctions appear once we pull back and get a larger perspective on things: "Having this vantage point from space, we can see the effects of our presence on Earth. There are no political borders when you look down at the planet. So, it does look like we are all part of one big team." In response to that, his friend,

Russian cosmonaut Mikhail "Misha" Korniyenko added: "I think if we could send our two presidents up for two weeks, problems on Earth would get settled." If we always keep in mind the image of our planet from space, we will be far less likely to think that our regional differences are so important as to raise armies, wage wars, or even build huge stockpiles of nuclear weapons as a "deterrent" to such lunacy. If we can keep in mind that our collective survival depends on treating everyone on Earth as a fellow space traveler, as someone who wants to contribute *their* small share to this great enterprise as well, then we can go a long way toward ensuring the happiness of each individual (regardless of which nation they happen to be in).[8]

I started this paper with a remark by a most remarkable man of science, one who felt that our long-term survival depends on our thinking differently about the world, ourselves, and our relation to one another. In the wake of the atomic bombing of Japan, and in the midst of a Cold War with its looming threat of global destruction, Albert Einstein realized that "peace cannot be kept by force. It can only be achieved by understanding."[9] So, in concert with nine other Nobel laureates of science,[10] he and the mathematician Bertrand Russell generated the *Russell-Einstein Manifesto*, which emphasized the dangers of nuclear weapons and called for world leaders to seek peaceful resolutions to international conflict. Signed by Einstein shortly before his death in April of 1955, the manifesto made clear his concern with the role of nationalism in preventing our global cooperation, and the need for all of us to work together toward this common end:

"We are speaking on this occasion, not as members of this or that nation, continent, or creed, but as human beings, members of the species Man, whose continued existence is in doubt…The abolition of war will demand distasteful limitations of national sovereignty… But all, equally, are in peril, and, if the peril is understood, there is hope that [we] may collectively avert it."

This manifesto led to the first conference of science and world affairs (in Pugwash, Nova Scotia, 1957), and such conferences have made great strides in this direction ever since. Today, our hope is that everyone will come to adopt such an enlightened view, thereby strengthening our resolve to work together toward what is best for everyone (by harnessing what is best

[8] *A Year In Space*, PBS, 3/2/16. Part of the nearly year-long mission included comparing the effects on Kelly's physiology with that of his twin brother, Mike (who remained on Earth): "I said to my brother 'I'll be in space, flying all the way around the Sun, one lap a year.' And he's like 'Yeah, so will I. The rest of us will be doing the same thing on Spaceship Earth.'"

[9] Albert Einstein, in a speech to the *New History Society* (14 December 1930).

[10] Max Born, Percy W. Bridgman, Leopold Infeld, Frederic Joliot-Curie, Herman J. Muller, Linus Pauling, Cecil F. Powell, Joseph Rotblat, and Hideki Yukawa.

in us all). For, as Russell said then (which is still true today), "the only thing that will redeem mankind is co-operation, and the first step towards co-operation lies in the hearts of individuals."[11]

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[11] Bertrand Russell, *The Impact of Science on Society*, 1952.