[Existential Risk / Opportunity] Singularity Management

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Contents:

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Global Risk Reduction Heroes

By James Blodgett

We in this SIG are literally trying to "save the world," a quest right out of the superhero comics. Some aspects of our quest can be analyzed using the superhero metaphor.

Heroes and Saints

Saints are religious heroes. They become role models that people who are inspired to be religious can emulate. Science has its heroes too, people like Copernicus and Einstein. In his book The Structure of Scientific Revolutions, Thomas Kuhn examined the process of paradigm shift, the process by which scientific theories like the phlogiston or heliocentric theories were replaced by better theories. Scientists who initiate this process become scientific heroes. In Kuhn's history, this process was usually resisted by conventional scientists who were attached to the old theory and saw no need for a new one. Kuhn's book and the process it documents have lessened that resistance. Now a substantial percentage of scientists are looking for the next big theories so they can become the next big heroes. I see this as one of the reasons that there are many competing theories at the cutting edge of many scientific fields. This is good from the point of view of risk reduction because it gives us a wider view of the theoretical possibilities. However, we also have to deal with the fact that the theories that connote danger are often a subset of all theories, and therefore individually somewhat improbable. However, even a small probability of global risk is not a trivial issue.

Heroes as Role Models

How one goes about reducing global risks is not immediately obvious. Therefore we could use our own list of saints and heroes whose stories can help us see how to proceed. Heroes are especially valuable when the path forward is unclear. Someone who can see and articulate that path can lead the way, as Einstein did in science. Therefore I plan to include brief histories of folks who have contributed to global risk reduction in this and future newsletters. There are many people who are working on these things from whom to choose.

Sidekicks as a Form of Superhero

Charities vary widely in the amount of good that they do. There is an "efficiency of charity" movement that attempts to estimate the good that charities do per dollar contributed. For example, see http://www.givewell.org . This same line of thought can be applied to our efforts, a form of charity because we often donate some of those efforts. Some activities we might donate are more valuable than others. Miranda Dixon has published an impressive (though rather roundabout) essay that suggests that volunteers who are not experts at advocating for fixing global problems might do more good by becoming sidekicks to others who are at the top of the game. You can see this essay at http://lesswrong.com/lw/lig/the_importance_of_sidekicks .

I mention helping others because I am painting pictures of activities that readers might realistically accomplish, readers with varying skills and varying amounts of time. If you don't have time to do major work, perhaps you can help someone who does. It is useful to find people who are doing good work and think about how you can help their effort. Lest the role of sidekick seem less glamorous than the role of hero, there are ways of helping others that are not precisely the sidekick role. Apprentices eventually become master craftsmen. A hero who leads needs those who follow, in various roles. Those who contribute money or votes or educate people or shape opinion can provide vital resources for projects that depend on these things and can be heroes in what they do. Heroes can help other heroes. In the superhero genre this is called a superhero matchup.

I can use some of my own history as an example. I have published a few papers, some as second author. My role in writing papers as second author was to recognize the value of the principle author's work and help him or her to write it up. Also, as I write this essay I am trying to help others (you readers) accomplish something.

An example of one of our SIG members who helped others in a "sidekick" role is the work Justine Jones did in copy editing a larger work written by several authors. I was one of the authors, so I saw her work first hand.

In 2009, three of our SIG members helped an international group write a complaint to the US Human Rights Committee about risk management at particle colliders, which in the worst case might violate everyone's right to life. Copy editing was a frustrating job, but an important one. Four of the larger group collaborated using an online wiki, while another who was not comfortable with wikis contributed text via email. The process was not smooth. For example, I was annoyed when my writing was edited by others who were good at science but poor at writing to make pedantic points that I thought unnecessary, meanwhile disrupting the flow of my text. Justine helped to sort things out. At times even her edits were lost when someone who was editing elsewhere made changes on a version that did not include her contribution, then mistakenly substituted their version for the one she had edited, thus losing her edits. Despite all of this, I am proud of the resulting document. It made good use of our diverse expertise. The process resulted in a document that was better than any individual member of the group could have accomplished on his or her own. Justine, as copy editor, made a substantial contribution. The document, which has 73 pages and 69 footnotes, can be seen at http://web.archive.org/web/20101013205558/http://lhc-concern.info/?page_id=84 . Download the PDF titled "UN Communication CERN LHC ConCERNed International_on-line version 1.1 "

Justine also has done things on her own that could fit the role of hero. She wrote a sensible "letter to the editor," a short novel not published in response to other's concerns that it might cause more problems than it solves (her restraint here is heroic too), and she pastes interesting things on Facebook. When I asked her if she minded if I described her copy editing as an example of the sidekick role, she responded: " I have always seen myself as a facilitator, helper, that sort of role, rather than a leader. Sidekick isn't the most flattering description but I guess it goes with the superhero idea."

If you, readers, don't have good ideas of how to proceed, consider helping someone who does. Think about ways to do that. Email me your ideas or concerns--I may be able to help you (functioning as somewhat of a sidekick to you as hero.) If you do have good ideas, use this newsletter (and other venues) as a away to spread that idea and recruit others.

Also, if you don't have good ideas of how to proceed, consider using the methods of another of our SIG members, Win Wenger. He is an expert on brainstorming. He frequently applies his methods to generate ideas for solving global risks. See his Project Renaissance at http://www.winwenger.com .

How an Individual Can Improve Humanity's Odds

By James Blodgett

We live at an important time in human history. The human species has amazing prospects right now...but might not achieve them, and might even go extinct. We as

individuals have some prospects of tweaking the odds towards the former, and away from the latter. That could be tremendously important, but even if not, it is a hobby that is more fun than bowling. In this newsletter we explore ways of tweaking those odds.

Such things have already been done. The cold war has ended, resulting in destruction of many but not all nuclear weapons. Gorbachev and Reagan deserve most of the credit for this , but they could not have acted without the social support of many people who favored detente and arms reduction, including some who advocated actively for various aspects. Indeed Gorbachev was almost deposed by a military coup which might have been successful had more Russian citizens supported that coup. As another example, there were reasons to think that the latest particle collider at CERN might destroy the world. It was almost started up with those reasons poorly refuted, but safety considerations were improved (although not perfected) by a study made in response to critics.* Critics accomplished something here, and even more so did the authors of that study: it is safer to fly in an airplane that has been checked out, even if the check is not perfect, and even if it turns out that there was nothing wrong with the airplane, since something might have been wrong.

*[Steven B. Giddings & Michelangelo M. Mangano, Astrophysical implications of hypothetical stable TeV-scale black holes, Phys.Rev.D78:035009,2008. Available at: http://arxiv.org/abs/0806.3381v2 (download the PDF)]

There many ways we can contribute to the cause. We are writing about some of them in this newsletter. As discussed in "Book Reviews as Things We can Do" in the April 2015 issue, we can read relevant literature, and contribute to knowledge of and evaluation of that literature. I had hoped to have another book review in this issue of this newsletter, and hope to do so in future issues, and there are many other venues for reviews. We can identify top people working on these things, and try to help them out, as suggested in the sidekick portion of the "Global Risk Reduction Heroes" article in the current issue. We can contribute money. We hope to identify other things we can do in upcoming issues. There are thousands of people who are working on various aspects of this issue. We hope to feature people who are doing relevant things as potential role models.

One way to help is to help me think about and write some of this. Consider this a casting call.

My best current idea was described in the January issue of this newsletter, (see past issues at http://www.global-risk-sig.org/pub.htm) and is reprised in the following piece I am printing here, on the next page, and also posting in the Lifeboat Foundation discussion section on Yahoo Groups. Note that in this initiative I am in some ways a sidekick to Metzger.

The Wright Brothers as Role Models

By James Blodgett

Paul Werbos (who posts regularly in the Lifeboat Foundation discussion) seems discouraged that US space agencies appear to be redoing legacy missions and avoiding new directions. He and others are discouraged that the US budget for these things keeps getting cut.

Perhaps we can hope that other countries will take up the slack. However, there is another approach that just might work, and that is therefore worth some effort on my standard grounds of expected value.

The "Magnificent Men" video I linked to 7/9/15* shows some considerable (and comical) efforts to develop aviation over a hundred years ago.

* [It is at https://www.youtube.com/watch?v=AXT4pgW_UGk . I posted in response to a similar video showing experimental robots falling down, with the implication: "Why worry about them?" My message was that, despite comical missteps, airplanes eventually worked very well.]

The problem of controlled flight was solved impressively by the Wright Brothers, two bicycle mechanics and manufacturers who worked with determination and skill for a few summers, building their own aluminum engine and inventing a wind tunnel and a scheme for multi-axis control.

The Wright Brother's version of independent work seems impossible when we think of the difficulties of space industrialization. It takes a lot of energy to achieve orbit. A reliable machine that can accomplish that seems inherently expensive. It seems to take many millions, and often billions, of any currency to launch a serious space mission. There are ideas for reducing that cost, but their development will also require billions. Space industrialization to the point of self-sufficiency would seem to require many many missions, and so seem priced in the trillions.

However, Metzger* has suggested another way. You have probably heard this before because I keep talking it up. I will keep the basics short.

* [Philip Metzger et al, "Affordable, Rapid Bootstrapping of Space Industry and Solar System Civilization," Journal of Aerospace Engineering, April 2012. A preprint is currently available at: http:\\data.spaceappschallenge.org/aerospace.pdf]

Metzger suggests sending a mission to the moon. It would deliver a few tons of miniaturized mining equipment and machine tools, machines that can make other machines. They would include 3D printers that can use regolith and materials extracted from regolith. They would include teleoperated robots that can assemble things. These would make machines that in turn could make other machines. The second generation of machines would be crude and include components from Earth since the first generation would not have the capacity of Earth machine shops. Our cavemen ancestors started with sticks and stones, which eventually grew into the sophisticated technology of today. Metzger proposes doing the same thing in space, refining machines, adding to their capacity, reducing the percentage of Earth components, and expanding exponentially with each generation. If industrialization can grow exponentially, it can fill the solar system in fairly short order. We did the same thing on Earth. There is enough material in the asteroid belt to build habitats for trillions of people, and to build many other useful things on a grand scale. Some of those things could address existential problems, as would space industrialization itself. If done on a grand scale, it would provide an impressive backup for Earth.

The problem here is converting many existing industrial processes and machine designs so that they can function in the space environment, and, for early generations of machines, so that they can be constructed with the initially minimal tool set. If we do this in the now traditional way, it would seem necessary to pay billions to many aerospace firms employing many thousands of engineers. It would be cheaper if we could get many duplicates of the Wright Brothers to do much of it on their own.

My idea is to encourage this kind of work with a version of the challenge prizes that NASA and DARPA already employ. They target mostly university teams. I would include them, but would focus on another target. There are now hundreds of makerspaces and thousands of hackerspaces (basically the same thing), places where members have access to advanced machine tools. Today's versions of the Wright Brothers are likely to hang out there. Makerspace prize competitions have already been conducted for inventions that benefit the community. It should be fairly easy to try sponsoring one such competition, hopefully many, for space industrialization machine tools. A series of successful competitions would not only produce designs for manufacture of machine tools that could be made in space, it would (assuming success) also produce press coverage and public enthusiasm that would encourage governments to provide the necessary launch capacity.

A brief version of this idea is included in my essay that will appear in the upcoming Lifeboat anthology, "Visions of the Future". If thousands read that book and that essay it might help to raise funds to implement this idea. However, we don't have to wait for that or count on it happening. It would be a good idea to try initial versions of

the idea now, so we know the ropes if more funds become available. I could use volunteers to help. I could use contributions for prizes.

We also need to think about the sequence of prizes. We need to think about specific developments to target.

Another issue worth thought is the economic model for industrialization of space. Later stages will produce tremendous economic value. Early stages require investment. Governments have encouraged such things before, jump starting development by helping to finance canals, railroads, and airports, often on a large scale. I can imagine a market on the moon, in which governments buy things useful for their space projects and allow entrepreneurs to rent machine tool capacity to produce them. As the economy grows entrepreneurs produce tools to sell to each other so they can acquire their own capacity. When the economy grows enough to produce things like space solar power stations that beam power down to Earth, it becomes self-financing, since there is a big market for power on Earth. Folks in this special interest group could contribute by thinking about how this might work and how it might best be facilitated.

I think this idea for industrialization of space is at least interesting to talk about. One thing SIG members can do it simply to talk this idea up whenever they have a receptive audience, thus helping to introduce it into meme space. Try to make it sound good.