Intelligence
MAKING THE WORLD WORK
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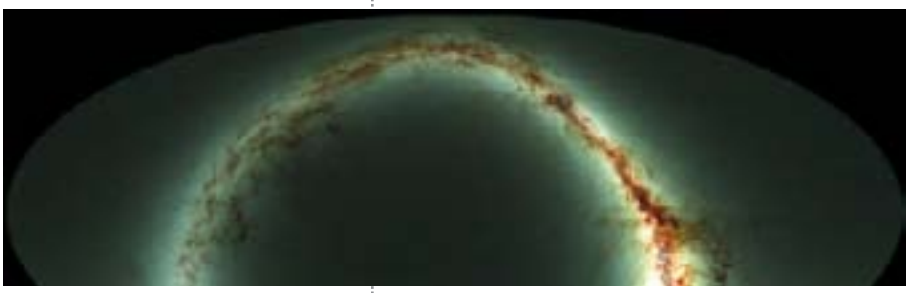
Tumultuous Change - Brittle Social Structures - MI? - What's the Plan?

THERE IS ENOUGH - RETHINKING: A GLOBAL MANHATTAN PROJECT - WHAT DO YOU DO?



HAWAII STAR MAP
A composite image of the sky visible over Hawaii made over four years from a half-million exposures by the Pan-Starrs1 Observatory. If printed at full resolution, the researchers say, this photograph would be one and a half miles long. Danny Farrow, Pan-Starrs1 Science Consortium and Max Planck Institute for Extraterrestrial Physics

Change and accelerating change; some exponential, some not, but totally overwhelming changes are here, now; and more change is on the way. We don't know how fast things will change, but change is in the air, and some of those changes will be frightening and disruptive. Other changes have the potential to be freeing and to provide more for everyone. But we will have to plan and act to avoid the worst and hasten the best.

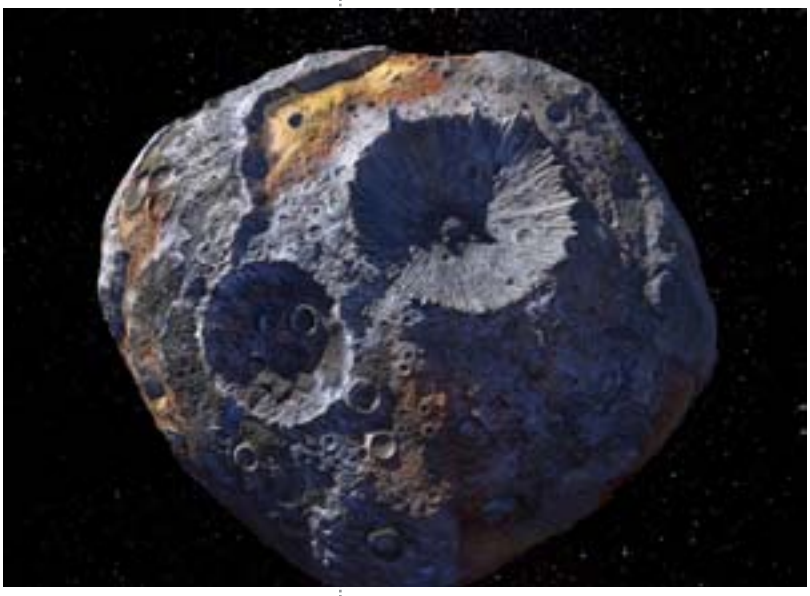
Our social, economic and governmental institutions are archaic. Their inability to deal with global transformations, in light of changes starting now and accelerating with more intensity in only a few years, creates many pervasive social weak points. The very brittleness of our political and economic structures is not only true across nations, but makes the planet vulnerable to important consequences and potential dramatic failures.

Machine intelligence (MI) is part of the oncoming problem AND also has the potential to provide many solutions. But these very positive solutions have many attendant negative consequences, including the loss of jobs, the redefinition of "work," social disruptions, and so much more.

What's is most threatening is the lack of plans for coping with the coming changes and how to achieve global solutions that will serve not just the wealthy but the many. What's needed is an advocate, better a multitude of advocates, for world design science, for real plans for the future. How will we remake our society? How will we reconfigure what it means to work? We have not seen the modern equivalent of a Buckminster Fuller emerge on the contemporary scene. What will we do?

When the job that you've been doing for years is automated, what do you do? When most jobs could be done by some form of automation with MI and other advanced technologies, what do you do? In the future, will work be necessary for all? If we don't work, and some won't, what do we do?

As Bucky Fuller observed decades ago, and, more recently, Peter Diamandis and Steven Kotler detailed in their book, *Abundance: The Future is Better Than You Think* (2012), there is enough to go around. Getting all that there is, and can be, to as many as possible is compounded by not just problems in distribution and logistics, but in social norms having to do with wealth, inheritance, greed and more. For many, there isn't enough; for the privileged few: there's never enough.



PSYCHE?
An artist's rendition of Psyche, the asteroid that is the target of a NASA mission in the next decade. Planetary scientists speculate it was once the nickel-iron core of a small planet. Peter Rubin/Arizona State U

There are proposals and potential, but, often, only partial solutions. The social, economic and political structures underlying these very futuristic problems (e.g., automation, changing nature of work and jobs, restructuring of how we spend our time, et al) have been assessed many times throughout history.

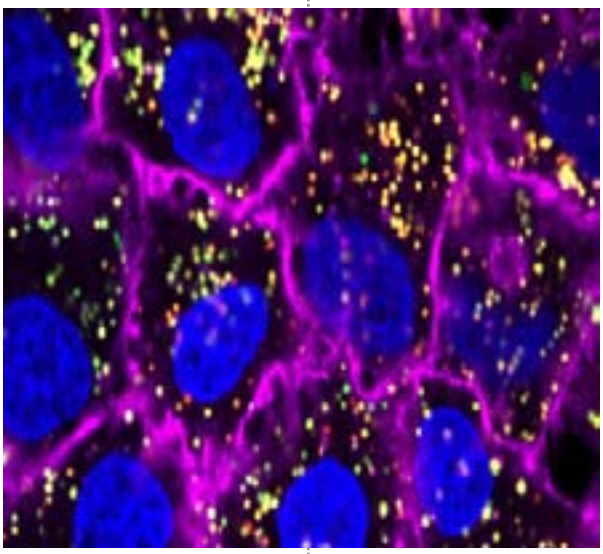
INTELLIGENCE Contributing Editor, Brian Van Der Horst noted: Karl Marx wrote (in *Critique of the Gotha Program*): "In a higher phase of ... society, after the enslaving subordination of the individual to the division of labor, and there with also the antithesis between mental and physical labor, has vanished; after labor has become not only a means of life but life's prime want; after the productive forces have also increased with the all-around development of the individual, and all the springs of co-operative wealth flow more abundantly—only then can the narrow horizon of bourgeois right be crossed in its entirety and society inscribe on its banners: 'From each according to his ability, to each according to his needs!'"

Staying with similar themes from the left of the political sector, comes *Inventing the Future: Postcapitalism and a World Without Work* by Nick Srnicek and Alex Williams. They propose an immediate reduction in the work week to three days; aggressive pursuit of full automation; and the development and implementation of a universal basic income (UBI); and, further, a full reevaluation and redefinition of jobs and the nature work.

This kind of rethinking of basic standards of behavior and social organization will become more and more important as advances like MI, CRISPR technologies, 3-D printing, et al, continue and speed up in their rearrangement and reorganization of life on this planet. New technologies all but guarantee that

such technical changes will spread every where, if only by descriptions glimpsed on a smartphone screen. The philosopher Alfred North Whitehead observed some 90 years ago:

"It is the first step in sociological wisdom, to recognize that the major advances in civilization are processes which all but wreck the societies in which they occur:—like unto an arrow in the hand of a child. The art of free society consists first in the maintenance of the symbolic code; and secondly in fearlessness of revision, to secure that the code serves those purposes which satisfy an enlightened reason. Those societies which cannot combine reverence to their symbols with freedom of revision, must ultimately decay either from anarchy, or from the slow atrophy of a life stifled by useless shadows." This quote is from his book, *Symbolism, Its Meaning and Effect*, and the paragraph, above, ends the book.



CANCER
Nanoparticles (yellow) targeting and entering cancer cells (blue). US National Institutes of Health

Reconsideration of the many status quos we now live by, and with, must go along with investigation, planning, discussion and actions. How to achieve new and flexible kinds of insightful models for our future will require intense scrutiny, communication and focus.

And, even with the best intentions, focus and actions, what happens when things go wrong, as they inevitably do, especially in the realms of technology and automation? Tim Harford, a columnist for the UK-based *Financial Times*, covers the specter of mistakes quite well in his book, *Messy: The Power of Disorder to Transform Our Lives*. He cites several examples of the failure of human beings to take over when automated systems fail, or just do the unexpected. He underscores, for example, how pilots lack the necessary flying experience and practice to take over and do the right thing when airplane autopilot systems mess up.

"The paradox of automation is that as things (like cars, airplanes, ships and nuclear reactors) get more automated, the operator's skill degrades due to lack of practice. The better the automatic systems, the more out-of-practice human operators will be, and the more extreme the situations they will have to face. Automation will routinely tidy up ordinary messes, but occasionally create an extraordinary mess.

"'Manual control is a highly skilled activity, and skills need to be practiced continuously in order to maintain them. Yet an automatic control system that fails only rarely denies operators the opportunity for practicing these basic control skills ... when manual takeover is necessary something has usually gone wrong; this means that operators need to be more rather than less skilled in order to cope with these atypical conditions,' wrote James Reason in *Human Error*."

After citing Reason's "paradox," Harford continues: "The paradox of automation, then, has three strands to it. First, automatic systems accommodate incompetence by being easy to operate and by automatically correcting mistakes. Because of this, an inexpert operator can function for a long time before his lack of skill becomes apparent – his incompetence is a hidden weakness that can persist almost indefinitely. Second, even if operators are expert, automatic systems erode their skills by removing the need for practice. Third, automatic systems tend to fail either in unusual situations or in ways that produce unusual situations, requiring a particularly skilful response. A more capable and reliable automatic system makes the situation worse."

That automation will increase and spread around the globe is a given. That, sometimes, these automated systems will fail, is also a straight-forward assumption. But, because these kinds of systems rarely fail, when the unexpected happens, when a "black swan" descends from out of nowhere, and failure wreaks havoc about the land, we will be left in conditions that we haven't yet studied and planned for, nor devised ways to prepare us, help us practice and better our chances.

NGC 891
Large spiral galaxy NGC 891 spans about 100 thousand light-years and is seen almost exactly edge-on from our perspective. In fact, about 30 million light-years distant in the constellation Andromeda, NGC 891 looks a lot like our Milky Way. © Alessandro Falesiedi

What can we do to start making those studies, those preparations and plans? What steps can be taken to insure that we improve our chances of surviving technological failures and dealing and coping with social disruptions and redefinitions? We have to do something together and the Internet and smartphones make global participation possible and desirable.

What kinds of plans can we make now that will give us the coping skills we will need to reorganize life on Earth so that all can and will benefit and be taken care of? What social structures no longer serve humanity and need to be reconsidered, reconfigured, even replaced? Who will make the decisions that determine our future? Who will they answer to and who and what will check their power and authority?

I've been thinking that what's needed is the formation of a Global Manhattan Project. It has to be global because the entire planet and all its inhabitants are at stake here, now, and in the near future. I invoke the Manhattan Project because, like nuclear power and weaponry, the decisions we make and the actions we take are inextricably linked to great and grave dangers.

Consider: what will happen over the next three-to-five years when our aging global population needs more workers, more help and care. John Markoff pointed out to me "In the past year, the working age workforce in China shrank by 5 million people. This led [Nobel laureate] Danny Kahneman to say to me: 'If they are lucky in China, the robots will come just in time.'" What will occur when as many as one hundred million people globally who drive for a living are slowly, but certainly replaced by autonomous vehicles? And, that's just for starters, in one industry. What will they do? What will we do? What do you do?

My hope is the ubiquity of the smartphone and its ability to tie together billions of people into a web of communications and knowledge discovery and dissemination can play an important role in this Global Manhattan Project (GMP). I have always trusted that the global spread and use of smartphones was in fact the next, true singularity. (I will offer more details on the GMP soon.)

JIA JIA
The humanoid robot 'Jia Jia' was created by a team of engineers from the University of Science and Technology of China. The humanoid robot 'Jia Jia' can hold a simple conversation and make specific facial expressions when asked. U of Science and Technology, China.

When I first planned the publication of this newsletter, I decided to name it **INTELLIGENCE** and for its first sub-title I chose the phrase: **The Future of Computing**. I did so because I believed that different forms of intelligence would best serve humankind and the future of such intelligence increase seemed likely to emerge from efforts in computation.

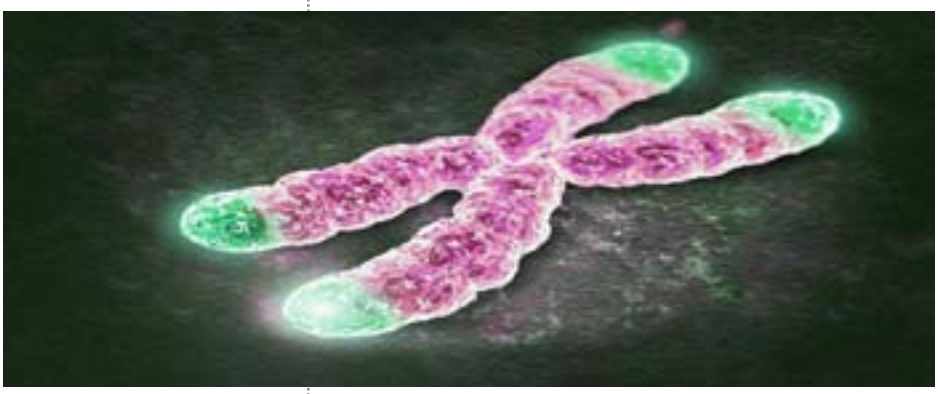
Most of my colleagues in the AI field told me I had to call the newsletter not INTELLIGENCE, but something with the phrase: artificial intelligence. They speculated that my publication would be mistaken for one in the field of spycraft if I didn't use the "artificial" modifier. I decided against that term and, ironically, over the years most every US intelligence organization (CIA, DIA, FBI, NSA, et al) and other foreign intelligence operations have, at one time or another, subscribed to my newsletter.

In 2014, I changed the subtitle of this newsletter to **Making The World Work**, taking a cue from Bucky Fuller. He was the first person I encountered who discussed, in detail (as Bucky always did) the notion that the world could work and that we need to do all that we can to make the world work. I'm still of the opinion that expanded intelligence will lead to making the world work, but I believe such world working operations will encompass more than just computing and automation.

Now, in a world moving politically into more authoritarian ("populist"!) control, the actual and potential disruptions of increased technological control and automation are discussed, but only in limited circles. Majority political thought is more concerned with the control of the other: the foreigner, the immigrant, the poor ("Aren't they all criminals?"), seemingly ignoring the larger forces now

coursing through global culture and organizations. Current political systems are weak and don't work well, so, to many, the answer is to return to older standards that prevailed in the last century. This won't work. How we will deal with these failures is still unknown.

New York Times columnist Tom Friedman quotes Dov Seidman, author of *How: Why How We Do Anything Means Everything*, on what we'll have to do now that we've advanced forward from the scientific revolutions that grew out of the Renaissance and "I think therefore I am": [Seidman asks] "'What does it mean to be human in the age of intelligent machines?' In short: If machines can compete with people in thinking, what makes us humans unique? And what will enable us to continue to create social and economic value? The answer, said Seidman, is the one thing machines will never have: 'a heart.'



TELOMERES
Telomere defined by Wikipedia: A telomere is a region of repetitive nucleotide sequences at each end of a chromosome, which protects the end of the chromosome from deterioration or from fusion with neighboring chromosomes. Stanford Medicine

"'It will be all the things that the heart can do,' he explained. 'Humans can love, they can have compassion, they can dream. While humans can act from fear and anger, and be harmful, at their most elevated, they can inspire and be virtuous. And while machines can reliably interoperate, humans, uniquely, can build deep relationships of trust.'

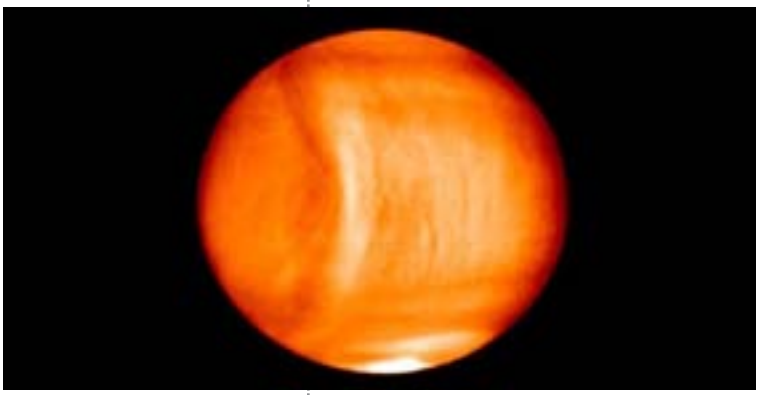
"Therefore, Seidman added, our highest self-conception needs to be redefined from 'I think, therefore I am' to 'I care, therefore I am; I hope, therefore I am; I imagine, therefore I am. I am ethical, therefore I am. I have a purpose, therefore I am. I pause and reflect, therefore I am.'"

These values, this emphasis on caring as a primary human trait, will be very important as we chose new paths and directions going forward. We may yet invent MI and robots who display caring and empathy, and that will be wonderful, because there are not enough human caregivers and caretakers to deal with the python-like swelling of the aging of the baby boomer population. Markoff: "When do you think a robot will be able to safely give an aging human being a shower?"

It should be known, however, that such robots will need to be instilled in their caring and empathy by human beings, who can create the programs that will drive this empathic robotics. Already, scientists and researchers are developing sensors for emotional displays on peoples' faces, as well as systems that can learn to interpret emotional cues from spoken speech as well as facial image recognition algorithms.

Organizations and social structures are contracting, reconfiguring and, in some cases, beginning to fracture. In the US, representative democracy has worked only intermittently, calcified by greed and fear into unequal political fragments. In other countries, especially Europe in the wake of the Middle East wars and migrant crises, fear of the other and fear of the unknown combine with economic insecurity and inequalities to challenge existing governmental and other organizational structures.

Perhaps these are merely symptoms of some of the transformations to come. What is worrisome is how rapidly these changes will be upon us. In the very near future we will have to profoundly consider the renovation of important structures and symbols of our ways of life.



VENUS WAVE
The wave is generated as Venus' lower atmosphere flows over mountainous topography. ©Planet-C

Already, instantaneous translation, available by most every computer and smartphone, is breaking down language barriers. A computer enabled translation system is a technology that will quickly become invisible, especially augmented by video; invisible in the same way the telephone instrument disappears during an urgent call: only the function of the technology matters. People are now talking to each other in different languages, yet still are able to hear and understand what the other person is saying and also see each other. This will enhance future communications and break down barriers between people.

An always on, billions-plus interconnected world is shaking the foundations of national boundaries. This fracturing also serves authoritarians and despots in their quest for more territory. Maps be redrawn as people make different kinds of connections with each other. With virtual and augmented reality systems, we will "go places" in entirely different, but familiar ways. Will the notion of, and nature of "place" itself change?

When jobs disappear and when whole categories of employment change and reconfigure, will "work" still be work? And, with these and so many more changes (genetic editing; 3-D printing; a multi-sensor Internet of things world) barreling towards us, where is the discussion and contemplation of the world to come now when such examination is so sorely needed?

Will, for example, "play" become a much more important experience in place of work? In investigating this notion, I was motivated to find the source of a quote from the author and futurist Arthur C. Clarke. I found it came from an interview Clarke did with another futurist, Gene Youngblood (in the *Los Angeles Free Press*, April 25, 1969), discussing the movie *2001: A Space Odyssey*, which was based on a Clarke short story:

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"GENE: ...You see the average person doesn't see it. All he sees is that he's going to be replaced by a computer, reduced to an IBM card and filed away.

"CLARKE: The goal of the future is full unemployment, so we can play. That's why we have to destroy the present politico-economic system."

Such destruction today would be thought of as disruption; yet, to date, this kind of systemic change in governments and organizations is hard to find.

UBI PROJECTS
A map of universal basic income pilot projects throughout the globe. http://infozaps.com/images/UBI_Pilots_2017_a.jpg

The notion of play as an important part of the future was recognized many decades ago by the Dutch cultural theorist and historian Johan Huizinga. In 1938, he wrote *Homo Ludens: A Study of the Play Element of Culture*. The Latin ludens or ludus means play, thus: humans as players.

In that work, Huizinga notes the importance of various elements of play, including the notions that play is freedom, play is different from "real" life and that play creates its own order and is "order" of a distinct kind. The possibility of a future planet with more play is certainly a delicious possibility to weigh and consider as jobs and work are transformed.

In the coming months in **INTELLIGENCE - Making The World Work** I will focus on the advances in technologies and social organization that have the potential to help us better grasp the changes that are taking place now and that soon will alter our world and all of our lives. Some of this coverage will be based on breaking news, as new developments present themselves and are assessed as to their import. It will be important to detail future plans for the GMP.

What I hope I can provide, after decades of tracing the developments that have resulted in contemporary machine intelligence, is an overview, a presentation of the patterns and images of change and transformation that are better scrutinized from the vantage of, say, 50,000 feet, and with an increased historical perspective. If we focus, discuss and plan, we can do what we need to make the world work. And, wouldn't that be great?!

N. B., A tip of the hat and a deep bow to John Markoff for his decades of fine reporting on science and technology for *The New York Times*. I am pleased to include his ideas and suggestions for this issue of **INTELLIGENCE**.