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Interview with Alexander Rose about archiving digital data and the aims of the Longnow.org.
(The interview was carried out by Axel Vogelsang and took place in Basel/Switzerland in autumn 2000. The text may be copied but please mention author and website.)

Q.: How would you describe the purpose of the Long Now Foundation?

A.R.: The Long Now foundation was mainly created to lengthen cultural attention span, to come up with ways of expanding the way that people think about time while there is an ever-shortening horizon that occurs in politics, business, and practices.

Q.: How do you want to achieve this?

A.R.: We started out with a concept of a 10,000-Year Clock that was brought about by Daniel Hillis. As a designer of some of the fastest computers in the world he was interested in working on one of the slowest computers in the world. And when a friend of his, Stewart Brand had this idea, he actually thought that the clock was a very good icon to help think about long-term time spans. But he was even more interested in some content behind that and thought a 10,000-Year Library could go along with it. So over the last three and a half years we have gone forward with physically building a 10,000-Year Clock, working towards a monument size version as well as working on longer-term data storage methods, most recently exemplified in the Rosetta Disk Project.

Q.: Three and a half years ago...Was that actually the starting point of the whole project?

A.R.: I've been on it for three and a half years now so I was the first employee, initially as the project manager for the clock alone and then just lately as the director for the foundation. Daniel Hillis probably has been talking about this as long as maybe 10 years ago. He and Stewart Brand pulled it together with the board of directors to operate as a nonprofit organisation in the U.S. around five years ago.

Q.: How many people are involved in the whole project?

A.R.: We have 10 board members ranging from different fields of experience. We're trying to add to a lot of people from technical fields. Most recently we've added people like Roger Kennedy who used to be head of the National Parks and many other various governmental and private founded organizations in the U.S. as well as Michael Keller, who is head of the Stanford Libraries. I'm starting to get more of the kind of academic and historical side into the mix. And there are people like Brian Eno, Stewart Brand, Daniel Hillis. So there is ten board members. In the office we have three full-time staff. Myself, mainly working on the clock project and overall foundation issues, one assistant, Camille and Jim Mason who is heading the library and specific projects, mainly the Rosetta Disc Project.

Q.: I have seen the pictures of the mountain where you want to put up the clock. Have you already begun?

A.R.: Well we've purchased the land but there are a lot of subtle political issues that go on with the land in that area. One of the main reasons we bought it is because it's surrounded by national park land. And that is good in a

sense that, that it is protected for at least the length of the U.S government and the national park system. But it also means that we have to deal with that in terms of access. For example the U.S. forest service has adjacent personal land that they have to gain access with. There is a lot of subtle issues there plus we have another two prototypes to build before we are ready for that. So it's probably a decade away.

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Q.: You also said, you want to put up one clock in a deserted place and one in a big city. Have you already chosen a city?

A.R.: We've had two offers so far from cities that are intriguing to us. One was from Jerusalem – a site in the new city – and there was the idea that there would be a three-calendar clock that would have Jewish, Muslim and Christian calendar systems on it. That was one proposal and we are still waiting to see, if they can come forward with the money for that. The other proposal was from San Jose in California, which was actually interesting for the opposite reason: instead of a very stable place it's in the epicenter of the increasing speed of our culture and besides their problem isn't money. Either one of them would be interesting sites in fact. Maybe we could build a pair of clocks if both sites would be interested.

Q.: Jerusalem does not look like a place of big stability at the moment. Setting up the 10.000-Year Clock there seems a contradictory thought.

A.R.: Honestly, I haven't been in Jerusalem. I only have second hand senses of the city. What is interesting about it is, that the artifacts of the city have actually largely endured even through the political clashes that have gone around it. Whether or not a three-calendar clock is meant to bring people together or if it will be seen as a target, I don't know. Maybe it's an interesting social exercise to see if modern archaeology can be added to the mix. Nevertheless it is one of the oldest cities on earth. It has a lot of special meaning for a lot of people on the planet so it would be interesting in that sense. A place like San Jose would be interesting in that sense that it's the beginning of a new kind of culture that may or may not make it. San Jose might be wasteland in a far shorter time than Jerusalem which might make it that much more intriguing.

Q.: You said it needs some human beings to maintain the clock? What intervals of maintenance are we talking about?

A.R.: The winding ritual could be done once a year or one could stretch that out. But if you stretch it out one will have to find natural cycles that are easy to understand - once a year is a very easy natural cycle. It's not a mechanical problem but what happens, if you choose a decade or a century or a millennium? We've only been a base ten culture for a fairly reasonable amount of time. We've gone through base three five, seven cultures so maybe the No. 49 will be more useful in the future, who knows? You could pick some natural cycles like the lunar rotation, which takes 18 and a half years. We have to find a cycle that is more important than just once a year but at the same time make it relevant from generation to generation so that at least a father can say to his children "I did this the last generation". One of our greatest examples that we often refer to is a Shinto temple called Issei Shrine, which is rebuilt from scratch every 20 years. For both, master carpenter and apprentice carpenter it's a ritual that they go through and I think that the physical act of building this thing reminds them about their religion and why they're doing it. This ritual has helped Shintoism last through Buddhism and other fluxes of religions. That's the kind of thing we're after.

Q.: But doesn't this actually mean that if one generation forgets its task, the whole project would die?

A.R.: In fact we designed the clock specifically to allow for it to be stopped. I would actually say that the times the clock is stopped would be as interesting if not more so, than the times when it's running. We included information like the stars and the procession of the equinox so that even if the clock was stopped for 6000 years and it was refound by another civilization or another race for that matter they could from observations see where

the stars are now, see where the stars were when the clock stopped and reset it back to current time. They would know when it stopped and where they are now. It would be independent from all calendar systems.

Q.: But it does not have a memory on its own?

A.R.: No, it wouldn't jump forward. You would have to set it forward.

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Q.: Actually what is wrong with a society that is speeding up because we all know the Western economy is buzzing and unemployment is going down. It seems as if we are in a very comfortable situation

A.R.: I would say, that the main thing we are trying to point out is that there is several levels to human time. They start at the very outside edge with arts and fashion moving in many directions at various fast speeds and then underneath there is things like commerce and then going all the way down to infrastructure, governance and nature at the very bottom. The problem is not that art and fashion and commerce and technology are moving in very fast speeds. The problem is when you superimpose one layer on top of the other and you're trying to do something like use a natural resource at commercial speed.

A very good example is the whaling industry or the logging of the Pacific Northwest. New York companies bought out companies that were logging actually fairly intelligently in the North West, because they realized their assets were worth more than the companies. Those assets are very old Redwoods. So they started clear-cutting these Redwoods thinking of them only as assets not as a long-term resource. So it's when you start doing that, you start to reduce options for the future. We really wanted to bring awareness to this type of issues. When we came up very recently with the library project it was this issue of the digital continuity, that as a civilization we were recently committing all of our record to digital media, which has basically a zero life expectancy. This is another example of where we are rushing ahead. Moving into a new technology can be actually very dangerous to a civilization.

Q.: Maybe you can tell us a little bit more about the problems of digital continuity.

A.R.: It turns out that governments, companies, libraries, archives have all made a serious commitment to digitizing a lot of data and then after throwing away the originals or in some way damaging the originals in the scanning process, assuming that this concept of digital is forever. My favorite quote about that digital media is forever is: " it is only slightly facetious to say that digital information lasts forever - or five years, which ever comes first." Even if you can recover the media, you cannot recover the operating system. When was the last time you saw a 5 inch floppy or an Apple II or something like that, in case you want to recover your writing? I think this is going to be a severe problem to the point where we can assume that everything that is currently digital and everything that has been digital will be lost. I don't see any help for anything that is currently on hard drives or that kind of media. One of the few recent hopes is probably the Net because HTML and certain image formats have become so widespread that it will be very difficult to move off of. At the same time a very difficult problem is the amount of content that is generated and stored in the Net or other archives. There are a lot of technological problems but more it's a social issue. People are making this assumption about digital technology equaling longer-term physical archiving materials such as paper or vellum.

Q: You told us about the Shinto Shrine and the Redwoods. But there always have been catastrophes. Cultures rise and fall, that's just the way it is.

A.R.: Yes in fact. And it was even brought up by one of our board members, Brian Eno, in one of our conferences about long-term data storage - the case for forgetting and that there is a value in the case for forgetting. If a culture has infinite access to all of its past then it's very difficult to start new things and to try new things that were previously seen as impossible. There is many experiments that were successful because they did know how many failures preceded them. So, there's something to that. Currently I don't think that that is the problem. The problem is, that we will lose everything. In the past some books made it, some films made it, but in the digital

world I think we will lose such a large percentage of it, it will be really tragic. There are things that we still look back on that were really tragic - fore example the burn of Alexandria, actually the many burns of Alexandria. We only have one out of five Greek tragedies remaining. The Roman census, which is lost forever, would be immensely valuable now. There are definitely things that our culture would love to have.

So there is key things that we would like to be able to at least have ways to storing and there's all sorts of data that is currently considered as uninteresting or at least unsexy to archive which I think is interesting, like negative results from experiments. Nobody publishes negative results, however negative results might be probably more valuable than positive results. Positive results will always make it into the future just because they will always be built on. Negative results are very valuable if you look at the development of some of the HIV-drugs, which were actually a group of failures. Each one had a spike of success that fell off in another area, but when you put them all together - what was then called cocktail - the spikes lined up to something that was very, very useful as a meaningful treatment. Also a place for long-term environmental data doesn't exist currently. Usually longest-term projects that go on are about the length of one graduate student's education or sometimes the length of a person that happens to have passion about a certain issue. But usually when they die, the information dies with them.

It would be interesting to be able to collect things like ocean water analysis for a long period of time. There is many institutions who do amazing analysis now. If we would have that down from a hundred or thousand years ago it would be probably one of the most valuable treasures to us we could find. There's grassroots ones like the Surfrider Foundation. They're trying to protect surfers in the water. They do mass spectroscopy of water all over the world and all these great surfing places. They put it up on the Web, but they don't archive it. So you can actually just very simply grab this all of the Web and archive it in a more stable manner. If you would have that for a 10,000 years it would be incredible. It's the kind of things that are being overlooked now, but they could nevertheless be interesting for us.

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Q: If I talk to people about digital continuity, I always hear arguments like "look, if something is important and if we want to retrieve it, we will always find a way." It is this belief, that everything is possible through technology. Is this something that happens to you as well if you talk to people or do they agree to the seriousness of the problem?

A.R.: There is people who get it and there is people who don't. I remember one specific representative of a company. When they went to go to get their own medical records after not believing, that it was a problem, they found out it was a problem. They had been losing a large chunk because it was digitized. And it became very relevant because they were having a lot of problems. It was interesting to see how that specific person totally flip-flopped in their belief in that problem. Medical records are a very everyday problem. Institutions in the U.S. like the Department Of Energy have the legal responsibility to hold information for 10,000 years and they have no method of doing it. And the actual problem is about a quarter of a million years long and not a ten thousand years. I think the number of people who realize the problems with digital continuity will rise, as people try to access their early data.

The NASA lost a large percentage of the first 20 years of their own remote sensing data. This is the institution with the highest technology resources. But they all end up doing the same thing as we all do which is replacing equipment as it begins getting old. It was the very first magnetic tape readers that were developed and they have been recording all the data that came down from satellites all the time. So later, when archaeologists and other people were asking them for data they realized they didn't have all the tapes and they started collecting them from closets in New Zealand, Africa and all this places around the world. They still didn't find them all. Some where lost. Then they realized that they had no player because it was old hardware and there was only two of them ever built. Finally they were able to recover from the scrap parts one working machine. Then they found out that the magnetic tape had deteriorated so far that it took some unbelievable hundreds of hours to decode what they could get off each tape but it still was not hundred percent.

Q.: It was digital data?

A.R.: Maybe it was analogue data. It was on magnetic tape. But now they had the data, they actually had no documentation of how it was organized. So they were left with a bunch of numbers. And all the people that originally had worked on it were gone. It's a multi-layered problem, but if they would have just written it down on paper they would still have the information. NASA just recently said they couldn't recreate the moon landing. So much of it was black magic that was done in the heat of the moment by people who were experts. A lot of it was undocumented because they had to do it so fast. Nowadays they couldn't just recreate the Apollo missions. They would have to reinvent them from scratch. So there is where very important data was lost because hurry was put on them.

One of the more interesting one for me is the way that Aviation retains its records. They are actually able to keep a 747 flying for a very long time. It's a massive amount of data and it requires a lot of people. It is like downloading a whole brain and passing this information from generation to generation. And they've been very successful at it. So there are ways to go ahead.

Q.: Lets have a look at a wider cultural context. As you have mentioned before there are several layers of code in software programming. Metadata might be needed to explain certain code and there might even be other metadata for to explain the metadata. So different layers of Code have to be deciphered in order to retrieve some

information. On the other side I heard the phrase that nowadays the only more or less stabile encoding modus in programming is the English language. English definitely is the language of computing and computers keep the modern world going. Therefore English puts an enormous pressure on other languages. Couldn't that be a big problem in order to retain cultural heritage?

A.R.: I would say that this is probably only one of many forces that the Western world is putting on other cultures in an unfair kind of techno-deterministic future that seems to be pervasive at this point. A language will be picked as globalization occurs and if it's being picked because of technology than there is not much that can be done about it. The question is: is English the correct language to choose? It's probably one that's changing the fastest.

Q.: Actually I heard that it is one of the most stabile languages since about 500 years, related to its Island situation of Great Britain.

A.R: It depends if you are talking about American English or English English. British English is very stabile. And I would also say that it's the American English that is being pervasive in the technology world. If you have a communication revolution that's global there is a language that will come forward. And if this revolution started n the United States it's very likely that it is the American language.

Q.: Have you ever thought about other languages that could do that job?

A.R.: Unfortunately we never get to choose that things. I don't know if it's worth worrying about. I would worry rather more about some of the other effects of westernization of some of the more ancient peoples or cultures. They are kind of wiping themselves out in favor of jumping from the third world into the first world without anything in between, without any sense of pride in their own culture. That to me is a far larger danger than the English language being pervasive.

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Q: Nowadays computers are everywhere and you can also access the Web from all over the world. One cannot just tell other people to stick to their tribal cultures and not to get into touch with the modern world.

A.R.: I think it comes down to a matter of pride and there is cultures who saw the outside world but also have a high amount of pride for their own. They took it in as tourism and were realizing that tourists were only coming if they were different from the tourists. Therefore they stayed that way. So it is possible but it takes a heavy pride in your own culture when western people come and start giving you things that make your life very different or easier in some way.

Q.: You already told me that you were traveling around the world to find some artifacts and pieces that are somehow related to your topic of maintaining culture and cultural heritage. Can you tell me a little bit about these travels?

A.R.: We've done a series of trips to places that we felt had a lot of importance for our project. Places like Chaco Canyon In the southwest of the United States...an interesting forgotten culture flourishing very widely there1500 years ago. They had string-lined roads 20 feet wide across states to this one point. This all was gone before any westerner ever had arrived. Danny Hillis has made trips to the pyramids and Stonehenge. We still are going to make a trip to Machu Picchu. What we are trying to see is mainly where they went right and where they may not have succeeded in keeping an institution going.

A really good example is Stonehenge. A beautiful relic was generated, but the institution that surrounded it died out very fast and we don't know what it was there for. The problem of our foundation is not building a clock, the problem is building an institution that can last that long. That is something that hasn't been done. The clock is just a material science problem that can be solved. The more interesting problem is how do you create an institution that can last that long. Things like the Issei Shrine where you have this going back and fourth from ritual to idea to physicality to ritual is where we've seen the most success.

Q.: Isn't it that you will have to build up this institution in the minds of the people?

A.R.: It has to do with building a myth. Storytelling traditions are probably the best examples that we've seen. The stories of modern story telling in Bali are documented from archaeology of images to be largely unchanged since 3000 years. There is a few other things like forestry, wine making and martial arts that survive on a multi-millennium scale. It's not that many, so we're trying to pick out the things that work for them.

Q.: Nicholas Negroponte, as you know, is on the forefront of digital technology. I would like to hear your opinion on the following quote: "While the politicians struggle with the baggage of history, a new generation is emerging from the digital landscape free of many of the old prejudices. These kids are released from the limitation of geographic proximity as the sole basis of friendship, collaboration, play and neighborhood. Digital technology can be a natural force drawing people into greater world harmony."

A.R.: There is very obviously a certain amount of optimism in a lot of the new communications technologies, especially from people like myself who have been engaged in it for the last several years and can no longer imagine their lives without it. But it just has the obvious problems of the digital divide of who has computers and who doesn't, who has these communication technologies and who doesn't. If you have a satellite communication network, it doesn't matter where you are, you will be able to connect to the world at very high speed. And one can

easily imagine what happens when the rest of the world sees that 10 percent of the world is using up 90% of its resources. I think we will see a different type of revolution that will not really have to do with countries anymore, but will be more on an economic scale.

Communication technologies definitely have a large input: There is a guy who predicted the fall of the USSR due to the rise of telecommunications level per person. He had studied a lot of cultures that have oppressive governments and whenever communications reached 60% saturation the governments always fell. He has looked at the USSR inside and saw it was very close to 60%, so it was very likely to fall then. He was largely ignored. And then the USSR fell and he was right, the saturation was about 62%.

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Q.: There is this conflict between American techno optimism and European skepticism or even pessimism. As an American you are criticizing some of the outcomes off high technology. Where exactly do you see yourself in this discussion?

A.R.: As I said before, we're trying to open up some objects that are closing off due to a lack of foresight. The digital problem is probably one of the easiest examples. The issues also are surrounding topics like environmental education or even world hunger. It is this kind of large problems that are non-tractable on a very short timescale. You cannot solve education on a four-year election horizon because it takes at least a 30 years for return on investment. The kids have to graduate from higher levels of education, enter into society and then give a return. So why would a politician interact with such problem, when it's a lose-lose situation for them? So what we like to be able to do is raise awareness towards that and start to find ways of increasing the incentives for society to look at its longer-term problems. We are not totally sure how we can achieve that, but we are starting with projects like the clock and are trying to get into conversations like the one we are having now.

Q.: Stewart brand in the book "the clock of the long now" says, that during the Cold War the thinking of people was blocked. The overkill potential in the hands of superpowers did not allow a thinking towards the future. It seemed realistic at that time that there might not be a future at all. Today we've fallen back into the other extreme of total believe in the power of technology to solve all our future problems. The sky seems to be the only limit.

A.R.: I think the tendency is definitely out there. However I think it is far more positive to see people with hope. I also felt that there was no future during the Cold War and that is why this project was very attractive to us because of how much hope was involved with it. So this project is largely one about hope. I think that right now we are standing at a different time. That is one of the things that is actually a part of the project of Danny Hillis. He had in his mind the wall of the year 2000 as we approached it. Everything had target dates for the year 2000 and nothing had target dates for the year 2011 and he felt that his future was shrinking one year per year for his entire life, because back in the 60's everyone thought in the year 2000 all will be solved and now here we are in the year 2000. I think it's actually a fairly exciting time both because of the end of the Cold War and we now don't have this artificial Wall any more ahead of us. I think the only real danger is a kind of temporal vertigo that is starting to occur - here we are, we don't have any other deadlines any more, now what do we want to do?

Q.: Let's talk about the millennium bug. It actually didn't really happen. Even countries that didn't spend a lot of money didn't face a lot of problems. Doesn't this undermine your predictions about the problems with digital continuity?

A.R.: With the problem of the year 2000 bug we have seen the fact that it actually didn't break down. And with the digital continuity problem we have many examples of loss. I do think it is interesting how things like the Y2K bug really kept public attention and eventually institutional attention. Billions was spent in some countries and zero has been done in others with basically the same result. Whereas something like the digital continuity problem is being ignored. In the U.S. the National archive is getting ten times more data every year to archive and the budget is decreasing every year because it is not really seen as getting to be more difficult. In fact their job is actually getting more difficult. Whereas all this money has been spent on the Y2K bug. Maybe the digital continuity problem just needs a sexy name.

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Q.: The agenda of technological development for the next years is obvious: Even faster computers, extremely small devices, convergence of media, more information. If you could address the presidents of the ten biggest technology companies and if you were asked for advice on their politics in the context of digital continuity, what suggestions would you have for them?

A.R.: I think it is very difficult to suggest to a company that they completely ignore time to market. I think you cannot make this kind of suggestions. Nowadays you release broken software and you fix it in updates, it is a common practice. All agree that this is ok. And in fact, I was told some projects that were done on longer time spans where people said "we gonna get this right, we are not going to be rushed by deadlines" - what happens is that the project never happens. Tons of man-hours have been put into it. The project I'm referring to is Xanadu, something like the Internet II: ten or hundred times the speed of the Internet... a lot of a brainwork was done, but the project never happened, because it didn't have deadlines. So we seem to need deadlines. But one of the key things that needs to be understood more fully by these companies is that they are not just cutting edge media companies anymore. They are places where culture is stored. The people that are writing Microsoft Word are trying to write a better word processor. They are not sitting around and thinking, " Oh, the entire world is writing their thoughts, their emotions on it - the next Shakespeare could be writing on this software ". They are not thinking about that, they are thinking about adding new functionalities and little paper clip guys that tell you what to do. I would be more interested in seeing backwards compatibility being something they would care about. E.g.: being able to read a Word 3 document in Word 8. I think, that open source is a very interesting movement, where you actually have some hope of recovering information because of the way they have opened their code to the public. Finding ways where you can open up the source code is always interesting in terms of longevity.

Probably it's just those three things:
1. Culture is not a fringe element of society. Companies do know that but also aren't thinking in terms of culture being stored on digital media.
2. Backwards compatibility. Even though they might not be screaming for it right now, people will need to be able to read their old documents.
3. Open source. Opening up at least certain portions of your code to the public.

A.R.: There are some things that are going on, for example it looks like we may work together with the Department of Energy in the future. They have a long-term stewardship office, which was actually interesting to me that it exists. Two of its representatives' job is warning away people from nuclear waste for 10,000 years. They have problems of data storage and those are things that are going to come out of the government. There is many more areas and I think it is also becoming less about individual countries' governments than it is about some of the organizations that govern trade around the world - the world trade organizations, the ones that are actually setting policy to a large extent in a way that different governments use their resources and part taking in the trade world.

I don't know that many public projects that are going on about long-term storage. The Internet for example was an accident. It was released so that the system would become more robust in the eventuality of a nuclear war. That was the reason why it was allowed to be a public thing. They figured, if at least all universities in the countries had servers that were connected then if there was a nuclear war they had a greater chance of communicating with each other. But then again the United States has a long history of tax-supported developments, being then sold off for nothing to businesses and then the businesses exploit them with no return. In the end they fight the government in terms of how much it should be paying for it, even though their whole existence is based on that project, supported by the taxpayers. So the taxpayers aren't getting paid back for research like that very much.

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 Q.: Don't you think that there will be a new industry coming up for data recovery and writing emulations?

A.R.: I do think that this market is developing. There are already companies that do data recovery on different levels. There is two concepts, first emulation and the other one, the so-called Dracula Room. The latter refers to the room where all those undead media readers live and all the old file formats are preserved. All the old hardware that is preserved to read the old media that companies or individuals need to recover will be very valuable. People like Bruce Sterling have brought this up in fiction as well as real projects like the dead media project.

Actually Jaron Lanier was asked to reproduce one of his first videogames done for the Commodore 64 for the Smithsonian and he actually found out he couldn't do it. This is a person with probably limitless resources in terms of getting hold of digital gear, but he physically couldn't get hold of the gear, the right software, the right version of the firmware etc. ... in order to play his game. And a few months later, after he failed he got an email from some random person who said, " You know, I love that game that you made, so I wrote an emulator."

Q.: So there is some hope for the future?

A.R.: Luckily these are markets where there is a lot of passion and so therefore there are some lovers. The new project that we are working on is a permanent e-mail server, which not only gives you an e-mail address for life, but also archives all your incoming and outgoing e-mail for life. It will be an expensive service and therefore a source for the foundation to generate income. And it would not be meant as many of these free services that are out there, that promise a lot and deliver little. It's meant as something that you pay a lot for and you get a lot for. It's in the research status now. It's actually very difficult to build servers for foreign migration. Server Technology and things like this are all designed for speed and scalability not for when they actually are outdated they need to be replaced in a smooth fashion. So it actually requires a lot of work. Here is a good example where government has come to forefront due to some of the laws requiring the government to keep all its e-mail for at least seven years. And as I understand this is happening in other places as well. They are actually building off-the-shelf servers that store all the e-mail that comes in and out on a certain server on the earliest simple formats like txt-formats, so that it is infinitely foreign migratable. But at the same time, if everyone in governments has no way of privately communicating they tend to destroy information. I think probably the biggest enemies of a lot of the information storage issues are legal issues and some people don't want their information to be stored. Companies already destroy e-mail 30 days old. This is regular practice to avoid allegation from it. And copyright is getting longer. Copyright is increasing two days for every day we move forward. So at the current pace we will never be able to have uncopyrighted material. I think it is very difficult for an archive or a library to exist in that environment.

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Additional Q&As after Sept. 11th 2001

Q.: Our last interview was more than a year ago. A lot has happened since. I would like to know how the recent events have influenced your work. First there was the burst of the dot.com-bubble. The nearly religious believe in the possibilities of high technology was shattered. Did it make your work easier or more difficult? Did you have problems with funding since?

A.R.: Funding is a bit tougher, but it seems our project has become more relevant to people. The benefit is that rent has fallen in San Francisco to reasonable rates and that we have received tons of cheap and free computer and office equipment from all the failing companies.

Q.: The events of the 11th September did not only have political consequences. It touched people in a very emotional way. It has made everyone aware of the fragility of ones live and human society as a whole. Could it be that it makes people more open to the ideas of the Long Now Organisation?

A.R.: This definitely has had an interesting affect. Mainly with our Rosetta project as it is a tool of inter-cultural understanding. This lack of understanding is obviously at the crux of the reason behind the attacks and the way the US and its allies have responded.

Q.: How has the work of the long now in generally progressed since last year? Have there been any important events, breakthroughs or setbacks?

A.R.: The All Species project has taken off (a 25 year project to identify all the species on the planet) The Rosetta website has become the largest linguistic data source on the net. We are starting a long-term digital server project. And we are building the second and much larger version of the Clock.