Looking Back and Forward

by Bill Baylis for the UUOlinda congregation on January 1, 2017.

The **opening hymn** *Deck the Halls* is an old Welsh song, *Nos Galan* (New Year's Eve) from the 16th c. welcoming the New Year. Check out the third verse!

Story for all ages is a description of winter time, specifically of Winter Solstice. [It can be adapted to the audience present.] The term "solstice" refers to when the sun (sol) stops moving, and it was introduced long before scientists Copernicus, Galileo, and Newton worked out how planets move in the solar system. Think about the importance of the sun, not only before electrical lighting when this church was founded, but even earlier when people thought of Earth as fixed in space. Who could imagine back then that Earth really races around the sun at the impressive speed of 30 km/s (108,000 km/hr and 1/10,000 the speed of light) around the sun! Winter solstice in northern hemisphere is the time of summer solstice in the southern hemisphere, but that was poorly understood by inhabitants of our globe back then. The thoughtful and curious among them observed the path of the sun across the sky and the shadows cast by it. The path reaches its highest extent in the sky at summer solstice and sinks thereafter until winter solstice. It sinks fastest in Fall and slows as Winter Solstice approaches. At solstice, the path of the sun stands still. Before science explained the apparent motion of the sun, imagine how people might fear that the sun would sink into oblivion. They would light fires, not only to keep warm but to call back the sun. They would gather evergreen trees, holly, and mistletoe because these showed colours of plant life when most plants and other trees—the deciduous ones--had died back. And you know what? It worked! The sun did return and rise higher in the sky, bringing new life with it. Was it because of the fires and celebrations? Who knows, but it is better not to take a chance. Repeat the festivities every year just in case they helped to bring back the sun!

Many of our Christmas customs stem from these early pagan celebrations. Pagans get a bad wrap from many Christians and followers of other established world religions. They are called "ungodly" and "irreligious", but that's unfair. UUs generally respect pagans as having a religion based on worship or reverence for nature. Indigenous societies around the globe practice pagan religious rites. Pagans introduced many environmentally based practices that we can learn from, and UUs welcome them into our modern, liberal religious fold. According to most biblical scholars, Christ was probably born in 4 to 6 B.C., but the time of year of the birth was a point of argument until 4th c. Christians adopted Dec. 25 as birthdate of Jesus in order to incorporate the popular pagan Roman holiday commemorating the "birthday of the unconquered sun" (*natalis solis invicti*)–the Roman name for the winter solstice. Etc.

Main talk: The title of this talk is Looking Back and Forward, and indeed the transition to the New Year is a time to reflect on the past and prepare for the future. There were

many historically important events of the past year and we could easily spend the next half hour just enumerating these, from the US election to Brexit to the Ft. McMurray fires, and more, and also major local events in the church: the passing for our beloved Romell Reid and the selection and arrival of our Interim Minister, the Rev. Fran Dearman, and more…but wait. Let's not go there, but rather let's look at more general themes in the evolving world.

The title, about looking back and forward, assumes an association of place and time. Back is behind us, forward is in front of us. Places of course, but also times: we face the future; the past has happened already and is behind us. The past may be recorded in history and although subject to interpretation and *at times* misrepresentation, it is fixed and essentially certain, and is less demanding of our attention than the future, which is largely unknown may bring surprises as it arrives.

The association of time and place is important. It may have really become imbedded in our culture with the transcription of music: pitches shown by vertical displacement and time stretched out horizontally, but not always obvious. This allowed a musical line to be stored in graphical form: pitch vs. time, or pitch as a function of time, as a mathematician would say. It could then be reproduced and several musicians could perform the transcribed piece together in ensemble, not just in monody, but also in pleasing harmony. This provided for a critical advance in the history of music.

The importance of associating time with a position in space goes well beyond the musical arts: it enabled scientists to represent motion and study its behaviour. As my former colleague Geza Szamosi, in the Physics Department of the University of Windsor described in his book, *The Twin Dimensions,* motion could be shown by plotting position vs. time. The position of an object is given by a point in a three-dimensional space, and the plot of this point as a function of time describes its motion. The time is given by the coordinate of the point along one axis, the "time dimension," and the full plot is in a 4-dimensional diagram, three for position and one for time. Physicists speak of a 4-D spacetime continuum, and it provides the framework for the theory of relativity. I'll return to this shortly.

But before we go there, consider: just how clear is it that our future lies ahead and our past is behind us? What lies before us must be something we clearly see. It must be our past, since we can't really see the future. So it is in the native American language of the Aymaran tribal people of the Andes in parts of Bolivia, Peru, and Chile, which has about 2.8 million speakers. For them, time moves forward, or more specifically events in time move forward, as you remain at rest. What is about to happen sneaks up behind you. You don't see it until it happens and then it is in front of you, gradually fading into distance as time continues on its way forward. This is not the way we usually associate time as a dimension, so consider: you are at the present. What occurred ten minutes

ago is still clearly visible but a bit further away. As time and its events continue forward, yesterday's experiences have moved far enough away in front of you that details may get a bit fuzzy, and it is only the major events from years past that are still clearly visible. Tomorrow has not yet arrived. It is still hidden and approaching from behind. It will reach you and become apparent in about 24 hours.

Of course, as Galileo understood, motion is relative. So instead of thinking of time moving forward, you can consider time as fixed along the time dimension and yourself moving backward. It is like riding in the back of a cart that is moving backward toward future times along the time dimension; you are facing forward (in the direction that time is advancing) and you can see what you have just past, things that happened just now and at earlier times, appear before you. It's all logical and consistent, but it conflicts strongly with the images built into our own language about us moving forward toward future times. It amounts to only change in sign in the way we label times along the time dimension, but concepts clash to such an extent that one can understand why an isolated society would adopt only one of them. In both cases we view time as an added dimension, and this concept has been an essential element in the study of motion and the development of modern science.

Of course, no one would confuse time and space. Time was thought to be universal by Galileo and Newton, the same for everyone and quite distinct from the 3-dimensional continuum of space. It took Albert Einstein to show that time and space could get mixed by motion: clocks in a moving frame or a strong gravitational field run slow (time intervals dilate) while distances along the direction of travel contract (shrink). These effects are very small for observers where the motion is much smaller than the speed of light, but they are significant when calibrating GPS satellites, for example. They can become large at high speeds, for example at speeds needed to reach the Earth-like exoplanet around our closest stellar neighbour Proxima Centauri, a red dwarf (part of a triplestar system alpha Centauri) just over 4 light years away. On a trip to get an astronaut there and back in ten years (requiring an average speed of 80% that of light!), the astronaut herself would return only six years older than when she left, a feature of what has been called the twin paradox but is now a well-established scientific fact.

However we choose to envision the evolution of time, the New Year brings us closer to many existential challenges: threats to our very existence! There are still grounds for hope, however. Let me describe some of my concerns and hopes and then invite you to add your thoughts.

The world is changing both from natural aging and from human influence. The current population of 7.5 billion is growing at a rate of about 1 billion every 12 years. It is straining the Earth's resources and may have already surpassed its ability to heal. The UN projects a population of 10 B in 2056. In 1960, it was 3 B and 1B in 1804, 500 M in

1650, 200 M in yr. 1, 2 M in 10,000 BCE, and as few as a few thousand (some have estimated only a few hundred!) in 75,000 BCE after largest eruption of the Indonesian Toba supervolcano. Where will it peak? How can we feed 10 B? Of course, wars, suicides, mass killings, illness, street drugs, and starvation lower the growth rate but can hardly be viewed as solutions. When human population was only 1 or 2 B, humans were a fairly benign part of nature with minimal influence on Earth, but that has now changed. Education and female empowerment are the most effective actions to counter excessive population growth. The combination of population growth and technological evolution has meant that humans wield immense power over the evolution of our planet.

- We have stockpiles of nuclear weapons that can destroy the surface and atmosphere of the Earth several times over
- GHG levels, especially CO_2 have surpassed the highest levels ever recorded (300 ppB in 2002? And 400 ppB in 2016) and threaten Earth with global climate change that is flooding low islands and coastal cities, upsetting weather patterns with unprecedented storms, killing coral reeves, bringing unbearable heat waves, mass extinctions and plants and animals, and droughts.
- Over-use of antibacterial products in soaps, drugs, and animal feed have induced deadly bacteria to become drug resistant, threatening the end to the use of antibiotics that we have come to rely upon.

Fortunately, there has been progress in several areas. Computational power and data storage capability have increased dramatically, progress connecting computer chips in neural networks and in teaching these neural networks by computer learning have brought us to self-driving cars and to computers that can beat humans at chess and Go (AlphaGo). Such neural networks seem to think faster and in many ways more accurately than humans, and computational models of climate change, together with data storage and sophisticated communication abilities now far exceed those previously possible. New predictions of the changes we are causing on Earth are more reliable and detailed than ever. We have no excuse for ignoring the effects of our actions or inaction. Medical advances have been impressive and life expectancy has risen almost everywhere except the USA, where diabetes and drugs have reversed progress in this area. DNA analysis and synthesis with CRISPR (developed over from bacterial defenses against viruses over the past decade and chosen as breakthrough of the year 2015 by the AAAS) has taken leaps forward in 2016, and there is now a portable DNA sequencer, and DNA synthesis techniques have led to a new era of designer proteins. The improved abilities we have with DNA has led to understanding of species history and human origins.

A few further hopeful advances in our understanding of things:

2% dried seaweed in cattle feed can reduce methane production by 70% to 99% depending on seaweed variety, and the GWP (greenhouse warming potential) of methane is 35-40 times higher than that of CO_2.

The dangers of sugar content in many cases exceed those of animal fat consumption, and that we have been misled to think that fat was much worse by the sugar lobby.

Significant improvement in shingles prevention have been demonstrated in large trials and the new vaccines are likely to be approved for general use later this year. The improvements are especially important for seniors, for whom GSK's non-infectious Shingrix acts with efficacy at 90% for those of age 80 in contrast to 18% by Merck's Zostavax.

There is better targeting of cancerous tumors in radiation and chemotherapy treatments, and activation of natural immune-system defenses.

The tracking of smaller asteroids and comets that could threaten Earth, is more comprehensive.

Gravitational waves provide a new window on the universe, especially important for understanding origin of universe.

Strong indication of benefits of exercise in promoting health, brain function, muscle tone, balance, and longevity, and of meditation for relieving stress and focusing awareness.

Earlier detection and more effective treatment of Alzheimer's

Improved understanding of the effects—beneficial and otherwise--of the human biome and more generally the interconnectedness of nature.

But there are also many threats, old and new, to concern us:

- Street drugs, especially synthetics Fentanyl (100 times more potent than morphine or heroin) and carfentanyl (100 times more potent than fentanyl) are increasing in use at frightening rate across the world and in North America, where drug smugglers and makers get the highest profits.
- Lack of respect for human life and mass slaughters and displacements in Syria, not to mention Yemen, South Sudan, Libya, Burundi, Northern Iraq,…, and the growth in extremism as a natural response.
- Willful ignorance of scientific facts and well-based reports, the growing strength of fundamentalist, right-wing religion and political commentary with its concurrent fueling of racism and xenophobia, and the explosion of fake

news stories, often with wild conspiracy theories that raise fears about mainstream media, and even the labeling of any distasteful main-stream news articles as “fake news”, and other threats to democratic principles.

At least the UN has recently undertaken to investigate for war crimes and crimes against humanity in Syria, the Security Council took an international stand against the further expansion of Israeli settlements in West-Bank Palestinian lands, an expansion that would scuttle any two-state solution that might lead to lasting peace, and a number of NGOs like Amnesty International are doing an admirable job of applying pressure on governments to protect human rights. Also, closer to home, the humanist, UU-like Oasis movement in the U.S., is now joined by Greta Vosper, the self-declared atheist and (soon-to-be former?) United Church minister, and is spreading even to Toronto in Feb. 2017. Vosper’s drive to reform the traditional church is supported in an impressive TEDWomen talk by female Rabbi Sharon Brous, given this past October 2016. It’s entitled *It’s Time to Reclaim and Reinvent Religion*, and recognizes that traditional religions have largely failed us by speaking to a distant, hardened past that fosters extremism rather than compassion, respect, and love, and she embraces a renewal of such outdated religious practice to something that looks very much like an energized UU movement. So there grounds for hope, and UUs can (and should) be on the forefront (or rearfront if you view time as moving forward!), advancing this movement for religious renewal.

Now it’s your turn: There are many more problems in the world and hopes for the future than I have listed. What concerns you about the future—not only globally but also personally--and where do you find hope? Have you adopted any New Year`s resolutions to change how you live and what you strive for?

Thomas Levenson, *Measure for Measure: a musical history of science. Simon and Schuster, New York 1994.*

Geza Szamosi, *The Twin Dimensions: Inventing time and space. Mcgraw Hill, 1986.*

Wikipedia, *The Aymara Language*(2015), Fentanyl (2016), and Carfentanyl (2016).

Discover Magazine *100 Top Stories of 2016*, January/February 2017.

http://www.ted.com/talks/sharon_brous_it_s_time_to_reclaim_and_reinvent_religion

http://www.nytimes.com/2016/09/13/well/eat/how-the-sugar-industry-shifted-blame-to-fat.html