COMMON GROUND

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It is customary for humans to use familiar periods as milestones for the purposes of reflecting upon the past and speculating about the future. For example, a year, a decade, or a century. The combination of the end of the 20th Century and the millennium has provided the grandfather of all milestones. It is difficult to find the words that no one will likely remember.

A thousand millennia ago modern humans appeared by simply standing up. Scientists considered this act such an achievement and amazing event that new scientific classifications were created. The fossil record gave us examples throughout the world. These human variations are our common ancestors. We have a common bond and stand on common ground.

From this new altitude, humans developed a new attitude. They found a new pursuit, that being evolution. In today's society, this pursuit has merely become a pass-time. Humans had closed a common evolutionary loop, like the common ground of an electrical circuit. Mankind evolved from one to two dimensions.

Humans began making tools, weapons, and ornaments, from which came agriculture, hunting, art, and unfortunately war. The materials used in these endeavors lay on the common ground at their feet. Humans had only scratched the surface of the Earth, but in a crude way, we were mining. No regulations, no environmental impact statements, and no lawyers.

The evolutionary process was chaotic and took hundreds of thousands of years. Mining appeared about eight millennia ago, when copper was first smelted. By that time humans had invented the wheel, domesticated animals, and the sea had risen tens of meters. The cause of this wave of Global Warming remains unknown since there were no coal fired power plants or sport utility vehicles.

About three to four millennia ago, the Iron Age started and metals were being mined in Britain. During this time, the alphabet was created, Stonehenge was erected, the Great Pyramid was build, and the principles of acupuncture were established by the Chinese. Humans had the means and motivation to advance and progress. We could extract metals from the Earth and mold them into form with function.

For the next several millennia, the history and vision of man were clouded by repetitive cycles of pestilence, starvation, natural disasters, crusades, and wars. These were the Dark Ages, medieval in nature. Humans were evolving rapidly into their present day form and exhibiting many present day characteristics. Humans were again reduced to a single dimension. I prefer to term this time as the Age of Mysticism. Then a millennium ago in 1,000 AD, "zero" was invented and introduced into mathematics. Humans had "nothing" to lose. One could now "count" on humans to grow and expand on an unlimited basis on both sides of the decimal point. From this point on humans began exploring and applying the underlying principles of nature, known as Science. Humans discovered their common ancestry and destiny.

Humans looked around the planet not across it and peered into the heavens. Mankind leaped from one to three dimensions. Soon humans were entering the Age of Reason and Enlightenment, also know as the Renaissance. While the metals were being forged at our mines, the foundations of science were being forged in our minds.

For the next few centuries, we explored the world and expanded our knowledge. We discovered the elements, along with their chemical and physical properties. Using a combination of mining, metallurgy, and manufacturing, we began changing our world. We were gaining knowledge and wisdom. We actually thought we were improving society and civilization. Keep in mind, there were only millions of humans on Earth. There was still unlimited room and resources.

The last three centuries of this millennium I have termed the "Age of Tinkerers and Thinkers". The two humans that best illustrate this Age are Thomas Edison and Albert Einstein. These two humans exemplify the attributes of perspiration and perception, and the conflict between need and desire. The perspiration of Edison gave us the phonograph and light bulb. The perception of Einstein have us relativity and atomic power. Common to both, was mining and metallurgy.

This last century of the 1,000th millennium of modern man has been the best and worst of times. Our worst moments have been the wars and the detonation of the atomic bomb. Knowledge without wisdom can be dangerous. The dividing line between insanity and genius is far less than we think. We proved we could go from three dimensions to one dimension over night. Einstein once commented he didn't know what weapons would be used in the Third World War, but he knew what weapons would be used in the Fourth World War, those being sticks and stones.

Our greatest common achievement as humans was go to and return from the moon. This technological achievement required all of our most positive attributes as humans. For the first time, we left our ancestral home on Earth and ventured into the cosmos. For a moment, a thousand millennia paused, and humanity was united as one. We had reached the fourth dimension of human development, but ironically with little space and time to spare.

Central to the success of the early space program, was mining and metallurgy to produce the specialized elements and materials needed to handle the extremes of space. The concept that lying in the common ground at our feet were the individual elements that once recombined in a different manner could take us to the moon is cosmically spiritual. We are now test flying a plane that can travel from Los Angeles to Sydney in a couple hours. The list of achievements and advancements in science, engineering, and medicine in this century is staggering.

Without mining, metallurgy, and materials science there would be no physical achievements, only those of the mind. Some would say this is the true way to Enlightenment. Others would say that the many inventions have only made us softer and weaker. Survival of the fittest had transitioned into survival of the financier.

Regardless of one's outlook, our survival has and will always be dependent upon mining. Our constant companions through evolution have been mining and metallurgy, their products finding application on both sides of good and evil. No matter our direction in the future, mining will be there. Metals and minerals will continue to be taken from the Earth. Like early humans, we have only scratched the surface. The quantity of metals and minerals taken from the Earth over time represent only a minute fraction of the total available. A common bond between humans and Earth was, is, and will always be mining. A few see the inspiration in this bond, while most see only the impacts. No one seems to mind that we mine, but how, where, and why we mine are the issues. We should "mine" our own business.

Mining is our ambassador to the Earth and our initial interface with our planet. The mine itself is the consulate. Some are offended by mining because of our reliance upon it and the minerals and metals taken by it. Some are offended because we must physically take the metals and minerals from the Earth.

Some feel a strong spiritual bond with the Earth like mother and child. Mining is an affront to that bond and that relationship. However, it is irrelevant to attack mining on the basis that it will be eliminated as an industry. We can and have altered the methods of mining, but we will not abolish it.

Nevertheless, we have not set the best example of how to approach and communicate with the Earth. If civilized cultures and societies curtail mining due to environmental incompatibility, the resources will be obtained elsewhere at a much higher price, both environmentally and economically. We are becoming dependent upon sources of metals and minerals located in many diverse and sometimes unstable political and social situations.

We can and must have respect for each other. The lack of respect leads to mistrust. Once trust is lost all is lost. We must strive to view the Earth and our surroundings through the eyes of others. Human evolution has transitioned into the Human Race, and has remained so ever since. Due to our near-sightedness, transitional periods in our development are often marked by confusion, stress, and irrational behavior. Humans do not respond to change willingly. There is a natural tendency to resist science and knowledge in favor of mysticism and conjecture.

How many times have you heard someone make the statement "it works like magic" or "I am looking for that magic number". Humans are creatures of convenience. We are still dependent upon many rituals. Nature maintains the rational view. Man on the other hand is driven by emotion and by some hidden guilt to extreme compassion. Nature is not compassionate or judgmental and does not recognize the individual. It only recognizes the whole as a sum of bits and pieces.

Nature itself is much more resilient than one might imagine based upon the recovery of Yellowstone Park a decade after fire destroyed 50% of the forest and Prince William Sound a decade after the Valdez went aground.

It is very disheartening to have witnessed the demise and denouncing of science in many instances. Science has been trivialized in many cases and reduced by policy decisions to a series of three-letter acronyms. Science is the language by which humans communicate with nature. Science is universal and neutral. Its laws cannot be broken, although many seem "bent" on breaking them.

As we approach the new millennium, I sense a return to the Age of Mysticism. The world seems somehow smaller but remains dangerous because most humans do not want to understand scientific principles, and how they apply to and effect their daily lives. When asked the source of electricity, many point to the wall socket. When asked the source of food, many point to the supermarket. The situation worsens with mining. The Achilles Heal of a free society is an uninformed public. The only tool by which to fix this tendency is education.

Sadly, the educational process in civilized cultures is moving away from the objective and toward the subjective. The evolutionary fulcrum point lies heavily on the side of the "feel" of the situation rather than the "facts' surrounding it. Recently the State of Kansas in the U.S. passed a law banning the teaching of evolution in school curriculums, on the basis that it was not provable science. Science in many ways has become irrelevant.

The demise of communism and the rise of computers have left a cultural vacuum that will be filled rapidly, but hopefully not by the hot air of politics. In the age of computers, silicon and electrons have replaced steel and elevators. We can measure parts per billion, move billions of bits of information in a billionth of a second, but we cannot grasp the big impacts of billions of people. Talk of sustainability becomes lost in the ever-demanding voices of overpopulation.

The original environmental movement provided the necessary momentum to bring about a consciousness about mining. Tremendous strides have been made in cleaning up and protecting the environment. I am thankful we found a common consensus and did not remain unconscious. The global mining community is responding to these sensitivities.

We have expended so much effort examining the right side of the decimal point that we have ignored the exponential expansion of the Left. We have given new meaning to the game "Trivial Pursuit".

The number of major hard rock mining projects placed into operation in the United States in this decade can be counted on less than one hand. The permitting process has become a stagnant cycle of studies, statements, and statutes. No level of environmental protection is enough. Humans are no longer relevant. More regulation, more review, and more rhetoric are sought.

Mismanagement, fear, and lack of knowledge have contributed to the historical impacts of mining. Fear is more marketable than knowledge. The ability to implement appropriate corrective actions, standards, and criteria in the mining industry is not limited by technical knowledge. The recent focus on bird mortality and establishment of appropriate protection standards and strategies is an excellent example of industry response to an environmental problem. The application of technical knowledge is limited primarily by the agenda of a few, and a bureaucracy driven more by politics and litigation than science and engineering. The adversarial three-way relationship that has developed between industry, regulatory agencies, and environmental groups has circumvented the ability of scientists and engineers to practice the art of "problem solving".

The current losers are the stockholders and stakeholders, while the future losers are our children. The manner in which to address the impacts of humans is not by trying to eliminate them from the landscape through legislation and litigation. The ideological concepts of "zero discharge, zero impact, and zero risk" are naïve and unworkable, and will not eliminate the global impacts of humans. Humans cannot and will not live and work in zero risk environments. We must consider as partners the stockholders and stakeholders. The stockholders who invest their hard-earned dollars in a hard rock mine instead of a computer company. These stockholders are our clients. The stakeholders are the local citizens in a mining community. We must win their hearts and minds before we can mine.

The devastation of the rain forests, concerns of over global warming, the poaching of thousands of endangered animals each year are not the result of mining, but the result of human indulgences and extravagances. The Industrial Age has given way to the Information Age. Although science has become irrelevant, somehow it will save us. The Internet and the Web are perceived as the saviors of the new religion of information. Many equate speed with truth. Regurgitating outdated information at light speed will not improve its accuracy or move all the mineral deposits from the sensitive ecosystems to Western Australia or Nevada. In spite of the fact humans are not perfect and make mistakes, there are no substitutes for us. The facts and propaganda surrounding information are everywhere.

There has been more information produced in the last fifty years than in the last five thousand. The supply of information currently doubles every five years. The weekly edition of the New York Times now contains more information than the average person encountered in their lifetime in 17th century England.

Your child is invited to a birthday party, so you pull out some pocket change and buy a little greeting card that plays "Happy Birthday" when it is opened.

After the party, someone casually tosses the card into the rubbish bin, and with it more computing power than existed in the entire world only fifty years ago. The same can be said about the average digital wristwatch.

Its amazing the extent we will go to monitor time with the intent of controlling it. None of these examples or facts, however, comes close to the ability and speed of the human mind to accept, process, and apply information in an integrated manner to form knowledge. There is no substitute for the human mind.

I am suspect of many aspects of the information revolution. I am afraid we will drift further apart in the Silicon Sea, and become even more detached from one another in our faceless monitors. We will become more dependent upon computer speed and less dependent upon common sense. With each new method of communication, we create another barrier between ourselves.

In some respects, humans have given up on learning, because the quantity of information and knowledge seems overwhelming. The approach to learning involves letting others "handle it". Learning is a process of finding information, identifying its source, and verifying its validity. Everyone wants the fast buck, the fast cars, the fast way to the top. The faster we communicate and move, the shorter our vision becomes. It is no longer a century its only a second.

We demand bio-diversity but struggle to maintain our individualism as the world population expands by more than one hundred million humans per year. In the next century, humans will strive to define their relationship to one another and to again find some common ground and a common purpose. Many if most of the conflicts we encounter personally or globally relate to the desire to be recognized among the masses.

In the next century, we will enter the Age of Reality, both virtual and actual. The availability and applicability of virtual reality will affect our lives to levels never thought possible. Politics will become somewhat passe due to the uncontrollable nature of the Internet.

We will be overwhelmed by over population. We will cure the most dreaded medical illnesses, only to discover ignorance and apathy our greatest social diseases. China will become a Superpower. Our thirst for energy will nearly exhaust it and us. We will land humans on Mars. There will be more wars and natural disasters. The next century will bring a continuous blending of global thinking and culture. Provincial and colloquial diversity will diminish among humans. However, the tensions of religion, race, and politics will persist due to the need to establish our individuality and maintain our identity.

The reality for western culture and developed nations in the next century will be to keep their life styles and maintain the aging infrastructure of the late 20th Century. In the emerging and developing countries, the reality will be to get a life style. Infrastructure and not the Internet will dictate our budget concerns. We are consumed with consuming. Yet, over one quarter of the world's population will face severe water shortages in the next 25 years.

Nearly a half a trillion dollars will be needed in the United States in the next century just to upgrade existing wastewater treatment facilities. Just to maintain basic infrastructure and our life styles will require all the additional capital available.

The environmental movement has created the awareness needed and action followed. It is time to move on to more pressing and immediate global issues like overpopulation, decease, and starvation, and get back to the basics and our common goals. We must again understand that we do stand on common ground.

If additional advances in environmental protection are desired, then humans must make real personal sacrifices and must be willing to give up extravagances, like multiple vehicles and larger homes. In the United States, the average number of humans per vehicle in major metropolitan areas remains just over one.

The average home is getting larger, not smaller. Yet, we must not cut down any more trees. We can no longer see the trees for the forest. The demand for metals and minerals goes up several per cent each year, and yet the majority of Americans say they are "environmentalists".

Since development and progress are accepted by most people, but not their environmental impacts, the approach has been to move mining to other less developed and emerging countries. If the approach leads to exploitation of these countries, then the environmental hypocrisy is not justifiable. We must look in the mirror and reflect upon these decisions.

The time has passed for rhetoric, now is the time for realism. We must understand that humans create things and in that process, we are unfortunately wasteful. Technology has limitations.

The solution lies in the common ground of identifying and balancing the ecological and environmental factors into a sustainable "ecolibrium". We must think globally and act locally as was said in conjunction with first Earth Day. It is unlikely we will eliminate our wants and waste, but we can learn to limit them through cooperation and communication, as we transition into the new global ecolibrium.

Difficult decisions will have to be made by citizens in free societies. If a free society is to succeed, the electorate must be informed. In the Age of Information, ignorance is intolerable. With personal freedom comes a tremendous responsibility to be knowledgeable. Be informed, ask questions, taking nothing for granted.

This is the message to our children. As citizens of planet Earth, we must take on personnel responsibility for educating and informing ourselves. We will be held accountable for our actions or inaction in one way or another.

Humans have become arrogant as they have progressed. We want our cake and eat it too, although what we need is a little humble pie. Are we here only due to an errant meteor that struck the Earth and destroyed the dinosaurs?. They had lasted hundreds of millions of years. I wonder if humans can endure. There are inherent levels of risk in natural systems. We cannot eliminate them. In the complex cosmic interplay of destiny and free will, there is little that we have control over. It seems the more advanced we become, the less time we have and less freedom of choice we exercise. I sometimes wonder what is really meant by advancement and progress. If we lose the common bonds and ground that holds us together as humans, we will lose the shared dreams for a better future. Australia is now a leader in the world with respect to environmental issues in mining. Many scientific advances in mining have originated in Australia.

But with that leadership come responsibility and accountability. The recent financial and social changes in Southeast Asia have demonstrated that clearly. Australia has changed in many ways during the last decade of this century. I sense a greater cohesiveness and sense of purpose amongst its people. For most of this century, the United States has been the actual if not the virtual leader in many areas. In the next century that will change and there will be many leaders.

The development of a philosophy like the Code for Environmental Management is critical to the global mining industry. Without acceptance and implementation, it is only words. All of themes that I have discussed are found in the Code including responsibility and accountability, education and communication, ethics and integrity, and honesty and respect.

However, if one of the signatories does not adhere to the Code in all countries and at all operations, then the entire process is meaningless. Verification is needed through monitoring and auditing of some form.

This message also applies to the individuals that work directly and indirectly for the mining industry. We have an ethical and professional responsibility to the stakeholders and stockholders as well. A project is far more important than the final report. I challenge individuals and consulting firms to embrace the principles of the Code. Keep in mind that this is a beginning and that we must learn to crawl before we walk and walk before we run. We must have patience but not become complacent.

Nonetheless, what about mining in the new millennium? The mining industry must address some outstanding issues. These issues revolve around aesthetics, sustainability, environmentalism, communication, technology, and closure.

Aesthetics has become an issue with the advent of surface and open pit mining, and concerns raised by native peoples. Active mining operations are not generally appealing from a visual standpoint and only limited approaches are available to make them so. Consequently, aesthetic concerns transcend operations to become a closure issue.

The mantra of sustainability is constantly with us. The extractive industries do remove non-renewable resources. However, sustainability has had as much to do with the pace of extraction as it did with the extent. We should focus on larger long-term deposits to maximize economics and to minimize the environmental impacts of operations and closures.

As more and more countries reach developed status, the cyclic demand for metals and minerals will diminish. Profit margins will shrink and become more reflective of other industries. Geological deposits are where they are and are often in sensitive areas.

If humans do not want to mine in sensitive areas, then the public must pay the price for exploration and development of mines based upon marginal deposits. As more and more countries enter the development stage and population grows unchecked, sustainability transcends a discussion of resource extraction alone. The risks due to mining are acceptable when compared to its benefits. We do not and cannot live in a risk free world. Timber, Energy, Agriculture, and Mining, make up a "TEAM" of industries essential to our political, economic, societal foundations. Without these industries and their respective resources, modern societies cannot endure. This is the message that those in opposition to progress will inevitably come to recognize as true. For the mining industry itself, it is time to recognize that the tail wags the dog with respect to environmental issues. Environmental and process goals must merge into a seamless plan of operations and closure. Environmental concerns carry equal weight with process issues.

It is time the industry recognizes these facts. The environmental professional at a mining operation is constantly torn between policy, politics, perception, and the public. It is a very difficult job balancing safety, environment, and production.

Central to the environmental theme is communication and compromise. This industry must act as one. If we as an industry do not conduct ourselves in the appropriate manner, the public will demand that someone else do it for us. We know that scenario does not work when that someone else is the government or lawyers. I hope we can prove we have nothing up our sleeves before we lose our shirts.

The mining industry has not conveyed the message to the public. We need to open our doors and hearts to the public. We must challenge the public to learn and provide them the means. The mining industry has not provided the level of environmental and economic education necessary. Our community relations typically exist only as needed. We must reach out and bring the public to us. We must win their hearts and minds before we can mine.

Mining is truly a global endeavor. No other industry has operated longer on more continents, in more countries, in more cultures, and in more climates than mining. Miners are often the first foreign diplomats entering a country. We must take on that responsibility humbly and seriously.

Obviously, we have been doing something wrong, based upon the poor perception of the industry. Progress is being made in addressing the legitimate environment concerns of the public. The perception of the mining industry is one of pirates, imperialists, capitalists, and opportunists. We earned that reputation with too many examples to mention.

The process and mechanisms are in place to accommodate the future. The transition into the future is the issue. We as humans are failing again getting from the past to the future. The mining industry sees the caterpillar, while the public and the environmental community see the butterfly. None of us understands metamorphosis.

From a technical perspective, there are three issues. These issues relate to water management, waste rock disposal, and physical stability. If we cannot get these issues right, we will not be allowed to mine. Water management and water quality during operations and at closure is the central issue.

Perpetual water treatment is not a suitable long-term alternative from either an environmental or an economic standpoint. A water balance means a water balance. Central to the water quality issue is the characterization and control of acid generating materials. If we cannot legitimately dispose of these materials without long-term protection of water quality, then we should not mine. The generation of acid mine drainage is the number one environmental issue in this industry with respect to the public. Proper characterization and commitment to the management and disposal plan is critical. This approach should include those situations in which the government is willing to relax the standards considerably. Ethics should take precedence over economics. Not every mineral deposit is amenable to mining. I hope that this statement does not come as a surprise to anyone.

The geotechnical issues relate primarily to the integrity of natural and synthetic liners and the stability of embankments. We often hear that a particular dam failure was the result of out-dated design strategies. However, in recent years the only dams failing are modern ones. We cannot ensure that disasters of this kind will not occur because of human error. If we can get these three technical issues right, the level of risk is acceptable. There should be no tolerance for incompetence or mediocrity among the professional consulting industry.

As an aside, I feel that this problem could be alleviated if the senior professionals re-established the relationship between Mentor and Apprentice.

The final item is closure because of its relationship with long term environmental and economic implications. Although we know how to close mines, we often close our minds to the costs. Although we have the knowledge to deal with the technical issues, can we find the wisdom to apply it. Closure requires innovation, integration, and implementation.

The consultants must produce the innovative solutions. The governmental agencies must provide the regulatory flexibility to implement the solutions. The mining industry must pay for the integration of the solutions. The entire closure process relies upon these three entities to communicate, coordinate, and cooperate.

Recognition of the problem and implementation of a solution are the issues. The mining industry is not judged by the promises it makes during permitting, or met during operations, but those maintained after closure. We must view mining as an entire cycle of permitting, operations, and closure.

We must not and cannot condone the abandonment of mines with the result being the stakeholders and stockholders "holding the bag and picking up the tab".

We must address closure during the planning and permitting phases of a project. In many instances a failed operation could have been successful and made a profit if closure had been considered at the beginning. The most difficult aspect of closure is the transition from mining known as decommissioning. We must come to grips with metamorphosis and come to see both the caterpillar and the butterfly.

In the final analysis, we cannot predict the future. All we know is that change will occur more rapidly and we will no longer have the luxury of anticipating it. Therefore, we must learn to adapt quickly in order to survive as an industry and as humans. The older I become the more I seek the refuge of the basics. I will sail into the future with my heart as my compass, science as my tiller, and the truth as my map.

Somehow, we must still find the humor in humans. I have always believed that laughing is the greatest single attribute of humans. We really need to lighten up figuratively and figuratively. We must stand up once again like early man. This time around our attitude will determine our altitude and not visa versa.

As you gaze around at the beautiful natural and man-made surroundings of this conference be aware that mining made it possible for us to safely and comfortably gather here. As we are listening to or delivering a presentation during the conference, let us take the information seriously, but not ourselves. Take the time to share ideas and thoughts. Remember we are all in this alone and we all walk around on common ground. Thank you.