

Open Letter to the Astronomical Community

Having worked at many [astronomical observatories around the world](#), I have a very good overview of [astronomy](#). I have also had the privilege of working in the [solar industry](#) and I was the [manager of the largest utility solar photovoltaic power system in the USA](#) that was launched by [President Barack Obama](#). Witnessing the incompetence that was in the utility solar industry and is still present within the industry led me to the belief that the astronomy community must turn its views toward the [environment that we are living in](#). We live in truly unbelievable times. [Autism](#) is an [epidemic](#) in most [western countries](#), [western governments are nothing more than corrupt corporations](#), and [corporations are routinely suppressing information regarding the toxicity of many common household items](#). The result is that [many people are unnecessarily suffering from easily preventable developmental problems, sickness and cancer](#).

Much of this illness stems from incorrect human environmental conditions and is [easily preventable by simply moving the human into the correct environmental conditions](#). Astronomers must return to studying [environmental radiation](#) for associations to human problems and incorrect environmental conditions. The future of the [next generation](#) relies on astronomers obtaining a full understanding of the [rapidly changing human environmental conditions](#) and the halting of biologically [toxic corporate government policies](#). The overloading of the electromagnetic environment is one of these [disastrous policies](#) that must stop.

[Dark Energy](#) is poorly understood and it is clear that we are currently moving into exploring the complete electromagnetic spectrum that also includes the study of [atmospheric pressure waves](#), [atmospheric voltage effects](#) on the [cellular system](#), and the [biological effects](#) of the various forms of [atmospheric radiation transmission](#). [Light](#) and the [human](#) is poorly understood by the astronomical profession, with many astronomers not understanding which [light bulbs](#) they should have in their own homes and offices! It is embarrassing that astronomers do not understand the many forms of [artificial lighting](#) that they are exposed to every day and how it affects them. It is a sad state of affairs that I do not know of any astronomer who fully understands the [energy](#) in their own daily environment. Until that changes, Dark Energy will always be a mystery to the astronomical community.

We see a continuation of astronomical incompetence in their own facilities. Promoted to the public as the latest generation facility, the 1.4 billion dollar [Thirty Meter Telescope](#) project is a continuation of environmental human biological problems that I observed on the summit of [Mauna Kea, Hawaii, USA](#). I worked on Mauna Kea for over five years and saw my health severely degrade during that time. The two long term summit workers that I knew well died of [disease conditions](#), another worker went on to [commit suicide](#), and others were argumentative. Astronomers know the site is [biologically toxic](#) to their [workers health](#), but do not inform the new hires of it, other than they may get [altitude sickness](#) and direct them to use the company supplied [drugs](#) to offset that sickness. They know that workers are [inappropriately acclimatizing](#) on a daily basis, which further aggravates the altitude sickness symptoms. The insatiable quest for [knowledge](#) is far greater than the quest for [worker health and safety](#). If a company is advising workers to [take drugs to perform their job](#), they probably should not be working there. Mauna Kea is a known [biologically hostile work environment](#) and one can only wonder why the astronomy community is investing 1.4 billion dollars to build the world's largest telescope there.

[Steven Magee](#) – [Chartered Electrical Engineer](#), [The Institution of Engineering and Technology \(IET\)](#)

Social Media

“GAME of Thrones star Jason Momoa has joined Nicole Scherzinger, Zoe Kravitz, Ian Somerhalder and other stars in a new social media campaign protesting against a construction project on Hawaii’s big island.” <http://www.news.com.au/entertainment/celebrity-life/celebrity-selfies/game-of-thrones-star-jason-joins-we-are-mauna-kea-campaign-to-protest-new-telescope/news-story/5455acb3bd9fd5600061f323f87f5847>

“Professional surfer and former Kauai mayoral candidate Dustin Barca was among those arrested Thursday while conducting peaceful demonstrations at the summit of Mauna Kea...But activists have been outspoken in their opposition to the project, including actor Jason Momoa, who took to Instagram to ask other Hawaii-based celebrities--including Dwayne "The Rock" Johnson and Kelly Slater--to join protesters atop Mauna Kea.” <http://www.hawaiinewsnow.com/story/28730585/local-celebrities-take-part-in-mauna-kea-protests>

Facebook

- Environmental Radiation LLC: <https://www.facebook.com/EnvironmentEMR/>
- Protect Mauna Kea: <https://www.facebook.com/protectmaunakea/>
- We Are Mauna Kea: <https://www.facebook.com/groups/393211327547061/>

Twitter

- Dustin Barca: <https://twitter.com/barca4mayor>
- Dwayne "The Rock" Johnson: <https://twitter.com/TheRock>
- Ian Somerhalder: <https://twitter.com/iansomerhalder>
- Jason Momoa: <https://twitter.com/PrideofGypsies>
- Jill Wagner: <https://twitter.com/JillWagner>
- Kelly Slater: <https://twitter.com/kellyslater>
- Nicole Scherzinger: <https://twitter.com/NicoleScherzy>
- Protect Mauna Kea: <https://twitter.com/ProtectMaunaKea>
- Environmental Radiation LLC: <https://twitter.com/EnvironmentEMR>
- TMTshutdown: <https://twitter.com/TMTshutdown>
- We Are Mauna Kea: <https://twitter.com/WeAreMaunaKea>
- Zoe Isabella Kravitz: <https://twitter.com/ZoeKravitz>

Instagram

- Dustin Barca: <https://www.instagram.com/barcalive/>
- Dwayne "The Rock" Johnson: <https://www.instagram.com/dwaynej0hnson/>
- Environmental Radiation LLC: https://www.instagram.com/environmental_radiation_llc/
- Ian Somerhalder: <https://www.instagram.com/iansomerhalder/>
- Jason Momoa: <https://www.instagram.com/prideofgypsies/>
- Jill Wagner: <https://www.instagram.com/jillwagner/>
- Kelly Slater: <https://www.instagram.com/kellyslater/>
- Nicole Scherzinger: <https://www.instagram.com/nicolescherzy/>
- #protectmaunakea: <https://www.instagram.com/explore/tags/protectmaunakea/>
- #wearemaunakea: <https://www.instagram.com/explore/tags/wearemaunakea/>

- Zoe Isabella Kravitz: <https://www.instagram.com/zoeisabellakravitz/>

Petition

- “Foes of the Thirty Meter Telescope on Monday delivered to Gov. David Ige a petition with more than 53,000 signatures opposed to the \$1.4 billion project on Mauna Kea.”
<http://www.staradvertiser.com/2015/04/20/breaking-news/mauna-kea-telescope-petition-delivered-with-53000-signatures/>
- “Stop TMT Construction and Arrests of Mauna Kea Protectors”
<https://www.change.org/p/governor-david-y-ige-stop-tmt-construction-and-arrests-of-mauna-kea-protectors>

Hashtags

- #protectmaunakea
- #TMTshutdown
- #KuKiaiMauna (Ku Kia'i Mauna means the guardians of the mountain in Hawaiian.)
- #AlohaAinaPatriots (Aloha 'Āina means "love of the land")
- #WeAreMaunakea

Interesting Quotes & Internet Links

Latest News

- "When asked about references Nees cited in his written, direct testimony, he said they were incorrect. Flores also asked Nees about the exhibits that were associated with his testimony. Nees stated that he did not read nor was he familiar with the majority of the exhibits."
<http://bigislandnow.com/2016/12/06/tmt-hearing-uh-calls-archeologist-to-the-stand/>
- "Mental exam ordered for alleged telescope attacker" <http://hawaiitribune-herald.com/news/local-news/mental-exam-ordered-alleged-telescope-attacker>
- "40% less oxygen and high radiation levels can do strange things to sea level adapted humans." Steven Magee CEng MIET
- “We think of hypoxemia as something that happens all at once leading to unconsciousness, but it’s often not like that. The victim can be mildly to severely confused and even combative for a period of time.” https://www.planeandpilotmag.com/article/flying-high-unpressurized/#.WEkSC2r_q00
- “High altitude makes you stupid.” <http://www.pbs.org/newshour/updates/reporters-notebook/>
- “Abnormal radiation exposure and oxygen starvation teaches you that reality is just a perception that is derived from your immediate environmental conditions in conjunction with your prior environmental exposures, your health problems, your age, and the area that you grew up in and adapted to.” Steven Magee CEng MIET
- "The Hawaii state Supreme Court today invalidated the permit allowing construction of the Thirty Meter Telescope atop Mauna Kea...Today’s order could set back the project months to years while it goes through permitting again." <https://www.staradvertiser.com/breaking-news/state-supreme-court-vacates-permit-for-thirty-meter-telescope/>
- "The scandal with the Thirty Meter Telescope (TMT) atop Mauna Kea is how it managed to

obtain a construction permit to build a manned telescope in a known biologically toxic environment to workers. How many more people need to die, get injured or develop long term very high altitude sickness that will last a lifetime?" Steven Magee CEng MIET

- "...incidents claimed the lives of four workers during the construction of the telescope"
https://en.wikipedia.org/wiki/Subaru_Telescope
- "The wrap around effect of the wind could be very severe at times," Arimoto added, "which can swing the heavy metal door to create this kind of dent on it. The director reminded staff to be extra careful about this kind of wind effect when working outside of the enclosure."
<http://www.bigislandvideonews.com/2015/06/08/subaru-damage-not-from-bullet-observatory-confirms/>
- "astronomer...crushed to death between a door and a 150-ton revolving telescope dome"
<http://www.nytimes.com/1987/05/02/us/marc-a-aaronson-astronomer-killed-by-revolving-dome.html>

Altitude Hazards

- "After a decade of working in high altitude astronomy the medical profession discovered that I had a hole in my heart, heart arrhythmia's, erratic low blood oxygen levels and brain issues. Heart, lung and brain problems appear to be long term known adverse health aspects of high altitude work and unnatural electromagnetic radiation exposures." Steven Magee CEng MIET
- "someone who races up to an elevation of 15,000 feet will be worse for the wear"
<http://adventure.howstuffworks.com/outdoor-activities/climbing/altitude-sickness5.htm>
- "A slow ascent with ample time for acclimatization do not safeguard against illness"
<https://www.thetech.org/exhibits/online/everest/about/physiology.htm>
- "Pulmonary Hypertension...Mountain climbers all develop the condition"
<http://www.mountsinai.org/patient-care/health-library/diseases-and-conditions/pulmonary-hypertension>
- "Pulmonary Hypertension - This condition of high blood pressure in the lungs can occur from many causes. Since high blood pressure in the pulmonary vessels is a main mechanism that leads to HAPE, persons with pulmonary hypertension have a much higher risk of developing HAPE and need to consider this risk before coming to altitude."
<http://www.altitudemedicine.org/altitude-and-pre-existing-conditions/>
- "A high prevalence of patent ductus arteriosus and atrial septal defect was found at the three high altitude sites and the effect of altitude was progressive."
<http://www.ncbi.nlm.nih.gov/pubmed/3379209>
- "ECGs of immigrants to high altitude demonstrate an increase in RV hypertrophy with increased duration of high-altitude residence. Loss of normal circadian rhythm and QTc prolongation have been described in both infants and adults."
<http://emedicine.medscape.com/article/901668-overview>
- "The amount of people I met that had heart problems surprised me in high altitude astronomy. I had not seen it in other fields. After a decade of working at high altitudes, I was also diagnosed with a heart problem." Steven Magee CEng MIET
- "Relationship of Hypoxia to Arrhythmia and Cardiac Conduction Hemorrhage"
<http://circ.ahajournals.org/content/circulationaha/27/4/742.full.pdf>
- "The hypoxemia (lowering of SpO2) is the independent risk factor leading to

arrhythmia...Compared with the non-cardiac disease group, patients in cardiac disease group has significantly lower toleration ability against hypoxia, and its SpO2 warning value is lower than 0.95.” <https://www.ncbi.nlm.nih.gov/pubmed/23648165>

- "experienced and professional climbers tend to show higher levels of chronic damage, suggesting that high altitude's effects may be cumulative and lasting." <http://healthyliving.azcentral.com/high-altitude-effects-mountain-climbers-4931.html>
- "Three attributes of a good mountaineer are high pain threshold, bad memory, and ... I forget the third. — Joke in a mountaineering Internet chat room" <http://www.scientificamerican.com/article/brain-cells-into-thin-air/>

Radiation Hazards

- "A few years after working on Mauna Kea, I discovered that I had radiation sickness" Steven Magee CEng MIET <http://amzn.com/1500896241>
- "Ionizing radiation...Its most common impact is the stochastic induction of cancer with a latent period of years or decades after exposure. The mechanism by which this occurs is well understood, but quantitative models predicting the level of risk remain controversial. The most widely accepted model posits that the incidence of cancers due to ionizing radiation increases linearly with effective radiation dose at a rate of 5.5% per sievert. If this linear model is correct, then natural background radiation is the most hazardous source of radiation to general public health, followed by medical imaging as a close second. Other stochastic effects of ionizing radiation are teratogenesis, cognitive decline, and heart disease." https://en.wikipedia.org/wiki/Ionizing_radiation
- "Teratology is the study of abnormalities of physiological development. It is often thought of as the study of human congenital abnormalities, but it is broader than that, taking into account other non-birth developmental stages, including puberty; and other non-human life forms, including plants. The related term developmental toxicity includes all manifestations of abnormal development that are caused by environmental insult. These may include growth retardation, delayed mental development or other congenital disorders without any structural malformations." <https://en.wikipedia.org/wiki/Teratology>
- "I was on the Big Island of Hawaii in 2015 and managed to characterize the ionizing radiation levels in the south of the island. Mauna Kea was the radiation hot zone with approximately a doubling of radiation levels at the Mauna Kea Visitors Center at 9,200 feet as compared to sea level. I did not venture to the summit due to the known biologically harmful environmental conditions to the sea level adapted human that exist at 13,796 feet." Steven Magee CEng MIET http://www.environmentalradiation.com/hawaii_radiation_readings.pdf
- "workers who were exposed to radiation for a median of 10 years had: 2.8 times higher odds of having skin lesion: 7.1 times higher odds of having orthopedic (back/neck/knee) problems; and 6.3 times higher odds of having cataracts." <http://newsroom.heart.org/news/healthcare-workers-radiation-exposure-tied-to-range-of-health-problems>
- "experimental evidence supported low-dose ionizing radiation exposure causes a significant long-term alterations in lipid metabolisms and endothelial function" <http://info.cfimedical.com/blog/hypertension-and-high-cholesterol-linked-to-radiation-exposure>
- "A mathematical model constructed by researchers at Imperial College London predicts the risk of cardiovascular disease (heart attacks, stroke) associated with low background levels of

radiation. The model shows that the risk would vary almost in proportion with dose.”

<https://www.sciencedaily.com/releases/2009/10/091022202710.htm>

- “The effects of radiation on the long-term trends of the total serum cholesterol levels of the Hiroshima and Nagasaki atomic bomb survivors were examined using data collected in the Adult Health Study over a 28-year period (1958-1986)... We showed that the mean growth curve of cholesterol levels for the irradiated subjects were significantly higher than that for the unirradiated subjects, and that the increase was greater for women than for men... This increase may also partially explain the increased rate of coronary heart disease seen in the atomic bomb survivors.” <https://www.ncbi.nlm.nih.gov/pubmed/10360794>
- “At the age of 46 I was placed onto cholesterol lowering RX-Only prescription medication.” Steven Magee CEng MIET
- “All the endocrine glands are susceptible to damage by radiation exposure; however, pituitary, thyroid and gonads are most likely to be affected. In addition to the endocrine effects, the rates of birth defects and carcinomas may also be increased in the population exposed to excessive radiation.” <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3125012/>
- “studies have associated chronic radiation exposure with poor long-term heart health.” <http://www.medicalnewstoday.com/articles/308881.php>

Ultraviolet (UV) Radiation Hazards

- "The effects of UV-B radiation on human skin are varied and widespread. UV-B induces skin cancer by causing mutation in DNA and suppressing certain activities of the immune system... UV-B may also suppress the body's immune response to Herpes simplex virus and to skin lesion development, and may similarly harm the spleen... Common eye problems resulting from over-exposure to UV-B include cataracts, snow blindness, and other ailments, both in humans and animals... Living organisms at high elevations are generally exposed to more solar radiation and with it, more UV-B than organisms at low elevations." http://earthobservatory.nasa.gov/Features/UVB/uvb_radiation2.php
- “Ultraviolet radiation (UVR) whether of solar or artificial origin, is a known carcinogen. Excessive exposure to UVR increases the risk of several types of cancer, cortical cataract, some conjunctival neoplasms, ocular melanoma, autoimmune and viral diseases.” <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3125012/>

Oxygen Starvation Hazards

- "Decreasing Blood Oxygen At Altitude" <http://environmentalradiation.com/Steven%20Magee%20Decreasing%20Blood%20O2%20At%20Altitude.pdf>
- “When the brain is deprived of oxygen, irreversible damage may be the result, even when the deprivation has been for a short period of time. Oxygen deficiency may also lead to anemia in the organs, which can progress to arrhythmia and heart failure. Hypoxemia occurs when arterial blood is not being oxygenated sufficiently. This is a serious condition and needs to be treated quickly.” http://www.petmd.com/dog/conditions/cardiovascular/c_multi_hypoxemia
- “What Happens After A Lack of Oxygen to the Brain?” <http://www.spinalcord.com/blog/what-happens-after-a-lack-of-oxygen-to-the-brain>

- "Federal Aviation Regulations Sec. 135.89 — Pilot requirements: Use of oxygen.(a) Unpressurized aircraft. Each pilot of an unpressurized aircraft shall use oxygen continuously when flying—(1) At altitudes above 10,000 feet through 12,000 feet MSL for that part of the flight at those altitudes that is of more than 30 minutes duration; and (2) Above 12,000 feet MSL." <http://www.risingup.com/fars/info/part135-89-FAR.shtml>
- "At altitude above 10,000 ft, a person may fail to adjust to the low level of oxygen" <http://www.amperordirect.com/pc/help-pulse-oximeter/z-interpreting-results.html>
- "14,000 feet. Blood oxygen saturation is down to a dangerous 85%. You will be increasingly disabled at this altitude. Vision will dim. You will experience serious degradation of judgment, memory and thought. The impairment of judgment will leave you feeling just fine and confident in your performance, however. If hypoxia is not recognized and corrected at this stage of impairment, it is unlikely that it will be recognized. You are in serious danger." <http://www.avweb.com/news/aeromed/181893-1.html>
- "Pressurization becomes increasingly necessary at altitudes above 12,500 feet (3,800 m) to 14,000 feet (4,300 m) above sea level to protect crew and passengers from the risk of a number of physiological problems caused by the low outside air pressure above that altitude" https://en.wikipedia.org/wiki/Cabin_pressurization
- "climbers are advised by medical experts to ascend only 300 meters a day at altitudes over 3,000 meters to give their bodies time to adapt." <https://www.ucalgary.ca/utoday/issue/2016-01-27/study-looks-effects-oxygen-depletion-high-altitude-workers-chile>
- "The Neurology of Altitude" <https://www.peacehealth.org/sites/default/files/Documents/mcgirr-neurology-of-altitude.pdf>
- "Very high altitude astronomy only works by ignoring established biological science" Steven Magee CEng MIET
- "Everyone on Mauna Kea should have a Pulse Oximeter" Steven Magee CEng MIET <http://amzn.com/B00B8L8ZXE>
- "Low Brain Oxygen Ups Alzheimer's Risk" <http://www.webmd.com/mental-health/news/20061120/alzheimers-risk-upped-by-low-brain-oxygen>
- "you could suffer brain damage by going from sea level to 14,000 feet in a couple days" <http://climbing.about.com/od/mountainclimbing/a/AltitudeStudy.htm>
- "I consider myself fortunate that I spent three years working at 7,775 feet before spending five years working at 13,796 feet on the summit of Mauna Kea. I can only wonder how much more severe my long term very high altitude sickness could have been without the initial adaptation to the lower altitude." Steven Magee CEng MIET
- "Low oxygen levels affect a number of systems in the body" http://www.copdbfrg.org/?page_id=984
- "When your body doesn't have enough oxygen, you could get hypoxemia or hypoxia. These are dangerous conditions. Without oxygen, your brain, liver, and other organs can be damaged just minutes after symptoms start." <http://www.webmd.com/asthma/guide/hypoxia-hypoxemia#1>
- "Chest pain may occur if the heart is not receiving enough oxygen, which is especially likely if the arteries leading to the heart are narrowed by coronary artery disease...Fatigue, lethargy and irritability are common symptoms, as is impaired judgment. Breathing may be irregular, and abnormal heart rhythms are often present." <http://www.livestrong.com/article/112789-effects-low-blood-oxygen-levels/>
- "Immediate signs of poor oxygen circulation to the brain may include: Difficulty with complex tasks; Poor short-term memory capacity; Decreased motor control; Cyanosis (bluish tone) of the

- skin; Increased heart rate; Fainting” <https://www.dementia.org/oxygen-deprivation-dementia>
- "The Low Blood Oxygen Graph of a Very High Altitude Mauna Kea Worker" Steven Magee CEng MIET http://www.environmentalradiation.com/Steven_Magee_Low_SPO2_Graph.pdf
 - "Blood Oxygen From Sea Level to 9,200 feet and Back to Sea Level" Steven Magee CEng MIET http://www.environmentalradiation.com/Steven_Magee_9200_Feet_SPO2_Pulse.jpg
 - "excessive or inappropriate supplemental oxygen can be deleterious" <http://www.uptodate.com/contents/oxygen-toxicity>
 - "Yup, pretty much how it works" W. M. Keck Observatory <http://xkcd.com/1463/>
 - 'we were briefed on high-altitude hazards, such as dehydration, intense solar radiation and altitude illness, which can lead to life-threatening conditions such as high-altitude pulmonary edema and high-altitude cerebral edema. "There's 40 percent less oxygen up there than you're used to," said Joy Pollard, who works in outreach for the Gemini Observatory. "It'll feel like you've had a cocktail or two ... Most people don't get sick, but almost everyone feels something." <http://www.honolulumagazine.com/Honolulu-Magazine/January-2016/Walk-Inside-the-Controversial-Telescopes-Atop-Mauna-Kea-Starting-This-Month/index.php?cparticle=2&siarticle=1#artanc>
 - "The Mauna Kea observatories and the Imiloa Astronomy Center will hold what is being called the first Kamaaina Observatory Experience tour Saturday, Jan. 16. The tour is a free, monthly community event that welcomes Hawaii residents to the science reserve atop Mauna Kea to see world-class telescopes and learn about the cultural and environmental importance of the mountain. Those interested must be 16 years of age or older and possess a valid Hawaii ID." <http://khon2.com/2016/01/12/monthly-observatory-tours-on-mauna-kea-begin-this-weekend/>
 - "It is totally nuts to take healthy sixteen year old sea level adapted children to the 13,796 feet very high altitude summit of Mauna Kea and put them on "Rx Only" prescription medical oxygen for two hours! I really hope that they acclimatize correctly, that they have pulse oximeters and doctors prescriptions to ensure that the medical prescription oxygen is administered correctly and legally." Steven Magee CEng MIET
 - "The United Nations Convention on the Rights of the Child defines child as "a human being below the age of 18 years unless under the law applicable to the child, majority is attained earlier". This is ratified by 192 of 194 member countries. In U.S. Immigration Law, a child refers to anyone who is under the age of 21." <https://en.wikipedia.org/wiki/Child>
 - "I regard taking healthy sea level adapted children to the 13,796 feet very high altitude summit of Mauna Kea as a form of child abuse." Steven Magee CEng MIET
 - "I saw a guy faint at the W. M. Keck Observatory, he stepped out from the tour group and said to me "I'm feeling sick" and then his eyes rolled back and his knees gave way! The group caught him on his way to the ground and he got free emergency medical oxygen for half an hour before being evacuated off the summit by his tour group!!! His friends stated that he was considered the healthiest person in the group while he was gasping for breaths of life on the summit of Mauna Kea! Never saw him again." Steven Magee CEng MIET

Altitude Acclimatization Hazards

- The incorrect acclimatization guide for the 13,796 feet high summit of Mauna Kea: "It's important to acclimatize at least a 1/2 hour (1 to 1 ½ hours for first timers) at the Hale Pohaku facility or the Visitor Information Station (9,200 foot/2,800 m level) before going to the

summit.” Steven Magee CEng MIET

<http://www2.keck.hawaii.edu/observing/ObserverPacket/highaltitude101.htm>

- "to adapt to 4,000 metres (13,000 ft) of altitude would require 45.6 days"
http://en.wikipedia.org/wiki/Effects_of_high_altitude_on_humans
- “climbers are advised by medical experts to ascend only 300 meters a day at altitudes over 3,000 meters to give their bodies time to adapt.” <https://www.ucalgary.ca/utoday/issue/2016-01-27/study-looks-effects-oxygen-depletion-high-altitude-workers-chile>
- “But inside the control room at 16,500 feet, my head was splitting. I was out of breath and couldn’t tell if my shot was in focus. My cameraman Josh Barajas was struggling too. He asked repeatedly where his memory card was, and repeatedly I told him he’d already put it in the camera. ...My blood oxygen read 83 — that’s low. At sea level, I would be in the hospital for a reading of 93.” <http://www.pbs.org/newshour/updates/reporters-notebook/>
- “some employees report blacking out or falling asleep at the wheel as they wind their way back down the mountain... some of the body and brain-altering effects of oxygen depletion are causing untold accidents at the observatory... the most significant issue is an employee’s ability to undertake the complex tasks necessary for safe work performance — memory, attention and planning....These likely become compromised at altitude because of the lack of oxygen and the inadequate time for the body to adapt” <https://www.ucalgary.ca/utoday/issue/2016-01-27/study-looks-effects-oxygen-depletion-high-altitude-workers-chile>
- "Altitude sickness, unregulated drugs and medical gas enabled workers to become drug abusers/addicts" Steven Magee CEng MIET <http://www.keckobservatory.org/>
- "Over-the-counter drug abuse or addiction was a problem that I observed at Mauna Kea" Steven Magee CEng MIET <http://www.crchealth.com/addiction/otc-drug-abuse/>
- "During my five years on Mauna Kea, workers routinely displayed the symptoms of Cerebral Hypoxia" Steven Magee CEng MIET <http://www.nytimes.com/health/guides/disease/cerebral-hypoxia/overview.html>
- “Oxygen deprivation and supplemental oxygen are both bio-hazards for Mauna Kea workers” Steven Magee CEng MIET <http://elsmar.com/Forums/showthread.php?t=48325>
- "It is well documented that high altitude expeditions may elicit alterations in both emotional and cognitive functioning. These changes are likely due to the cumulative effects of hypoxia, high altitude deterioration, physical exhaustion, fluid and electrolyte disturbances, and preexisting psychological morbidity." <http://onlinelibrary.wiley.com/doi/10.1111/j.1708-8305.2009.00369.x/full>
- "Journeying to these places of high altitude carries significant risk of illness and death." Centre for Altitude Space and Extreme Environment Medicine (CASE Medicine) http://www.case-medicine.co.uk/news_detail.php?article=33

Altitude Case Studies

- "An avid mountain climber, Konrath is one of less than 300 people who have climbed to the highest point on all seven continents...Konrath appeared to explain a plan to sneak into his ex-wife’s house at night and shoot her while their children were asleep in their rooms...Konrath told ABC News' "20/20" in a jailhouse interview." <http://abcnews.go.com/US/inside-bizarre-case-indiana-surgeon-accused-plotting-wifes/story?id=33800834>
- "Lisa Marie Nowak is an American former naval flight officer and NASA astronaut...Florida

prosecutors filed three formal charges against Nowak: (1) attempted kidnapping with intent to inflict bodily harm or terrorize, (2) burglary of a conveyance with a weapon, and (3) battery...Her lawyer stated that she suffered from major depression, obsessive-compulsive disorder, insomnia, and "brief psychotic disorder with marked stressors" at the time of the incident. She was also suffering from Asperger Syndrome"

https://en.wikipedia.org/wiki/Lisa_Nowak

- "Kurt "Charlie" Steil...used to run competitively in marathons and ultramarathons, including a grueling race up Pikes Peak (14,115 feet)... About four years ago he was diagnosed with amnesiac mild cognitive impairment, or short-term memory loss, robbing him of his ability to go about his daily life the way he once did. The condition also has caused him to lose some physical strength" https://www.uwstout.edu/news/upload/LT_021715_N_PolingTrail.pdf
- "Steven Magee, Chartered Electrical Engineer, was medically diagnosed with Amnesiac Disorder which is characterized by short term memory loss in 2016 at the age of 46. He had worked for five years on the 13,796 feet very high altitude summit of Mauna Kea, Hawaii, USA from 2001 to 2006 and had noticed memory problems developing during the last years that he worked there. The condition has now progressed into a disability." Steven Magee CEng MIET

Dementia

- "The amnesiac disorders are a group of disorders that involve loss of memories previously established, loss of the ability to create new memories, or loss of the ability to learn new information. As defined by the mental health professional's handbook, the Diagnostic and Statistical Manual of Mental Disorders , fourth edition, text revision (2000), also known as DSM-IV-TR , the amnesiac disorders result from two basic causes: general medical conditions that produce memory disturbances; and exposure to a chemical (drug of abuse, medication, or environmental toxin)." <http://www.minddisorders.com/A-Br/Amnesiac-disorders.html>
- "Dementia from oxygen deprivation is not always treatable, because it usually stems from some form of permanent brain damage. If a person facing low levels of oxygen is restored to adequate levels fast enough, the damage may be minimal or reversible. But if the damage is long-term and causes the onset of dementia, there is little that can be done short of managing the symptoms." <https://www.dementia.org/oxygen-deprivation-dementia>

Triggering Of The Human Mating Cycle

- "Astronomers Are Finally Doing Something About Sexual Harassment" <http://www.theatlantic.com/science/archive/2016/01/gender-discrimination-astronomy/422817/>
- "I worked the extremely long night shifts for three years on the 13,796 feet very high altitude summit of Mauna Kea and I noticed during that time that my mating cycle was being repeatedly triggered. It cleared up when I left for my next job." Steven Magee CEng MIET

Oxygen Hazards

- "Levels of Oxygen Deficiency - Concentration of Oxygen Effects"

<http://www.bodydesigncenter.com/oxygen-service/oxygen-deficiency>

- "OSHA, FDA and DOT have guidelines developed for precautionary labels for use on oxygen cylinders and cryogenic vessels...the FDA requires "Rx Only" on the label, among a few other things" <http://applied-inc.com/new-osharequirements-for-oxygen-cylinder-labels>
- "KEEP OUT OF REACH OF CHILDREN. WARNING! For emergency use only when administered by properly trained personnel for Oxygen deficiency and resuscitation. For all other medical applications, Rx ONLY. Uninterrupted use of high concentrations of Oxygen over a long duration, without monitoring its effects on Oxygen content of arterial blood, may be harmful. Use only with pressure reducing equipment and apparatus designed for Oxygen." <http://www.drugs.com/pro/oxygen.html>
- "Why do portable oxygen concentrators require a prescription? Like other medications, supplemental oxygen is a medical treatment and treatment is specific to the user. Your doctor may prescribe an oxygen flow rate, as well as the length of time you should use the oxygen each day." <http://www.domorewithoxygen.com/bid/340083/Do-Portable-Oxygen-Concentrators-Require-a-Prescription>
- "At 3:31 in the first video you can clearly see four people in the video wearing what appear to be portable oxygen units and nasal cannula's on the 13,796 feet very high altitude summit of Mauna Kea." Steven Magee CEng MIET
<http://www.bigislandvideonews.com/2016/01/21/video-kamaaina-observatory-experience-visits-mauna-kea/>
- "QUESTION: Why are compressed medical gases for medical use considered prescription drugs? ANSWER: Because their use as drugs, without the supervision of a licensed practitioner or by properly instructed emergency personnel, is not safe."
<http://www.fda.gov/Drugs/GuidanceComplianceRegulatoryInformation/Guidances/ucm124716.htm>
- "Medical oxygen (or oxygen USP) is considered both a hazardous material by the U.S. Department of Transportation (DOT) and a prescription drug regulated by the U.S. Food and Drug Administration (FDA)." <http://www.homecaremag.com/law/jan-2014/protect-your-company-following-dots-oxygen-provider-regulations>
- "What are Prescription Drugs? A prescription drug refers to those medicines which must be prescribed by a medical professional and are regulated by the government. In the United States, a variety of medical professionals can authorize prescription drugs, including: physicians, nurse practitioners, dentists, veterinarians, psychologists and optometrists."
<http://www.michaelshouse.com/prescription-drug-rehab/history-of/>
- "The goal of oxygen therapy is to maintain your blood oxygen at a level that meets your body's demand for oxygen, usually above 89 percent. In general, oxygen is safe and effective when used correctly but, according to the American Thoracic Society, there are several recognizable hazards associated with its use that you should be aware of." <http://www.inogen.com/blog/side-effects-oxygen-therapy/>
- "Patients with chronic obstructive pulmonary disease are at a particular risk of accumulating carbon dioxide if they are administered supplemental oxygen and these patients needs to be carefully monitored to prevent supplemental oxygen becoming dangerous rather than beneficial." <http://www.news-medical.net/health/Oxygen-Therapy-Side-Effects.aspx>
- "Oxygen therapy is used to treat hypoxia. The concentration of oxygen required depends on the condition being treated. Inappropriate concentrations of oxygen may cause very serious problems for the patient - even death." <http://patient.info/doctor/prescribing-oxygen>

- "When I was instructed to use medical oxygen to do my job at the W. M. Keck Observatory from 2001 to 2006, I was never told about the legal health information that is now posted on oxygen cylinders. My memories of the green medical oxygen cylinders that we would use daily is that they had no information on them and we were never given a recognized legal oxygen administration training course for routine daily use or a medical prescription from a doctor. We were shown the three oxygen cylinders at the facility and told to use them whenever we developed headaches, which was multiple times daily. It was common to find all three oxygen cylinders in use by other very high altitude sickened workers and to have to line up to get a turn on the magical medical gas." Steven Magee CEng MIET
- "When I worked on the 13,796 feet very high altitude summit of Mauna Kea we were advised to only use the medical oxygen after the daily headaches appeared and that just 15 minutes use was all that was needed to clear up the headaches for a while before we would need it again. We were not advised to use medical oxygen continuously as the Federal Aviation Regulations advises pilots to do. We were not advised to use pulse oximeters to monitor our blood oxygen levels or that the company medical oxygen should have been routinely administered only with our doctors prescription." Steven Magee CEng MIET
- "At the W.M. Keck Observatory on the very high altitude summit of Mauna Kea, there was no routine monitoring of mental functioning, blood oxygen levels, blood pressure or heart rate of summit workers." Steven Magee CEng MIET
- "A healthy person that uses medical oxygen to perform their job on a daily basis should expect to eventually become a sick person." Steven Magee CEng MIET
- "Working on the summit of Mauna Kea was comparable to working on the hospital pulmonary ward with sick people sucking on oxygen cylinders." Steven Magee CEng MIET
- "Oxygen Inhalation: May cause breathing difficulty. Prolonged exposure to high oxygen levels (>75%) can cause central nervous system depression: signs/symptoms can include headache, dizziness, drowsiness, poor coordination, slowed reaction time, slurred speech, giddiness and unconsciousness. May cause coughing and chest pain. May cause lung damage. May cause soreness of the throat." http://www.uigi.com/MSDS_gaseous_O2.html
- "Supplying oxygen to animals has been known to produce tissue damage, with toxicity increasing with the increase of oxygen concentrations and exposure pressures. End-organ damage from hyperoxia depends on both the concentration of oxygen administered and the oxygen pressure during exposure. Prolonged exposure to hyperbaric oxygen causes central nervous system and pulmonary toxicity, which results in atelectasis, pulmonary edema, and seizures. Lung damage may occur as a result of normobaric hyperoxia." <https://www.ncbi.nlm.nih.gov/pubmed/8087571>
- "Oxygen therapy is like a two-edged sword, at one edge oxygen is essential for human survival, while at the other edge it may become toxic at an elevated partial pressure. This is a hazard, especially in intensive care units, where oxygen therapy may be administered over a period of days. Oxygen toxicity usually manifests in one of several forms including central nervous system manifestations, pulmonary manifestations, and ocular manifestations, especially in premature neonates. The major factors affecting the onset and the severity of the toxicity are the concentration of the gas used, the duration of the exposure, and the susceptibility of the individual person." <http://medind.nic.in/jac/t03/i3/jact03i3p234.pdf>
- "Though oxygen therapy is helpful in many disorders, its injudicious use may lead to toxic effects usually involving the CNS, the lungs and the eyes." <http://medind.nic.in/jac/t03/i3/jact03i3p234.pdf>

- “Although supplemental oxygen is valuable in many clinical situations, excessive or inappropriate supplemental oxygen can be deleterious. According to human and animal studies, high concentrations of inspired oxygen can cause a spectrum of lung injury, ranging from mild tracheobronchitis to diffuse alveolar damage (DAD). The latter is histologically indistinguishable from that observed in the acute respiratory distress syndrome (ARDS).”
<http://www.uptodate.com/contents/oxygen-toxicity>
- “Exposure time, atmospheric pressure, and fraction of inspired O₂ (FIO₂) determine the cumulative O₂ dose leading to toxicity.” <https://www.hindawi.com/journals/nrp/2011/260482/>
- “We have always known that oxygen is necessary for all animal life, and that lack of oxygen damages tissues. It is beyond argument that patients who are hypoxic must receive supplemental oxygen. What we’ve not always known is that too much oxygen can harm patients in a number of ways... These can damage tissues throughout the body, but of particular concern are lung, heart and brain tissues.” <http://www.emsworld.com/article/10915304/the-dangers-of-giving-too-much-oxygen>
- “Like every other drug, oxygen administration has complications. Common complications include skin irritation and breakdown as well as a drying of the mucous membranes. Less common but more serious complications include oxygen toxicity, absorptive atelectasis and carbon dioxide narcosis.” <http://www.emsworld.com/article/10523286/oxygen-toxicity>
- “In high altitude astronomical facilities we routinely discharged large amounts of nitrogen gas into closed spaces. We were never informed by the astronomy management team about the abnormally low oxygen environments that the use of liquid nitrogen creates, how long term exposure to it manifests itself in human health and the resulting abnormal mental behaviors”
Steven Magee CEng MIET
- “Although the body requires oxygen for metabolism, low oxygen levels normally do not stimulate breathing. Rather, breathing is stimulated by higher carbon dioxide levels. As a result, breathing low-pressure air or a gas mixture with no oxygen at all (such as pure nitrogen) can lead to loss of consciousness without ever experiencing air hunger. This is especially perilous for high-altitude fighter pilots. It is also why flight attendants instruct passengers, in case of loss of cabin pressure, to apply the oxygen mask to themselves first before helping others; otherwise, one risks losing consciousness.”
https://en.wikipedia.org/wiki/Carbon_dioxide#Regulation_of_respiration
- “My memories of my time in high altitude astronomy indicate that there were no oxygen concentration monitors or alarms in the areas that liquid nitrogen was in use at in the high altitude astronomical facilities where I had worked.” Steven Magee CEng MIET
- “Astronomy staff that routinely discharged industrial gas into the indoor environment at high altitudes did not wear oxygen deficiency monitors.” Steven Magee CEng MIET
- “This fits in with what I saw in staff in astronomical facilities and was reporting to the management team: 10-14% Oxygen: Emotional upset, abnormal fatigue, disturbed respiration.”
Steven Magee CEng MIET <http://www.centralwelding.com/MSDS-P/Nitrogen,%20Liquid.pdf>

Nitrogen Hazards

- “Health effects of nitrogen - Nitrates and nitrites are known to cause several health effects. These are the most common effects: Reactions with haemoglobin in blood, causing the oxygen carrying capacity of the blood to decrease (nitrite). Decreased functioning of the thyroid gland

(nitrate). Vitamin A shortages (nitrate). Fashioning of nitro amines, which are known as one of the most common causes of cancer (nitrates and nitrites)”

<http://www.lenntech.com/periodic/elements/n.htm>

- “When I worked at the W. M. Keck Observatory on the 13,796 feet very high altitude summit of Mauna Kea, we would routinely be engulfed in cold clouds of helium and nitrogen gas as we discharged it into the video camera systems daily. The management team never warned us that we were in a hazardous oxygen deprived environment during this activity that was known for its ability to adversely affect physical and mental health, and possibly bring on death by asphyxiation.” Steven Magee CEng MIET
- “Five technicians are asphyxiated while setting up a ground test for the space shuttle Columbia, then in preparation for STS-1, the first operational shuttle mission. Two of them die. The accident occurred during a nitrogen purge of the orbiter.”
<http://www.wired.com/2009/03/march-19-1981-shuttle-columbias-first-fatalities/>
- “Nitrogen tends to displace Oxygen from the air, whenever it comes in contact with it. Thus if a continuous flow of Nitrogen is released into air, the Oxygen level in the air depletes very fast and can choke a person who is breathing this Nitrogen rich air.”
<http://industrialplantsafety.com/dangers-of-nitrogen.html>
- “Being odorless, colorless, tasteless, and nonirritating, nitrogen has no properties that can warn people of its presence. Inhalation of excessive amounts of nitrogen can cause dizziness, nausea, vomiting, loss of consciousness, and death. Death may result from errors in judgment, confusion, or loss of consciousness, which prevent self-rescue.”
<http://www.airproducts.com.tw/~media/downloads/article/U/en-use-nitrogen-safely-312-12-023.pdf>
- “Nitrogen Gas Safety Hazards: Nitrogen can cause oxygen deficiencies. The danger will increase if nitrogen is used in a confined space where limited air or ventilation exist. A simple safety tip for operation involving nitrogen is to measure oxygen contain in the atmosphere by using oxygen detector such as GA24XT-X form BW Technologies.”
<http://chemicalengineeringmagazine.com/nitrogen-gas-safety-hazards/>
- “Failure to detect an oxygen deficient (nitrogen-enriched) atmosphere was a significant factor in several incidents.” <http://www.csb.gov/assets/1/19/SB-Nitrogen-6-11-031.pdf>
- “Nitrogen: The Silent Killer - Nitrogen is an invisible, tasteless and odorless gas that comprises about 78 percent of the air we breathe. But its potential to kill workers in or near confined spaces should never be underestimated.” http://ehstoday.com/safety/confined-spaces/ehs_imp_38471
- “When I worked in astronomy, I routinely observed young college and university students working with liquid nitrogen and breathing nitrogen gas as they discharged it into the indoor environment at high altitude.” Steven Magee CEng MIET
- “My memories of high altitude astronomy indicate that up to four (4) liquid nitrogen flasks were left venting gas into a small indoor workshop and office area where workers were permanently stationed.” Steven Magee CEng MIET

Helium Hazards

- “After inhaling helium, the body's oxygen level can plummet to a hazardous level in a matter of seconds.”

http://www.slate.com/articles/news_and_politics/explainer/2006/06/stay_out_of_that_balloon.html

- “On February 4, 2015 it was revealed that during the recording of their main TV show on January 28, a 12-year-old member (name withheld) of Japanese all-girl singing group 3B Junior suffered from air embolism, losing consciousness and falling in a coma as a result of air bubbles blocking the flow of blood to the brain, after inhaling huge quantities of helium as part of a game. The incident was not made public until a week later. The staff of TV Asahi held an emergency press conference to communicate that the member had been taken to the hospital and is showing signs of rehabilitation such as moving eyes and limbs, but her consciousness has not been sufficiently recovered as of yet. Police have launched an investigation due to a neglect of safety measures.” <https://en.wikipedia.org/wiki/Helium>
- “Inhalation of this product may cause dizziness, an irregular heartbeat, narcosis, nausea or asphyxiation. NEVER INHALED, OR ALLOW TO BE INHALED, EVEN FOR A SHORT PERIOD, HELIUM CONTAINED IN A BALLOON, A GAS CONTAINER OR FILLING EQUIPMENT. INHALATION CAN CAUSE DEATH OR SEVERE DAMAGES.” <http://www.centralwelding.com/MSDS-P/Helium.pdf>
- “Most terrestrial helium present today is created by the natural radioactive decay of heavy radioactive elements (thorium and uranium, although there are other examples), as the alpha particles emitted by such decays consist of helium-4 nuclei. This radiogenic helium is trapped with natural gas in concentrations as great as 7% by volume, from which it is extracted commercially by a low-temperature separation process called fractional distillation.” <https://en.wikipedia.org/wiki/Helium>

Carbon Dioxide Hazards

- “Snow cleaning of the world's largest telescope mirrors was an impressive sight. The optics technicians would climb into a huge telescopic boom lift and spray immense clouds of cold carbon dioxide snow and gas onto the ten meter diameter mirrors high above the floor indoors. It would cause some of the accumulated dirt to magically fall off, leaving it less dirty.” Steven Magee CEng MIET
- “the telescope mirrors are periodically “dusted,” not with Windex, but with a spray of carbon dioxide snow. The carbon dioxide particles and gas, which are nondestructive, nonabrasive, residue-free and environmentally friendly, blow dust and grit from the mirror surface through a process called sublimation.” http://www.keckobservatory.org/recent/entry/a_mirrors_perfect_reflection
- “Occupational CO₂ exposure limits have been set in the United States at 0.5% (5000 ppm) for an eight-hour period. At this CO₂ concentration, International Space Station crew experienced headaches, lethargy, mental slowness, emotional irritation, and sleep disruption. Studies in animals at 0.5% CO₂ have demonstrated kidney calcification and bone loss after eight weeks of exposure. A study of humans exposed in 2.5 hour sessions demonstrated significant effects on cognitive abilities at concentrations as low as 0.1% (1000ppm) CO₂ likely due to CO₂ induced increases in cerebral blood flow. Another study observed a decline in basic activity level and information usage at 1000 ppm, when compared to 500 ppm.” https://en.wikipedia.org/wiki/Carbon_dioxide#Below_1.25
- “Oxygen deficiency during pregnancy has produced developmental abnormalities in humans

and experimental animals.” http://www.uigi.com/MSDS_liquid_CO2.html

- “Carbon Dioxide is an asphyxiant and a powerful cerebral vasodilator. If the concentration of Carbon Dioxide reaches 10% or more, suffocation can occur within minutes. At concentrations between 2 and 10%, Carbon Dioxide can cause nausea, dizziness, headache, mental confusion, increased blood pressure and respiratory rate. Carbon Dioxide initially stimulates respiration and then causes respiratory depression. High concentrations result in narcosis.”
<http://www.centralwelding.com/MSDS-P/Carbon%20Dioxide.pdf>

Industrial Gas Hazards

- “When discharging industrial gas into the indoor environment in high altitude astronomy, we never wore protective breathing respirators that fed us oxygenated air at above the legally required 19.5% oxygen levels.” Steven Magee CEng MIET
- “Industrial liquid gas containers were left open and venting gas into the indoor environment in high altitude astronomy. On reflection, I realized that I routinely observed mental and physical effects that match those of a low oxygen environment in staff that I supervised.” Steven Magee CEng MIET
- “The toxicity of medical and industrial gas to the human depends on where it is used. A gas that is regarded as safe in a well ventilated environment at sea level may be a toxic gas in an indoor environment at high altitude.” Steven Magee CEng MIET
- “An open flask of industrial liquid gas that is venting into the indoor environment should be thought of as the same as a smoldering fire, as they both create a dangerous oxygen deficient environment for the human.” Steven Magee CEng MIET
- “During my time in high altitude astronomy, I routinely witnessed workers breathing medical oxygen, industrial carbon dioxide, nitrogen and helium gas as part of their daily indoor work routine.” Steven Magee CEng MIET
- “When I worked in high altitude astronomy, the worst sickness that I experienced was not at the 13,796 feet very high altitude summit of Mauna Kea Observatory (MKO) in Hawaii, it was at Kitt Peak National Observatory (KPNO) in Arizona at the much lower altitude of 6,875 feet. Due to my very high altitude experiences, I knew that this strange sickness was not primarily caused by altitude sickness and was most likely Sick Building Syndrome (SBS). After reporting various behavioral problems in all of the staff to the upper management team, my contract was not renewed, I was unable to legally protect the health and safety of the workers that I was responsible for, troubleshooting of this environmental problem stopped and I left in a sickened state for my next position before I could find the root cause.” Steven Magee CEng MIET
- “Asphyxiation Hazard: When cryogenic liquids form a gas, the gas is very cold and usually heavier than air. This cold, heavy gas does not disperse very well and can accumulate near the floor. Even if the gas is non-toxic, it displaces air. When there is not enough air or oxygen, asphyxiation and death can occur. Oxygen deficiency is a serious hazard in enclosed or confined spaces. Small amounts of liquid can evaporate into very large volumes of gas. Toxic Hazards: Each gas can cause specific health effects.”
<http://www.hsc.wvu.edu/safety/Laboratory-Safety/Cryogenic-Liquids.aspx>
- “Asphyxiation Hazard...Small amounts of liquid can evaporate into very large volumes of gas. For example, one litre of liquid nitrogen vapourizes to 695 litres of nitrogen gas when warmed

to room temperature (21°C). Toxic Hazards: Each gas can cause specific health effects. For example, liquid carbon monoxide can release large quantities of carbon monoxide gas, which can cause death almost immediately.”

<https://www.ccohs.ca/oshanswers/chemicals/cryogenic/cryogen1.html>

- “Asphyxiation - nitrogen, argon and helium: Releasing nitrogen, argon or helium may produce local oxygen-deficient atmospheres, which will produce asphyxia if inhaled....BOC recommend that, as a precaution, oxygen deficiency monitors should be used....Asphyxiation - carbon dioxide: Carbon dioxide is essentially an asphyxiant gas but also has mild toxic properties. The Health and Safety Executive's guidance note EH40 indicates that the recommended exposure limit for carbon dioxide is 5,000 ppm (0.5%) by volume - calculated as an eight hour time-weighted average concentration in air - or 15,000 ppm (1.5%) for a 15 minute period. For these reasons, a carbon dioxide monitor should be used when there is a risk of CO2 exposure, rather than an oxygen deficiency monitor.” <http://www.boconline.co.uk/en/sheq/gas-safety/gas-risks/cryogenic-gas-risks/cryogenic-gas-risks.html>
- “When humans breathe in an asphyxiant gas, such as pure nitrogen, helium, neon, argon, sulfur hexafluoride, methane, or any other physiologically inert gas(es), they exhale carbon dioxide without re-supplying oxygen. Physiologically inert gases (those that have no toxic effect, but merely dilute oxygen) are generally free of odor and taste. As such, the human subject detects little abnormal sensation as the oxygen level falls. This leads to asphyxiation (death from lack of oxygen) without the painful and traumatic feeling of suffocation (the hypercapnic alarm response, which in humans arises mostly from carbon dioxide levels rising), or the side effects of poisoning. In scuba diving rebreather accidents, there is often little sensation but euphoria—however, a slow decrease in oxygen breathing gas content has effects which are quite variable. By contrast, suddenly breathing pure inert gas causes oxygen levels in the blood to fall precipitously, and may lead to unconsciousness in only a few breaths, with no symptoms at all.” https://en.wikipedia.org/wiki/Inert_gas_asphyxiation
- “HYPOXIA: If the bag has a device that will remove CO2 repeated breaths would deplete the oxygen, but no CO2 would accumulate. The person would be unlikely to experience severe dyspnoea, and might not be aware of the shortage of oxygen until too late (unconsciousness occurs), but the respiratory minute volume (RMV) would begin to increase due to hypoxia. In about the same time he would become unconscious and eventually die from hypoxia. There would be very little discomfort and he might feel rather euphoric and unconcerned about the situation; euphoria is a typical and characteristically dangerous aspect of hypoxia.” http://archive.rubicon-foundation.org/xmlui/bitstream/handle/123456789/6041/SPUMS_V27N1_13.pdf?sequence=1
- “Dangers of oxygen-deficient atmospheres: Effects of exposure to low oxygen concentrations can include giddiness, mental confusion, loss of judgment, loss of coordination, weakness, nausea, fainting, loss of consciousness and death.” <http://www.airproducts.com/~media/files/pdf/company/safetygram-17.pdf>
- “I have memories from my time in high altitude astronomy of being euphoric and giddy after discharging large amounts of industrial gas into the indoor environment. The effects would last hours and resembled being drunk and intoxicated.” Steven Magee CEng MIET
- “Euphoric: Psychology. in a state of happy and confident well-being sometimes exaggerated in pathological states as mania.” <http://www.dictionary.com/browse/euphoric>
- “Giddy: 1. affected with vertigo; dizzy. 2. attended with or causing dizziness: a giddy climb. 3. frivolous and lighthearted; impulsive; flighty.” <http://www.dictionary.com/browse/giddy?s=t>

- “Some of the typical long-term effects of hypoxic ischemic encephalopathy (HIE) include the following: Cerebral palsy; Epilepsy, seizure disorders; Severe hearing impairments; Blindness or severe vision impairments; Problems learning, thinking and speaking. These are called cognitive developmental problems and are often accompanied by a low mental development index (MDI) score; Problems with walking and coordination, also called motor and behavioral developmental problems. These result in a low psychomotor development index (PDI) score.”
<https://www.abclawcenters.com/frequently-asked-questions/what-are-long-term-effects-of-hie/>
- “What Happens After A Lack of Oxygen to the Brain? Common long-term effects of oxygen deprivation can include: Damage to specific brain regions deprived of oxygen...Changes in mood or personality...Difficulty with memory...Changes in motor skills...Chronic pain...The inability to feel pain, or to correctly respond to pain signals...Difficulties with impulse control...Symptoms of mental illnesses such as depression or anxiety....Dementia-like symptoms, including confusion, memory difficulties, and signs of rapid brain aging.”
<http://www.spinalcord.com/blog/what-happens-after-a-lack-of-oxygen-to-the-brain>
- “Risk Factors For Oxygen Deprivation: Cerebral hypoxia has a variety of potential causes— anything that interferes with the body's ability to process and distribute oxygen could lead to deprivation in the brain. This could include: Severe asthma attacks; Chronic work in a nitrogen-rich environment; Extremely high altitude without a pressurization mechanism; Choking or strangulation; Drowning; Chronic smoke inhalation; Crushing of the trachea. Any situation in which you are unable to breathe normally can lead to cerebral hypoxia and eventual brain damage, which in turn can increase your risk for developing a form of dementia.”
<https://www.dementia.org/oxygen-deprivation-dementia>
- “The Dangers of Industrial Gas Abuse” <http://www.essencia.be/en/Document/Download/15360>
- “5 Most Common OSHA Violations” <http://safetyculture.blr.com/safety-culture-5-most-common-osh-a-violations-infographic/>
- “1910.134(a)(1) In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to this section.”
https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=12716&p_table=STANDARDS
- “Employee exposure means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.”
https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=12716&p_table=STANDARDS
- “Immediately dangerous to life or health (IDLH) means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.”
https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=12716&p_table=STANDARDS
- “Oxygen deficient atmosphere means an atmosphere with an oxygen content below 19.5% by volume.” https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_id=12716&p_table=STANDARDS

- “The Air check O2 Deficiency Monitor is used in restaurants where CO2 and nitrogen are used to dispense beverages, Tire sales and repair centers to protect employees when filling tires with nitrogen, MRI facilities to protect against helium leaks used to cool the magnets, and Food processing facilities to alert personnel of nitrogen leaks from freezer tunnels. PureAire’s Air check O2 continuous monitor can provide comfort in protecting your employees from entering potentially hazardous situations if a leak occurs.” <https://www.pureairemonitoring.com/all-categoriesgas-monitorsair-check-o2-oxygen-deficiency-monitor-for-co2-n2-storage-areas/>
- “Drugs Associated with the Development of Interstitial Lung Disease...Aspirin, Oxygen, Radiation”
<http://www.clevelandclinicmeded.com/medicalpubs/diseasemanagement/pulmonary/interstitial-lung-disease/>
- “Low-level continuous or intermittent exposure to irritant gases or chemical vapors may lead to chronic bronchitis” <http://www.merckmanuals.com/professional/pulmonary-disorders/environmental-pulmonary-diseases/irritant-gas-inhalation-injury>
- “At the age of 46 I was diagnosed with lung issues.” Steven Magee CEng MIET
<http://environmentalradiation.com/High%20Resolution%20CT%20Radiation%20Scan%20Experience.pdf>
- “During almost a decade of working in high altitude astronomy with liquid cryogenics and industrial gas, I have no recollection of ever being sent on a industry recognized training course in the safe handling and use of them.” Steven Magee CEng MIET
- “One of my astronomy managers used to tell me that liquid nitrogen was harmless and was just liquid air. He would pour it onto his bare hands to demonstrate how safe he thought it was. I was later to realize that incompetence was a feature of high altitude astronomy.” Steven Magee CEng MIET

Industrial Gas Use In Chemical Weapons

- “Chemical warfare (CW) involves using the toxic properties of chemical substances as weapons.”https://en.wikipedia.org/wiki/Chemical_warfare
- “A chemical weapon (CW) is a specialized munition that uses chemicals formulated to inflict death or harm on humans.” https://en.wikipedia.org/wiki/Chemical_weapon
- “Nitrogen oxide” https://en.wikipedia.org/wiki/Nitrogen_oxide
- “Nitrogen mustard” https://en.wikipedia.org/wiki/Nitrogen_mustard
- “During World War II, naval personnel who were exposed to mustard gas during military action were found to have toxic changes in the bone marrow cells that develop into blood cells. During that same period, the US Army was studying a number of chemicals related to mustard gas to develop more effective agents for war and also develop protective measures. In the course of that work, a compound called nitrogen mustard was studied and found to work against a cancer of the lymph nodes called lymphoma. This agent served as the model for a long series of similar but more effective agents (called alkylating agents) that killed rapidly growing cancer cells by damaging their DNA.” <https://www.cancer.org/cancer/cancer-basics/history-of-cancer/cancer-treatment-chemo.html>
- “Choking agents injure an individual mainly in the respiratory tract, i.e. in the nose, throat, and particularly, the lungs. In extreme cases, membranes swell, the lungs become filled with liquid and death results from lack of oxygen; thus, these agents “choke” the unprotected individuals.

Fatalities of this type are referred to as 'dry-land drownings.'"

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3148621/>

- "How much nitrogen gas can the human body handle before nitrogen asphyxiation occurs? For an inert gas, nitrogen can be surprisingly dangerous if not handled properly. It's the kind of thing best left to professionals." <https://www.quora.com/How-much-nitrogen-gas-can-the-human-body-handle-before-nitrogen-asphyxiation-occurs>

Fall Hazards

- "I ventured up onto the domes of the worlds largest telescopes a few times. The view was impressive! The curvature of the domes means that you can only walk around on about twenty feet of the domes before getting a feeling of fear of sliding off them on the rapidly sloping surface. What amazes me today was that I was not required to wear a safety harness during the fun activity while breathing very high altitude air that was 40% deficient of oxygen that was known to make people faint. A strenuous climb up ladders was required to get to the top of the domes and a fall from that height would likely be fatal." Steven Magee CEng MIET <http://www.environmentalradiation.com/We%20are%20mauna%20kea%20Steven%20Magee%20on%20Keck%20Dome.jpg>
- "Fall protection, for activities not in the construction industry, is addressed in specific standards for the general industry, shipyard employment, marine terminals and longshoring industry. This section highlights OSHA standards, Federal Register notices (rules and proposed rules), the Regulatory Agenda (a list of actions being taken with regard to OSHA standards), preambles to final rules (background to final rules), directives (instruction to OSHA staff), letters of interpretation, example cases, and national consensus standards related to fall protection." <https://www.osha.gov/SLTC/fallprotection/standards.html>

Extreme Night Shift Hazards

- "The Mauna Kea night shift was an 18 hour night in wintertime at the 13,796 feet summit (before sunset to after sunrise) with insufficient time for adequate sleep before the next night shift. Night shift was between 5 and 8 nights long and we slept at 9,200 feet. We sat at a desk staring at four large computer monitors and a large cathode ray tube television. I would also use my Wi-Fi laptop computer. I would have extreme fatigue by the end of every night shift and have chapped lips which I now associate with exposure to the artificial light from the computer screens. A good day of sleep between shifts was rare and starting the next shift fatigued was normal." Steven Magee CEng MIET
- "Both shift work and long work hours have been associated with health and safety risks." <http://www.cdc.gov/niosh/topics/workschedules/default.html>
- "Shift work is classified as Class 2A carcinogen by the WHO" <http://iohsad.org/12/10/women/shift-work-classified-class-2a-carcinogen-who>
- "A long-running study found that women who work overnight have as much as a 60 percent greater risk of developing type 2 diabetes due to irregular sleep patterns and poor dieting." <http://www.theatlantic.com/health/archive/2012/01/the-health-hazards-of-shift-work/251499/>
- "Shift Work, Light-at-Night and Melatonin" <http://www.breastcancerfund.org/clear->

[science/radiation-chemicals-and-breast-cancer/light-at-night-and-melatonin.html](http://www.environmentalradiation.com/science/radiation-chemicals-and-breast-cancer/light-at-night-and-melatonin.html)

- “Make efforts, whenever feasible, to ensure that unavoidable extended work shifts and shift changes allow affected employees time for adequate rest and recovery. Extended shifts should not be maintained for more than a few days, especially if they require heavy physical or mental exertion.” https://www.osha.gov/OshDoc/data_Hurricane_Facts/faq_longhours.html
- “With regard to employer training, OSHA does not train employers on hazards related to late night and extended unusual shifts. However, OSHA encourages employers to perform a hazard analysis of its jobsite...Can OSHA train and regulate employers about the basics of minimizing light pollution from the workplace, especially with the use of blue-rich/bright white LEDs, light trespass, skyglow, glare, etc? Response: No. With respect to training, OSHA does not train employers on light pollution.” https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=29306
- “Shift changes where you have only a shift (8-12 hours) between your old and new shift are especially bad.” <http://www.canmybossthat.com/category.php?id=169>
- “OSHA has no regulation for sleep deprivation – but you must know who is fit for duty” <http://www.ishn.com/blogs/16-thought-leadership/post/98415-osha-has-no-regulation-for-sleep-deprivation-but-you-must-know-who-is-fit-for-duty>

Industrial High Powered LASER Hazards

- “Working the night shift exposed me to very high powered 20 watt industrial sodium LASER light. We were told that it was harmless to the naked eye if we did not look directly into the LASER beam. Walking into the observatory dome being illuminated by the bright scattered orange laser light was a common occurrence.” Steven Magee CEng MIET
- “A Darker View: LASER” <http://darkerview.com/wordpress/?tag=laser>
- “The average power output of the Keck I and II lasers are generally 15-20 W and 20 W, respectively.” <https://www2.keck.hawaii.edu/optics/lgsao/lgsbasics.html>
- “Class IV: High power lasers (cw: 500 mW, pulsed: 10 J/cm² or the diffuse reflection limit) are hazardous to view under any condition (directly or diffusely scattered) and are a potential fire hazard and a skin hazard. Significant controls are required of Class IV laser facilities.” https://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_6.html
- “You need laser safety glasses in any situation where it is possible that your eyes could be exposed to direct, reflected, or scattered laser radiation. In other words, if there’s even a remote chance that your eyes could be exposed to even a scattered reflection of the beam, you need to be wearing laser safety glasses.” <http://blog.phillips-safety.com/when-do-you-need-laser-safety-glasses/>
- “Keck Laser Engineer Robert Lafon volunteers his hand to demonstrate the intensity (and safety) of the Keck LGS laser. Photo Courtesy of W.M. Keck Observatory.” <http://www.gemini.edu/node/128>
- “I enjoyed working with Keck Laser Engineer Robert Lafon during my night shifts. If I saw him today, I would ask him this question: Do you have any health conditions that you associate with working with 20 watt high powered LASER's and very high altitude work?” Steven Magee CEng MIET
- “The long term effects of exposure to high powered 20 watt sodium LASER guide stars are unlikely to be fully understood for a few more decades, as it is such a new technology and only

a relatively small group of people have been exposed to it. LASER radiation safety standards appear to be where X-Ray radiation safety standards were in the 1900's." Steven Magee CEng MIET

- "Early X-ray machines needed to be set and repeatedly adjusted. To achieve this, radiographers would place their hands between the actively radiating tube and the film plate to check if the apparatus was functioning and that it was well focused on the film. By practicing this for 12 years, Dr. Kells was the first victim of dental X-ray radiation with numerous cancerous tumors on his fingers." <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4319329/>
- "She was a dental technician in the Navy and also worked for years in pediatric dental offices and orthodontics as an assistant, calming nervous children, helping them to have good dental experiences, and when she was exposing radiographs, sometimes she admits that she would make it easier on everyone if she would stay with the child while the x-rays were beaming through her hand...Even though the tumor was benign, because of the damage done, the possibility of regrowth and other factors, the decision was made for my friend to have her ring finger amputated." <http://www.dentalbuzz.com/2013/03/15/fingers-in-the-picture/>
- "Light Sources and Laser Safety - SPIE" <https://spie.org/Documents/Publications/00%20STEP%20Module%2002.pdf>
- "ANSI Z136 Standards: The Foundation of a Successful Laser Safety Program" <https://www.lia.org/store/ANSI%20Z136%20Standards>
- "Laser safety is the safe design, use and implementation of lasers to minimize the risk of laser accidents, especially those involving eye injuries. Since even relatively small amounts of laser light can lead to permanent eye injuries, the sale and usage of lasers is typically subject to government regulations." https://en.wikipedia.org/wiki/Laser_safety
- "The Laser Institute of America (LIA) is the international society for laser applications and safety. Our mission is to foster lasers, laser applications, and laser safety worldwide." <https://www.lia.org/index.php>
- "Laser Bio-effects" <http://www2.lbl.gov/ehs/safety/lasers/bioeffects.shtml>
- "Laser guide star" https://en.wikipedia.org/wiki/Laser_guide_star
- "Industrial very high powered sodium LASER systems in action" <https://youtu.be/o1xEQ212iyY>
- "Summary of Sodium Laser Guide Stars now On-the-Sky" http://lao.ucolick.org/static/SodiumLaserGuidestars_Frameset.html
- "The most serious health problems that I exhibited during my night shifts at the very high altitude summit of Mauna Kea occurred after I started routinely working with the high powered sodium LASER guide star system." Steven Magee CEng MIET
- "Light causes biological damage through both temperature effects due to absorbed energy and through photochemical reactions. The chief mode of damage depends on the wavelength of the light and on the tissue being exposed. For control of hazards from lasers, the damage is believed to be due principally to temperature effects, and the critical organs are the eye and the skin." <http://oregonstate.edu/ehs/laser/training/laser-biological-hazards-eyes>
- "The retina represents a paradox, in that, while light and oxygen are essential for vision, these conditions also favour the formation of reactive oxygen species leading to photochemical damage to the retina. Such light damage seems to be multi-factorial and is dependent on the photoreactivity of a variety of chromophores (e.g., vitamin A metabolites, lipofuscin, melanin, flavins, porphyrins, carotenoids) endogenous to the retina." <https://www.ncbi.nlm.nih.gov/pubmed/11744401>

- “The outer retina [photoreceptors and retinal pigment epithelium (RPE)], is immediately adjacent to the choroidal blood supply and thus highly oxygenated. Therefore, these are potentially favourable conditions for photodynamic damage to occur. The strong dependence of susceptibility of the retina to photodamage on oxygen concentration suggests that light-induced damage to the retina is indeed photodynamic in nature”
<http://photobiology.info/Rozanowska.html>
- “At the age of 46 I was starting to see the appearance of rainbow halos and starbursts around bright nighttime lights, problems reading small print, blurred focusing with my eyes, and image recognition issues. I had been exposed to medical oxygen, industrial gasses and bright high powered 20 watt scattered sodium LASER light a decade earlier in very high altitude astronomy.” Steven Magee CEng MIET
- “Seeing rainbows or halos around light indicates a problem with how light is filtering into the eye. Light is made up of different colours but the rays are normally focused on a single point so you can't distinguish them. These symptoms indicate that scattering of light is occurring on the cornea or lens” <http://www.dailymail.co.uk/health/article-2567022/Seeing-rainbows-Its-time-eyes-checked.html>

Mauna Kea Hazards

- High Altitude Health Hazards of Mauna Kea, Hawaii
<http://www.environmentalradiation.com/Altitude%20chapter%20of%20health%20forensics.pdf>
- Mauna Kea, Hawaii, USA – A very high altitude worker's experiences
<http://www.environmentalradiation.com/Hawaii%20Chapter.pdf>
- Annoonymous worker review 1 of the summit of Mauna Kea: "...Keck is run for the benefit for 3 or 4 key individuals who have a long history of mistreating staff. In some instances the mistreatment led to suicide. Expect to work with angry explosive hair trigger co-workers...In one incident it was necessary to post guards at headquarters to protect the hq workers from a disgruntled mountain worker...Working at altitude can have profound effects on one's health and relationships with others..." <https://www.glassdoor.com/Reviews/W-M-Keck-Observatory-Reviews-E783404.htm>
- Annoonymous worker review 2 of the summit of Mauna Kea: "...Don't be the next victim of this toxic organization. This isn't a collegial scientific organization, its an Apartheid style old Hawaii Sugar Plantation on top of a volcano..." <https://www.glassdoor.com/Reviews/W-M-Keck-Observatory-Reviews-E783404.htm>
- "The summit of Mauna Kea was definitely a place where it was better to be a hard to replace skilled engineer than an easy to replace technician. It was my experience that once you had developed Mauna Kea Sickness (MKS) that the management team would blatantly harass you out of your job using nasty inhumane human resources techniques." Steven Magee CEng MIET
- "I posted a truthful review of the W. M. Keck Observatory on Glassdoor and got the following message back from them: ...We determined your review does not meet these guidelines because it contains an accusation of a specific criminal activity that we don't allow on our site...Best Regards, Glassdoor" Steven Magee CEng MIET
<http://www.environmentalradiation.com/Glassdoor%20w%20m%20keck%20observary%20review%20rejection%20captioned.jpg>
- "What do I need to know about... WORKPLACE HARASSMENT"

<http://www.dol.gov/oasam/programs/crc/2011-workplace-harassment.htm>

- "The following information really should be placed on all very high altitude job adverts and company contracts: WARNING – Very high altitude commuting presents many known health risks to sea level adapted humans. Some of the documented conditions are headaches, forgetfulness, confusion, irritability, aggression, hallucinations, visions, light headedness, fatigue, fainting, sore throats, runny noses, digestive disturbances, changed personality and panic attacks. Development of cancer, heart, lung, brain, and blood oxygenation issues have occurred in very high altitude workers that have resulted in disability and premature death. The nearest fully equipped hospital accident and emergency facility is typically one to two hours away. Numerous very high altitude workers have been killed due to fatal mistakes on the job. Workers are expected to use a variety of company supplied drugs to offset the daily very high altitude sickness including "RX-Only" prescription medical oxygen. Daily long term self medication is known to damage human health. The work environment is comparable to a Faraday cage and Faraday Cage Sickness (FCS) may occur in long term workers. Radiation levels are abnormally high and long term radiation sickness may result. Blood oxygen levels are typically in the region of 80% and the medical profession regards this as a health risk. Repeatedly reporting observations of abnormal behaviors in workers to upper management may result in your contract not being renewed or termination without notice." Steven Magee CEng MIET
- "If you are looking for a career that may induce a myriad of health conditions into you, I can recommend working at the 13,796 feet very high altitude summit of Mauna Kea, Hawaii, USA." Steven Magee CEng MIET
- "Very high altitude observatories are a known worker health hazard." Steven Magee CEng MIET

Sonic Boom Hazards

- "When I was hired to work at the Kitt Peak National Observatory (KPNO), it was not disclosed to me that the site was being hit by powerful sonic booms from military supersonic aircraft that would shake the buildings. I had noticed that there seemed to be a significant number of staff that were having heart issues and some appeared to have had heart attacks and died prematurely. I later discovered during researching my own heart issues that it was a suspected effect of exposure to sonic booms. Regular exposure to sonic booms from military supersonic jet aircraft is suspected of increasing the incidence of vibroacoustic disease, a thickening of heart tissue which may lead to heart arrhythmia or premature death." Steven Magee CEng MIET
- "48 of the 50 Vieques residents tested were diagnosed as suffering from vibroacoustic disease — a thickening of heart tissue caused by exposure to sonic booms. Simultaneously, the Ponce School of Medicine conducted an independent study and found other data to confirm the presence of vibroacoustic disease: 79% of Viequenses fishermen have thickened heart tissue, which is the main symptom of vibroacoustic disease. This disease is said to lead to heart arrhythmia, or even death."
https://en.wikipedia.org/wiki/United_States_Navy_in_Vieques,_Puerto_Rico#Sonic_booms

Astronomy Health & Safety

- "Based on the medical evidence that clearly states that being above 10,000 feet is hazardous to the health of sea level adapted humans, it is clear that all of the manned facilities on top of the 13,796 feet Mauna Kea summit in Hawaii should be removed and the summit restored back to its native environment." Steven Magee CEng MIET
- "The summit of Mauna Kea should never have been developed as it is not safe for humans up there. I am now locked into an endless loop of doctors visits for what appears to be classic very high altitude heart, lung & brain damage because I was unfortunate enough to have worked there." Steven Magee CEng MIET
- "The lasting physical and mental health effects of long term very high altitude exposure appear to be remarkably similar to daily heavy smoking." Steven Magee CEng MIET
- "As a manager in high altitude astronomy, if you report to the upper management team that their staff appear sick and that they are displaying behavioral problems, it was my experience that they respond by notifying you that your contract will not be renewed and that you will be terminated without notice if anyone complains about you! High altitude astronomy is a very shady industry that only functions by ignoring worker health and safety issues." Steven Magee CEng MIET
- "It has been my experience that the astronomical industry will not rehire past staff members whose health they know that they damaged with their biologically toxic high altitude workplaces." Steven Magee CEng MIET
- "Never trust a high altitude astronomer." Steven Magee CEng MIET
- "the hashtag #WeAreMaunaKea...and the hashtag #ProtectMaunaKea have seen big jumps in use this week." <http://www.bbc.com/news/blogs-trending-32239000>
- "Stop TMT Construction and Arrests of Mauna Kea Protectors" <https://www.change.org/p/governor-david-y-ige-stop-tmt-construction-and-arrests-of-mauna-kea-protectors>
- "Should the Thirty Meter Telescope Be Built?" <http://pbs-hawaii.org/insights-on-pbs-hawaii-should-astronomy-related-development-on-mauna-kea-continue/>
- "The electrical, electronics and wireless radio frequency (RF) industries are creating an increasingly high radiation environment for the human. This is comparable to the elevated radiation environment found at high altitudes and smart health researchers would be wise to contrast high altitude diseases to the epidemics of our time, such as Autism, Attention Deficit Disorder (ADD), Fibromyalgia, Electromagnetic Hypersensitivity (EHS), and so on." Steven Magee CEng MIET <http://www.emfscientist.org/index.php/emf-scientist-appeal>
- "At the age of 47, the medical profession had me on four RX-Only prescription drugs for lung and heart problems, an RX-Only prescription continuous positive airway pressure (CPAP) life support machine during sleep, two brain RX-Only prescriptions, a brain supplement, and high cholesterol medication. I am still in the process of being fully diagnosed by the medical profession and this drugs list may increase." Steven Magee CEng MIET
- "Continuous positive airway pressure (CPAP) is a form of positive airway pressure ventilator, which applies mild air pressure on a continuous basis to keep the airways continuously open in people who are able to breathe spontaneously on their own." https://en.wikipedia.org/wiki/Continuous_positive_airway_pressure
- "I have worked with many of the greatest minds in astrophysics and it is now clear that they were the dunces of astrobiology." Steven Magee CEng MIET

- “There is a lot of willful incompetence in high altitude astronomy that is in the process of coming to light.” Steven Magee CEng MIET
- "The biggest surprise that I had during my time in high altitude astronomy was being prevented from arranging a free Occupational Safety & Health Administration (OSHA) onsite evaluation to assist with bringing the observatory into OSHA compliance by the upper management team that I reported to." Steven Magee CEng MIET <https://www.osha.gov/>
- “When the National Optical Astronomy Observatory (NOAO) found out that Occupational Safety and Health Administration (OSHA) were going to visit the site to assist in bringing it into legal compliance, they freaked out! They insisted that the visit had to be canceled and the result was that I eventually became so sick from the toxic workplace environment that I had no option but to leave.” Steven Magee CEng MIET
https://en.wikipedia.org/wiki/National_Optical_Astronomy_Observatory
- “When sending your children to an Ivy League school, you must remember that some schools prevent Occupational Safety & Health Administration (OSHA) from visiting their training and research facilities.” Steven Magee CEng MIET https://en.wikipedia.org/wiki/Ivy_League
- “I advise people to avoid workplaces that prevent Occupational Safety & Health Administration (OSHA) visits.” Steven Magee CEng MIET
- “It is clear that the protective functions of workplace health and safety have transferred to the workers through the process of corporate government deregulation and reduced funding of relevant government departments.” Steven Magee CEng MIET
- “During its more than 40 years of existence, OSHA has secured only 12 criminal convictions”
https://en.wikipedia.org/wiki/Occupational_Safety_and_Health_Administration
- “Occupational Safety & Health Administration's (OSHA) lack of law enforcement has made the USA a dangerous place to work.” Steven Magee CEng MIET
- "I have no faith in the corporate USA government systems of protection of public health and safety." Steven Magee CEng MIET

"Most people have no idea that OSHA is a ghost and has been so for years"
[Devra Davis – Author of the Secret History of the War on Cancer](#)