

IMCZ NEWS



FEBRUARY / MARCH 2019

EDITORIAL **Change at the helm**

Hello IMCZ members. I'm the new editor and I'm trying to fill Muthana's shoes in continuing to provide the Newsletter you want. As a newbie, I'm still learning the ropes – and beginning to realise just how much work Muthana did.

We're always looking for articles which would interest the membership, so if you have something related to your business, if you have recently travelled to somewhere you really liked, or if you have a passion for some hobby, sport, technology, pastime or anything which fascinates you, please let me know and I'd be delighted to include it in a future newsletter. Don't worry if you are not a native English speaker; I can give you any support you need to produce your article in a readable form. You can contact me through my IMCZ email at any time – or at one of our events. Articles can come from both members and non-members and can be short or longer. I'm also happy to receive input or feedback on the newsletter content; what you liked, did not like or want to see more of in the future.

So, I hope you enjoy the first of the "post Muthana" newsletters and I wish you all a belated Happy New Year!

Alan Cattell
Editor



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Introducing... New members

THE IMCZ WELCOMES:

Igor Dremelj

Igor was born and raised in Slovenia. He studied Engineering and got a Masters in electrical engineering from the University of Ljubljana. Shortly thereafter, in 2006, he moved to Zug and started to work for Landis+Gyr. In 2012 he finished the Executive Management program at IMD and since then worked on many projects around the globe. After helping the company become public again in July 2017, completing largest IPO on SIX Swiss Exchange since 2006 in record time, he returned to his roots in global technical sales, business development and global key accounts, specializing in Smart Grid and other critical infrastructure. When not traveling for work, he likes to be out in nature, mountain biking, hiking, skiing or simply standup paddling up and down Aegerisee in the summer. He enjoys meeting new people and looks forward to many interesting discussions at the weekly IMCZ Stammtisch events.



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FUTURE EVENTS

IMCZ Ski Days with swissfivestar

SATURDAY 2ND AND SUNDAY 3RD FEBRUARY 2019, THURSDAY, ON MOUNT TITLIS, ENGELBERG AT SWISSFIVESTAR STORE & MORE.

There are two separate days of ski-testing and après ski in this beautiful ski area. For more information and registration: contact

Joe: [jjdown\[at\]Hotmail.com](mailto:jjdown@hotmail.com) or Enrico: eda.itech@gmail.com



AGM

Annual General Meeting (AGM)

7TH FEBRUARY 2019, AT THE CITY GARDEN HOTEL.

The agenda includes the 2018 Reports from the President, the Event Manager, Treasurer and Auditor. The Election of the Board for 2019 will also take place. Finally, the proposed budget and outlook for 2019 will be presented.

Contact for Information: Mr Enrico Dell'Angelo

14TH MARCH, 2019 • **Conference Sovereignty and Serenity** • Speaker: Nadja Lang, Lawyer, certified coach for Business, Sportsmen and Musicians

11TH APRIL, 2019 • **Round Table Talk: All about Golf** • Speaker: Dave Speicher

9TH MAY, 2019 • **New Members Reception NMR** • Organizer: Enrico Dell'Angelo

TBD • **Cooking event**

Contact for Information: Mr Enrico Dell'Angelo



PAST EVENTS

Modern Buildings, Jeremy Towler

13th December 2018

The meeting took place in the Italian centre, opposite the City Garden. Around 20 members were present, two members came with their wives.

Jeremy made his presentation aided by a beamer. He covered the issue of modern buildings, how they have evolved and the technical challenges they pose. He went on to project the future with sensors placed everywhere, all connected to the Internet-of-things, providing for complete control of all the functions needed to run and maintain a building to optimise comfort, safety and efficiency. During the brief discussion, I pointed out that tall buildings can be a death trap as, in the case of fire, lifts are switched off and stairwells sometimes can't be used, resulting in certain death to occupants of higher floors as happened in Grenfell fire in the UK last year in London. Sensors which detect fire and raise the alarm would not help much. Jeremy pointed out that sadly, Grenfell did not represent a particularly modern building, but that with proper maintenance and training, stairwells can be kept smoke free by over pressure provided by the air-conditioning equipment allowing safe emergency evacuation.

The interesting discussion came suddenly to an abrupt and rude end when the pizzas we had ordered were served.

An interesting and informative evening, many thanks to Jeremy and the organisers.

Muthana Kubba



Swiss German Round Table

Harry Fuchs (CEO of Softlanding)

1. Transformations

Prefix	Stem	Suffix
drop	change vowels	drop
	ei → i	ch
	eu → ü	(also in compound words)
	au → u	ch
(g)z(-)	u → ue	ch
	ü → üe	-ung → ig
	ie → i-e	



On 10th January '19, Harry Fuchs kindly led a very interesting, highly interactive round-table discussion on Swiss German. In an entertaining and informative session he explained how the various Swiss German dialects fit into the overall landscape of the German language in Europe. He also showed how the language has evolved from the different forms of German, how pronunciation has been transformed and how the grammatical structure differs from today's high German. He explained many of the variations in verbs, conjugation and tense constructs in a concise and enjoyable way. Overall this was a very enjoyable evening, and it's no surprise that the session overran substantially. Our thanks to Harry for his time and preparation.

Alan Cattell



IMCZ BOARD MEMBERS Thumbnail biographies of board members can be found on our website www.imcz.club under 'About Us' section	PRESIDENT Bill Lichtensteiger 079 378 63 26 President@IMCZ.club	NEWSLETTER EDITOR Alan Cattell 079 340 25 51 Newsletter@IMCZ.club	SECRETARY Roy Havermann 032 512 39 60 Secretary@IMCZ.club
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Potential adverse effects of artificial sweeteners

Contributed by Remo P. Jutzeler van Wijlen, Head R&D Sponser Sports Food Ing. Appl Food Sciences, MAS Nutrition & Health ETHZ

In my contributions I already wrote about artificial sweeteners, mostly trying to put their putative danger into relation to real-life scenarios. As a matter of fact, most of the studies (by far) showing detrimental effects of any artificial sweetener on mammalian metabolic health are rodent studies, which use extremely high amounts of the sweeteners under research. For aspartame, for example, the human equivalent dose is often higher than the amount of the feared artificial sweetener you would consume if you guzzled all 1.5l bottles on a "Diet Coke version" of the Coca Cola's Christmas truck.

However, today I am writing about some undesired adverse effects the widespread use and consumption of non-nutritive, high-intensity sweeteners (NNS) may have. That said, it is important to keep in mind that not all NNS are alike! Aspartame, for example, consists of two amino acids which are naturally part of our own body proteins, and it is digested like other proteins once in our digestive system. On the other hand, we have NNS which are assumed not to be digested at all, e.g. sucralose or acesulfame-K. Sweetener residues are released into the environment, mainly through domestic waste water and discarded pharmaceuticals. The environment is not able to degrade these substances naturally either, and they accumulate in lakes and rivers - (see graph for the Zugersee). Today's traditional water treatment technologies are unable to remove these substances completely and need to be upgraded for substance-specific elimination. Meanwhile, these residues of artificial sweeteners accumulate in our environment like other chemicals. Since the problem is still "new" in the time perspective of science, it is not possible to refer to studies directly concerning the impact of sweetener residues on the human organism.

Adverse effects on human health ascribed to NNS are mainly focussed on their effect on appetite, insulin and the development of diabetes. Previously, no properly designed studies could prove undesired side-effects in this area. Over the years the irrelevance of potential insulin secretion was demonstrated in a number of studies and eventually accepted (Mattes, *Am J Clin Nutr*, 2009; Renwick, *Brit J Nutr*, 2010). Recently, however, the discussion was relaunched: a new study did not just replace the lab-rats from the average anti-sweetener study with healthy (!) human beings (mean age 22 y, normal BMI and a low habitual consumption of NNS), they also chose the administered amount of sucralose to the subjects at only 15% of the acceptable daily intake (ADI) level set by health authorities (Romo-Romo, *Am J Clin Nutr*, 2018). For sucralose 100% ADI

is 15 mg/kg/d or 1125 mg/d for someone weighing 75 kg. Since a portion-sized drink between 250-500 ml needs about 30-50 mg of sucralose to provide a pleasant sweetness compared to sugar, the consumption of 15% ADI of sucralose, i.e. 3-6 portions of sucralose-sweetened foods or drinks, is not completely unrealistic, depending also on the consumer's body weight. After two weeks of daily intake the researchers calculated out of their analyses a relative risk increase of 1.48 for a "worsening" of the insulin sensitivity. In layman's terms, this means that the relative risk for a declined (which is undesired) insulin sensitivity increased significantly over the two weeks period by 48%. This seems huge and concerning at first sight. However, one has to keep in mind that the relative risk in healthy, normal-weight people is very low, since diabetes is clearly dependent on obesity as a main risk factor. The estimated overall prevalence of diabetes in Europe (2018) is about 7.3%.

Even assuming a very unlikely high baseline risk of a declined insulin sensitivity (within two weeks) of e.g. 1 in 100, this 1.0% risk will increase by 48%, according to Romo-Romo's study, if you decide to consume 2.25 mg sucralose per kilogram body weight on a daily basis for two weeks. Now, as bad as that sounds, this implies that your *absolute risk of a decline in insulin sensitivity* increases by only 0.48%. Nevertheless, even if these results are presumed to be unarmful regarding insulin sensitivity, these new data may corroborate another recent study (Bornemann, *J Toxicol Environ Health A*, 2018) which shows that sucralose is - at least partly - metabolised in the gut and can accumulate in mammalian tissue, contrary to what researchers have previously believed.

There is much more research to be done to assess the real-life risk and relevance of these effects. The underlying mechanism need to be clarified and related questions such as:



"I think sugar substitutes are fattening. Have you noticed that people who use them are usually overweight?"



Do these effects persist, if you stop using sucralose?

Does the timing of the sucralose ingestion matter (with vs without meals)?

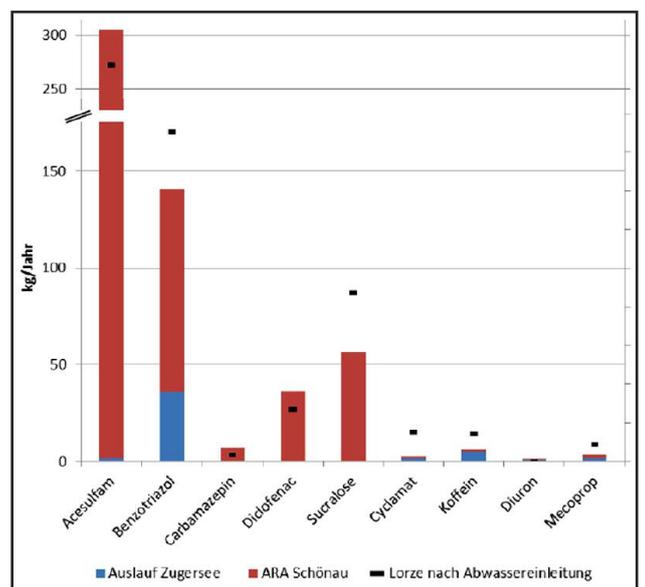
Is there a linear, logarithmic, exponential, J-shaped or dose-response relationship?

Will other parts of the general population (e.g. the elderly, toddlers and children, athletes, and diabetics) see similar, more pronounced or maybe no effects, at all?

However, replacing 100 mg of sucralose in your diet with the U60g of sugar that produces the same sweet sensation would not necessarily be the best strategy to avoid reductions in insulin sensitivity.

Furthermore, in another recent study (Tey, *Int J Obesity*, 2017), the consumption of calorie-free beverages sweetened with artificial and natural NNS (aspartame, monk fruit, stevia) revealed only minimal influences on total daily energy intake, postprandial glucose and insulin compared to sucrose). It's therefore clear that further work is needed to understand what is happening in more detail.

It is important to remember that the food industry does not set the guidelines for what type of research must be done. These are set by health and safety research authorities from around the world, such as the FDA or EFSA.



Vaccination to Manage Dangerous Infectious Diseases Risks And Benefits

Contributed by IMCZ member Alan Cattell

Intro

The issue of vaccination against infections is discussed ever more frequently on the news media. There are claims that vaccination is dangerous and can cause a wide range of conditions; a particular subject of discussion is the link to autism. This article is an attempt to give a very simple overview of vaccination, it's purpose and risks. My apologies in advance to all medical / bio- /chemical readers for the necessary oversimplifications.

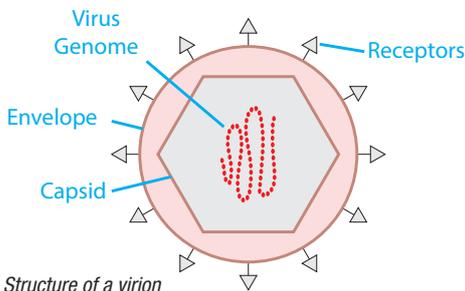
Vaccination

Many diseases are dangerous and are difficult to cure. Bacterial diseases are treatable in many cases by antibiotics, but resistant forms of diseases are a growing problem. Very few viral diseases can be treated effectively, other than by supporting the patient and waiting for their body's own immune system to fight the infection.

The purpose of vaccination is to "prime" the body's immune response by exposing it to an antigen with similar properties to that of a known disease. This allows the immune system to react much more quickly to any new exposure to an infection and destroy it before the disease itself develops.

Viruses

I'll focus on viral diseases as these are where the most controversial discussion arose. Viruses are tiny, typically between 20 and 300 nanometres in size. They are normally too small to see using optical microscopes.

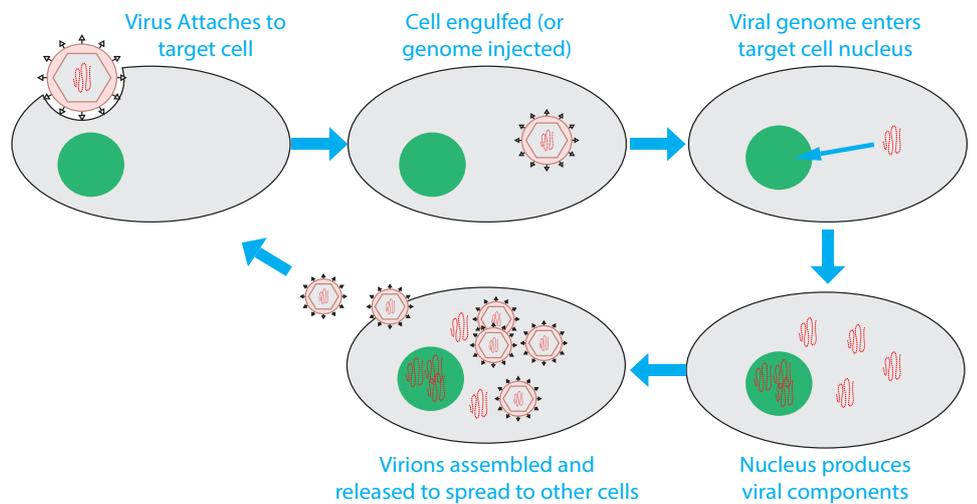


Structure of a virion

A virus particle, or virion, consist of a small package of genetic material (DNA or RNA) wrapped inside a protein coating (capsid). Some species of virus (e.g. influenza) are further encapsulated in layer which is created from the material of the cell which they target (the "host"). This layer contains proteins which are "coded" for the host cell (receptors). This enables them to infect the specific host cells in which they replicate.

Viruses are not considered to be living. They cannot reproduce by themselves. They

reproduce by infecting specific host cells in a living organism and hijacking the processes of that cell to produce copies of themselves. These copies are released to infect further cells in turn. In the diagram below an outline view of virion reproduction is shown. There are many variations on this mechanism, but the diagram shows the general principles.



When one is exposed to a virus there is an incubation period during which the virus is multiplying but no symptoms are observed. For example, in measles the incubation period is typically 10 to 12 days, the first symptoms (prodrome) are then visible for 2 days, followed by the characteristic rash which lasts 5 to 6 days. The patient is contagious for

The immune response

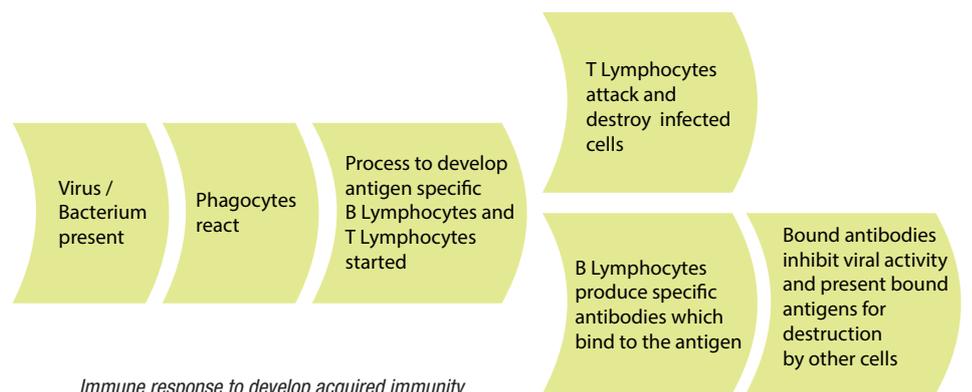
The immune response of the host organism is the means by which a run-away viral infection is combated.

It's way beyond the scope of a short non-technical article to describe the details of the human immune response. This is a complex, multi-step system which has evolved over time and all living things have some type of immune system. In humans, it consists of an "Innate" immune system (generic response to foreign bodies and damaged cells) and an "Acquired" immune system (specific targeted response to identified antigens). For a person exposed to a new virus, it's helpful to understand a little about the Acquired immune system.

about 8 days, from about 4 days before the rash presents.

When a new virus enters the body, there may initially be no acquired immunity. This process of acquiring specific immunity starts in the various different lymphocyte cells in the body. These learn to recognise the specific antigen (virus in this case) and specific T lymphocytes and antibodies are generated which allow the body to target the antigen efficiently.

However, this process takes time. If someone has a weak (slower) immune system, or if the virus is extremely virulent, the process might take too long. Also, the disease itself may result in complications for the patient which are best avoided. So, the development of



Immune response to develop acquired immunity

acquired immunity is a race against time – to identify, ramp up defences and destroy the infection before too much damage is done.

Using measles as an example again, the worst complications from the disease are:

- Inner ear infection (7% of cases) with risk of hearing loss in a small number of cases
- Pneumonia (6% of cases)
- Acute encephalitis (0.1% of cases)

The overall death rate is around 0.2% and about 30% of all measles cases have some form of complication.

Once immunity has been acquired to a specific antigen, the immune system reacts much more quickly, and the infection can often be defeated before any disease symptoms appear and before the patient is contagious. Vaccination is the means used to acquire such immunity **without** exposing patients to the disease.

Vaccines

The three most common forms of vaccine are

- live-attenuated vaccines – contain a small amount of weakened virus or bacteria. They generate a strong, lasting immunity with only 1 or 2 doses but are not suitable for all patients (e.g. weakened immune system, some long-term health problems, organ transplant patients)
- inactivated vaccines – contain “killed” version of the antigen. Usually generate a weaker response so booster injections are commonly needed
- Subunit vaccines – use specific pieces of the antigen. Generate strong response and patient sensitivity is much lower.

In addition, with the growth of genetic and molecular science, new types of vaccines are being developed with the aim to create more effective vaccinations with even fewer side-effects.

Vaccine production

The first step in the production of a vaccine is to generate the antigen (e.g. virus) in quantity. A virus is normally grown on cells from chicken embryos, using fertilised eggs or using cell-lines that are cultivated for that purpose.

Then the antigen is separated from the growth medium, “killed” or attenuated and then purified to optimise its concentration and minimise the risks of any allergic reaction from components of the growth medium (e.g. eggs).



Outline of process steps in production of vaccine

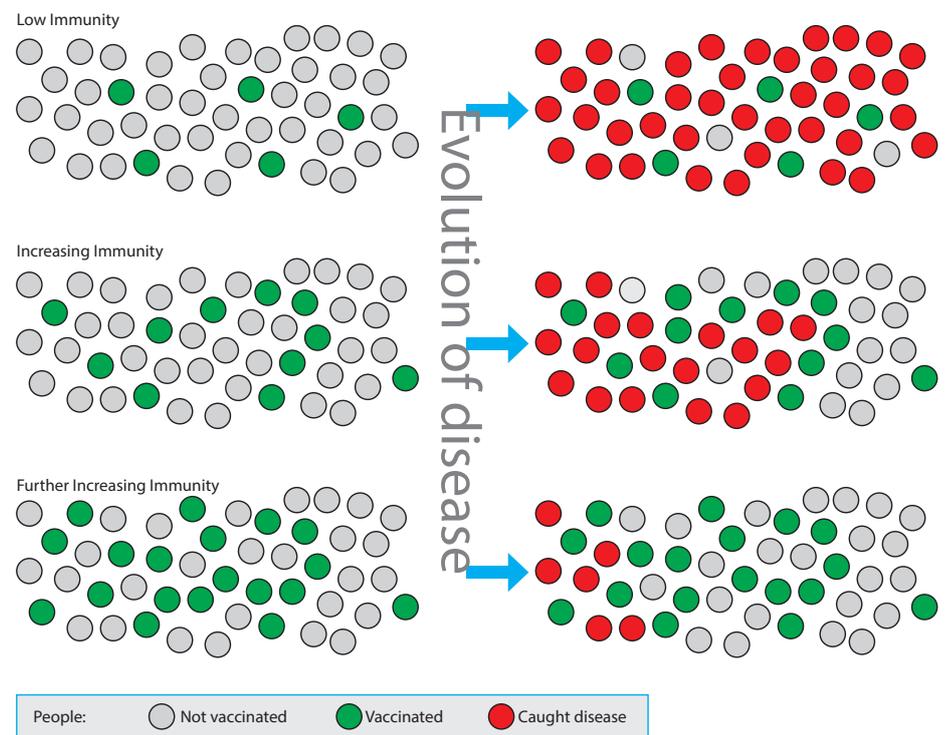
Obviously this is a very simplified overview. The quality control needed and attention to detail in these manufacturing processes are substantial.

Herd Immunity

Many vaccines are very effective at protecting individual people. For example, the MMR (Measles, Mumps and Rubella) is typically 99% effective in producing acquired immunity after one injection and a second dose takes this to 99.9%. However, there is another very important dimension to vaccination that is called herd immunity.

In any population there are always individuals who do not have immunity to a given pathogen. They may be too young to be vaccinated or have medical conditions which preclude a specific vaccine. They may have another condition which precludes vaccination, or they may just be getting older and have weaker immune systems. However, in a well vaccinated population, **these individuals are also protected.**

A highly simplified diagram showing how this works is below.



In the diagram three levels of “immunity” are shown as starting positions. As a disease evolves, individuals are infected (red) through direct or indirect contact with infected people.

The green “immune” members of the population reduce the number of opportunities for someone who is infected to pass it on. Obviously, the higher the number of immune individuals, the lower the chance of the disease propagating, as shown schematically in the diagram. Herd immunity levels are achieved when individual immunity is sufficient that the disease cannot propagate in the population.

This is a hugely oversimplified diagram, but the mathematics of disease spread has been widely studied and is well understood. In addition to the vaccination coverage, other factors which affect the spread of disease include its virulence, the extent to which a population has been exposed to a similar antigen, population density, travel frequency, population age distribution and general health of the population. Of all these factors, the only major one which can be influenced by governments is the vaccination coverage. Herd immunity is a very important factor in managing public health.

The level of vaccination required for herd immunity for measles is above 90%. For polio,

because it is less contagious, above 80% is sufficient. These are HIGH levels of coverage and are the reason why there is concern about anti-vaccination propaganda.

Risks from vaccination

All vaccines are capable of producing side effects. In most cases these are trivial, such as soreness and swelling around the injection site. For live vaccines, there are categories of patients for whom the risks are markedly

higher (e.g. patients on chemotherapy). Minor allergic reactions can occur in some patients and, for a very few, anaphylaxis may occur (around 1 in a million). Mild fever is also occasionally seen.

One common misunderstanding is that there is a risk of getting the disease from a vaccination. This is **ONLY POSSIBLE** with a live attenuated vaccine. A flu vaccine (injection) is **NOT** a live vaccine and cannot lead to flu. (The nasal spray flu vaccine may be a live vaccine.)

Generally the risks from vaccines are much lower than the risks from the diseases. In addition, the risks of vaccines are tracked continually. In many countries there is a formal reporting mechanism for any reactions to vaccines and any significant anomalies are followed up.

MMR and Autism

There has been a lot of controversy around the role of the MMR vaccine in triggering autism in children. This was initiated by Andrew Wakefield and 12 colleagues in 1998 with an article in the Lancet. This was based on a study of 12 children.

As a result of this work, many different large-scale epidemiological studies were conducted covering hundreds of thousands of children, vaccinated and not vaccinated. No evidence of any link between autism and the MMR vaccine has been found. In addition, 10 of the 12 original authors of the 1998 paper retracted the interpretation of their paper following further

analysis. It was then disclosed that Wakefield had a financial interest, having been funded by lawyers engaged by parents in lawsuits against vaccine producing companies. Finally, it was shown that deliberate fraud had been perpetrated by Wakefield (Godlee F. The fraud behind the MMR scare. British Medical Journal.2011;342:d22)

It is now completely clear that the MMR vaccine has no link to autism. The results from Japan, which changed vaccination policy as a result of this scare, are conclusive. The incidence of autism has risen since the MMR vaccine was withdrawn. (The incidence of diagnosed autism is growing generally, but it is not known if this is due to better diagnosis or a real increase in autism as such.)

Finally, lost in the whole discussion was the key point that measles is a **DANGEROUS** disease which kills children (and adults). For some strange reason people started to focus on intangible risks of vaccination despite the evidence to the contrary and they ignored the real tangible risks of the disease.

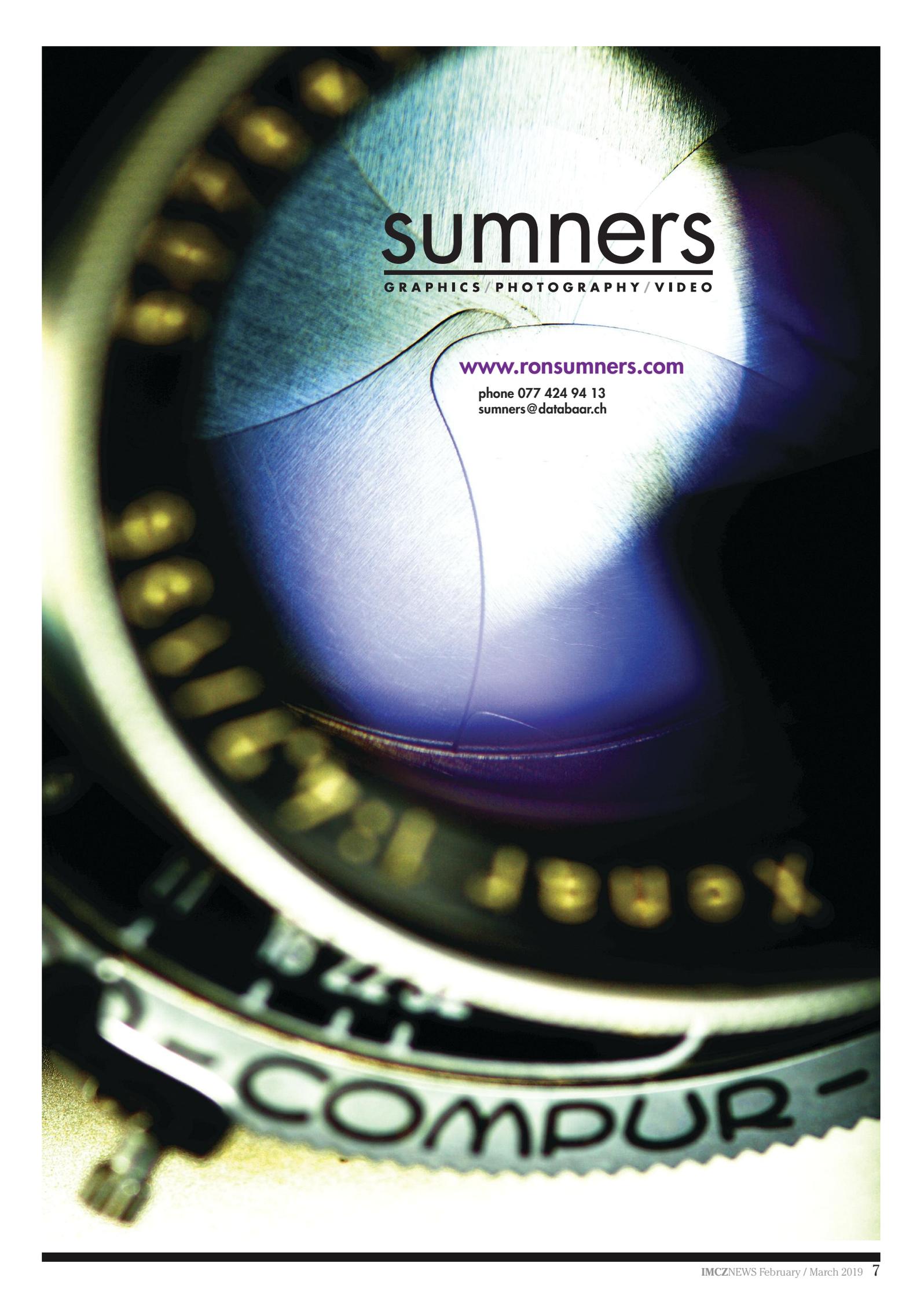
Unfortunately, this controversy, and related anti-vaccine sentiments, have not gone away with the clear evidence that there is no link between MMR and autism. Epidemiological evidence is the best source of information on links between treatments and side-effects. History shows clearly that beliefs based on a handful of cases, or self-selecting groups of people, are meaningless and that only proper, independent large-scale studies are useful in guiding public policy.

In summary

- Vaccination can be a very effective way to protect individuals against a range of dangerous diseases.
- As with all medicines, there are some risks with vaccines – but for most people these risks are trivial by comparison with the risks of the diseases.
- Properly designed and implemented vaccination programmes protect non-vaccinated / at risk individuals through improved herd immunity – and this is important because there are **ALWAYS** some unprotected individuals.
- There is a clear tension between individual choice and public health. Because herd immunity declines with vaccination coverage, individual choices not to participate in vaccination programmes have consequences for other people.
- From an overall population perspective (fewest deaths, least damage), the best approach to vaccination is for all to participate in the major initiatives against dangerous diseases unless there are *specific* medical reasons for them not to do so.
- The MMR vaccination does not cause autism – and the other vaccine controversies I've looked at are also not credible. These conspiracy theories are very damaging and directly cause needless death and suffering.



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A Vision of the Future

Compiled by IMCZ honorary member Muthana Kubba

Auto workshops will disappear. A petrol engine has 20,000 individual parts. An electrical motor has 20. Electric cars will be sold with lifetime guarantees. It takes only 10 minutes to replace an electric motor...Faulty electric motors are not repaired in dealership but are sent to a regional repair shop that repairs them with robots. When the electric motor malfunction light goes on, you simply drive up to what looks like an auto wash, and your car is towed through while you have a cup of coffee. By the time you have finished your coffee, the car is ready complete with a new motor.

Filling stations will disappear, so will all parking meters. They will be replaced by meters that dispense electricity.

Most major auto manufacturers have allocated huge funds to building new plants dedicated to the manufacture of electric cars. Oil will lose its strategic importance, and OPEC will be history. In addition, coal-mining and the major oil exploration, drilling and marketing companies will disappear as well.

Homes will produce and store more electrical energy during the day then they use and will sell it back to the grid. The grid stores it and dispenses it to industries that need it.

The FUTURE is approaching faster than most of us can handle. A baby born today will only see private cars in museums.

Kodak had 170,000 employees in 1998 and sold 85% of all photo paper worldwide. Within just a few years their business model disappeared and they went bankrupt. Who would have thought that would ever happen? What happened to Kodak will happen in a lot of industries in the next 5 -10 years. Unfortunately, not many people see it coming. A similar story was repeated with **digital cameras**, which were invented in 1975, but have now been virtually replaced by the built-in cameras of the ubiquitous smart phones.

Software has disrupted and will continue to disrupt most traditional industries in the next 5-10 years. **UBER** is just a software tool, they don't own any cars, and are now the biggest taxi company in the world! Ask any taxi driver if they saw that coming. **Airbnb** is now the biggest hotel company in the world, although they don't own any properties. Ask Hilton Hotels if they saw that coming.

Artificial Intelligence: Computers become exponentially better in understanding the world. This year, a computer beat the best Go-player in the world, 10 years earlier than anticipated.

Lawyers have now difficulty finding jobs in the USA, thanks to IBM's Watson. One can get legal advice (so far for the basic stuff only) within seconds, with 90% accuracy compared with 70% accuracy when done by humans. So, if you are studying law hoping to become a successful rich lawyer, stop immediately. There will be 90% fewer lawyers in the future. Only omniscient specialists will remain.

Watson already helps doctors to diagnose cancer. It is four times more accurate than diagnoses made by humans.

Facebook has a pattern recognition software built in that can recognise faces better than humans can. In certain disciplines, computers will become more intelligent than humans and as early as 2030.

Autonomous cars are already here. In the next few years, the entire car industry will be disrupted. Privately owning a car will no longer be fashionable or necessary. Whenever one needs a car, it can be hailed using a smart phone. It will show up at the correct location and drive to the desired destination. No need to park it. One pays for the driven distance only. What is more one can be productive, or catch up with reading the morning paper etc., while being driven. Our young children of today will never need driving licenses and will never own a car. This will change our cities, because 90-95% fewer cars will be needed. We can have the luxury of transforming existing parking lots into parks.

Car Accidents claim the lives of 33 thousand persons in the US alone, every year. For a population of 326 Million, this means that one person in 10,000 dies on average every year by a fatal car accident. It is estimated that the rate will drop 100 fold with autonomous vehicles, i.e. one person per million would then die by fatal car accident.

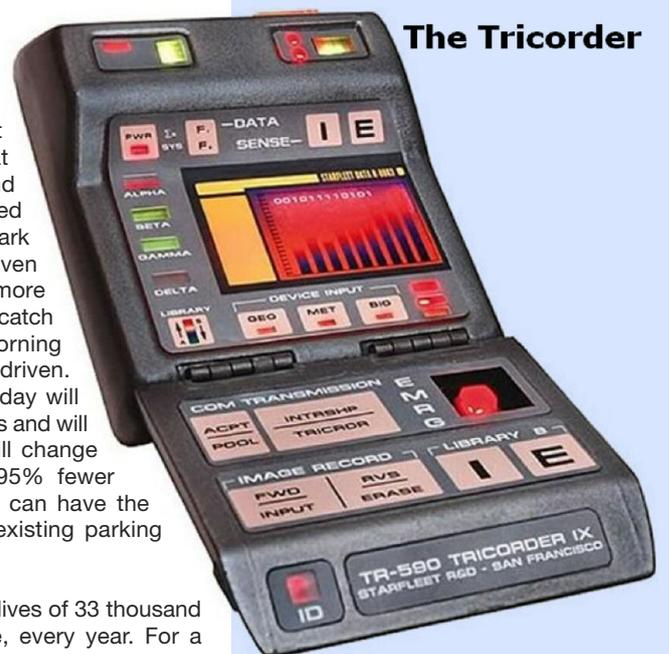
Many car companies will doubtless go bankrupt. The major traditional ones will try to adapt but the real winners will be tech companies (Tesla, Apple, Google) whose approach will be to build a computer on wheels. Volvo has taken the decision to stop making internal combustion engines for their vehicles. All their 2019 models, will be either all electric or hybrid, with the intent of phasing out the hybrid models soon afterwards.

Insurance companies will have massive trouble because, without accidents, the costs will become cheaper. Their car insurance business model will disappear.

Real estate will suffer as well. If people can work whilst commuting, then they can afford to live farther away to more beautiful or affordable neighbourhoods.

Electric cars will become mainstream at about 2030. Cities will be less noisy because all new cars will run on electricity. They will be also much cleaner as well due to less pollution.

Electricity will become much cheaper as well. Less demand on fossil fuels will push the price of fossil fuels down and solar power will be ubiquitous. The mighty fossil energy companies will have to reinvent their business model.



The Tricorder X is a Star Trek contraption that will actually be available soon and its price will be announced this year. It is a medical device that analyses 54 bio-markers including retina scan, blood and breath samples and will automatically identify any ailment.

WELCOME TO TOMORROW, it actually has arrived already

Modern Buildings

Contributed by ICMZ member Jeremy Towler

Jeremy has built a career in intelligent building systems, beginning with Honeywell in the '80s as a building control systems engineer. In 1984 he joined Landis and Gyr in Zug and over a period of 11 years held a number of techno-commercial roles. His most recent role in the UK was as Principal Consultant for intelligent building technologies at BSRIA, the Building Services and Research Establishment. He returned to Switzerland in 2016, where he now works for Siemens Building Technologies, managing market and competitor intelligence analyst relations.

At the ICMZ special Stammtisch on 13 December 2018 Jeremy gave a presentation on the current status of modern buildings.

Modern buildings are significantly different from the buildings we have grown up with. New materials and new technologies are enabling buildings to be better designed, and more fit for purpose, than ever before. Progress in the technical infrastructure of buildings, together with software, the internet and mobile apps are transforming the current generation of buildings, both new and existing, making them more comfortable, productive, energy efficient, and safer places to be.



This article outlines the status quo, provides a glimpse of how the latest technology is enabling buildings to be more adaptable to their specific use and outlines how the next generation of buildings will even be able to anticipate people's individual preferences and automatically respond to their personal needs. The article mostly describes the active technology inside buildings. It does not focus much on the passive building structure, the so-called building envelope, important though this is.

Past – Present – Future

Ever since man learnt to build, he has been creating structures that fulfil a number of basic needs, these being Shelter, Safety, Security and Comfort. These fundamental needs are just as relevant today as they were in the past and they always will be, but as we will see, technology is emerging which is allowing us to go beyond these to help us fulfil further objectives.

Why do buildings matter?

We may well ask ourselves why buildings matter? Well, we spend 60-90% of our time in buildings. They are where we live, learn, work, create, heal, entertain, exercise, meet and consume. Siemens has a campaign called «Creating perfect places», meaning the creation of optimal environments for the specific use of each building.

However, buildings and construction together account for 36% of global final energy use and 39% of energy-related CO2 emissions, when upstream power generation is included (buildings and construction, including the manufacturing of materials and products for building construction). This is pretty significant, and any reduction that can be achieved will be beneficial.

In buildings we meet – collaborate - consume

Ideally, we should want to optimise our experience within buildings, to find the best place to collaborate and to find each other easily and find facilities, doing so safely, securely and comfortably. Better still, we should want to enhance our productivity and creativity in buildings through greater comfort and convenience. Many companies are realising that buildings that deliver on this help



them to attract and retain talent, and of course, they want to optimise flexibility for changing building use.

Buildings protect valuable assets

Buildings also protect valuable assets. Whether it be hospitals (medical electronics), data centres (servers), industry (computerised / robotic production equipment), laboratories (clean rooms / measuring devices), food and drug (regulated production and storage), museums and galleries (artefacts and artworks), all have assets that are vulnerable.

Technology keeps us safe – secure – comfortable

There is a host of building technology keeping us safe, secure and comfortable. This ranges from secure access - for those entitled, to safe exit in emergency, fire detection and alarm systems. Technology helps maintain comfortable temperatures, and sometimes humidity and even air quality - for health and productivity. Lighting systems control artificial illumination, blinds and shutters, low energy LED lighting and emergency lighting equipment. There is also equipment for measurement and metering (utility usage; electricity, gas, water) as well as for optimisation of these. And there are all sorts of technologies for transportation, including pumps (water), fans (air) escalators (people), lifts (materials).

What do these solutions comprise?

These technologies are combined into solutions which typically comprise:

- Switches (on/off relays, thermostats, smoke detectors etc.), sensors (temperature, humidity, pressure, air quality, light etc.), security cameras, access card readers, door entry systems,
- Digital controllers and computers
- Software
- Motors, actuators, valves, pumps, fans
- Services such as design, installation, commissioning, maintenance and optimisation

Networked systems

Nowadays, it is increasingly common to network and integrate building systems. There are many benefits for doing so including:

- Triggering events in one system from another. For example, fire alarms release exit doors, start fans to extract smoke, turn cameras to visually verify and monitor a fire, use energy management data to adjust heating, ventilation and air-conditioning (HVAC) parameters etc.

- Monitoring and management from multiple locations. For example, it is now common practice for facility management and maintenance engineers to monitor systems remotely on mobile devices.
- Sharing of sensor information. For example, occupancy sensors perform a security *and* an energy optimisation role, temperature sensors perform a control and a fire verification role, etc.

New technologies are human-centric

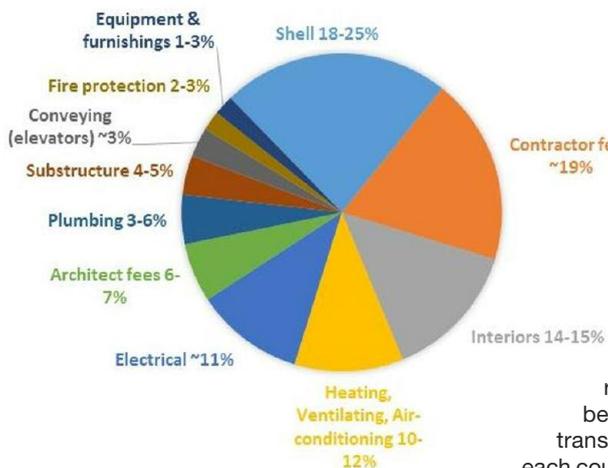
"We shape our buildings; thereafter they shape us". This quote by Winston Churchill neatly describes how traditional technologies have been building-centric and we have had to adapt to our buildings. However, new technologies are becoming much more human-centric. Systems are appearing that map the building and new indoor location systems can track the location of people and assets (equipment). They are becoming increasingly personalised, able to remember personal preferences, know our daily schedule, who we are due to meet, and make suggestions (from parking, to suitable meeting rooms, restaurant offers, best times to depart, and commuting options).

Most of these technologies are software based and operated via apps on mobile devices and from the Cloud, using powerful analytics and employ artificial intelligence (AI) to learn and adapt the building.

Construction costs

It is worth taking a moment to look at how much it costs to construct a building, and what those costs comprise.

The chart shows the approx. proportions of the main cost elements for a building of roughly 15-20 storeys, comprising a floor area of around 250,000 - 300,000 ft² (23,000 - 28,000m²) and costing between about \$40-50m



A large share of cost is accounted for by the fabric of the building (30-50%). Mechanical and electrical systems make up around 20-30%, whilst architect and contractor fees

account for around 25%. The technical systems for fire, HVAC control, and security typically represent only around 5%, depending on how it is measured. And yet, it is these intelligent systems that play a key role in managing and optimising the long-term running costs of the building.

Building life cycle

Nowadays, there is a lot more focus on the building life cycle, with major refurbishments being conducted typically every 10 - 15 years. In fact, some 80% of total building costs result from building operation and so there is a growing tendency to move from CAPEX to OPEX when it comes to the technical infrastructure. If designed and planned well, smart buildings do not have to cost more than traditional ones, particularly using the latest Building Information Modelling (BIM) tools, which reduce the amount of waste and rework during the construction of the building.



Enormous renovation potential

Around 80% of the buildings that will exist in 2050 have already been built! This means there is enormous renovation potential. The Energy Performance of Buildings Directive (EPBD) is the European Union's main legislative instrument aiming to promote the improvement of the energy performance of buildings within the Community. It was inspired by the Kyoto Protocol which commits the EU and all its parties to set binding emission reduction targets, and so the EPBD becomes effective when it gets translated in to the building codes of each country. These become more stringent with each update every few years and consequently, a new commercial building can today only meet these targets by installing a state-of-the-art building automation and energy management system.



The 3-30-300 ratio

There is a handy rule of thumb which provides a breakdown of what an organization pays per square foot, in terms of total occupancy costs. It is sometimes referred to as the 3-30-300 ratio. It relates to a company's spend of \$3 for utilities, \$30 for rent and \$300 for their employee costs (salaries, benefits, etc.). While actual figures will vary across locations and organizations, 3-30-300 is a solid rule of thumb. So, when thinking about investments, a 10% increase in energy efficiency would yield \$0.30 savings per square foot, a 10% decrease in rent would save \$3.00, while a 10% gain in productivity is worth \$30!

Creating a smart office using Internet-of-Things (IoT) and sensor technology with a focus on improving utility costs can result in major energy savings. Yet, a recent McKinsey report found that people-related gains from IoT are 5 times higher than energy savings and makes a much more significant impact on the organization. Productivity gains from IoT technology accounted for 75% of the benefit, while energy savings accounted for only 14%. Changes that affect human capital have a greater impact than those that improve only physical capital.

Buildings and the Internet of Things

Individual building devices are becoming intelligent. This applies both to sensors and controllers. Engineers today speak of processing data "at the edge" and then transmitting processed information to the "Cloud" where remote analytics of massive amounts of data, "big data", is carried out. Here, there is enormous potential. Incredibly, over 50% of the world's data was created in the last year, and yet less than 0.5% was analysed or used.

Digital twins

Construction is often referred to as the last industry to digitalise and so this article would be incomplete without the mention of Digital Twins, where industry categorises 3 different functional stages, namely: Design twin, Construction twin, Operational twin.

Prime examples already exist, from Rolls Royce who monitor and manage all their aircraft engines 24/7 wherever they may in the world, on the ground or in the air, to Siemens Digital Factory division who model and fine tune complete production lines before they are even built.

With BIM – Building Information Modelling, a building is effectively built twice – first virtually (the *Design twin*) and then physically (the *Construction twin*). When people speak today about the potential of BIM, they are focusing primarily on the optimized planning and construction process and the related cost-savings that can thereby be achieved. However, the end goal is to update this in real-time with information from the building systems for live status (the *Operational twin*) to optimize operation, predict faults before they occur, and rapidly mitigate unexpected breakdowns.

The future

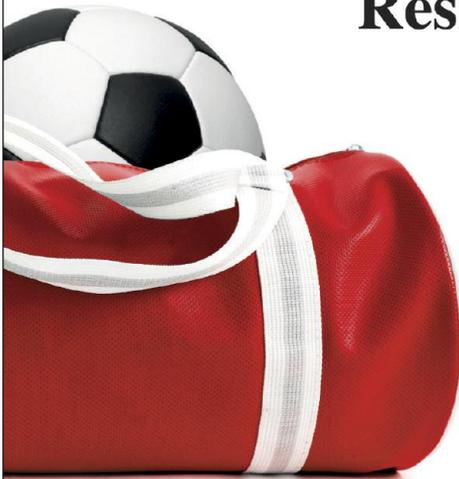
Buildings of the future will all be about sustainability, performance and reliability. Progress towards sustainable buildings and construction is advancing, but improvements are still not keeping up with a growing buildings sector and rising demand for energy services. The energy intensity per square meter (m²) of the global buildings sector needs to improve on average by 30% by 2030 (compared to 2015) to be on track to meet global climate ambitions set forth in the Paris Agreement.

Looking forward, buildings will be an integral part of smart cities, integrated to a smart energy grid and acting as “prosumers” (buildings that both consume and produce energy), integrated to a smart transportation infrastructure, and integrated with our individual profiles.

New technologies will become ever more human-centric. They will increasingly employ analytics, learn, adapt and employ artificial intelligence (AI) to fine tune the building – and more!



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Back for the Future:

Contributed by IMCZ Sports' editor Joseph Dow

Heierling Ski Boots of Davos



Having enjoyed Hans-Martin Heierling's presentation about the history of the ski boot and his family's iconic brand at our IMCZ Ski Evening, I recently dropped in for a visit at his workshop in Davos. Personally, I have a love-hate relationship with ski boots, mostly due to my strangely-shaped feet and the difficulty of achieving a comfortable and effective performance fit. I will try, buy and use many different ski models over the span of a few years, but I seem to stick to a pair of successfully-fitted boots for up to a decade and beyond.

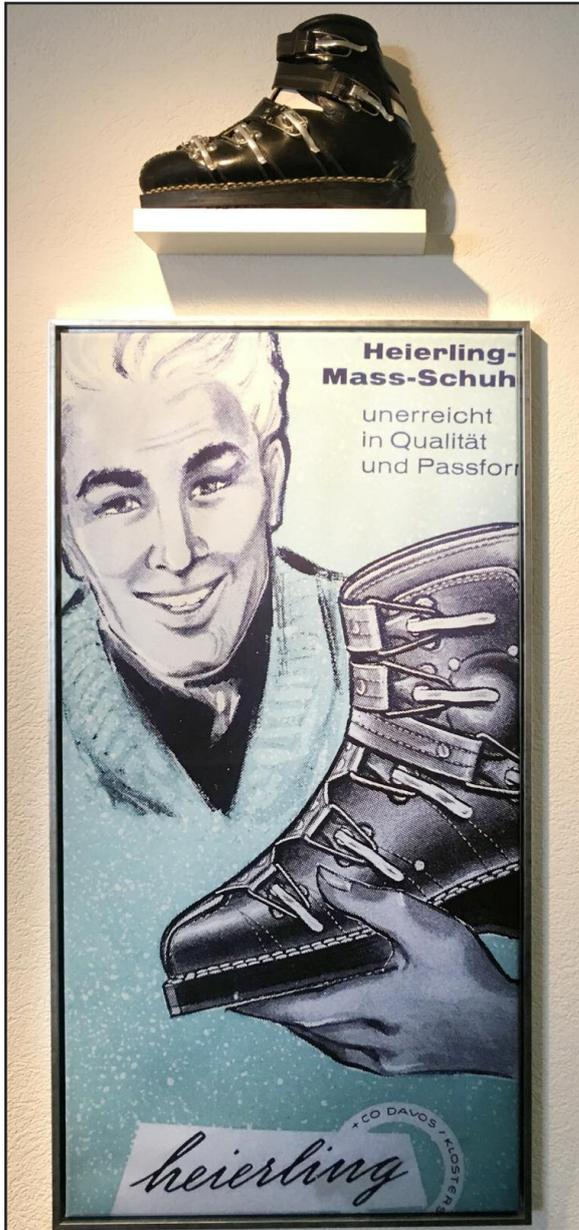
Currently, my main ski boot is a 2012 Salomon Impact CS with almost two hundred ski days on them, fitted by Andreas, whom you may have met at the second ski show back in 2016. On a warm July day, we spent about five hours heating, punching, stretching, and grinding them and more time tweaking them later. Andreas even skied with me to identify remaining areas of pressure and discomfort. I'm still breaking in my "new" Dalbello Panterras from three years ago and my old Salomon X-Waves had nearly 350 ski days spanning 15 years! For a ski enthusiast, a perfectly-fitted ski boot is a treasure to be cherished for many, many years.



Heierling is a Swiss brand steeped in history as the world's oldest ski boot manufacturer, going back to 1885. Hans-Martin was able to secure the rights to the name and has revived the company to once again produce ski boots under the legendary banner. Ski boots have evolved from leather to primitive plastics to today's high-tech

materials. Harnessing the technological know-how and skills emanating from four generations in a family of ski boot designers and manufacturers, Hans-Martin pursues his passion to innovate and revolutionize the design and materials of the ski boot. The desired goal is to reach the pinnacle of comfort and performance, while addressing effects on the environment.





Additional Information

Heierling

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www.heierling.ch

In addition to fitting its own in-house ski boot, Heierling provides custom Skiboot-fitting services for other brands in their Davos facility.

Currently, Heierling produces three models in the h1 line, all with the Templast material, but with some specific differences among the models:

“h1 Herren Komfort”

Inner boot with visco-elastic foam and a fur-lined toe area
Genuine specially-tanned leather from Grisons
Flex index: 120

“h1 Damen Komfort”

Total fur lining
Gold-plated buckle
Swarovski crystals
Flex index: 90-100

“h1 Komfort Race”

Larger and wider power strap
Flex index: around 150



Future: a new rear-entry model is in the works. Many of you may remember such boots as the Hanson Stiletto and Salomon SX-92 Équipe R, on which I skied well over 200 ski days during all of the 1990s. If they were good enough for Scott Schmid to jump cliffs in the early ski movies, I thought they were good enough for me, and they did provide good comfort. Heierling’s new design will address the shortcomings of the basic rear-entry design with some innovative ideas and ingenious and unexpected uses of materials to bring a new level of comfort to skiers, while preserving performance.

Also, the h1 ski boot is built in a modular manner enabling repair and the replacement or exchange of individual parts to increase the lifespan of the boot. “[Heierling] resist[s] a “throw away” mindset in favour of protection of resources and sustainability and aim[s] to do [its] part by way of [its] materials, workmanship methods and [its] promise to repair, refurbish or renew. You thereby get a ski boot for life.”

Heierling’s emphasis on maintaining and reviving the ski boot aligns with my philosophy of living with my precious ski boots for a long period of time. If you also think along those lines, contact Hans-Martin and check out Heierling’s shop in Davos Dorf.

THINK SNOW!!! THINK SNOW!!! THINK SNOW!!! THINK SNOW!!!

If you have questions about skiwear or equipment or want a recommendation, feel free to send me an email: [jjdow\[at\]Hotmail.com](mailto:jjdow[at]Hotmail.com)



WAGNER & ASSOCIATES Investment Consulting INVESTMENT COMMENTARY JANUARY 2019

December 28, 2018

ECONOMY

After Germany several other European countries published negative figures for the 3rd quarter (Austria, Italy, Sweden, Switzerland). The Euro-region as a whole is barely positive with 0.6%. While the USA is still growing steadily, there are more and more signs of an economic slowdown in China. The Permanent Committee of the Politburo has already declared a "stabilization of growth" and introduced tax reductions and infrastructure investments by regions as countermeasures.

BOND MARKETS

Italy and the EU have been able to come to terms which means that penalization proceedings become unnecessary. The ECB has received belated authority for their net purchases of government debt over the past 4 years by the European High Court, but the program ends by the end of the year anyway. The Fed has raised its key interest rate by 0.25% to 2.25-2.5% and emphasized that it will not be influenced by political deliberations.

EQUITY MARKETS

The susceptibility of markets was demonstrated emphatically over Christmas. A day before, US Secretary of Treasury Steven Mnuchin announced that he had spoken to the CEOs of the 6 largest banks and been assured that liquidity was not a problem upon which markets corrected by almost 3%. The day after, the market recovered by close to 5%. Reasons for weak equity markets abound but the fact that supposedly "good" news is initially deemed negative is typical for unsure market participants who act emotionally instead of rationally.

CURRENCIES

Despite the turbulence on the stock exchanges, the foreign exchange markets are relatively quiet. The USD still benefits from a yield advantage, the CHF from the status as a safe-haven currency. Thanks to the ECB, the EUR is holding up relatively well despite the politically induced uncertainties. The GBP could surprise on the upside: should the Brexit agreement pass the House of Commons or the application to leave the EU be cancelled (legally possible according to the European High Court), it would be positive news for the GBP.

FOOD FOR THOUGHT

A new year always presents the opportunity to make good resolutions, and financial experts are no exceptions. The maxim for 2019 is not to lose money. The numerous political and economic uncertainties as well as bewildered markets urge caution. High liquidity (30-40%) reduces risk for the whole portfolio and guarantees freedom of action should positive changes occur. A gold position of 10% is an uncorrelated investment which benefits from uncertainty. Equities (50-60%) are preferred over bonds whereby individual companies with proven management, leading product and good financing are preferred over index funds. Structured products and alternative investments are too risky.

Contributed by IMCZ member
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The Most Social Person in the World

Dave is a good worker, social and nice, but he keeps missing all company events. Eventually, his boss calls him to his office demanding an explanation why Dave can't be a team player and come.

"I'm sorry Boss," Said Dave, "I'm just so busy with all the people I already know, sometimes it seems I know everyone there is to know. Anyone famous at least."

"What do you mean?!?" Asks the boss with derision.
"Who can you possibly know?"

"Name someone famous," shrugged Dave, "I'll bet you I know him."

Amused, his boss called his bluff, "OK, Dave, how about... Tom Cruise? You know Tom Cruise, Dave?" He smirks.

"Oh yeah boss, Tom and I are old friends, and I can prove it." So Dave and his boss fly out to Hollywood and knock on Tom Cruise's door, and Tom Cruise shouts,

"Dave! What's happening? Great to see you! Come on in for a beer!"

Although impressed, Dave's boss is still sceptical. After they leave Cruise's house, he tells Dave that he thinks him knowing Cruise was just lucky.

"No, no, just name anyone else," Dave says.

"President Trump," his boss quickly retorts.

"Yup," Dave says, "Old buddies, let's fly out to Washington," and off they go.



At the White House, Trump spots Dave on the tour and motions him and his boss over, saying, "Dave, what a surprise, I was just on my way to a meeting, but you and your friend come on in, let's have a beer first and catch up."

Well, the boss is very shaken by now but still not totally convinced. After they leave the White House grounds he expresses his doubts to Dave, who again implores him to name anyone else.

"Pope Francis," his boss replies.

"Sure!" says Dave. "I've known the Pope for years." So off they fly to Rome.

Dave and his boss are assembled with the masses at the Vatican's St. Peter's Square when Dave says, "This will never work. I can't catch the Pope's eye among all these people. Tell you what, I know all the guards so let me just go upstairs and I'll come out on the balcony with the Pope." He disappears into the crowd headed towards the Vatican.

Sure enough, half an hour later Dave emerges with the Pope on the balcony, but by the time Dave returns, he finds that his boss has had a heart attack and is surrounded by paramedics.

Making his way to his boss's side, Dave asks him, "What happened?"

His boss looks up and says, "It was the final straw... you and the Pope came out on to the balcony and the man next to me said, **'Who the heck is that on the balcony with Dave?'**"

So the Pope is really early for his flight.

He asks his driver on his way to the airport if he could drive around for a while because they have time to kill and he hasn't driven a car since becoming the pope.

Naturally, he's a bit rusty, so he's driving poorly, when suddenly he sees police lights behind him. He pulls over and when the officer comes up to the window his eyes go wide. He says to the pope "Hold on for a minute," and goes back to his car to radio the chief.

Cop: "Chief we have a situation. I've pulled over an important figure."

Chief: "How important? A governor or something?"

Cop: "No sir. He's bigger."

Chief: "So, what? A celebrity or something?"

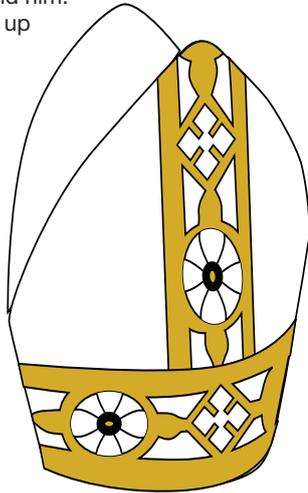
Cop: "More important, sir."

Chief: "A major politician?"

Cop: "No sir, he's much more important."

Chief: "WELL WHO IS IT!?"

Cop: "Well actually I'm not sure. But the pope's his driver."



Heavenly Justice

Once, there was a preacher who was an avid golfer. Every chance he could get, he would be on the golf course swinging away. It was an obsession. One Sunday was a picture-perfect day for golfing. The sun was out, no clouds were in the sky, and the temperature was just right.

The preacher was in a quandary as to what to do, and shortly, the urge to play golf overcame him. He called an assistant to tell him that he was sick and could not do church, packed the car up, and drove three hours to a golf course where no one would recognize him. Happily, he began to play the course.

An angel up above was watching the preacher and was quite perturbed. He went to God and said, "Look at the preacher. He should be punished for what he is doing."



God nodded in agreement. The preacher teed up on the first hole. He swung at the ball, and it sailed effortlessly through the air and landed right in the cup 250 yards away. A picture-perfect hole-in-one. He was amazed and excited.

The angel was a little shocked. He turned to God and said, "I beg your pardon, but I thought you were going to punish him."

God smiled. "Think about it - who can he tell?"

You know you're from California if . . .

1. Your co-worker has 8 body piercings and none are visible.
2. You make over \$300,000 and still can't afford a house.
3. You take a bus and are shocked at two people carrying on a conversation in English.
4. Your child's 3rd-grade teacher has purple hair, a nose ring, and is named Flower.
5. You can't remember . . . is pot illegal?
6. You've been to a baby shower that has two mothers and a sperm donor.
7. You have a very strong opinion about where your coffee beans are grown, and you can taste the difference between Sumatran and Ethiopian.
8. You can't remember . . . is pot illegal?
9. A really great parking space can totally move you to tears.
10. Gas costs \$1.00 per gallon more than anywhere else in the U.S.
11. Unlike back home, the guy at 8:30 am at Starbucks wearing a baseball cap and sunglasses who looks like George Clooney really IS George Clooney.
12. Your car insurance costs as much as your house payment.
13. You can't remember . . . is pot illegal?
14. It's barely sprinkling rain, and there's a report on every news station: "STORM WATCH."
15. You pass an elementary school playground, and the children are all busy with their cell phones.
16. Or it's barely sprinkling rain outside, so you leave for work an hour early to avoid all the weather-related accidents.
17. HEY!!!! Is pot illegal????
18. Both you AND your dog have therapists, psychics, personal trainers, and cosmetic surgeons.
19. The Terminator was your governor.
20. If you drive illegally, they take your driver's license. If you're here illegally, they want to give you one.





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 Your Aston-Martin old-timer with the roll top roof?
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 Call Bill at 041 123 45 67.

your text here.

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- 1/3 Page, horizontal (19 x 9.2 cm), Fr. 85.-
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