



Winter 2021/ Spring 2022

## Chairman's Chat



Photo courtesy of IOM3.

Hello everyone,

As you see I am still here with MTD and preparing this Newsletter, our first of 2022! It's packed with lots of articles and regular features, so I hope there is something for everyone. The MTD newsletter has been developing over the last six years. The Editorial team would welcome constructive comments and suggestions on what you would like to see featured in upcoming editions.

Last year MTD had the pleasure of welcoming the Ground Engineering Group (GEG) and since then they have been very proactive in establishing themselves. Recently releasing a promotional podcast which achieved some notable success reaching position 22 in the Science category podcast charts of HKSAR. The podcast can be heard at:

<https://www.iom3.org/news/iom3-investigates-podcast.html> Well done to the GEG.

MTD were saddened to hear the news of the passing of Professor John Tunncliffe, a very well-known figure in the mining industry and stalwart support of the Midlands Institute and IOM3. In his memory an award has been developed as a lasting tribute. Read more in this newsletter.

Lastly and belatedly as we are in February at the time of publication: HAPPY NEW YEAR.

Please feel free, all you readers, to let us know your thoughts and comments on our Newsletter, as they say "every little helps". We aim to try and make it an interesting read. Send comments to me at [c.blackmore@iom3.org](mailto:c.blackmore@iom3.org).

## STOP PRESS

See MTD webpage for latest articles:

Website address: [iom3.org/mining-technology-division](http://iom3.org/mining-technology-division)

### Upcoming Events

**11<sup>th</sup> International Symposium on Ground Freezing, London, 10<sup>th</sup> – 12<sup>th</sup> October 2023.** See Page 5 for a synopsis of the conference.

**15<sup>th</sup> MIMinE Safety Seminar, Sheffield, 22<sup>nd</sup> April 2022.** See Page 2 and Page 15

### Obituary

#### Professor John F Tunncliffe

Tragically, Professor Tunncliffe died the month following the Legacies of Mineral Extraction conference, after awarding his medal to James Heslington. See Page 3 and Page 14.

### Sustainability Development Committee

Watch out for the SDC Newsletter, coming soon!

## CONTENTS

Page 2: News and Views	MTD
Page 3: Legacies of Mineral Extraction	David Seath
Page 4: Toys for Boys (and Girls!)	Andy Birtles
Page 5: Ground Freezing Symposium	Alan Auld
Page 6: Copper Canyon	Tony Francis
Page 7: Global Action on Tailings 3	Andy Birtles
Page 8: Death of King Coal	Laurence Morris
Page 9: COP 26 Glasgow 2021	Laurence Morris
Page 10: UK Lithium	Christine Blackmore
Page 11: From Russia with love 2	Ian Bowbrick
Page 12: Article from ICMM December 2021	MTD Board
Page 13: Medals and Announcements	Wyn Griffith
Page 14: The IMM Gold Medal 1954	Bob Siddall
Page 14: Local Societies	David Seath

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## News and Views from the Mining Sector MTD Board Members

### Japanese power

In 2010 about one third of Japan's electricity came from nuclear power, and there were plans to build more. Then the 2011 Fukushima Daiichi disaster hit, and all Japan's nuclear power plants were shut down. Ten years later most remain closed and there is much resistance to restarting them. In their place Japan's gas-fired power stations have been doing a lot of overtime. But, as Britain has found out recently, natural gas is expensive.

The Japanese government have decided to build 22 new coal-fired power stations, to run on "cheap" coal imported from Australia. Economically it made sense. Environmentally, not so much. Japan is now under intense pressure to stop using coal.

Toyota is thinking of a future where hydrogen fuel cells are everywhere, in homes and offices and factories, as well as cars. Toyota and Japan want to be at the forefront of this new hydrogen society. Most hydrogen is made from natural gas, or even coal. That is cheap but it produces lots of "greenhouse gases". However, when those greenhouse gases are captured and buried in the ground, this is called "blue hydrogen". "Green hydrogen" is made from water using renewable energy. The problem is that "green hydrogen" is expensive.



Photo courtesy of J-POWER, all rights reserved.

### gravitricity

This is an adaptation of the information on the internet (<https://gravitricity.com/>).



Gravitricity is an energy storage technology company based in Edinburgh, and one of the leaders in the emerging field of underground energy storage. Their core technology is based on a simple principle: raising and lowering a heavy weight to store and release energy. The system uses weight configurations totalling up to 12,000 tonnes in a vertical underground shaft. Early shafts will be existing underground mineshafts but they also plan to sink new shafts using modern sinking techniques. Electricity is stored in the form of potential energy by raising the weights. Power is then generated by lowering the weights to turn a generator. The technology has been proven to reach full power in less than one second and has a predicted full-scale efficiency of between 80% and 90%.



Photo courtesy of gravitricity.

The company is working with hoist manufacturer Huisman Equipment BV and Careys Civil engineers, and is developing projects in the UK, central Europe and South Africa. The technology is suited to both developed and developing grids, and can be configured to deliver rapid, short bursts of power or longer-duration energy for several hours. In addition, the technology's long lifespan offers strong synergy with new grid infrastructure projects by facilitating a vast reduction in materials required to achieve peak power transmission capability.

### Midland Institute of Mining Engineers Annual Safety Seminar

The annual Midland Institute of Mining Engineers Safety Seminar will be held on Friday 22 April 2022 at The Crowne Plaza Hotel, Station Road, Sheffield, S4 7YE.

Please see the Midland Institute of Mining Engineers website for more details <https://www.themime.org.uk/>

### West Cumbria Mining

This project update (October 2021) is from the website - <https://www.westcumbriamining.com/>.

The "support [from interested parties] has been, and remains, so important in reinforcing our commitment and determination to deliver the Woodhouse Colliery project for the benefit of West Cumbria and the UK. It would be the first 'net zero' metallurgical coal mine in the world and lead the industry through the transition to a net zero economy.

We now await the recommendation of the Planning Inspector and decision by the Secretary of State, which is not anticipated before 2022.

West Cumbria Mining remains fully committed to the successful delivery of the Woodhouse Colliery project and will provide further update via the website in the future".

## Legacies of Mineral Extraction

David Seath

**The Mining Technology community makes a significant contribution to the IOM3 Sustainable Future theme.**



Photo Courtesy D Seath

The Mining Technology technical community, supported by the North of England Institute of Mining and Mechanical Engineers (NEIMME), staged its Conference 2021: Legacies of mineral extraction and sustainability opportunities on 10<sup>th</sup> & 11<sup>th</sup> November 2021. The event was also a celebration of the reopening of Neville Hall, Newcastle-upon-Tyne and home of NEIMME and The Common Room.

Originally proposed by Norman Jackson (MTD Board Member) to the MTD Board in May 2019, the initial date for the conference was set for 16<sup>th</sup> & 17<sup>th</sup> November 2020 and endorsed by the MTD Board in October 2019. Unfortunately, the coronavirus pandemic intervened and the conference date had to be postponed to March 2021 and, subsequently, following

consultation with the authors/speakers, further postponed until November 2021.



Photo Courtesy D Seath

The organisation and administration of the conference continued through 2020 and 2021. Overall, there were 24 offers of papers for the conference but due to various reasons several authors withdrew their papers. Nevertheless, there were sufficient papers available for the conference to proceed. Authors who had submitted abstracts and/or final manuscripts had these published in a 156-page, soft-backed book (Record of Proceedings), which was issued to all attendees at the event.



Photo Courtesy D Seath

The conference was split into six sessions over two days. On Day One there were ten presentations delivered. These presentations led on to a buffet supper and entertainment by Ashington Colliery Brass Band. On Day Two there were a further nine presentations in addition to the presentation of the J F Tunncliffe Medal. Professor Tunncliffe made the inaugural presentation of the medal to James Heslington. Tragically, Professor Tunncliffe died the following month. Feedback from the attendees showed that the event was well received with the only issue being during online presentations when the link was temporarily lost. Fittingly, the MTD Board congratulate all the speakers for their important contribution over

the two days of conference.

A pre-Conference Field Trip on 9<sup>th</sup> November was made to the Port of Blyth where delegates visited the Bates Clean Energy Terminal and then Narec Distributed Energy, which is part of the Offshore Renewable Energy (ORE) Catapult. Following a buffet lunch delegates boarded the Blyth Tall Ship (The William II) for a cruise on the river.

The MTD Board is pleased to record its thanks to the Midland Institute of Mining Engineers, The Mining Institute of Scotland, the Western Institute of Mining and Metallurgy, as well as NEIMME for their donations to the conference. Other donations gratefully received were from The Coal Authority, Durham Energy Institute, AECOM, geoterra, and the Port of Blyth. Finally, thanks go to Sir John and Lady Hall for their personal donation.



## Toys for Boys and Girls!

Andy Birtles

I considered that for a change, the more interesting aspects of mining include some interesting means of transport and the rest. I thought that for 2022 we should explore some of the different vehicles that could assist in our mining operations. Here are some of the more fun aspects of the work with which an engineer in the minerals industry can be involved.

### UAZ

Until I discovered the SHERP, I considered this to be the best vehicle on the planet! Four wheel drive and able to go virtually anywhere (in Russia!).

UAZ is an automobile manufacturer based in Ulyanovsk, Russia, which manufactures off-road vehicles, buses and trucks. It has been part of the Sollers automotive group since 2000.

UAZ is best known for the UAZ-469 utility vehicle, which has seen wide use as a military vehicle in the Eastern bloc and around the world. The UAZ factory started production in 1941 as part of the Soviet war effort. 51,706 UAZ vehicles were produced in 2016.

The UAZ-452 must be the best vehicle ever in Russia – in summer the



Photo Courtesy Reezocar



Photo Courtesy Facebook

air conditioning system (wind down the windows) is simple and effective. In winter, the heat from the engine keeps you warm. If the vehicle breaks down, the engine is accessible without having to go outside in minus forty (plus/minus) degree temperatures. Yakutsk holds a record of being the coldest place in Russia at -64°C

The one in which I travelled to appreciate the engineering was equipped with a full bar and a fridge – Volkswagen camper van eat your heart out! A brilliant design!

I see there are variants. These must be Russia's answer to the Jeep or the Land Rover

### SHERP

Sherp International is the developer and manufacturer of SHERP utility task vehicles that have no equal in the world in terms of their capabilities and characteristics. A company with an international quality standards certificate ISO 9001 headquartered in Kyiv, Ukraine.

It took 20 years to develop a reliable amphibian utility task vehicle that can move on any surface and overcome the most difficult natural obstacles. SHERP is a reliable assistant for specialists who overcome natural difficulties as a part of their



Photo Courtesy Sherp

profession: geologists, oil workers, rescue agents, fishermen, hunters, extreme

drivers, and travellers. In partnership with United Nations World Food Programme (WFP), SHERP fights hunger in several countries around the world. In 2016, the British Top Gear auto show called SHERP "a tank for two". The latest models can even "be tanks" for 4, 6 and even 22 people. SHERP is a technology company that helps customers to overcome obstacles, to solve their challenges, to value trust and collaboration.



Photo Courtesy Sherp

SHERP actively develops a new niche, while remaining the market leader in utility tack vehicles.

In my opinion this must be the best vehicle in the world!

See more at <https://sherpglobal.com/>

### Petrovich

There's also Petrovich based in Tobolsk. The all-terrain Petrovich vehicle specifications and a review can be found at [tostpost.com](http://tostpost.com). Professor Brian Cox mentions these vehicles in his Human Universe series. More on these in a future Newsletter.

## Ground Freezing Symposium

Alan Auld



### 11<sup>TH</sup> INTERNATIONAL SYMPOSIUM ON GROUND FREEZING LONDON 2023

#### Advance Notice

The above important, prestigious international symposium will be held during 10<sup>th</sup> – 12<sup>th</sup> October 2023. It will be led by Keller North America supported by the IOM3 Mining Technology Division (MTD) and the Ground Engineering Group (GEG) using IOM3 as the professional body to run the Symposium. The Proceedings will contain refereed papers. A further announcement listing the topics and requesting the submission of abstracts for approval will follow shortly.

#### Symposium Background and Details

An International Symposium on Ground Freezing was first organized in 1978 and convened in Bochum, Germany. The symposium series subsequently convened every three years in cities across the globe. The 9<sup>th</sup> ISGF, Brussels 2000 was the last one on the three-year cycle. A 10<sup>th</sup> Conference was held in Maine in 2006 but since then no further ISGF Symposia have been held, a period of 15 years until now.

The ISGF provided a forum for ground freezing practitioners from all over the world including engineers, contractors, academics and scientists to meet and exchange ideas, theories, and project case histories. It also served as a vehicle to promote this highly specialized and complex technology.

Since the last symposium Artificial Ground Freezing (AGF) has grown in popularity and its application has expanded to projects including shafts, tunnels including cross passages and large barrier walls with increased attention to soil-structure interaction in urban areas.

The technology itself has advanced tremendously in the last twenty years. The advancement of numeric modelling for heat transfer and structural analysis, more powerful and efficient refrigeration plants and new concepts in instrumentation have changed the approach to ground freezing projects. Yet, with these advancements the basic theories and mechanics have not changed. A new generation of engineers, project managers, academics and researchers have emerged and continue to advance the technology.

With these advancements and the new generation of professionals, it is imperative that the ISGF re-convene and move forward. Members of the previous symposia have collaborated and organized ISGF 2023, which will be held in London, during October of 2023. It is the goal of the Organizing Committee to bring professionals from all six continents to exchange ideas, share experiences on not only artificial ground freezing projects, but the mechanics of frozen earth.

The Symposium will be particularly relevant to engineers involved in the construction of foundations, shafts and tunnels which require ground temporary support and water control measures during construction using AGF. Such projects require specialized site investigation and frozen soil testing measures to enable the appropriate ground engineering designs to be carried out for successful construction by contractors.

Frozen ground also occurs naturally near the surface, and deeper in permafrost susceptible regions, and hence frost heave and freeze thawing become important for near surface foundation and pavement design.

The warming of Arctic regions has created immeasurable geotechnical issues and for this reason, an additional session that includes Sustainability in Cold Regions will be included. This symposium will provide a forum for the discussion of frozen earth mechanics as it relates to infrastructure in the Arctic regions.

This three-day symposium will include several technical sessions on specific topics, an exhibit area to promote new technologies as well as social events to collaborate and enjoy London.



Photo Courtesy A Auld

## Copper Canyon

Tony Francis

Occasionally there are novels about mining. This was brought to our attention by Tony Francis, FIMMM, who suggested that we could add a note in the newsletter of a very relevant book recently published describing how accidents can occur, even in the best operated and regulated mines. The book is called **Copper Canyon** by Tim Means. The book describes in great detail the personalities, the systems, the regulations and even the inspectors contributing to a serious underground mine accident. The mine is an underground coal mine in the USA but the conclusions are valid to the industry irrespective of location. Obviously written in American English, but it is available for order in the UK.

### Synopsis

As the Mine struggles to survive the climate-change driven disappearing market for its coal, it comes under increasingly costly regulatory pressure to protect the miners' safety. The Mine's survival and the miners' safety are imperilled by the combined personal vendettas of a powerful government safety inspector and a venal and vicious coal miner.

Enforcement of the federal law intended to protect miners' safety rights and a trial held to vindicate those rights instead jeopardise their very survival and a disastrous accident results. Although the end seems near for the Mine and the little town of Heavenly that depends on it, a talented lawyer and a young Mine foreman trained in metallurgy come to the rescue, bringing hope for the future.

**Copper Canyon** is an exploration of the fascinating and unfamiliar world of coal miners manoeuvring monstrously massive mining machines tunnelling through the darkness thousands of feet beneath the surface. At the same time, it is an exploration of the role of law versus religion and morality in regulating behaviour and striking the proper balance between too little and too much government regulation in protecting public safety and health.

### The author

Tim Means is a practicing lawyer based in Washington DC focusing on administrative law, litigation and regulatory policy representing the mining industry, mine operators and individual miners on occupational, health, safety and environmental issues.

### Reviews

"As someone who has devoted his life to mining and mine safety, and managed both coal mines and the federal agency that ensures that miners' safety is protected, I highly recommend this masterpiece of story-telling that speaks truth to power and shines with authenticity. Every miner should read this book!" *Dave Lauriski, former U.S. Assistant Secretary of Labor for Mine Safety and Health*

"A fast-moving novel set in the unfamiliar world of underground mining, it is a riveting, action-filled story about the characters' compulsions, violence and motivations, and a real-world illustration of the law of unintended consequences in the context of government regulation." *Mike McKown, Sr. VP Law, American Consolidated Natural Resources, Inc., & former General Counsel of Murray Energy, the largest underground coal company in America.*

"A compelling story of the dysfunctions often found with our laws and their potentially tragic consequences, and a realistic and harrowing portrayal of a mine accident which the government investigates, not so much to search for the truth as to justify its own conduct. Captures the real-life courtroom drama of an agency enforcement hearing with miners' lives hanging in the balance." *Roscoe C. Howard, former U.S. Attorney for the District of Columbia.*

### Details

**Copper Canyon**, Tim Means, © 2021, ISBN No – 978-0-578-91422-0. Available from Amazon.

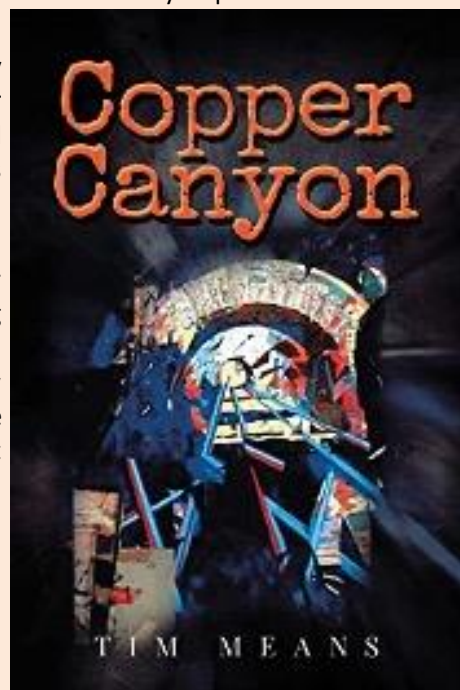


Image Courtesy Amazon



## Global Action on Tailings 3

Andy Birtles

### Introduction

In the previous Newsletter a profile of the ICMM and the Church of England was presented. This edition (the last in the series) will present other global professional organisations who are involved in the promotion of standards improvement for tailings dams associated with the mining industry.

### CRIRSCO

CRIRSCO, which was formed in 1994 under the auspices of the Council of Mining and Metallurgical Institutes (CMMI), is a grouping of representatives of organisations that are responsible for developing mineral reporting codes and guidelines in Australasia (JORC), Brazil (CBRR), Canada (CIM), Chile (National Committee), Colombia (CCRR), Europe (PERC), India (NACRI), Indonesia (KOMBERS \_ KCMI), Kazakhstan (KAZRC), Mongolia (MPIGM), Russia (NAEN), South Africa (SAMREC), Turkey (UMREK) and the USA (SME). The combined value of mining companies listed on the stock exchanges of these countries accounts for more than 80% of the listed capital of the mining industry.



Image Courtesy CRIRSCO

The similarity of the various national reporting codes and guidelines has enabled CRIRSCO to develop an International Minerals Reporting Code Template, which is available on the CRIRSCO web site. This can act as a "core code and guidelines" for any country wishing to adopt its own CRIRSCO-style reporting standard, after including provisions for country-specific requirements such as those of a legal and investment regulatory nature.

Following discussions over several years, CRIRSCO published fifteen standard definitions, which have been incorporated in International Reporting Template of CRIRSCO and in the Codes and Standards of most of the CRIRSCO Members in their own updates.

In the early part of the millennium, CRIRSCO was supported by individual professional bodies in member countries but lacked the organisational and financial resources to handle its expanding work load effectively. Following a series of discussions from late 2006, CRIRSCO formed an alliance with ICMM and became a Task Force of that organisation charged with promoting and maintaining best practice reporting. In 2009, CRIRSCO became a Strategic Partner of ICMM.

Further information can be found at <http://www.crirSCO.com/welcome.asp>

### OneMine

OneMine is an online global mining and minerals library providing access to more than 139,000 articles. As a collaboration between international professional societies in the mining and minerals related fields, OneMine is a comprehensive collection of relevant technical papers, research, articles, journals, books and other published works, accessible in one, easy to navigate location.



Image Courtesy CRIRSCO

Access can be attained through participating professional organisations (for IOM3 members via My IOM3 from the log in page – it is quite a mission though) or through the GMPA, or from [www.onemine.org/index.cfm](http://www.onemine.org/index.cfm).

A recent search on OneMine for "tailings" reveals some 4,500 documents relating to this subject, the majority of which are submitted by American, Canadian and Australian professional organisations.

Further information can be found at <https://www.onemine.org/>

# The Death of King Coal

Laurence Morris

## Introduction

Coal dominated Britain's energy needs for centuries then in the last 30 years production fell to almost nothing. Most coal mines closed, and it seems highly unlikely that significant coal-mining will happen again in the UK.

Coal's fall was fast: coal imports rose as UK mined coal could not keep up with the electricity demand in the 90s and into this century. The black stuff has been replaced by wind power, and in the next 10 years there will be a steeply rising demand for electricity as transport, home and commercial heating, and the remaining industry is electrified to meet the government's zero-carbon targets. The rise of wind farms will have to be as rapid as coal's fall was if those targets are to be sustained.

There is a real possibility that the build of wind farms won't be fast enough to meet demand. Coal imports could yet resume, either as physical coal or from electricity imported from Europe where coal is still burnt as power station fuel.

## King Coal's dethronement

Britain has almost stopped burning domestic coal: last year the amount burned in power stations fell to less than 2 percent. Indeed, for two months over the summer no coal was burnt at all.

Nevertheless, fossil fuels still dominate power generation: oil and gas still account for around 45 percent of electricity. In comparison, renewable energy provides 37 percent and the balance is held by nuclear energy.

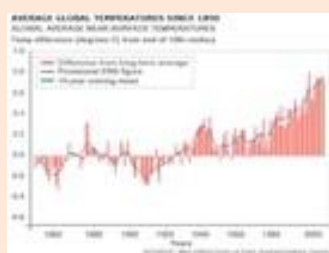
The decline in coal production and consumption is relatively recent: it began after the Miners' Strike in 1984 and accelerated from 2012 to virtually zero today. A scale of increasing carbon credits to make coal uncompetitive accelerated the fall.

The main reason for the fall is largely political. The Thatcher government wanted to reform the public sector and encourage alternative sources of energy for power generation. From 1984 the government closed between 6 and 15 collieries a year, then from 1994 undertook closures at a slower rate until the last deep mine, Kellingley, closed on 18<sup>th</sup> December 2015.

The UK discovered cheaper sources of energy, largely North Sea gas and oil in the 1960s, accompanied by a modest growth in nuclear power. British Rail switched over from coal to diesel and electric, and households installed gas and electric central heating, impelled by the various clean air acts.

Electricity demand rose until it peaked in 2005, then consumption today has fallen to the same level as the 1970s, despite a population rise of five million people. The drop in demand is caused by the growth of more efficient technologies such as LED lighting, by energy savings and a decline in manufacturing.

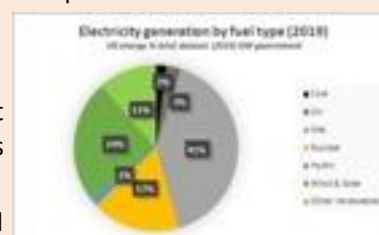
A welcome side effect is that, according to [government statistics](#), UK total greenhouse gas emissions are down 38 percent from 1990 levels. An awareness of the adverse impact of people on the natural world has grown since the Rio Earth summits in the 1990s, and during this century global warming has come to dominate green politics – and government energy policy.



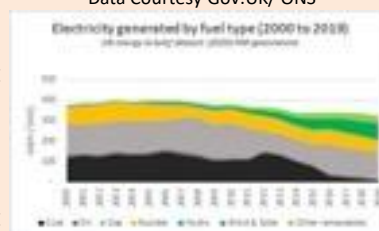
Data Courtesy Gov.UK/ ONS

There has been a rise in global temperatures of 1°C since the 1930s. The extent of natural and anthropogenic warming has never been really established although scientific wisdom is that man-made production of greenhouse gases predominates over inter-glacial warming.

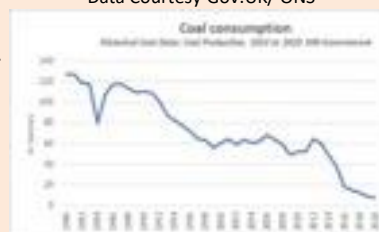
Since the 1990s anthropogenic warming has become the main driver in changing the energy mix in electricity generation from coal to renewable energy. In 2018 the British government set a target of zero greenhouse gas emissions by 2050. The main casualty is UK mined coal; from 2020 onwards, none will be burnt in power stations.



Data Courtesy Gov.UK/ ONS



Data Courtesy Gov.UK/ ONS



Data Courtesy Gov.UK/ ONS



## COP26, Glasgow, 2021

Laurence Morris

“We have kept 1.5 degrees alive; but its pulse is weak and it will only survive if we keep our promises...and take rapid action”, part of the concluding remarks by the COP26 President, Alok Sharma. Greta Thunberg, the teenaged Swedish activist, went further ridiculing COP26 as “blah, blah, blah”.

Conference of the Parties, or COP gatherings, occur almost every year, and COP25 held in Madrid, also promised far more than it delivered; Patricia Espinoza, executive secretary for UN Climate Change expressed disappointment. Essentially, the Madrid conference was a prequel for COP26 in that national governments were to bring their carbon-reduction plans to fruition at Glasgow. Roger Harrabin of the BBC opined that there would be enormous pressure on COP26 to succeed.

The key objective of COP26 was to uphold the target of keeping temperatures at or below 1.5°C higher than pre-industrial levels, which originated from the “IPCC Special Report on Global Warming of 1.5°C”, issued in 2018. Governments were to detail how their legislatures were going to achieve carbon reductions. Focus was to be given to “real world sectoral action” (UK Presidency), based on four areas: mitigation, adaptation, finance and collaboration.

The last two parts, finance and collaboration, consisted of promises and pledges to raise trillions of dollars from mainly western governments, companies and NGOs. After Madrid, many promises proved to be empty; it was hoped to renew, indeed add to those pledges at Glasgow and use moral authority to ensure that entities pay up.

Most of the delegates’ energies were dedicated to mitigation, attempting to limit global warming by stopping carbon dioxide emissions, known as net zero carbonisation. A final result of the Glasgow Climate Pact is the claim is that over 90% of the world GDP and global emissions are covered by net zero commitments. If these commitments are carried out to the letter – they are non-binding – then greenhouse gas (GHG) emissions will be around five billion tonnes lower in 2030, about 10% of the 50 billion total in 2016 (ourworldindata.org).

World-wide zero carbon targets, designed to keep 1.5°C in view, will require an enormous global effort. The conference envisaged four main approaches: reducing power generation from fossil fuels, reversing deforestation, switching to electric vehicles, and reducing methane emissions.

The complete elimination of burning coal by 2030 was originally proposed as the principal target, but several “low income” countries, and China, announced they will continue to grow their economies by using coal for power generation. The conference compromised by promising USD 20 billion for “a just and inclusive transition from coal to clean energy”, though no firm targets were set. The presidency bravely called its financing scheme “a huge leap forward”.

The second mitigation measure is deforestation and preserving wetlands, which are seen primarily as carbon sinks to absorb carbon dioxide. The conference proposed various pledges, again non-binding, and financial packages to help developing countries.

The electrification of transport is the third measure. Transport, road, rail, water, and air, presently consumes around half the world’s oil and produces 10% of GHG emissions. No firm commitments were made, and action is limited to appealing to vehicle makers and investors to increase the production of electric vehicles.

The fourth pledge is to reduce methane emissions.

The most disappointing part of the Glasgow Pact is the section on adaptation. The utmost effort was given to mitigation but non-binding treaties and the aspiration of developing countries to grow their economies, global emissions are likely to increase even if all commitments are met. It is hard to see how the temperature rise will be held to 1.5°C by the end of the century. As the impact of climate change intensify and sea levels rise, then more attention should be given to adaptation, such as flood defences, crop diversification, food security, transport links, rainwater dams, forestation and so forth. At Glasgow a “Dialogue on Loss and Damage” was agreed on disaster relief and USD 12.7 billion promised to various countries and NGOs working on adaptation, but no specific targets were discussed.

As climate change starts to bite, and if the mitigation measures fail to make more than a marginal difference, then a much larger part of the trillions spent on mitigation will have to be diverted to adaptation.

## UK Lithium

Christine Blackmore

The development of a domestic supply chain for lithium is a strategic priority for the UK therefore geothermal and hard rock sources need to be investigated. At present (2020) all the lithium used in the lithium ion batteries industry in Europe is imported. Currently there are no European, let alone UK supply chain for lithium.



Image Courtesy BGS

Whilst lithium is not yet designated a critical raw material (CRM) it is certainly considered a strategic metal and there has been recent interest in investigating the potential to secure European lithium supplies. The UK government is concerned about potential impacts of lengthy supply chains and over reliance on a few countries for strategic commodities such as lithium. Lithium is imported into the UK primarily for the manufacture of lithium-ion batteries, in the forms of lithium carbonate, lithium oxide and lithium hydroxide. In 2017 the UK imported 1919 tonnes of lithium carbonate and a combined 324 tonnes of lithium oxide and hydroxide (Bide et al., 2019).

In 2017 nine countries were known to be producing lithium: five countries from lithium minerals (Australia, China, Zimbabwe, Portugal and Brazil), and four from brines (Chile, Argentina, China and USA) (Brown et al., 2019), collectively producing 58,000 tonnes of contained lithium. Between 1993 and 2017 global mine production of lithium increased at a compound annual growth rate of almost 9%. Production is dominated by Australia, accounting for 54% of total in 2017.

Lithium in the UK only occurs as a minor element and in the mica found in granite and granite pegmatites especially in the south-west of England and indeed, lithium-bearing mica was first identified in the St Austell Granite in south-west England in 1825, (BGS minerals for UK May 2020),

and only a small amount from the Trelavour Downs pegmatite (St Austell Granite) was used for firework manufacturing (Hawkes et al., 1987), no other exploitation has been undertaken. Other lithium minerals, such as amblygonite ( $(\text{Li}, \text{Na})\text{AlPO}_4(\text{F}, \text{OH})$ ), spodumene, petalite, montebrasite ( $\text{LiAl}(\text{PO}_4)(\text{OH}, \text{F})$ ) and elbaite ( $\text{Na}(\text{Li}_{1.5}\text{Al}_{1.5})\text{Al}_6\text{Si}_6\text{O}_{18}(\text{BO}_3)_3(\text{OH})_4$ ), are very rare and have only been documented at a few localities in the UK (Tindle, 2008). To date no reserves or resources for Lithium have been reported. Other sources of Lithium are potentially from the recovery of geothermal brines which are now considered to be an important part of the potential UK lithium supply chain. The figure (BGS minerals for UK May 2020) identifies areas where there are potential sources of lithium in the UK.

Although there are potential sources of lithium minerals in the UK, it should be noted that most of these are only possibly in small amounts. The search for lithium sources has not been fully investigated outside of the South East of England to understand whether there is in fact a commercial and economic opportunity. The information on occurrences of lithium minerals in other parts of UK relies heavily on old data and where Lithium was possibly not the primary mineral targeted.

As discussed above the South East of England is being explored for lithium sources and indeed exploration drilling and sampling of geothermal waters has been very active since 2017. Lithium can also be extracted from kaolin clay, as the pilot study suggests, this is also being investigated in the South-east of England.

## From Russia with love - 2

Ian Bowbrick



Photo Courtesy IOM3

In this second article on the activities of IOM3 in Russia, Ian Bowbrick talks about the Russia-UK dialogue, its history and plans for the 2022 event. One of the key benefits sought from any international relationship between IOM3 and likeminded organisations is technology transfer. This not only serves to inform members of related activities being undertaken in other countries, but also showcase and promote similar work being undertaken in the UK by both those in academia and industry. It was therefore unsurprising when the Russia-UK Raw Materials Dialogue was conceived in 2016. The inaugural event was held in St Petersburg in October 2017, just before the centenary of the revolution. Finding common ground for the event was far simpler than might be thought and reflected the hot topics for the industry at the time. 'The Major Elements of Sustainable Development' was our umbrella theme and of interest

to both partners. It also struck a chord with the UK Foreign Office who financially supported the UK involvement. We were also welcomed by the team at a reception organised in the now closed UK consulate in St Petersburg. Aside from the dialogue, a business forum was also organised to provide an opportunity for businesses to network and seek opportunities for joint ventures and collaboration. There was also an excellent supporting social programme, where attendees could experience at first the Russian culture and heritage of a country with historically strong links to our own.

This inaugural event was an excellent pilot to not only test the demand for an event of this nature and quality of the collaboration, but also identify what worked and what didn't. On the plus side both sides put forward some excellent speakers, presentations and thought pieces. Our Russian partners were also able to host the event in an excellent facility – their Multifunctional Complex – which includes a 2,200 seat congress hall, state of the art breakout rooms and comfortable accommodation. On the downside, the then process to secure the necessary visa to enter Russia, as many may know, was involved and costly. It is worth noting that the process which existed at the time for a Russian national to obtain a visa to enter the UK was equally onerous. This has now improved for those visiting Russia thanks to changes made for hosting the 2018 FIFA World Cup competition which have remained in place.

Subsequent dialogues were hosted in London (2018) and St Petersburg (2019). This latter event switched the umbrella theme to 'The Investment Potential of Mineral Resource sector as a major element of Russia-UK relations', which has remained in place since. The switch to a more overt business perspective attracted an entirely new audience and speaker line up. As can be imagined, the challenges of investing and running a profitable and successful business in both countries were never far from the surface and frequently voiced, although each had their own quirks.

As with so much in recent times, the COVID pandemic forced the cancellation of the 2020 event and the 2021 dialogue to be hosted digitally on Zoom. Whilst this prevented much of the face to face and social interaction, it again opened the Russia-UK Raw Material Dialogue to a new audience who could watch and participate from the comfort of their own home or office without the financial or carbon footprint penalty. As I write this article, plans are already being agreed for the 2022 event. With uncertainty remaining over the global COVID situation, the UK as hosts has opted for a virtual event on the Zoom platform. There will however be a new theme for 2022 and we will be switching our attention to umbrella theme of Energy Transition. Full details will be available in due course.

I would like to take this opportunity to thank the many IOM3 members who have contributed to the success of the dialogue series to date. Whilst it is not possible to mention everyone, and I apologise for not doing so, mentions go to: Christine Blackmore; Paul Bradley; Dr Dennis Buchanan; Dr Colin Church; Prof Jan Cilliers; Martin Cox; Nick Hatch; Rt. Hon Charles Hendry; Norman Jackson; Jan Lewis; Bob Siddall; and the late Chris Broadbent, a keen supporter of this initiative and to who we dedicated the first collection of papers that were published to accompany the 2021 dialogue.



## ICMM

## MTD Board

**Article from the ICMM December 2021 Stakeholder Newsletter**

For a full version of this article visit:- [ICMM • Stakeholder Newsletter: December 2021](#)

Last week was Human Rights Day, and I wanted to take a moment to reflect on the role of business in championing the rights of everyone, everywhere – regardless of race, colour, religion, sex, language, political or other opinion, national or social origin, property, birth or other status.

In a year that was rightly focussed on the climate crisis it is important that we never lose sight of our responsibilities in supporting social progress and human dignity. In the 73 years since the signing of the UN Declaration of Human Rights, it is possible to call to mind countless examples of compassion, courage and care that have advanced sustainable development in and around mining communities. This is what I want the mining and metals industry to be known for, which includes full and fair redressal in instances where the industry has fallen short.

As an organisation, ICMM is working to enhance the contribution of mining and metals to sustainable development. To this end, we believe that the transforming of finite natural resources into economic growth and social development is best achieved through their responsible extraction, within effective mineral resource policy frameworks set by government. Transparency and accountability by government and industry are key for this.

Therefore, I'm delighted to announce that ICMM company members have committed to enhance their performance expectations and disclose all mineral development contracts granted or entered from 1 January 2021, wherever they operate. This new commitment, set out in ICMM's updated Transparency of Mineral Revenues:



Photo Courtesy ICMM

Position Statement, marks a significant step by approximately a third of the mining and metals industry to strengthen approaches to mineral resource governance.

Next year we will enhance transparency even further with the publication of a framework for consistent reporting on social and economic benefits generated. The framework will include a commitment to report tax information country-by-country. This will allow stakeholders to track, for example, if a company extracts copper in Zambia and then sells it in Europe, how much tax is being paid to the Zambian government.

Contract and tax transparency are two critical components of a safe, fair and sustainable mining and metals industry, representing two sides of the same coin. The former allows citizens to understand what should have been paid, and the latter enables them to see what has actually been paid.

Actions such as these, and others included in this newsletter, are just the start. Our Strategy and Action Plan for 2022–2024, to be published early next year will include a strong focus on the 'S' and 'G' in ESG because we believe that the 2030 Agenda will only be met if we achieve prosperity for people everywhere and the planet at large.

Ro Dhawan

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**ICMM**  
International Council  
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PRINCIPLES**

## Medals and Announcements

Wyn Griffith

### Obituary

It is with great sadness we have learned of the passing away of Prof John Tunncliffe. Prof Tunncliffe had served on the Midland Institute of Mining Engineers Council for over 50 years and held every senior post within the Institute. He had also been National President of the then Institute of Mining Engineers. A full obituary will follow later, but we pass on our condolences to his family and friends.



Photo Courtesy D Seath

### John F Tunncliffe Medal



Image Courtesy IOM3

The Trustees of the Midland Institute of Mining Engineers (MIMinE), in recognition of the long and outstanding contribution Prof Jonathan Tunncliffe had made to the MIMinE over 50 years of service and his association with the North of England Institute of Mining and Mechanical Engineers (NEIMME), agreed to strike a medal in his honour and award it annually to an outstanding young engineer. Professor Tunncliffe had a long and illustrious career in the mining industry, holding several senior positions. He left the industry in the early 1980's to pursue a career in academia, becoming Head of and Professor of the mining departments at Newcastle and Leeds Universities, bringing his practical experiences to a great many students during that time. He has always taken a great interest in the development of young engineers, both academically and industrially. He was particularly proud to chair the Royal Academy of Engineering Headstart Board from 1995 to 2013. In collaboration with universities, this five-day course was open to Year 12 or equivalent students who were interested in knowing more about science, engineering and technology. He had kept a strong interest in the activities of NEIMME and had been a member of their Institute for over 30 years. He always promoted closer links between the NEIMME and MIMinE whenever possible and supported their events.

Prof Tunncliffe also initiated the J F Tunncliffe Paper Competition in 1978 to encourage younger more junior members of the MIMinE to become more confident in public speaking and making presentations, both at work and in the wider environment. This competition is held in conjunction with IOM3's Young Persons' Lecture competition.

Winner of the J F Tunncliffe Medal 2021 was James Heslington of Anglo American with a paper entitled "Construction of a deep shaft sinking operation in the United Kingdom, 2021".

#### JF Tunncliffe Medal Competition Conditions

The John F Tunncliffe Medal is awarded on the basis of work of outstanding quality by a young engineer, as recognised by an employer, HEI or by NEIMME or MIMinE. All engineers, of any engineering discipline, under the age of 35 and who are members of either MIME or NEIMME are eligible to receive the award. The Medal will normally be awarded annually, with only one medal being jointly awarded by NEIMME-MIME per year.

#### Nominations and Award Process

Entry is open to engineers (in the broadest sense of the word) under the age of 35. Applications from both industry and academia are encouraged. Entrants are expected to be members of NEIMME or MIME which can be arranged as part of the competition entry. Entrants for the award may register their entry by writing to the Hon. Secretary of their respective regional Institute (either NEIMME or MIME – further details below) stating their membership status and talk title. All entrants must be 35 or under at the closing date for entries to the award. Closing date for this year's entries is: Friday 1st of June 2022

Nominees will then have to present a 20 minutes presentation on their work with an emphasis on the nominee's independent contribution to any project. This will take place before a joint NEIMME-MIME judging panel, who will decide the final nomination for the award.

Entries from NEIMME members or from those active in or surrounding areas of Durham, Northumberland, Cumbria, Tees- and Tyne-Side: [office@mininginstitute.org.uk](mailto:office@mininginstitute.org.uk).

Entries from MIME members or from those active in Midlands area: [office@themime.org.uk](mailto:office@themime.org.uk)

Further details on the competition and judging process are included in the [Competition Outline](#).

## The IMM Gold Medal 1954

Bob Siddall

### The Institution of Mining and Metallurgy Gold Medal 1954



Photo Courtesy R Siddall

This medal was recently put up for auction and purchased by the author. It was awarded to Professor William Richard Jones CBE, DSc, DIC a Past president of the Institution of Mining and Metallurgy.

Professor Jones received the award in recognition of his many years of untiring service to the advancement of the science and practice of economic geology, with special reference to his work for the Royal School of Mines, for the Institution, and in the service of his country, in the UK and abroad.

Professor Jones was at that time the only member who had received both Gold Medals awarded by the Institution.

In reply Professor Jones said that 'it was the fourth time in the history of the Institution that the Gold Medal had been awarded to a geologist. Almost 50 years ago, in 1907, it was awarded to Sir Archibald Geikie; 40 years ago, to the famous Canadian, Willet Miller; and a quarter of a century ago to Sir Thomas Holland, three geologists of international fame who would long live in the pages of their contributions to geological science. Even to be listed in the records of the Institution with such a triad of geological stars was a real honour.'

At the same Annual General Meeting the President announced the award of Honorary Membership to Sir Winston Spencer Churchill, KG, OM, CH, for his leadership and his outstanding services to the Commonwealth and Empire and in recognition of the Institution's deep and enduring indebtedness.



Photo Courtesy R Siddall

## Local Society News

David Seath

### THE MIMinE 15<sup>th</sup> Safety Seminar



Image Courtesy MiMinE

Part of the remit of local societies within the Mining Technology Division (MTD) is to provide a conduit for the sharing of experience and disseminating information, particularly regarding health and safety issues within the industry. In order to facilitate these important matters, the Midland Institute of Mining Engineers (MIMinE) is holding its 15th Safety Seminar, with technical papers of relevance to mining and mineral extraction. The theme of the event is 'Safely Managing the Challenge of Change'. This annual event attracts a diverse audience which includes senior personnel, procurement managers, trade unionists, students and apprentices. The event also features company exhibition stands and ample opportunities for delegates to network during break times.

This year the Seminar will take place on Friday, 22 April 2022 at the Crown Plaza Hotel, Sheffield. An Event Flyer and Registration Form can be downloaded from the MIMinE website ([themime.org.uk/events](http://themime.org.uk/events)). Pre-registration is essential to secure your place. The cost for delegates is £50 per person. Graduates/students can apply for grant funding from MIMinE.

Members of the MTD Board will be in attendance and would welcome meeting anyone who wishes information on MTD activities.

#### JOIN THE MIMinE

IOM3 Members need to specify the MIMinE as your Preferred Local Society: please log on to your account with [www.iom3.org.uk](http://www.iom3.org.uk) For retired or non-mining members, please apply for Life Membership. Download Membership Application from the MiMinE website: <https://www.themime.org.uk/>