

The Royal Society of Victoria

Promoting science since 1854

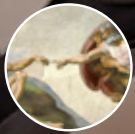
SCIENCE VICTORIA

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RSV.ORG.AU

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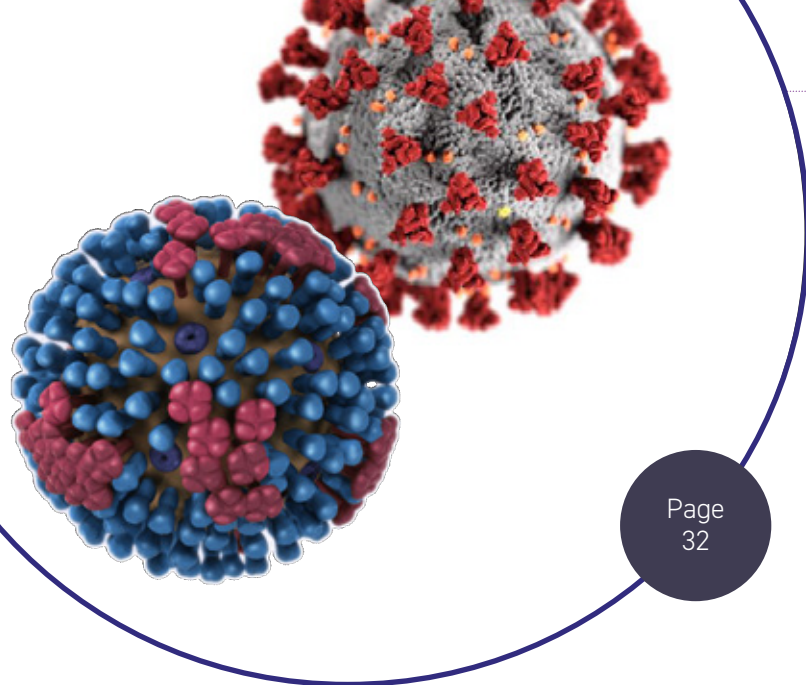
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FROM THE PRESIDENT

The Science Funding Dilemma

In his appearance on ABC television's Q&A in November 2017, particle physicist Brian Cox explained the need for investment in scientific research.

He explained that good Research & Innovation Policy must firstly educate people, at 'the cutting edge,' to bring new knowledge in and to commercialise it in-country.

His second point was that innovations create the new jobs of the future to replace the old jobs that will be taken up by automation. He made the point that these jobs most often come from technologies that are developed when we try to do something very difficult; for example, the particle beam therapies for cancer treatment developed using the Large Hadron Collider.

He also mentioned the World Wide Web, the use of Einstein's Theory of Relativity in GPS systems worldwide, and the 'spin off,' high impact technologies that are developed when we attempt difficult things.

"There's the generation of 'new knowledge' which always occurs at the border between the known and the unknown where you don't know what you're going to get... Elon Musk and Jeff Bezos always say that the real steps forward, the real innovation in a society, in a civilisation, occur 'at the frontier.' It hasn't been a physical frontier for some time but now it can be again, but it occurs at the frontiers of knowledge and at the (physical) frontier; you need to get people to that frontier."



The need for investment in science and science research in Australia is no doubt necessary but is a subject of contention. Liam Mannix recently wrote an article titled *Desperate, despondent, ignored: Australian science at crisis point* in the Sydney Morning Herald.

Analysis shows that research and development funding as share of GDP has been falling for fourteen years and that relationships have broken down and that the 'system of research', the value proposition that Brian Cox promulgates, is inadequate in a modern Australia.

Data shows that 79.8% of Australian Research Council (ARC) grant applications are not successful and that the National Health and Medical Research Council (NHMRC) approves just 9.9% of ideas grants. The applications are time-consuming to produce and over-prescriptive in format, and in some recent cases, grants approved for funding by the ARC have been vetoed by the Federal Acting Education Minister. This has contributed to a high-level of despondency amongst researchers.

Former Chief Scientist Ian Chubb makes the same point as Brian Cox regarding the need for the generation of 'new knowledge.' Nobel Laureate Professor Brian Schmidt, Vice-Chancellor at the Australian National University in Canberra, concedes the current process is not fit for purpose.



Professor Brian Cox discussing the need for investment in scientific research with host Tony Jones on ABC TV's Q&A, November 2017.

For the Royal Society of Victoria this dilemma is one that we need to understand and discuss with our membership and the wider community. As we encourage young Australians into STEM careers, we must work to ensure the next generation of graduates is able to translate their hard-won skills into secure career pathways, thus expanding Australia's research capacity – both beneficial outcomes for the nation.

The Society's role in the promotion and advancement of science puts us squarely in a position to have a voice. To this end we are encouraging discussions with a range of like-minded, science and technology focused organisations and societies and examining how affiliation with The Royal Society of Victoria might enable us to 'speak with one voice' on a range of critical issues, including appropriate funding of scientific research.

Again, I encourage you to contact me at president@rsv.org.au. We would like to publish your letters and thoughts on the issues I have raised and to publish your letters in future editions of this newsletter. Please respond to the letters and articles we publish from other members also, as we seek to foster productive discussions and a marketplace of ideas.

Rob Gell AM MRSV

President



FROM THE CEO

Responding to the Era - A Strategic Realignment of Victoria's Scientific Society

There have been few benefits to operating an intrinsically social organisation during "the world's longest COVID lockdown" here in Melbourne, so let's celebrate the ample time we have been gifted for reflection!

Our Council has been circling the renewal of the Royal Society of Victoria's mission and strategic goals for many years now, starting out with the production of the first *Concord and Progress* strategy published back in early 2016.

Over the course of the past two years, thanks to the input of many members and supporters of the Society, we have taken the opportunity to re-examine and refocus the Society's strategic settings, structures and scope of activities in service of our fundamental purpose to advance and promote the sciences in Victoria.

IN SUMMARY:

- Good science is required to inform good decision making; it is not, in itself, a good decision. Effective decision making is an interaction of due process with the constant variables of education, ethics and the vicissitudes of culture. This assigns scientific literacy as a vital component of effective citizenship, a foundation for distributed leadership and a precursor to a functional liberal or social democracy; by building our individual and collective capacities to act effectively, our knowledge safeguards our rights by helping us fulfil our responsibilities.
- To be activated for the "public good," scientific research and knowledge must be translated into forms that can be used by communities, industries and governments. Our scientific endeavours must simultaneously and constantly communicate with and draw from a "cultural knowledge" base in order to make their relevance visible to all.
- The Royal Society of Victoria's role as a convenor of Victoria's science community must be reinvigorated and extended, taking in the social sciences and stretching to include the sectors and knowledge systems beyond academia. This way, we connect

Victorians everywhere with expertise that can enable confident, effective decision making in uncertain conditions – informed, localised responses to issues both global and regional.

- Through a restructured Fellowship program and a concern with discovery, discussion and deliberation, our renewed focus is on the intersection of science and society, with an aim to translate disciplinary expertise into effective actions within each social sector through a process of knowledge exchange – a "feedback loop" between scholars, public servants, private sector experts and community-based knowledge holders that builds and distributes new knowledge.

AT LENGTH

The most important recalibration to note is a harder emphasis on translation; a term frequently used to describe the journey of research work "from bench to bedside" in medical science, it is equally as applicable to other fields, particularly in a country renowned for punching well above its weight in research activity yet remaining a trenchantly low consumer of that output in the industrial and community sectors in particular. Clearly, we are not doing enough to make scientific advancements in Earth systems, ecology, sensing, AI, energy, engineering and physics relatable to the people who could most benefit from this engagement in serving their communities, enterprises and sectors.

In terms of "filling a niche," the Society clearly has work to do in assisting with the "public good" element of translation; while we still champion the economic benefits of local commercialisation of local research outputs, as many research institutions are already capably doing, there are

few organisations that focus on the open access, "creative commons" aspect of translating specialised knowledge into what can be termed as "folk knowledge," mainly because there isn't really a dollar to be had from it, despite the clear benefits to Victorian communities, economies, governments and environments. Enter the community not-for-profit.

FOLK KNOWLEDGE, CULTURAL KNOWLEDGE, SCIENTIFIC KNOWLEDGE

An informed population is an empowered population. Scientific literacy is a vital component of effective citizenship, a function of distributed leadership and a vital precursor to a functional liberal or social democracy; it safeguards our rights by helping us fulfil our responsibilities, to one another and the broader economic, cultural and environmental landscape that supports our society. Just as eternal vigilance by a sceptical electorate combats the tendency for established power structures to become moribund or corrupt, a scientifically literate electorate can also more effectively recognise good policy informed by robust research when it comes along; which, I'm happy to say, seems to be happening more regularly of late. The last thing we want is for governments who embrace effective, evidence-based policy to be rewarded at the ballot box with dismissal by a citizenship with outdated "folk knowledge." So when we say "science is for everyone," this is really what I'm talking about; nobody can be left behind in the effort to engage if we wish to sustain what we value most about civic life in Victoria.

Alexander Pope warned us that "a little learning is a dangerous thing" back in 1709, referring to the overconfidence of the sparsely informed. While folk knowledge is what keeps us all alive and connected in a complicated world, certain concepts or understandings about "the nature of things" may have been attained long ago during schooling, or from workmates, friends and family members, and thus will retain emotional significance as well as an intellectual pride associated with their attainment – no matter how full of half-truths or misunderstandings a folk knowledge base might be, it is an important component of identity, or even ethnicity,

that will be fiercely protected from interference by outsiders. It is an inherently socially conservative part of every one of us, resistant to change and reactive to disruption. Scientific communities are human and must contend with this also. So, it will be important to meet all Victorians "where they are" – offering new tools for use in the context of local culture, partnering to learn new ways of using these tools together, and sustaining that engagement so the tools can change as our scientific knowledge base grows.

Even as we seek to reinform "folk knowledge," we must also acknowledge that "cultural knowledge" has much to offer scientists in return. People who work with and live on the land grow to know its natural systems intimately, just as people who run households and families, create artistic works, build and maintain infrastructure and financial systems, manufacture goods, provide services and extract primary resources have specialised knowledge to offer. To take this deeper, we can look to the Royal Society of Victoria's recent engagement with Aboriginal and Torres Strait Islander knowledge systems, developed over tens of thousands of years through elaborate systems of intergenerational memory and ritual, deeply embedded in cultural practices so as to be virtually indistinguishable from identity. This offers a wake-up call to Western science which is, for all its achievements, scarcely a millennium old at the most generous measure, and is yet to effectively articulate from the realm of specialised knowledge to the practice of culture at the local level. If we take the practice of ecological science into account, Western science seems to come up short – yes, we're good at classifying things by kingdoms, families and species, which aligns with our rapidly growing understanding of genetics, but do we understand how a particular lizard relates to a particular plant relates to a particular creek relates to a particular bird, or how songs, dances and rituals can sustain that knowledge, or how it's all written in the patterns of the stars and seasons for all to read? There are many other ways of classifying "the nature of things," and it seems there are knowledge systems holding lessons that might directly inform the work ahead of us as a whole community of Victorians journeying together through time in the south-east corner of an ancient yet changing continent.

To a very real extent, we need to establish and embrace a new system of cultural knowledge for everyone, informed by and informing the rapidly expanding understanding of the world

around and within us in the knowledge enterprise. We cannot afford to leave anyone behind.

We are seeing falling rates of literacy in Science, Technology, Engineering and Mathematics (STEM) in our primary and secondary schooling, technologies that emerge and evolve faster than our cultural, ethical and legal landscapes can keep pace, and populations increasingly disconnected from the natural systems that support all life on our planet. Vested and sectarian interests exploit the communication technologies created to connect and inform us to instead promote conflict and confusion through misinformation and political theatre. Meanwhile, we face the twin threats of climate change and mass biodiversity loss transforming life on Earth within the lifespan of school-aged children, with few places feeling the effects more than Australia, already a continent of extremes.

SENSE MAKING FOR DECISION MAKING

Many of these challenges are global in scale, yet local in expression; others are unique to our country and our state. We will need an epidemic of wisdom, intelligence, know-how, assurance and cooperation to successfully confront and come to terms with this era and its disruptions.

When we talk about bringing people together, role and function are important to keep clear – for example, science is a tool that gives us valuable information, but not a wise decision, which is a function of inclusive, balanced deliberation by thinking people with an ethical and functional stake in a positive outcome.

Our Society's role as a convenor of Victoria's science community must be reinvigorated and extended, taking in the social sciences and stretching to include the sectors and knowledge systems beyond academia. This way, we connect Victorians everywhere with expertise that can enable confident, effective decision making in uncertain conditions - informed, localised responses to issues both global and regional.

We've started work on a strategic plan to help us navigate the scale of these challenges and our role within them. A snapshot of the longer document is

provided below. I will be sharing our thoughts with other RSV members in the coming weeks to seek your further reflection, guidance and input.

Strategies are never 'final' – they are living documents that guide an organisation's course over years, even decades, so opportunities to review, refine or revise our strategy should be a feature of our Society's planning cycle. Regardless, to enable effectual progress towards strategic goals, we must remove structural impediments to positive change and put in place procedures and regulations to guide the conduct of new activities. Accordingly, there are a few immediate initiatives to draw your attention to.

A NEW FOCUS ON RSV FELLOWSHIP – A COLLEGE FOR SCIENCE AND SOCIETY

Recently, the appointment of Fellows of the RSV has been something of an award for a "job well done," whether in scientific careers or as a long-standing Member and leader of the Society. Acknowledging that we must maintain acknowledgement of career achievements in our merit criteria, we now seek to appoint our Fellows at "mid-career" phase; people actively pursuing their professional goals and seeking to make a change in the world through effective knowledge leadership.

Our Fellows are now explicitly appointed as a "brains trust" for the Society and its Members across the disciplines, to be called upon to provide expertise, speak for the Society on matters requiring extensive command of disciplinary or sectoral complexity, and champion the Society's mission within their networks.



Our "strategy on a page," courtesy of Richard Blundell MRSV

Our focus is on the intersection of science and society, with an aim to translate disciplinary expertise into effective actions within each social sector through an interdisciplinary process of knowledge transfer – a "feedback loop" between scholars, public servants, private sector experts and community-based knowledge holders that builds and distributes new knowledge.

Accordingly, we have set out a new structure to populate our new College with excellent individuals, drawing on knowledge leadership across the sectors of Academia, Government, Industry and Community. We are aiming for parity in representation between women and men, and those with non-binary gender identities are eligible to take up places otherwise reserved for a man or a woman.

This revitalised program seeks to establish a growing and enduring corpus of effective, influential, future-focused thought leaders to help our broader membership appreciate the progress made in diverse fields of endeavour, test ideas with experts and participate in deliberative forums informed by robust research and activated through effective networks for impact.

Beyond the labour involved in setting up the new structure and piloting the Member Forums in 2022, the new program will mean a realignment of the RSV's administrative work, including support for:

- Engagement and consultation with RSV Members to generate the themes/focus of quarterly Forums
- Engagement and consultation with RSV Fellows to populate panels with appropriate expertise
- Engagement and consultation with institutional partners to build an aligned program of public engagement, e.g., evening keynotes at Parliament, National Science Week activities, community network partnerships
- Sourcing nominations and conducting election processes with RSV Fellows to appoint new Fellows
- Building and ticketing Forums,
- Running proceedings and articulating Members with aligned partner events
- Commissioning and publishing peer-reviewed papers from the Forums ("Proceedings")
- Summary articles on proceedings/outcomes ("Transactions")
- Commissioning RSV position papers/report cards from proceedings, conducting further consultation processes with RSV Members and Fellows and stewarding approval processes through RSV Council
- Marketing and media campaigns, appointment and management of RSV spokesperson surrounding the release of each position paper/report card

Fellowship Program – Sectors, Domains and Gender*

		Sectors							
		Academia		Government		Industry		Community	
		Men	Women	Men	Women	Men	Women	Men	Women
Domains	Geosciences								
	Ecology & Biodiversity								
	STEM Education & Communication								
	Food Systems & Agricultural Science								
	Advanced Materials & Manufacturing								
	Energy & Primary Resources								
	Water, Oceans & Atmosphere								
	Human Health & Medicine								
	Technology & Engineering								
	Cultural Knowledge & Practice								
	Demography & Planning								
Cosmology & Astrophysics									

*We are aiming for gender parity between women and men, hence the reservations as indicated. Colleagues with a non-binary or otherwise diverse gender identity may be elected to any Fellowship position.

This administrative work will supplant much of the current effort undertaken in convening our annual lecture series which, while popular after the fact when filmed and shared via social media, has been sparsely attended by our Members for many years. We will sustain our long-running lecture series, a feature of Melbourne's culture for 160 years, albeit with less frequency of events.

CONSTITUTIONAL CHANGES

The Society's Rules require amendment to reduce our administrative burden, freeing up resources to pursue our mission. We last approached this challenging task in 2019, when we enabled the Society to take on aligned organisations as "affiliates." This time, we seek to:

- Streamline the process through which a person applies to become and is subsequently deemed to be elected as a Member of the Royal Society of Victoria
- Streamline the process of Membership subscription renewal, recognising the capacities enabled by digital subscription services
- Reduce the requirement for Ordinary Meetings of the Society to four per year in order to accommodate a renewed emphasis on membership forums, symposia and other labour-intensive deliberative processes, in addition to the Society's outreach and partnerships work
- Acknowledge that polling software may be used to conduct our General Meetings
- Maintain the role of Immediate Past President as an ex-officio Council member to retain the Society's corporate memory, without imposing the further obligation to also join the Executive Committee

The proposed amendments are [here circulated](#) (Word document, tracked changes) for feedback from Members ahead of voting at the RSV's *Annual General Meeting* in May. I would prefer to rehearse the detail of any suggested amendments ahead of the meeting in the interests of time spent well together on the night please, so your response is sought via [email](#), and can be further explored in a meeting if there are finer points to discuss.

AFFILIATION

We cannot take on this expanded community-facing role alone – our resources are scant, and we need to partner with, federate or otherwise augment the voices and efforts of aligned organisations.

Notwithstanding that our constitution has made room for affiliating like-minded organisations with the Society, as yet we lack a formal procedure to govern the process through our By-Laws. In the coming months we'll be inviting a number of organisations to be our first affiliates, offering mediated access to our facilities, communication channels and governance structures in pursuit of common goals. As outlined in our Rules, these affiliation agreements will be advertised to Members in *Science Victoria* a month ahead of formal adoption.

My gratitude to our Council members and those Members participating in the Future Focus Committee meetings for your guidance and kind assistance in developing these new structures and processes, particularly to our newest Councillor, **Richard Blundell**, who has contributed a great deal of his time and expertise to our strategic planning work, to our Secretary **Jeffrey Luckins**, who is driving our affiliations process along wonderfully, and to our energetic champion for change, RSV President **Rob Gell**.

LETTERS

Advocacy for Scientists with Disabilities

Jerusha Mather, PhD student, Institute of Health and Sport, Victoria University



My name is Jerusha. I am a PhD student at Victoria University, living with cerebral palsy. I am also a passionate and leading disability advocate.

I am writing to you regarding the lack of disability representation in science and would like to see more done to break the perverse barriers that currently exist in this field of work and set a more inclusive tone towards people with disabilities in the field. There is statistical evidence to back this up. STEM graduate students with disabilities are a significantly under-represented demographic. Notably, less than 2% of STEM doctorates are earned by students with disabilities.

I feel that people with disabilities are not given the equal opportunity or trusted enough to do the job within the science community and hence can find it quite challenging to find meaningful and equal employment in science as their peers. They can be refused support to help facilitate their independence within lab environments or even be directly and indirectly harassed and bullied by their colleagues. Even lab equipment can be very inaccessible and outdated and this can impact their independence within the laboratory setting. This can also affect their mental well-being and confidence and puts up unnecessary barriers to creating an inclusive and accessible laboratory.

Science can be a pretty hostile and inaccessible environment for people with disabilities. Attitudes and communication need to change as well, even in literature. Sometimes disability can be seen as a burden in medical science, and this is outdated and condescending. Despite having some positive

experiences and achieving some great things in my science career, I am still concerned about my future in science as a young scientist with a disability, and for others that follow in my footsteps, and would love to see more work done in attempt to raise awareness and break down these barriers. It is sometimes quite lonesome and isolating in science if you come from a diverse background.

My former supervisor, Professor David Walker at RMIT University (a valued member of your Society and the science community at large) and I were wondering if you could support us if we created a specific group under the Royal Society of Victoria - namely 'Scientists with Disabilities'? What kind of support would be available to get this started? We would love to break down the barriers and build a voice for scientists with disabilities. We think it's necessary and enough is enough.

Dear Jerusha,

Many thanks for your letter. I must admit I hadn't given sufficient thought to this matter - I am now, and the Royal Society of Victoria will now too.

I will need to talk with our CEO Mike Flattley and our Council but in principle the establishment of a 'Scientists with Disabilities Working Group' is a good thing to do and will meet with the Society's objectives.

We'll come back to you with a suggestion for a process that we might undertake, with a view to establishing 'how' the Society can effectively support your proposition.

Thanks for contacting me.

Regards,
Rob

I am keen to hear from all members, including our new members, on how you think we might best achieve positive outcomes across our state. Please write to me at: president@rsv.org.au



RSV NEWS AND NOTICES



New RSV Members

Ms Kate Phillips,
Senior Curator, Museums Victoria

Mr Glen Rush
Manufacturing Engineer (Aerospace/
Automotive) Associate Professor
Djuke Veldhuis, Course Director
of Global Challenges (Bachelor of
Science), Monash University

Dr Sarah Lovell
Genetics and Biomedicine Researcher
and Teacher

Ms Marina Yakou,
PhD Candidate, The Olivia Newton-
John Cancer Research Institute

Mr Damein Bell,
Atlantic Fellow, The University of
Melbourne

Ms Judith Downes,
Chair, Bank Australia Professor
Brendan Wintle, Conservational
Ecologist, The University of
Melbourne

Unless Members request a ballot, these will be considered by Council and, if elected, will be confirmed at the next Ordinary Meeting of the Royal Society of Victoria.

2022 RSV Fellows Appointed

We are delighted to announce the appointment of our 2022 Fellows, who will be leading our efforts in coming to terms with the subject matter of our forthcoming Members' Forum and Position Paper process on Biodiversity Conservation and Recovery in June.

Please join us in congratulating the following new Fellows of the Royal Society of Victoria:



Ms Fern Hames, Director, Arthur Rylah Institute for Environmental Research

Recognising a career in communicating science-backed priorities for ecological interventions across government and with the wider community, and the commitment to lead government research and community engagement activities concerned with helping all Victorians care for the environment, now confronting and resolving an unfolding crisis in biodiversity loss.



Ms Judith Downes, Chair, Bank Australia

Recognising the leadership of Bank Australia's Environment Social Governance (ESG) work within the Australian finance sector, her experience in leading the Global Alliance for Banking on Values Governing Board Forum, and background as a mathematics educator and STEM enterprise director.



Mr Damein Bell, Atlantic Fellow, The University of Melbourne

Recognising his leadership of the Gunditj Mirring Traditional Owners Aboriginal Corporation in attaining World Heritage status for the Budj Bim Cultural Landscape, sustained efforts in advocating for Native Title, equal opportunity and human rights, and connecting the land to its people to sustain healthy catchments and ecosystems in the south-west of Victoria.



Professor Brendan Wintle, School of Ecosystem and Forest Science, The University of Melbourne

Recognising his academic leadership in biodiversity conservation and recovery, ranging from ecological research to the financial modelling that can help governments and industries to understand the value of biodiversity in economic terms, which interventions in threatened species recovery will be most effective in terms of outcomes and cost, and proven instruments for long-term investment.

New RSV Trustees Appointed

We are delighted to announce that two new Trustees of the Royal Society of Victoria have been appointed by Governor-in-Council (the Governor and the Premier of Victoria) as of 1 March 2022.

The main function of our Trustees is to act as our landowners on behalf of the Crown, and ensure the RSV is still fulfilling the functions supported by the Crown Grant of 1883 in receiving value from the property, whether intangible or financial.

There's a responsibility to ensure the buildings do not fall into dilapidation, always front of mind as we continue to approach funding bodies to address both the accessibility and ongoing stability of our main, heritage-listed building. Structural issues became apparent almost as soon as our Hall was completed in 1859 and have continued virtually unabated up to the present day (we're pleased to advise the Caretakers' Cottage remains in good repair, although the roofing on both buildings is in some need of attention).

Please join us in congratulating the following:

Dr Gillian Sparkes AM FAICD FIPAA MRSV

Dr Gillian Sparkes AM has held the independent statutory role of Commissioner for Environmental Sustainability for Victoria since July 2014, having previously held senior roles with the Victorian Government including Chair of the Board of Sustainability Victoria, Deputy Secretary Corporate and Business Services for the Department of Sustainability and Environment and two terms as a Director of South Gippsland Water and Chair of the Board Environment Committee. As Commissioner, Dr Sparkes' prepares independent advice and scientific reports on the condition of Victoria's environment, many of which include recommendations to the Victorian Government. All reports are available online at www.ces.vic.gov.au.



An experienced leader in transformation and policy reform in complex stakeholder environments across multiple sectors, risks and settings, Dr Sparkes gained decades of experience working in industries that interface with the environment and community, including in the manufacturing, industrial services,

waste management and water industries, before becoming a senior public servant. This has enabled her to be an effective collaborator who has forged strong and productive partnerships between government, business, community and environmental stakeholders.

Dr Sparkes is a seasoned non-executive director with current roles including Chair of Frontier SI (formerly the Cooperative Research Centre for Spatial Information) and board member of the Country Fire Authority, Royal Children's Hospital Foundation, Industry Capability Network (Victoria), and a Commissioner of the Victorian Building Authority Board. Dr Sparkes holds a PhD in Applied Science (Chemistry), a Master of Business Administration, is a Fellow of the Australian Institute of Company Directors, a National and Victorian Fellow of the Institute for Public Administration Australia, a member of the Royal Society of Victoria and the Royal Australian Chemical Institute. Dr Sparkes was appointed as a Member (AM) of the Order of Australia (General Division) in the Queen's Birthday 2021 Honours "for significant services to environmental sustainability, and to public administration".



Professor Timothy Entwisle MRSV

Professor Tim Entwisle is a highly respected scientist, scientific communicator and botanic gardens director. He took up the role of Director and Chief Executive of Royal Botanic Gardens Victoria in March 2013, following two years in a senior role at Royal Botanic Gardens, Kew, and eight years as Executive Director of the Royal Botanic Gardens and Domain Trust in Sydney.

With an association stretching back to 1981, Professor Entwisle leads and promotes Royal Botanic Gardens Victoria to achieve the highest standards in horticulture, science, financial management and a broad range of visitor and education programs. As the 13th Director of the Gardens, Tim continues a long and successful stewardship of this beloved Melbourne icon, and its equally stunning companion, Cranbourne Gardens.

He has overseen the development of a ninety-year succession plan to maintain Victoria's Gardens through a changing climate, overseeing the preservation of species via the Victorian Conservation Seed Bank, the status of the Gardens as a terrestrial "ark" or bio-sanctuary, and pursuing the redevelopment of the iconic National Herbarium of Victoria, housing both the largest collection of dried specimens in Australia and the

aforementioned Seed Bank, to be both more resilient to the elements and more active as a scientific facility.

Professor Entwisle holds a PhD in phycology and botany. He was earlier a Councillor of the Royal Society of Victoria and is currently an Honorary Professorial Fellow at the University of Melbourne, a regular contributor to print, radio, television and social media. You can visit Tim at his blog, Talking Plants.

Gill and Tim join our two other RSV Trustees, these being Professor Lynne Selwood AO and Dr Alan Finkel AC, filling vacancies left by the late David Churchill and the retirement of Emeritus Professor James Warren. They have also joined quite a procession of RSV Trustees over time that started with Sir William Stawell, Dr Robert Ellery, Mr Edward White and Professor William Kernot on 2nd April, 1883.

AAS Dorothy Hill Medal Awarded to Dr Samintha Perera



Warmest congratulations to Dr Samintha Perera, one of the past winners of the RSV's Phillip Law Postdoctoral Award, now awarded the **2022 Dorothy Hill Medal** by the Australian Academy of Science for outstanding contributions to research in the Earth Sciences, looking at the unique interactions between coal mass and sequestered CO.

Way back in 2016, Samintha's work stood out to us from a very competitive field, not just because she had conducted excellent science, but because she demonstrated something many of us can overlook in fields of discovery: understanding what cannot be done is just as important as a breakthrough. Success in scientific work is a long road paved with failure, but these failures are all too rarely recognised or even shared as valuable in themselves. Anything that a robust scientific process reveals to us, through failure or success, constitutes a discovery - and this should inform our decision making.

In this case, Samintha put everything she could into making a carbon sequestration process into deep coal seams work, and in so doing demonstrated the severe limitations imposed by the geophysicists. Her subsequent work at the University of Melbourne has only reinforced these limitations, while finding some unexpected new processes with promising applications in the true spirit of discovery.

This is truly relevant work in light of the current and historical emphasis by the Australian Federal Government on investment in curative, quick fix "technology solutions" to the global CO2 problem over preventative, economically disruptive emissions reduction schemes, and it's so great to see Samintha's efforts getting due recognition. We should pay attention as a nation, and prudently invest in what will more reliably deliver the desired results.

Mike Flattley
CEO

Notice of Annual General Meeting

5:00pm, Thursday, 25th May, 2022

RSV members are asked to register to attend the 2021 Annual General Meeting (not an error – held in 2022, reviewing our performance in 2021), noting a quorum of 50 will be required.

Meeting papers and the members' circulation draft of the 2021 Annual Report, comprising our Financial Reports and President's Report, will be circulated ahead of the meeting. We will also be voting on amendments to our Rules, which are proposed here.

Please register to attend now at <https://rsv.org.au/events/2021-annual-general-meeting/>.

If you cannot attend, please nominate your proxy on the online form provided by the RSV at <https://rsv.org.au/proxy-form-2021-agm/>.

This meeting will be conducted online as a Zoom conference (including voting on motions via live Zoom



poll). Please test your software's compatibility ahead of proceedings – we recommend installing the latest version of the Zoom application and registering with a free account.

Fully subscribed RSV members only at the AGM please; full members, student members and Fellows are all entitled to vote. If your membership subscription has lapsed, please ensure it is renewed before 5pm on Wednesday, 25th May to be eligible to attend.

Natural Capital Finance Working Group

In 2021, for the first time in its 4-million-year history, the platypus was officially listed as vulnerable in the State of Victoria.



The key to the survival of the platypus is reliable water levels in our creeks and streams. In addition to ongoing land use changes which impact platypus habitat, climate change poses a threat to the platypus with a higher variability of rainfall, from extreme downpours causing 'surge' conditions in waterways to extended droughts eliminating the water supply.

The threat to the platypus will not take place at some distant date in the future. It is today. It is possible that at any time in the next years we can envisage a spring flash flood followed by a string of 45°C+ days. In this environment the platypus will not breed.

To identify innovative ways to finance the platypus' future, the RSV is establishing a Natural Capital Finance Working Group and has prepared a discussion paper, Financing the Future of the Platypus, available online at <https://rsv.org.au/financing-the-future-of-the-platypus-rsv-discussion-paper/>. To get involved in the working group, please contact the Group Chair, Mr Gordon Noble MRSV via email: [gn\[at\]blended.capital](mailto:gn[at]blended.capital).

WHAT I'VE BEEN READING

Thoughts and reflections from Fellows of the Royal Society of Victoria.



Michaelangelo's *The Creation of Adam*, which adorns the ceiling of the Sistine Chapel, depicts the Christian creation narrative

On Existence and the Utility of Religion



Dr Tom Beer AO FRSV

The God Delusion

Richard Dawkins

Bantam Press, London 2006

It is about 20 years since Richard Dawkins' readable and persuasive book *The God Delusion* appeared and only now have I read it. Its central tenet is that "there almost certainly is no God", the god in this case being defined as:

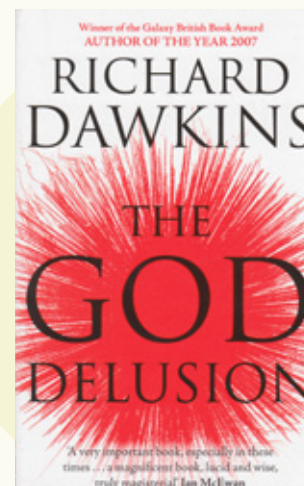
"...a superhuman, supernatural intelligence who deliberately designed and created the universe and everything in it, including us"

with the extra Abrahamic characteristic that:

"he not only created the universe; he is a personal God dwelling within it, or perhaps outside it (whatever that might mean)..."

In a wide sweep of philosophy, history and biology Dawkins surveys the philosophical arguments for God's existence. Thus, for me personally, the questions that arise after reading the book are:

1. Having been rationally persuaded that the idea of God is a delusion, why have I not joined the militant atheists?
2. Having been rationally persuaded that God does not exist:
 - 2a: Does it matter?
 - 2b What is existence?



EXISTENCE

To me the key one of these three questions is 2b: what is existence? This then leads to 2a: does existence matter in terms of the way people live their lives? The answer to these two may then help to determine my answer to Question 1.

My Webster New Collegiate Dictionary defines existence as: "the state or fact of having being esp. independently of human consciousness and as contrasted with nonexistence."

The critical item here is 'esp. independently of human consciousness' and I assume that it was added as a rider to exclude manifestly non-existent items that almost everyone can describe. Unicorns, witches and Harry Potter immediately spring to mind as examples.

The concept becomes less clear when I cogitate on whether money does or does not exist. Pieces of metal with designs stamped on them certainly exist, as do pieces of paper (or, nowadays, plastic) with designs printed on them. But the idea that a coloured piece of paper or plastic has an intrinsic value because the government has printed a number on it strikes me as not being 'independent of human consciousness'. Thus, money does not seem to have an existence, but the concept of money seems to have utility in human affairs leading me to suggest that utility rather than existence should be the criterion against which to judge God.

.....
Do numbers exist? Even though at first sight one would think that integers exist, it would appear not. Even though ten green bottles can stand upon a wall and the bottles themselves have an existence, their 'ten-ness' depends on human consciousness.

Or maybe they do exist. The dispute over the existence (or reality) of mathematical entities can be traced back to the Greek philosophers. Plato asked whether abstract concepts have some sort of real existence in the world, or whether they exist only in our minds. The mathematician Leopold Kronecker has been quoted as having said, "The natural numbers were created by God; all the others are the invention of humans." (Die ganzen Zahlen hat der liebe Gott gemacht, alles andere ist Menschenwerk).

I believe that most contemporary mathematicians would agree that Kronecker was wrong only in his statement about natural numbers; they too are the creation of human minds. Certainly, numbers do not have a tangible existence in the world. They exist in our collective consciousness. And yet they are not arbitrary products of our imaginations in the way that Harry Potter is.

.....
To illustrate – mathematicians use the words "there exists" a lot and within the context of mathematics it has a meaning. When a mathematician says that there exists one, and only one, prime number between the numbers six and ten, this statement is not a product of imagination. It is not a matter of opinion. The prime number is seven.

So perhaps numbers exist. Perhaps they do not. In either case (or in both cases) the concept of a number is useful. But the situation is even murkier in the case of the number zero. Zero is a representation of something that, by definition, does not exist. The discovery (or is it the invention) of the number zero greatly enriched mathematics. My view is that it also enriched religion because it illustrates the paradox that Dawkins highlights. The existence of something, namely God, that does not exist but has such great utility in human affairs that society works on the basis of its existence.

MEMES

The ability of the human mind to fashion existence out of something that does not exist (such as money) would, according to me, constitute the creation of a meme. A meme is a unit of cultural inheritance and the person who created the word was Richard Dawkins himself. Dawkins discusses "whether meme theory might work for the special case of religion" and to some extent he seems to agree with me by stating: "...memetic natural selection of some kind seems to me to offer a plausible account of the detailed evolution of particular religions". Curiously, Dawkins considers that if memes describe the detailed evolution of religion, then it bolsters, perhaps even proves, his argument that God is a delusion. Yet I can see the exact reverse – memes can bring into existence something that does not exist. They possess the magical power to imbue existence and thus the rational proof that God does not exist falls into the same category as proofs that zero does not exist, or proofs that money does not exist. Correct but irrelevant.

Religion, to me, but not apparently to Dawkins, provides a sense of community and it is an analogous sense of community exhibited by the Royal Society of Victoria or any other collection of human beings that come together because of a common interest. Such organisations share a paradoxical characteristic – the more bizarre and outlandish the group's core belief, the more cohesive and tightly knit is the group. Dawkins sees this as a black mark against religion. But science itself shares an analogous bizarre and outlandish belief – namely the idea that an objective reality and truth exists, and it can be determined by the scientific method. In an ironic and paradoxical twist, the mathematician Gödel proved that it is impossible to have a complete set of mathematical rules that will always have a true or false answer.

.....
Is then my reluctance to rush out and embrace the banner of militant atheism rationally constructed, or am I like the climate deniers in turning my back on a self-evident truth because I do not like the consequences?

In one sense – no. The two issues occupy different cells in Table 1.

In another sense, yes – one of the lessons that I have learnt from the climate wars embraced by Australian politicians is that science, on its own, does not persuade people to change their behaviour. A recitation of the road toll does not change driving behaviour. Demonstrating the unwelcome future that results from global warming does not persuade politicians to abandon support for coal-fired energy. A formal scientific proof of the non-existence of God will not persuade religiously inclined listeners to alter their stance.

Table 1 - To demonstrate different states of perceived and actual existence.

	Exists	Does not exist
People think exists	Physically observable objects	God, according to Dawkins
People think it does not exist	Global warming according to sceptics and deniers	Unicorns

.....
There is a slight difference between denying the existence, or the consequences, of something that is scientifically shown to exist (for which I use the words – ‘is true’) and confirming the existence of something that, Dawkins would claim, has been shown scientifically not to exist.

Thus, accepting Dawkins premise that God does not exist - is then a belief in God evidence of a delusion or is it merely a case of people having invented (or discovered) a useful construct? Certainly, money has played such a useful role for such a long time that almost everyone believes that money is real and the ability to purchase goods and services with an appropriately coloured piece of paper or plastic are inherent properties of a properly configured monetary system. A similar claim can be made for the number

zero – the quintessential definition of non-existence, yet it exists both as a concept and as a symbol.

In this respect, God exists but to up-end the phrase in the book of Genesis – man created God in his own image – and having done so found not only that he was good, but that he was useful.

Tom, thanks for this fascinating meditation on such a rich topic! It puts me in mind of the presentation we had from Dr Susan Blackmore (a compatriot of Professor Dawkins) back in 2018 on “Memes and Tremes,” the second term referring to technological memes, “units of cultural inheritance” created and replicated independently of humans to foster more effective interactions between discrete domains of machine intelligence. Utility indeed. <https://rsv.org.au/memes-n-tremes/>

I hope to see some responses from our readership in the coming months.- Mike (ed.)

Genetics, Genomics and the Spectre of Eugenics



Professor Jenny Graves AO FRSV

The Social Life of DNA: Race, reparations, and reconciliation after the genome

Alondra Nelson

Beacon Press, Boston 2016

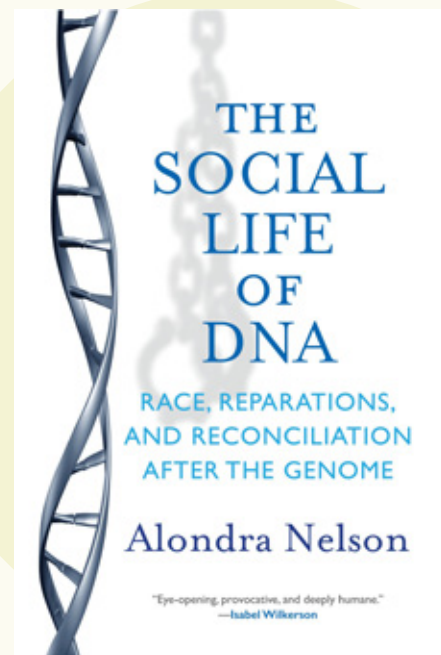
In expectation of fury at hype or gross inaccuracies, I don't usually voluntarily read popular books by sociologists on genetics and genomics. But this book promised a deep discussion of genome sequencing and racial politics in the USA and I was interested because I worry that human genome sequencing and identification of markers risks retracing the unhappy history of the eugenics movement.

.....
But Nelson's book, as well as getting the science right, is a rational and positive exploration of what genome sequencing can accomplish, both at the level of society and for the individual.

She recounts the role of DNA sequencing as a "medium through which the unsettled past is reconciled", linking the present with the past and the future, and providing tools for legal recompense for the injustices and cruelty of slavery. She gives moving descriptions of the fulfillment of the "enduring human desire: the search for roots and identity", which linked the descendants of enslaved people (including Nelson) to Cameroon or Sierra Leone, and inspired visits and contact with Africa, even identity cards.

.....
My deep admiration for this author was reinforced a week after I finished reading this book, when it was announced that Alondra Nelson has been appointed to a role advising the President of the USA on Science and Technology!

Jenny, thank you. I'm particularly intrigued to hear your further thoughts on the tensions in human genome sequencing and the spectre of the eugenics movement – I have only a surface understanding of both as an outsider yet share a similar concern. It would be remarkable to have the reflections of an accomplished geneticist on the socio-political dangers inherent in contemporary work.-Mike (ed.)



EVENTS

Ockham's Razor: LIVE from the Royal Society of Victoria

Thursday, 28th April from 6:00pm



GOT TEN MINUTES? LET US TELL YOU A STORY...

ABC Science returns to the Royal Society of Victoria for a special podcast recording event. Ockham's Razor is the ABC's soapbox for all things scientific: stories, insights, arguments or tributes – anything that can grip an audience by the ears for 10 straight minutes.

You'll hear from a hand-picked roster of superb speakers on a range of compelling topics. Expect a jam-packed evening of short talks that will intrigue, excite and inspire. Details on this year's speakers will be coming soon. Meanwhile, book now to ensure your seat at this popular annual event!

These talks will also be filmed for sharing online, post-event, as part of the *Inspiring Victoria* initiative in 2022. You can listen to Ockham's Razor now via *ABC Radio National*, iTunes or wherever you get your favourite podcasts.

All welcome, but places strictly limited! Please secure your place by registering online at <https://rsv.org.au/events/ockhams-razor-rsv-2022/>. Members are prompted to enter your promo code has been entered at the top of the

ticketing window. Please contact the Society if you are unsure of your code. If you are not a member but would like to join the Society, please refer to our [membership page](#).





RSV Members' Forum: Biodiversity Conservation and Recovery

Saturday, 4th June from 9:30am to 4:30pm

Developing a consensus position, with recommendations for further work and effective investment towards the goals of Biodiversity 2037.

This is a one-day workshop, delivered as a hybrid event; a mixture of interactive online and in person participation, depending on your role in proceedings.

We will be hearing from subject matter leaders from four different sectors on how their domain of experience, expertise and responsibility is reflected in the task before us. We anticipate presentations of no longer than about 10-15 minutes from each RSV Fellow, spaced throughout the day according to the task at hand, followed by room and panel discussions.

There will be breaks throughout the day to conserve our energies and gather our thoughts.

This forum will feature deliberative components to help our team develop a draft position paper for the Royal Society of Victoria, with recommendations for further work across the industry, government, academic and community sectors and developing effective investment strategies to help Victorians meet the goals of *Biodiversity 2037*.

Featuring (below):



Ms Fern Hames FRSV, Director, Arthur Rylah Institute for Environmental Research (Department of Environment, Land, Water and Planning)



Mr Damein Bell FRSV, Atlantic Fellow and previously CEO, Gunditj Mirring Traditional Owners Aboriginal Corporation



Ms Judith Downes FRSV, FAICD, FCPA, FCA, Chair, Bank Australia and immediate past Chair of the Global Alliance for Banking on Values Governing Board Forum



Professor Brendan Wintle FRSV, Conservation Ecologist and previously Director, Threatened Species Recovery Hub

Please secure your place by registering online at <https://rsv.org.au/events/biodiversity-forum/>. As this is a member-only event, the option to register will only be available once your access code has been entered at the top of the ticketing window. Please [contact the Society](#) if you are unsure of your code. If you are not a member but would like to join the Society, please refer to our [membership page](#).

Australian caves – diversity, wonder and risk

24th June at 6:30pm AEST

The Australian continent is not well-endowed with caves on a world scale, but Australian caves are notable for their diversity (greater than any other area of equivalent size on Earth), which reflects variety in carbonate rock types, climate, vegetation and geological history. Australian karst has something for everyone, from the razor-sharp towers of north Queensland to the cold, deep shafts of southwest Tasmania, the carbonate dunes of southwest Western Australia, the clear cenote lakes of southeastern South Australia and the ancient reefs of northwest Western Australia.

Australian caves are wonderful, both in terms of their visual impact and their scientific importance. They contain bat colonies that consume hundreds of kilograms of insects each night, a globally exceptional invertebrate fauna, vertebrate fossils that record animals and environments for at least the last 25 million years, and calcite speleothems that preserve detailed records of past climates.

And Australian caves have risks. There are inherent dangers in exploring caves, including cold, heat, falls and getting stuck, but there are very few accidents in Australian caves because organised trips must have an experienced leader and appropriate equipment. Some caves themselves have been at risk from overuse and threats like limestone quarries.

In this talk I will cover all these aspects and give examples from my own experience.



John Webb (PhD UQ 1982) is Professor of Environmental Geoscience at La Trobe University. His geomorphological interests centre on karst, and he is principal editor (with Susan White and Garry K. Smith) of *Australian Caves and Karst Systems*, in the book series *Cave and*

Karst Systems of the World, soon to be published by Springer. He also works on tectonic geomorphology and the interaction between landscape evolution and human settlement, and he has studied the geomorphology of archaeological sites in Australia, Jordan, China, Papua New Guinea and New Caledonia. In addition, he specialises in groundwater and contaminated site management, with on-going research projects on improving treatment procedures for acid mine drainage and on the influence of climate and land-use change on groundwater. He has published over 150 papers on these topics, with over 4900 citations; his h-index is 37 (Google Scholar). He has supervised 34 PhD students, 4 MSc students and 107 Honours students. He has received over \$1.5 million in research grants over the last 6 years, and has acted as a consultant on groundwater issues and contaminated site management, including as an expert witness in a number of court cases.



AWARDS, PRIZES AND FELLOWSHIPS



Call for Nominations - Young Scientist Research Prizes 2022

The Young Scientist Research Prizes are open for 2022 nominations! Final year doctoral candidates at Victorian institutions can apply across four categories of science, with finalists presenting their work to the Society during National Science Week in August.

Applications for the 2022 competition opened on 1 March and will close at 5:00pm on 31 May, 2022. Candidates should nominate themselves.

Your application for a prize should consist of an application form, incorporating your extended abstract - to be submitted electronically, then printed (from your confirmation email), co-signed by your Supervisor or Head of Department (to ratify your contribution to your doctoral research, particularly if it is a team research project) and submitted along with your RSV Membership Form (if required).

Your extended abstract presents a succinct summary of your research work. This is incorporated in the body of the application form to guide structure and length, and includes a title, rationale for the study, aims, methods, results, conclusions and significance, indicating why your research is important and of scientific interest. Our form will lead you through each element.

On the basis of the written abstracts, the judges will select a short list of two candidates in each of the four fields of Biomedical and Health, Biological (Non-human), Earth Sciences and Physical Sciences (eight finalists in total). We are planning

to host a live event this year (on Thursday, 18th August), however should COVID-19 pandemic restrictions be imposed on gatherings, each of the short-listed candidates will be required to give a 10 minute oral presentation to camera at the Society's premises during July, followed by 5 minutes of discussion with a general audience of scientists and members at the Society at an online conference, to be livestreamed during National Science Week on the evening of **Thursday, 18th August, 2022** commencing from 6:30pm. Finalists who are unable to present or attend the 18th August event cannot be considered for an award.

First Prize winners will each receive a certificate and a prize of \$1000. Second Prize winners each receive a certificate and a prize of \$500. All finalists will also receive free student membership of the Royal Society of Victoria for a period of two years and the opportunity to participate in the Society's programs and access our professional networks for mentoring and collaboration as desired.

Forms and full guidelines on applications and eligibility are available from the Society's website at <https://rsv.org.au/awards-and-prizes/young-scientistresearch-prizes/>. Submission of the prize application form and abstract should be received as a single file via email marked for the attention of the Chief Executive Officer at rsv@rsv.org.au before the closing time and date, being **5:00pm on 31 May, 2022**. All late submissions will be deemed ineligible.

2019 Biomedical & Health
Sciences Finalist Dr
Rachel Brand (Swinburne
University of Technology)
presenting at the Royal
Society of Victoria



Call for Nominations - RSV Medal for Excellence in Scientific Research 2022



Our 2021 Research Medal Winner, Professor Andy Ball, with the Victorian Minister for Energy, Environment and Climate Change, The Hon. Lily D'Ambrosio MP

Nominations are invited for the Royal Society of Victoria Medal for Excellence in Scientific Research 2022 in Category II: Biomedical & Health Sciences.

This category includes research in the disciplines of Genetics, Immunology, Human Physiology, Human Anatomy, Pathology, Neurology, Epidemiology, Endocrinology, Radiology, Microbiology, Medical Parasitology, Nuclear Medicine, and related human sciences.

The last Medal recipients in this category were Professors Anthony Burkitt and Jamie Rossjohn (2018).

AWARD CRITERIA:

The award of the Medal is based on demonstration of the candidate's excellence and leadership in scientific research. The candidate's research work shall have been carried out in Australia (including its territories), or on Australia, with preference for work done in Victoria, or on Victoria.

NOMINATIONS:

- Nominations open on 31 March, 2022 and close at 5pm on 31 July, 2022.
- Candidates cannot nominate themselves.
- Scientific Societies, Academies, Universities, Research Institutes, CSIRO, and Members of the Royal Society of Victoria are invited to make nominations.
- The nomination statement should demonstrate the candidate's:
 1. Exemplary publication track record during the ten-year period from 1st January 2012 to 31st December 2021. The track record will be judged on papers published and/or accepted for publication in refereed international journals. Work outside the ten-year period will not be considered, subject to due consideration of career breaks for primary care responsibilities. Career record relative to opportunity will be considered by the assessors. Nominators should indicate whether the nominee is an early career researcher, has had career interruptions, or has had extended periods of part-time employment. For multi-authored publications, the contribution of the applicant should be indicated.
 2. Consistent excellence in innovation or ground-breaking research and patents, incorporating novel scientific techniques and methods – described in plain language.
 3. Exemplary leadership in science incorporating evidence of a major contribution to the public promotion of science, advocacy for science, partnership building, collaborations, role modelling and influence across the scientific community.



SUBMISSIONS:

The submission should consist of:

- The nomination statement, signed by the nominator, covering points 1 to 3 above. This must be in Times New Roman, 11 point, and no more than three A4 pages please.
- A brief (no more than five A4 pages) Curriculum Vitae of the candidate. A list of publications, attached in supplement, should be constrained to the ten year period from 1st January 2012 to 31st December 2021.

The nomination submission should in the form of a single PDF file sent via email, attention to the Chief Executive Officer, at rsv@rsv.org.au

CONDITIONS:

The Royal Society of Victoria reserves the right to seek independent referees in considering the nominations received, and not to consider nominations that do not comply with the nomination format or do not address the award criteria.

If no candidate of sufficient merit is nominated, no award need be made in a particular year.

No posthumous award will be made.

THE AWARD:

The successful candidate will receive an engraved silver medal which is presented by the Society's patron, the Governor of Victoria or, in the event of Her Excellency's unavailability, a senior leader of Victoria's government or science community.

The medallist will be required to present a lecture to the Society Members and guests on the evening of Thursday, 8th December 2022 at which the Medal will be presented.

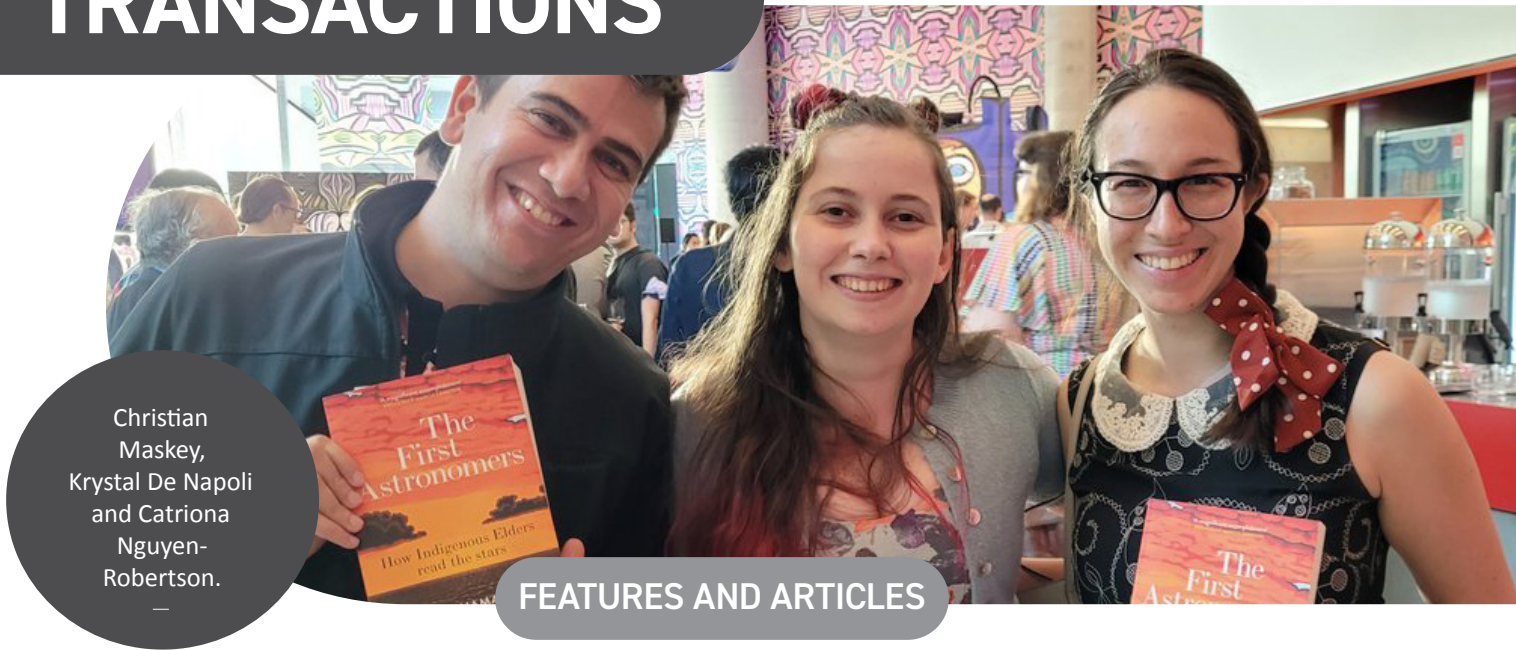
ENQUIRIES:

CEO, The Royal Society of Victoria, 8 La Trobe Street, Melbourne 3000 Telephone: (03) 9663 5259, or via rsv@rsv.org.au.



2018 RSV Medallists Professor Anthony Burkitt (left) and Professor Jamie Rossjohn (right) with Her Excellency the Honourable Linda Dessau AC, Governor of Victoria (centre)

TRANSACTIONS



Christian Maskey, Krystal De Napoli and Catriona Nguyen-Robertson.

FEATURES AND ARTICLES

The First Astronomers

By Catriona Nguyen-Robertson, RSV Science Engagement

*This article follows the book launch of **The First Astronomers: How Indigenous Elders Read the Stars**, hosted by the Royal Society of Victoria at Science Gallery Melbourne on 9th March 2022. The event featured N'arweet Dr Carolyn Briggs AM, Professor Marcia Langton AO, Uncle Ghillar Michael Anderson, and Associate Professor Duane Hamacher, with MC Professor Alan Duffy.*

'[The First Astronomers] is going to change your view of science and how it is practiced,' says Professor Marcia Langton. 'There's no going back.'

We no longer look to the night sky to predict the weather, forecast seasons, or know when to plant our gardens or harvest. Living in the bright light of major cities, most of us cannot even see the Milky Way clearly.

But First Nations Elders around the world still maintain the knowledge of how to read the skies and understand its connection to land.

Indigenous astronomy is the first astronomy. It existed long before the Babylonians, Greeks, the Renaissance and the Enlightenment. They have long known about the planets, understood the movement of the Sun, celebrated eclipses in ceremony, and have stories of the Big Bang. For tens of thousands of years, Aboriginal and Torres Strait Islander peoples have been observing the land, sea and sky.

There is no single First Peoples astronomy, as astronomical traditions vary largely between different language groups. First Nations groups are diverse yet unified. According to N'arweet Carolyn Briggs, they all share a connection across the lands and waters of their ancestors. These ties



Above: Astrophysicist, Professor Alan Duffy, came to Australia knowing things about the southern sky, but knew nothing of Indigenous Knowledge. 'Now, thanks to this book, there won't be this random Irish person coming here with that ignorance.'



Rob Gell, Mike Flattley and Catriona Nguyen-Robertson waiting in line for autographed copies of **The First Astronomers**.

have not been severed since Creation, despite the dispossession, displacement, and discrimination they have experienced over the past 200 years.

Astronomy is embedded within their traditions and cultures. They assign meaning to astronomical phenomena that informs Law and serves as a foundation for the songs, dances, and oral traditions passed from generation to generation.

N'arweet Carolyn shared the Boon Wurrung Wurrungi biik, laws of the land. The first law is Yulendj: the responsibility for knowledge, to maintain and pass it down to be used by future generations. The First Astronomers shares some of that knowledge so that it can be respected and live on as part of science.

Associate Professor Duane Hamacher is at the intersection of Indigenous Knowledge and modern science. He came to Australia to complete a Masters in astrophysics and a PhD in Indigenous studies. At astrophysics conferences, he sometimes struggled to convince peers that Indigenous Knowledge was anything more than folklore.

For years, he has been guided by Elders to share their knowledge and change the history and philosophy of science and how we see it. In *The First Astronomers*, Duane showcases their wisdom and shows how these living systems of knowledge challenge conventional ideas about the nature of science. Indigenous science is dynamic, adapting to changes in the land, seas and skies. Built on careful observation over 65,000+ years.

Professor Marcia Langton has been advocating for the incorporation of Indigenous Knowledge in the classroom for years, but it was not easy in the beginning. She led



'This book marks a profound paradigm shift in our understanding of Indigenous scientific traditions, how they are transmitted, and their relevance to life today,' says Professor Marcia Langton.

a project that provides resources to assist teachers in implementing the Aboriginal and Torres Strait Islander Histories and Cultures across different learning areas of the Australian curriculum. *The First Astronomers* is the book that she had wanted for the teachers and students she has visited across the country.

But of course, there is always more to learn. 'What this book represents is only a tiny bit of our stories...our knowledge,' says Uncle Ghillar Michael Anderson. A Senior Law Man, Elder and leader of the Euahlayi Nation, Uncle Ghillar is one of the six Elders who co-authored the book. He learned his knowledge of the stars from women – as did many others – and would like to see their knowledge featured too. (Perhaps there is an opportunity for a sequel?...)



Uncle Ghillar emphasised that this is only the tip of the iceberg. Aboriginal and Torres Strait Islander people understandably want to protect their knowledge from manipulation, abuse, bastardisation, or prosecution. Nor will the wider community ever be able to fully comprehend and understand it all. With different cultures, backgrounds and world views, we all have different values when it comes to land. The wider community may only ever be able to understand Indigenous Knowledge at "a kindergarten level" – but that doesn't mean that we shouldn't try.

Duane hopes that the book will encourage Western astronomers to treat Indigenous Knowledge with respect. What Western astronomers were uncovering in the last several centuries was "old knowledge" to First Nations Australians. The book demonstrates how respectful collaborations can drive exciting and innovative solutions to global challenges that impact our shared future. "Rarely is a book of such importance published", says Marcia.



The books on sale sold out in minutes! Plus there was a big queue for people to have their books autographed by Duane and Uncle Ghillar.

Skeletonised Leaves

By Priya Mohandoss MRSV

While strolling through a local park or wandering through your vegetable patch, you may happen to notice a number of leaves in some sort of fragmented form hanging loosely from a branch or in a cluster on the ground. These are known as skeletonised leaves.



Remnants
of an elm leaf.
Photo: Priya
Mohandoss

Being lacelike, they can be used in studying the vascular structure of the leaf or as a craft decoration. However, when seen on trees or bushes, skeletonised leaves are actually a result of chewing insect damage. It is largely caused from the impact of skeletonisers, that is, the young larvae of insects such as sawflies, cutworm, elm leaf beetle, lily beetle and Japanese beetle, including lily and cluster caterpillars.

Skeletonisers devour the upper part of a leaf's surface using their mouthparts to tear, rip or bite the tissue between the leaf veins and in turn, nourish themselves with its moisture and nutrients. As a consequence, the lower epidermis and leaf veins that create the exterior skeleton are the only parts that remain intact. Although trees initially affected typically present a bronze and charred look when noticed from afar, the repetition of this digestive process over time can lead to strain, other pest infestations, disease, heat stress or even tree fatality.

Another aspect to consider is that the process of photosynthesis is disrupted, since there is hardly a trace of chlorophyll left on the open leaf surface for the tree to draw upon. This creates a sharp decline in plant health, as there is less uptake of carbohydrates that are primarily used to fuel growth and immune function.

Even though skeletonised leaves can be a fascinating sight to see, we must also be aware of what they are indicating to us and the potential consequences, including the loss of valuable canopy cover in urban areas affected by the heat island effect and the deprivation of food sources to animals living in wildlife reserves and corridors.



Thoughtforms: Mind, Matter and Everything In Between

By Yvette Marris, Head of Online Content Creation, Let's Torque

This article is reproduced from the Let's Torque blog, available online at <https://www.letstorque.org/blog/2022/3/21/thoughtforms-mind-matter-and-everything-in-between>.



Let's Torque is an undergraduate science communication initiative auspiced by the Royal Society of Victoria. You can follow the team on [Instagram](#), [Twitter](#), or [Facebook](#) for more amazing SciComm!

If you want to get a stunning look at the science inside our minds, it's worth taking a look at the amazing ThoughtForms exhibit by Dr Kellyann Guerts and Dr Indae Hwang in the Science Gallery, at Melbourne Connect, Melbourne University.

ThoughtForms is an amazing blend of technology, science and self-reflection, where users are able to produce a snapshot of their own thoughts, with a mobile EEG (brainwave detector) and a 3D-printer. Inspired by some of her own lived, mental health experiences, Dr Guerts explores finding order in disorder and bridging the divide between the inaccessible thoughts and our physical world.



Using the Mobile EEG to create a 'thoughtform.' Photo: Alan Weedon, courtesy of Science Gallery Melbourne

SO, HOW DOES IT WORK EXACTLY?

The technology involved is incredible, not unlike something seen in a sci-fi movie. In the simplest of terms, it's creating a visual, physical representation of what's going on in our heads.

More specifically, to generate the shapes, she uses a mobile electroencephalogram, or EEG, to detect and map brain activity across different regions of the brain. These readings are input into a data visualization platform, transforming the data into abstract 3D shapes. These can be manipulated by the individual wearing the headset, along different axes associated with the various brain regions measured, and activated, depending on what the person is thinking.

If the parietal lobe is more activated, then the axis associated with parietal lobe activity would have a greater value. All you need is 3 regions, to get three axes, and boom, you have a 3D shape. Granted, the classification and extrapolation process are a little more complex than that but nevertheless, it is incredible.

To produce the "Thoughtform", the 3D printed abstract shape, participants were asked to think of a thought and press "Print" when they felt ready.



BUT WHAT DOES IT ALL MEAN?

Now left at that, all the measuring produces is copious amounts of numbers and squiggly abstract shapes. But this is where the Circumplex Model of Affect comes into play. Developed in the late 90s, by American psychologists James Russell and Lisa Feldman Barret, it proposes that all affective states are the result of a combination between arousal, or activation, and valence, i.e., positive or negative. Affective states are longer lasting moods.

Using this model, and the participants' own self-reflection on the category of their thoughts, commonalities between the shapes could be considered. Do happy thoughts have similar shapes? What might this say about the way the brain experiences happy thoughts? One thing they did notice was that focused, low-arousal thoughts were more spherical, smaller and compact. In contrast, high arousal thoughts were elongated, narrow and constantly moving. So, the data and model create something that gives us a bit of an insight into what's going on

WHERE WILL THIS TAKE US?

Unfortunately, at this stage, not particularly far. There is just too much of the brain, cognition and consciousness that we just don't understand. But that doesn't mean that there aren't extraordinary implications for this technology further down the track. That's why we love science!

In her paper, published 2018, Dr Guerts describes the abstract shapes to be "like biological specimens awaiting classification, the random fragments depicting mental states arranged in this image in order to observe and interpret".

From a clinical psychology perspective, there are potential implications too. Transformation imagery is an example of a technique used in therapy. Patients are encouraged to visualize their distressing feelings or thoughts. In doing so, they are able to regain control of their feelings, improve emotional regulation and processing. Using guided meditation in addition to a visual aid of this process could be very beneficial.

The Science Gallery on Swanston Street, Melbourne, is a branch of an initiative founded by Trinity College Dublin. Their mission is to create exhibitions that explore the intersection between art, technology and science, centred around a particular theme. Since their founding in 2008, they now have exhibitions in 8 cities around the world. Their exhibit MENTAL is open in Melbourne until Apr 23, 2022.

If you would like to learn more about the Science Gallery, you can visit them at the Melbourne Connect Building, 114 Grattan St, Parkville.

<https://melbourne.sciencegallery.com>

How does influenza mortality compare to COVID-19?

By Dr Jane Canestra MRSV, RSV Councillor



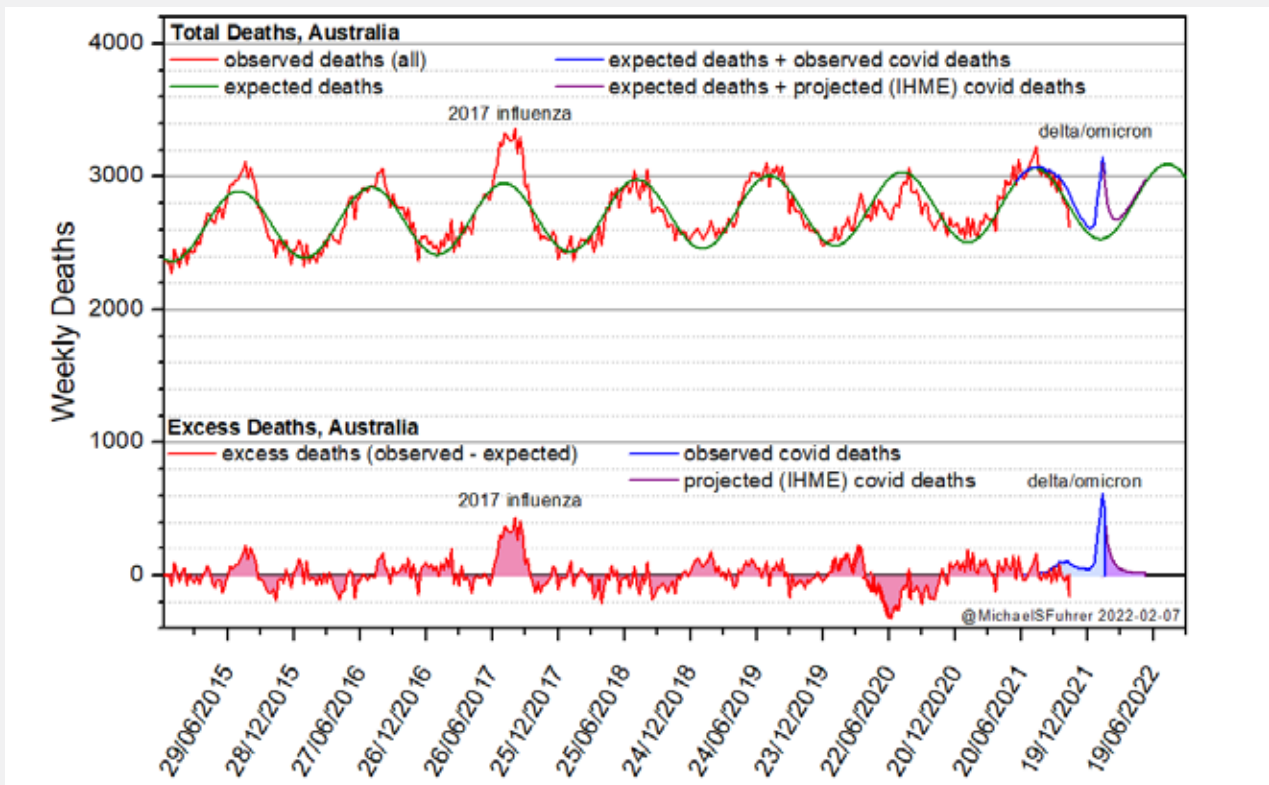
It is useful to compare influenza cases and mortality from 2019 to the current pandemic COVID-19 cases and mortality from 2020 until the present. This is because the measures taken to prevent the spread of COVID-19 were extremely effective at limiting the number of cases of influenza. No cases of influenza were reported in 2020.

313,033 cases of influenza were notified to the Australian Department of Health in 2019. This was higher than the 5-year average of 113,861. Deaths from influenza were 953 in 2019, compared to the 5-year average of around 404.

By comparison, there have been 4.28 million cases of COVID-19 in Australia to date and 5893 deaths. Mortality peaked on 26 January 2022 with the surge inOMICRON variant cases with 92 deaths on that day.

An influenza-infected person had a chance of dying from influenza of around 3% in pre-Covid years, whereas the overall risk of death with COVID-19 infection is 1.37%. This demonstrates that though mortality rates are lower with COVID-19, very high case numbers increase the overall likelihood of dying with COVID-19.

Stay safe!

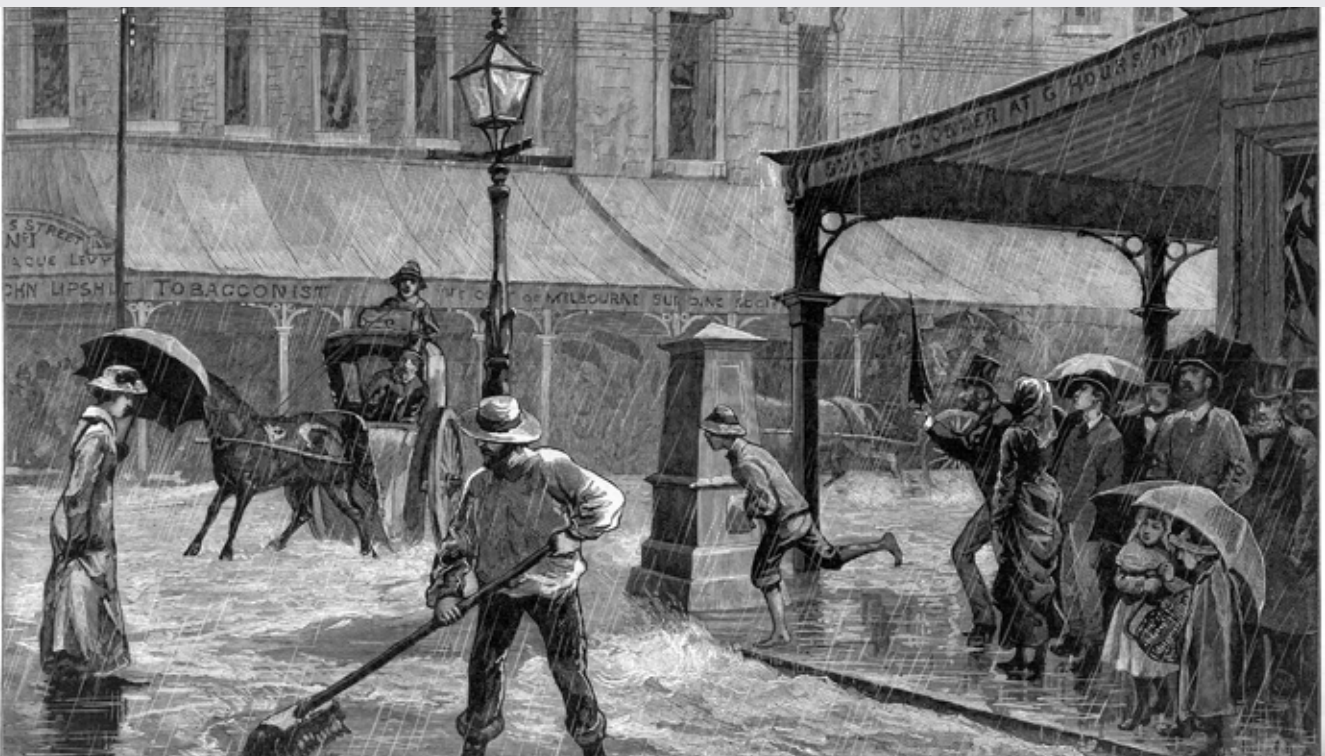


Deaths in Australia, highlighting excess deaths attributable to 2017 influenza season compared to out-of-season COVID-19

FROM THE ARCHIVES

THE PASSING OF OLD MELBOURNE

By A. W. GREIG

Reproduced from The Argus: Saturday, 12 June, 1915

The memory of most of the events of the "eighties" is somewhat tarnished by their association with the "land boom" and its disastrous consequences, but now that the lapse of time has lessened the poignancy of our recollections, it may not be amiss to take a glance at the remarkable developments of a decade which may without exaggeration be said to have witnessed the birth of modern Melbourne.

In the quarter century which followed the mushroom-like expansion of the goldfields days, Victoria's capital had been gradually acquiring solidity and dignity. Stately spires had sprung up, suitable edifices had replaced the older town hall and post office, substantial Government offices and palatial law courts had been erected; yet the town in the late seventies had only reached the level of

mediocrity. Scarce a building exceeded three stories in height; the streets were macadamised roads, not always in perfect repair, and the system of surface drainage frequently proved inadequate to meet the demands made upon it when heavy downpours of rain caused an excess of storm-water to find its way to the lower levels. Moreover the proximity of the river Yarra, with its rock-obstructed bed and tortuous reaches, placed Melbourne in danger from inundation.

Three times within ten years, between September 1870, and September, 1880, did the flood-waters from the eastern hills, damned up by the banked approaches to the old Prince's bridge, swirl in muddy torrents across the flats towards South Melbourne, more or less cutting off communication with the city, and every winter



The Yarra Falls in 1858, facing towards Melbourne and with Cole's Wharf in the background. The falls were called Yarra Yarra by the Woi Wurrung and Boon Wurrung peoples, and were confused with the name of the actual river (Birrarung) by early Europeans. Source: State Library of Victoria

swamps and marshes round the river were filled, and fogs arose of a greater density than those to which we are now accustomed. Here is an account of the results of one such happening on the evening of June 21, 1878, which also throws light on the travelling facilities of the period: "It was impossible for one with-out a light to see more than a few feet in advance, even in the city, while in the suburbs the darkness was oppressive and impenetrable. The omnibus traffic had to be stopped, and numbers of these vehicles were held captive by the darkness in Spencer, Elizabeth, and Spring streets for several hours. A few adventurous cabmen catered for passengers, but even they dared not travel at more than a walking pace. The footpaths were, comparatively speaking, deserted, and for four hours an unusual silence prevailed in the city." The cabmen referred to included a number of drivers of the two wheeled "Albert car" which had not yet been entirely displaced by the waggonette, while the organised omnibus service was an American innovation, then not quite ten years old. There was also, of course, a suburban train service, but this had not attained its full development, and the "coaching days" still lingered. From the Albion Hotel in Bourke street, from the post-office, and other central points, "Cobb's coaches" left daily for places like Lilydale, Mordialloc, and Eltham,

and it was not until more than ten years later that this feature quite disappeared from our streets.

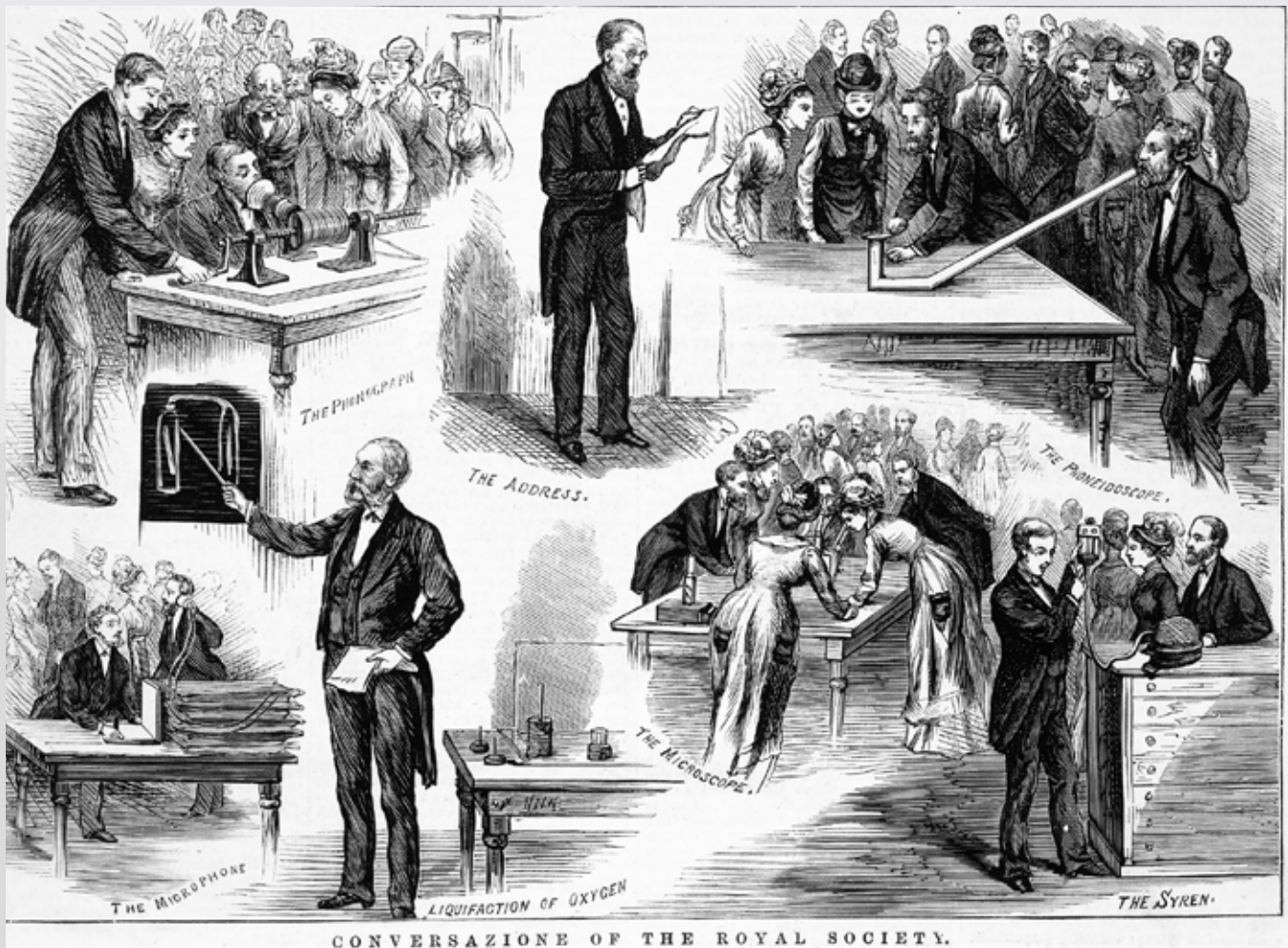
But Melbourne was on the eve of a great awakening - an awakening fitly symbolised, perhaps, by the erection of the Exhibition Building in 1879, since the city was about to join hands with the nations of the old world in the march of progress. In 1878 Sir John Coode visited Melbourne, at the invitation of the Harbour Trust, to devise a scheme for improving the navigation of the Yarra, and was fortunate enough to arrive when the great flood of that year occurred. His plans, sent out from London early in 1879, provided for the cutting of the Coode Canal, the removal of the falls at Queen's Bridge, the deepening of the Lower Yarra, &c. Meanwhile the city fathers were beginning to bestir themselves about the condition of the streets, and were considering schemes of underground drainage and experimenting upon the improvement of the roadways by means of wood-paving. The intersection of Collins and Swanston streets was laid down with redgum blocks early in 1881, and a little over two years later large culverts were constructed beneath Elizabeth street to receive and carry off the water which frequently rendered that thoroughfare impassable after heavy rainstorms. Following on these advances came the laying of the cable tramways, commenced in January,

1885, as the fruition of a scheme which had been eight years in preparation. Building activities quickened by "boom-time" conditions swept away many old landmarks, "replacing them with new structures more appropriate to the present position and requirements of the city" - as a journalist of 1884 puts it - and one by one the wooden verandahs, so characteristic of old Melbourne streets, disappeared. Buildings eight or nine stories high rose as if by magic in the principal thoroughfares. Two new bridges were thrown across the widened and deepened river, between the years 1885 and 1889, and the transformation was complete.

Side by side with these more spectacular developments came the introduction to Melbourne of two of the principal factors in modern business life-the typewriter and the telephone. As far back as 1875 "a recent American invention, styled a typewriter," had made its appearance in an Adelaide office, but the description

of one of these machines in the official guide to the Melbourne Exhibition of 1880 shows that at that time it was still a little understood novelty here.

"This clever machine," says the guide, with naive inaccuracy, "was in a box containing rows of buttons, marked with letters and numbers, corresponding to a circle of keys hung on to a cylindric drum above, the keys communicating with the buttons by wires." In the exhibition of 1888 several different makes of typewriters were shown, and it may safely be asserted that by the end of the eighties the new machine had gained a sure footing in Melbourne business circles.



A wood engraving published in The Illustrated Australian News, depicting a public demonstration of new technology at the Royal Society of Victoria during our annual "conversazione" on 8 August, 1878. This was one of the world's first public demonstrations of the phonograph, as invented by Thomas Edison in 1877, here demonstrated by the Society's Honorary Secretary, Alexander Sutherland (top left), a talented schoolmaster and the lead champion of Victoria's first Bachelor of Science (BSc) at the University of Melbourne. Source: State Library of Victoria

The telephone had not long been made a commercial possibility before it was heard of in Melbourne. In December, 1877, Mr. (afterwards Professor) Kernot explained its working before the members of the Royal Society of Victoria, and expressed the opinion that "there was every reason to believe that the use of the telephone would in time supersede the present method of conveying messages by means of the pneumatic tube."

There was even an attempt made by a Melbourne inventor to rival the achievements of the American inventors, Edison and Bell, and in July, 1879, a telephone devised by Mr. J. E. Edwards, of Little Collins street, was made the medium for conveying songs and recitations from one room to another at a conversazione held in the new Congregation Hall in Russell street. It is curious to note that that by-product of telephone invention, the phonograph, which was not to spring into popularity until many years later, was also exhibited in its first crude form, to a Melbourne audience on this occasion. In 1880 experiments were made in linking up various Government offices by telephone, and even long-distance conversations were carried on between the telegraph offices of Melbourne and Castlemaine, but the introduction of the new convenience to the commercial world was left to private enterprise. In May, 1880, Mr. H. Byron Moore opened a mercantile "exchange" in a building which had been erected at the rear of the older "Hall of Commerce," in Collins street, and it was soon rumoured that a telephone exchange would be added to the accommodation provided for patrons. Arrangements were made with the post-office, and a switchboard was actually got into working order in an upstairs room in the building in August or September. The original "subscribers" were only seven in number, and of these four were "deadheads," being directors of the company formed to carry out the undertaking. In addition, a free service was provided to the Law Courts, the Melbourne Hospital, and the Exhibition Building, and it is worthy of note that the lastnamed retains its original number "2" in the telephone directory of to-day. "It nearly broke our hearts," says Mr. Byron Moore, "to get our

first dozen subscribers. In a few months we could not connect them quickly enough." In December, 1884, the telephone exchange was removed to a new building in Wills street, and when, in September, 1887, the concern was handed over to the Government the company had over a thousand subscribers to its three exchanges at Melbourne, Ballarat, and Bendigo.

Another noteworthy phase of the progress of this period was the introduction of the electric light, beneath whose beams nocturnal football matches were played on the Melbourne Cricket-ground in August, 1879, while it was also utilised in lighting up the Exhibition Building for an evening conversazione in October of the following year. In both of these early experiments concave mirrors or "holophotes" were used, giving "searchlight" effects, which were hardly satisfactory for purposes of general illumination. But the public was soon to be familiarised with the electric light in more tractable forms. An "Australian Electric Company" was formed, and secured a contract for lighting the new Eastern Market, where six arc lamps, each with its separate dynamo, came into operation on July 1, 1881. The Swan incandescent light was also brought into notice, and in June, 1882, when the company had a generating station capable of supplying 2,000 Swan lamps, an exhibition to demonstrate the domestic possibilities of electric lighting was held in the Athenæum Hall. One or two enterprising business people began to hang arc lights under their verandahs, and in February, 1883, the election returns posted up in front of "The Argus" office were illuminated in this way. Thus was the way paved for the introduction of a regular system of electric street lighting, which took place a few years later.

So passed old Melbourne—the Melbourne of flood and fog, of low buildings, dimly gas-lit streets, and rattling omnibuses. Great have been our advances, even since that period; but it is doubtful if Melbourne will ever again see so much progress attained in ten years as from 1880 to 1890.

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1972

BASS STRAIT SYMPOSIUM

The Bass Strait Symposium edition of the Proceedings of the Royal Society of Victoria is published, with articles covering a history of the scientific investigation of the region, the changes of sea level in Bass Strait, the geological development of the southern shores and the islands of the strait, and multiple articles on the mammals, birds and the distribution of organisms throughout Bass Strait and its islands.

From the Proceedings of the Royal Society of Victoria, Volume 85, 1972/73

1922 - 2012

REMEMBERING NANCY MILLIS

Distinguished Victorian scientist Professor Nancy Millis AC MBE FAA FTSE FRSV was born in Melbourne on the 10th of April 1922. Professor Millis founded the first real course in biotechnology at the University of Melbourne. She was Chancellor of La Trobe University, and chaired the Recombinant DNA Monitoring Committee from 1980 for over 20 years. She chaired the Cooperative Research Centre for Water Quality and Treatment, and was on the board of the CRC for Freshwater Ecology. Nancy was among the earliest Fellows of the RSV, appointed in 1999. The Millis Room in the RSV's building is named in her honour.



Professor Nancy Millis

Matter—a Mode of Motion. 127

the kind are to be found in the numerous treatises on the indolgent use of the blowpipe.

By the purely mechanical treatment, the miner would ascertain whether the sample tried was auriferous or not, and even without attempting to weigh the separated gold, he would be able to draw valuable conclusions from its aspect in the mortar, concerning the comparative richness of the lode.

ART XLVIII.—On an Easy and Expeditious Method of verifying a Ship's Position on a Coast when only one Object on Shore can be seen either in the Day or Night, by the use of Perry's Anti-Collision Dial.

By C. J. PERRY.
(Read 14th October, 1872.)

ART XLIX.—On the Treatment of Criminals in Relation to Science.

By H. K. RUSDEN.
(Read 11th November, 1872.)

ART L.—On a Kaleidograph.

By M. O. PRITCHARD.
(Read 11th November, 1872.)

ART LI.—On Matter—a Mode of Motion.

By FARRIE MACGEORGE, Esq.
(Read 11th November, 1872.)

1872

HORRIFYING PROPOSALS

"The treatment of criminals in relation to science, or, Suggestions for the prevention of cruelty to honest men and women: an essay read before the Royal Society of Victoria, Melbourne, on Monday, 11th November, 1872.", written by H. K. Rusden. A 22-page essay, later published in Cambridge University's Journal of Mental Science, in which the author blends philosophical questions about criminality with some truly heinous 'recommendations' such as never releasing convicted criminals and even using them for scientific experiments.

From the Journal of Mental Science (Volume 19, Issue 85, April 1873, pp. 122 - 130, doi.org/10.1192/S0368315X00226789)



INSPIRING VICTORIA

National Science Week 2022 - Major Grant Recipients in Victoria

'Science plays a huge part in our daily life, even if we don't always realise,' says Minister for Science and Technology, The Hon Melissa Price MP. 'The great events and activities in National Science Week are not only fun and interactive, but they can show us just how much we use science in our everyday life.'

Indeed, science is everywhere. A great deal of Science, Technology, Engineering and Mathematics (STEM) went into the device you are currently using to read this, the production of the tea or coffee that you might be sipping, and the building that you are in. It is also vital in shaping our bright, collective future. Science is for everyone.

STEM comes into the spotlight during the annual celebration of National Science Week. Events are run across the country for the community to share in, discover, and engage in the excitement of science.

Every year, [AusIndustry](#) provides grant funding to support National Science Week projects across Australia. Please join us in celebrating the Victorian grant recipients.

The science all around us will be showcased by the Gippsland Reserve Committee of Management. Adults and children alike can head to Gippsland Heritage Park to meet quirky bugs, participate in scientific demonstrations, and watch drones and robots in action.



 national science week 2022

The unique natural environment of the Otway Ranges lends itself to different outdoor adventures. The Southern Landcare Network are inviting people to grow native plants, search for dinosaur footprints, survey seashells, and read the weather forecast written in clouds – very handy given the occasional unpredictability of the weather.

Closer to Melbourne, Port Phillip Bay is home to a spectacular giant spider crab, *Leptomithrax gaimardii*. Each winter, the crabs come into shallow waters. Remember the Wild is creating a virtual experience to watch the crab migration and call on citizen scientists to help researchers **gather information on this understudied species.**

As the crabs migrate, scientists will be hitting the road for the National Quantum Road Trip. Researchers from the ARC Centre of Excellences for Engineered Quantum Systems and Dark Matter Particle Physics will traverse the country to deliver talks, virtual lab tours and hands-on activities, cheering with "dark matter pom-poms" all the way.

Could all of this science be printed on a t-shirt? Shirty Science is a leader in science and art collaborations. Artists and researchers team up to design t-shirts that illustrate Australian science, and this National Science Week, they will battle for the title of Australia's Favourite Science Shirt.

This is only a taste of the many activities planned to inspire curiosity and engage Australians in science. Keep an eye out for event details, or if you have been motivated by these grant winners, perhaps you might organise one yourself. There will be something for everyone.

Note: These are recipients of national level grants. Victorian Seed Grant winners will be announced shortly.



PROCEEDINGS

Call for Papers

The *Proceedings of the Royal Society of Victoria* is our refereed journal, published twice annually by CSIRO Publishing. Current and recent editions are available online in open access format from <http://www.publish.csiro.au/rs>.

The *Proceedings* is one of Australia's oldest and longest-running science journals, a terrific platform for establishing an individual research presence, grouping papers derived from symposia on specific subjects, or simply joining a distinguished tradition of science published in or about our region that stretches back to the 1850s. We are always interested in hearing from authors.

Papers, Reviews and Reports of experimental or descriptive research, submitted for publication by the Royal Society of Victoria, should not have been published hitherto, nor should they be under consideration for publication elsewhere. Published papers are typically concerned with natural history, encompassing the biological and earth sciences, in the Oceania region.

Those interested in submitting papers should review the [Instructions for Authors](#). All enquiries and manuscript submissions should be forwarded via email to editor@rsv.org.au.



ENGAGE VICTORIA

Distinctive Areas and Landscapes Program

OVERVIEW

The Victorian Government is committed to protecting the significant economic, environmental, cultural and community values found in the peri-urban areas surrounding Melbourne, Geelong and other regional cities.

In 2018 Macedon Ranges region was declared as the first distinctive area and landscape under the new Part 3AAB of the Planning and Environment Act 1987. The government has since declared three new coastal areas - Bass Coast, Bellarine Peninsula, and Surf Coast.

These areas of outstanding environmental and cultural significance are being protected so that they can continue to be enjoyed by current and future generations. They have unique environments with productive and scenic landscapes, and due to their proximity to Melbourne and other regional cities, they are under pressure from urban encroachment and growing visitor numbers. These areas are also susceptible to the impacts associated with climate change, including extreme weather events.

By declaring an area as a Distinctive Area and Landscape it will:

1. Require the preparation of a Statement of Planning Policy (SPP) led by the State Government in partnership with local government and Traditional Owners.
2. Require the development of a long-term vision and strategies to protect distinctive areas in consultation with local communities
3. Introduce the opportunity for protected settlement boundaries for townships – like Melbourne's urban growth boundary.

We invite you to help shape the visions and strategies of the places you care most about.

Please visit <https://engage.vic.gov.au/distinctive-areas-and-landscapes-program> to learn more and contribute your thoughts.





Changes to the Regulation of Wind Farm Noise

Wind farms play an important role in achieving Victoria's emissions reduction targets and providing a sustainable, reliable and affordable energy future for all Victorians.

New regulations are proposed to ensure that the amenity of local communities is protected and to provide certainty for industry. These will replace interim regulations, which are due to expire in October 2022.

WHAT IS BEING PROPOSED?

Three alternative approaches to wind farm noise regulation have been assessed in a regulatory impact statement (RIS), prepared by Deloitte Access Economics:

1. No additional regulation – relying on general provisions within the *Environment Protection Act 2017*
2. Direct regulation – setting specific requirements for compliance
3. Permissions – using a permit or other permission from the Environment Protection Authority (EPA) to specify requirements for compliance.

The RIS identified that the preferred approach is direct regulation, as it is expected to provide greater certainty by creating an explicit and transparent regulatory framework.

The following package of requirements for wind farm operators is proposed under both the direct regulation and permissions options:

- Complying in an ongoing manner with the relevant noise standard
- Implementing a noise management plan, including a complaints management plan
- Providing an annual statement of actions taken to ensure compliance
- Completing a post-construction noise assessment
- Undertaking noise monitoring every five years.

Under all options, EPA will be the primary regulator for wind farm turbine noise, for new and existing facilities.

The Minister for Planning will continue to be responsible for assessing applications and approving permits for wind farm developments.

WHY ARE NEW REGULATIONS NEEDED?

The *Environment Protection Amendment (Interim) Regulations 2021* were made on 26th October 2021, are currently in effect and will expire after 12 months. Ongoing regulations are required to ensure continuity and certainty for industry and community.

HOW DOES THIS RELATE TO THE INTERIM REGULATIONS?

Proposed regulations about wind farm noise have been developed for public feedback, the *Environment Protection Amendment Regulations 2022* ('proposed regulations').

The proposed regulations have the same requirements for wind farm operators as in the current interim regulations, with some minor points of clarification and updates to the timing of requirements. This includes two changes in response to public consultation on previous draft regulations in January 2021:

- allowing greater flexibility in periodic monitoring of wind turbine noise, specifically the use of alternate assessment points.
- continuing to allow for stakeholder agreements with wind farm operators.

HOW CAN I PARTICIPATE?

Please provide your feedback via

<https://engage.vic.gov.au/changes-regulation-wind-farm-noise>

by 3 April 2022.

Please note that submissions to the previous consultation on wind farm noise regulation in January 2021 will not be considered as part of this consultation. Submitters to the previous consultation are welcome to provide additional or revised submissions to this consultation.

The Department of Environment, Land, Water and Planning (DELWP) will consider feedback and make recommendations on the final regulations or other regulatory options to the Minister for Energy, Environment and Climate Change. It is intended that these will be introduced, along with a report of responses to public comments in mid-2022.

HOW CAN I FIND MORE INFORMATION?

More information about the regulation of operational wind farm noise, including technical guidance is available from *the Environment Protection Authority - Victoria (EPA)*.

Concerns about wind farm turbine noise should be raised directly with the wind farm operator. The operator will respond according to their complaints management procedures. If unresolved, concerns about noise pollution can be reported to *EPA* via the 24/7 Pollution Report hotline – 1300 372 842 or you can send an email to contact@epa.vic.gov.au.

For more information on this consultation, see the document library at <https://engage.vic.gov.au/changes-regulation-wind-farm-noise> for:

- a summary fact sheet
- the regulatory impact statement
- the draft regulations
- a response to comments from the previous public consultation.

For any questions or further comments about this consultation, please email windfarmnoise@delwp.vic.gov.au



