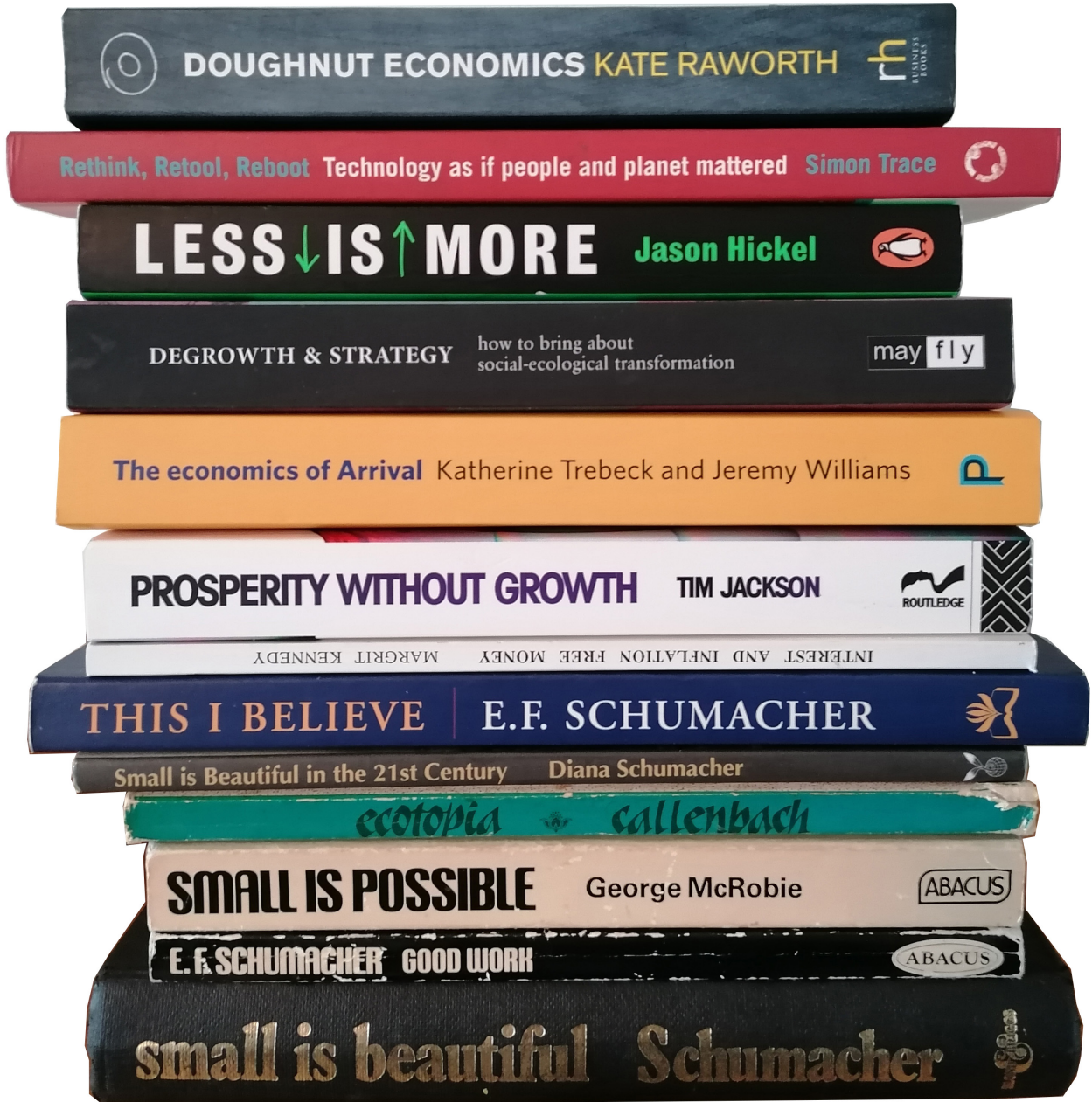


SEDA

Scottish Ecological Design Association

Legacy: is small still beautiful?



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Summer 2023

SEDA was formed in 1991. Our primary aim is to share knowledge, skills and experience of ecological design. SEDA is a network and links those seeking information and services with those providing them.

SEDA's membership comprises a large number of people involved, and with an interest in design, principally in Scotland. Members include academics, architects, artists, builders, planners, students, ecologists, landscape designers, materials suppliers, woodworkers, and many more whose work or interest involves design for a sustainable future.

SEDA is a charity and is run by a Board of Directors, who are elected at Annual General Meetings. The Board is advised by a voluntary Steering Group which meets 8 times a year for discussion and for planning the activities of the Association. All members are welcome to take part in these meetings. SEDA registered as a Company Limited by Guarantee in February 2011.

A SEDA membership is a great way to support ecological design in Scotland. As a member you will receive the SEDA Magazine for free, get discounted tickets to SEDA events, and have the opportunity to connect with a wide network of talented designers.

Editorial team

Shravya Dayaneni, Nick Domminney, Viktoria Szilvas, Doug Tullie, Sean Hendley

With thanks to all our contributors, sponsors, and supporters.

What do you think of this SEDA magazine? Do you have any disagreements or something useful to add to the issues covered? Do you have an idea for an article? Drop us an email!

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Legacy: is small still beautiful?

Shravya Dayaneni

This Summer edition is focused on the Legacy of Fritz Schumacher, a pioneer who championed the concept of "small is beautiful" and was the subject of the annual Howard Liddell Lecture series. Our very own Sandy Halliday organised the event and led the proceedings. We have articles recounting the august contributions and a link to a film summary of the event.

Alongside the celebration of Schumacher's legacy, we turn our attention to health and wellbeing. The Health Group within SEDA has curated insightful articles that shed light on the interplay between our built environment and our physical and mental wellbeing. Through the lens of collaborative thinking, and retrofitting, we explore how existing structures can be transformed to enhance health and comfort while minimizing environmental impact.

Our SEDA Specification section explores three key areas of material sustainability in design innovations: the potential for mass timber production in Scotland, post-tensioned stone, and the TCosy Deep Retrofit System. Flying Factory partnerships are also described as a possible solution to address the skills shortage in construction and deliver energy-efficiency.

SEDA Land's Building Futures event explored the implementation of NPF4's emphasis on placemaking with sustainable examples. Gail Halvorsen highlights the need for a more capable planning system, innovative funding models, investment

in IT infrastructure, and the promotion of locally-sourced timber and natural materials for sustainable development.

SEDA Solar celebrates Kerr MacGregor's contribution to solar innovation, including the development of solar air collectors and solar-thermal collectors, as well as the growth of passive solar design. The article emphasizes the importance of knowledge transfer and networking in promoting solar technology and highlights examples of practical innovations and product realization in the field. The Kerr MacGregor Award for Solar Innovation is being set up to recognise and encourage new solar innovations.

We are considering leading our upcoming Autumn edition, around the themes of "Sustainable Landscapes: Nurturing Nature's Abundance" and "Building Resilience: Nurturing Sustainable Communities." These topics encourage us to explore the intricate relationship between our surroundings, our communities, and the environment. Let us have your ideas, research, and inspiring stories that exemplify the harmonious coexistence between nature, human settlements, and sustainable development.

At SEDA Magazine, our goal is to provide comprehensive coverage of the diverse activities undertaken by the association. In some instances, however, we may have missed featuring a project, or a pressing topic, or featured an article you disagreed with. Your input is vital to

continuously improve and ensure that we offer a magazine that meets the needs and interests of our readers. You can reach us at magazine@seda.uk.net

Lastly, I'd like to extend heartfelt thanks to Nick Domminney for his outstanding stewardship of the SEDA magazine over the last four years. Stepping in as your new editor, I am thrilled to amplify our shared dedication to sustainability. I am eager to celebrate the transformative power of small changes, to highlight impactful narratives, and to illuminate the evolving tapestry of regenerative innovations, mirroring our diverse and interconnected world of ecological design and to bring you the very best of SEDA, working alongside our excellent magazine team. ■

Making the way for collaborative thinking to promote health and wellbeing

Pauline Cobbold, Janice Foster, Michèle Hipwell, Magdalena Blazusiak

Making the way for collaborative thinking to promote health and wellbeing rooted in the sociological and psychological value of deliverables.

It has taken a few months following the initial introductions for four Health and Wellbeing group members to virtually meet and deliberate on the direction the group could take to support and engage with other members of SEDA.

It soon became evident that despite diverse backgrounds, we all share a common goal and desire to expand the interdisciplinary approach to addressing health and wellbeing.

Introductions

Pauline – retired Advisory Teacher of the Deaf, self-builder and Passivhaus enthusiast promoting reuse and natural materials to address health and wellbeing.

Janice – Chartered Services Engineer and researcher of indoor environments, building physics and performance, maker of natural cosmetics, appreciating sensitivities to allergens in self-care products.

Michèle – Chartered Health Psychologist, retired academic and trainer of doctoral students. Supports health promoting environments to prevent and manage illness and collaboration across disciplines and community groups to enhance health and wellbeing.

Magdalena – Chartered Architectural Technologist, a supporter of holistic retrofits addressing the retrofit methodologies' social values, advocates mainstreaming natural materials and believing in learning exchange and industry-academic collaboration.

Getting started

Our initial brainstorming session resulted in some questions and topics we would like to expand on, through articles, initiatives, and engagement with other group members.

We discussed collaboration between disciplines and combining different approaches to Health and Wellbeing, considering both physical and psychological factors, with an understanding of the impact of sensory stimuli and sensitivities and the importance of full participation in communities and nature.

Principles of salutogenic approach

This approach took us to a discussion on the principles of salutogenesis - a study of health that focuses on factors that support health and wellbeing.

Can salutogenic and biophilic principles be applied to a variety of projects and promote preventative health? This theory resonates particularly well with designing spaces for dementia care and sheltered housing, understanding the importance of finding purpose for the people with the condition and not treating them as if they were no longer able to

have any contribution to the community. These aspects can be addressed in the provision of cohesive spaces promoting independence and tending to the gradual decline of people with dementia through well-designed, safe spaces, enabling the connection with nature and experiencing the beauty of nature, having the balance of the indoor and outdoor environments without feeling restrained or isolated.

Consider Passivhaus

Pauline told a story of how she embarked on her self-build Passivhaus project, the many difficulties and concerns, including knowledge and understanding of the building contractor to deliver a project to Passivhaus standard. Considerations for building in a Special Protection Area to minimise the impact on the environment, promote biodiversity and follow principles of regenerative design. The individual approach and understanding of the importance of healthy indoor environments on the wellbeing of the occupants, use of natural materials, finishes, and reuse of materials prove that high building performance standards can be achieved with consideration of embodied carbon and circularity.

Sustainable neighbourhoods

We pondered over the question of promoting health and wellbeing in the communities. Should we revisit the past and learn from the approaches applied pre-industrial revolution? How can the biophilic design enhance the spaces in urban areas?

Image:
Word cloud of key words which recurred during the SEDA Health team's discussion

We discussed the importance of well-planned communal outdoor spaces, developing a sense of belonging and engagement with others through nature-based activities, promoting biodiversity, and providing good transport connections from every home with access to community hubs, leisure centres, libraries, and community gardens. Many of these concepts directly relate to the psychology of wellbeing.

Readers can find out more about the psychology of wellbeing, consisting of 5 steps in which health and wellbeing behaviours can be promoted through design in Michèle's article.

Retrofit

Last but not least, we had arrived at the question of the meaning of health and wellbeing in retrofit. Is perhaps the sociological value of retrofit more critical than the economic value? How can health and wellbeing be improved through retrofit projects? Can it be measured or predicted? We asked Matthew Clubb of Northeast community-centred retrofit hub NESFIT to provide his insight.

Summary

Designing for health and wellbeing requires the application of a multi-layered approach and consists of physical, social, economic and psychological perceptions of the built environment, including tangible and intangible targets. Promoting early collaboration between disciplines could support communities through a people-centred approach, considering diverse

contexts, needs and aspirations to achieve what has been described by Kate Raworth as environmentally safe and socially just spaces.

We would like to encourage others to join us, to contribute to the work of the group through diverse experience and expertise to result in the provision of broader outreach. We feel that to widen the health explorations and connections with the built environment; we need to hear the voices of landscape architects, arboriculturists, environmental surveyors, special planners, nature enthusiasts, but also furniture makers, craftsmen and women, supporters and developers of natural and bioinspired materials to mention a few. ■



Can a well-being approach help us understand and shape how to manage our lives and protect nature?

Michèle Hipwell, Chartered Health Psychologist

As a resource for daily life and a significant underlying driver of policy coherence, well-being has been at the heart of the World Health Organisation (WHO),¹ including the UK, for many years. When WHO broadened its definition of health from the absence of ill-health to *'A state of complete physical, mental and social well-being'*, it developed a person-centred approach to our experiences, explored in 30 different languages. The WHO-5² well-being questionnaire allows us to reflect on what well-being means to us by rating and comparing our well-being score to others, using just five subjective statements such as: *'My daily life has been occupied with things that interest me'*, *'I have felt active and vigorous'*; A well-validated questionnaire, it has been used extensively. The UK Department of Health developed a similar definition of well-being: *'A positive state of mind and body, feeling safe and able to cope, with a sense of connection with people, communities and the wider environment.'*

Wellbeing economies

Nature and human experiences are essential to these person-centred definitions of wellbeing, including physical, psychological, and social attributes. The legacy of E.F. Schumacher in his 1973 book, *'Small is Beautiful'*³ defined the purpose of the economy as meeting human needs, not profit, with Head, Hands and Hearts at its centre and a view reflected in the recent developments for *'Wellbeing Economies'*, with human-centred approaches to well-being and

the protection of nature at the centre of decision making. There has been a rethink about the economy's focus on growth, where humans are described as resources. It has been increasingly compared to Kate Raworth's *'Doughnut Economics'*⁴ degrowth model, stating that no one should fall below a social foundation of well-being or go beyond an ecological ceiling of planetary pressure and a safe economic mindset. This approach has inspired and been consistent with developing new creative wellbeing economies frameworks in the UK and internationally.

A recent article from the Centre for Thriving Places summarises 8 of the best new economic frameworks, including the Shared Ingredients for a Well-Being Economy^{5,6} aiming at better policy making in the UK and abroad. For an example of a model for organising our society and the economy with tools for action and transformation, see P. Chatterton⁷, Leeds Doughnut Action Lab, demonstrating how changes are being implemented in the city.

The Scottish National Performance Framework (SNPF)

The Scottish National Performance Framework (SNPF) is a Scottish model with a similar structure. One of its aims is to better integrate policies across traditional sectoral 'silos' by focussing on outcomes. An example is the Public Health Scotland delivery plan 2021-24⁸, creating opportunities for Scottish Communities to work together with community

participation as its heart. It includes Local Authorities, Architecture and Design Scotland and Nature Scotland. The goals include many outcomes of relevance for architects and engineers and a particular focus on health, community, and the environment. They are guided by the Place Standard Tool, an outcome-based measure of the 14 themes of a place's physical, social, and natural elements collectively, see <https://www.ourplace.scot>.

In September 2022, a report published by Public Health Scotland summarised the initial evidence from the Place Standard Tool⁹. See the Place Principle¹⁰ to identify the primary outcomes to consider. The most relevant health and wellbeing outcomes identified included physical activity, social interaction, stress, safety, material deprivation, the environment, and climate change. Working across disciplines is a valuable way to fully understand how to develop human and nature-centred approaches.

Architecture for wellbeing - Collaborative working between architects and psychologists:

The work of the architect K. Steemers provides a valuable contribution to the development of wellbeing frameworks. A professor of sustainable design at Jesus College, Cambridge University¹¹, working in collaboration with psychologist F. Huppert¹², he examined the importance of a more holistic awareness of the behaviours that promoted wellbeing using human-centred approaches. Flourishing

Image:
Spreefeld Housing Community, Berlin

and thriving are positive ways to think about wellbeing by developing design-led ‘choice architecture’ and biophilic designs (designs connecting people to nature). Steemers described ‘the 5 ways to wellbeing’ as possible ways to develop housing and an outdoor environment conducive to wellbeing. Five key evidence-based behaviours support wellbeing, identified in large-scale studies and meta-analyses:

- 1) **Connect:** The quality and amount of social connection are associated with reported psychological and physical wellbeing
- 2) **Keep active:** Physical activity reduces symptoms of stress, anxiety and physical-ill health
- 3) **Take notice:** Being mindful – paying attention to the present and being aware of thoughts and feelings, reducing symptoms of stress, anxiety, and depression.
- 4) **Keep learning:** Staying curious and engaged in the world around you.
- 5) **Give:** Pro-social rather than self-centred behaviour has a positive impact on well-being.

Possible design examples of the critical behaviour ‘Connect’ include creating opportunities for social interaction: social space, accessibility and proximity to communal resources, places to stop and sit, creating a sense of homeliness, safety, peace, or a bustling and lively space; natural and biodiverse green and blue

outdoor spaces. See the article in footnote 10 for Steemers’ description of additional examples for all the key behaviours. Several models have also been identified in the Public Health Scotland Report.⁸

Exciting collaborations and joint working have been explored in this short article and, like the Basecamp Health Group collaboration, offer the possibility of positive associations and the development of collaborative working across disciplines in the future. ■

¹<https://www.who.int?activities/promoting-well-being>

²<https://www.psykiatri-regionh.dk/who-5/Documents/WHO-5>

³E.F. Schumacher (1975), *Small is Beautiful: A Study of Economics as if People Mattered*. Harper Perennial

⁴Raworth, K. (2017) *Doughnut Economics. Seven Ways to Think Like a 21st-Century Economist*. Penguin Random House. UK

⁵<https://whatworkswellbeing.org/blog/the-core-components-of-successful-wellbeing-frameworks>

⁶https://whatworkswellbeing.org/wp-content/uploads/2023/02/Shared-Ingredients-for-a-Wellbeing-Economy-Paper_Publication-Copy.pdf

⁷<https://www.climateactionleeds.org.uk>

⁸<https://publichealthscotland.scot/publications/public-health-scotland-delivery-plan-2021-24/>

⁹<https://publichealthscotland.scot/publications/evidence-behind-place-standard-tool-and-place-and-wellbeing-outcomes/>

¹⁰<https://www.gov.scot/publications/place-principle-introduction/>

¹¹K. Steemers (2015), *Architecture for well-being and Health*. Daylight & Architecture, issue 23, pp. 6-27.

¹²<https://www.happinessandwellbeing.org/felicia-huppert>



Health and wellbeing promotion through retrofit

Magdalena Blazusiak, MCIAT: Knowledge Exchange Coordinator for CIAT Scotland East, Senior Architectural Technologist at jmarchitects

*'Health is one of those abstract words, like love and beauty, that means different things to different people. However, we can confidently say that health is and has always been, a significant value in people's lives. If we do not acknowledge the contentious nature of health and have a sound understanding of the determinants of our preferred conceptualisation, it is unlikely that we will be able to develop incisive strategies for promoting it'*¹

NESFIT on the role of retrofit on health and wellbeing

NESFIT is a North East Scotland retroFIT Hub, a community-led retrofit cooperative, with a mission to help householders achieve warmer, healthier, emissions-free homes. Registered as a charitable trust, one of the requirements from the Office of Scottish Charity Regulator (OSCR) was to demonstrate the relation of the proposed charitable activity to maintaining and improving people's health.

Numerous research reports and policy documents address the links between poor housing and the development or exacerbation of a range of health problems. While there is no simple definition of what 'poor' housing means in practice, it can be broadly defined as accommodation which presents a range of risk factors detrimental to residents' wellbeing, where vulnerable groups are at particular risk.²

These research reports have been evidenced by the recognition of the

first formally reported fatality directly attributable to the effects of exposure to mould and associated poor housing conditions.³ Equally, the implications of lack of maintenance and inadequately applied and inappropriate retrofit measures can have a direct correlation between the detrimental effect on affected buildings and the corresponding mental and physical wellbeing of the occupants.⁴ Pelsmakers argues that buildings profoundly impact our quality of life, as we spend the majority of our lives indoors, in what is now our '(un)natural habitat'⁵

Re-use of buildings as a regenerative tool

Re-using existing resources, including building and infrastructure, would inevitably contribute to the circular economy at the local level. It would also follow E.F. Schumacher's ideal of an economy serving the people without depleting the finite resources of our planet. Utilising existing assets and prolonging their life expectancy reflects principles of de-growth and targets economic growth dependencies providing new avenues for environmental and socio-economic opportunities.

Griffiths, in the publication for STBA, states that 'we can not only meet our housing needs by converting existing buildings, but we can also locate people in cities, where the facilities already exist, and thus regenerate our city centres.'⁶

Design considerations

Golembiewski, in his article 'Salutogenic design – The neural basis for health promoting environments' states that 'simple concepts like comfort, joy and aesthetics have had no place in traditional hospitals, yet they are the psychological bricks and mortar of all healthy buildings whether or not they are health care buildings'.⁷

The effect of using chemicals in building materials and their impact on health and wellbeing is becoming better understood, where using natural materials in interventions can promote a healthy indoor environment and enhance mental health and wellbeing.⁸

To aid human connection with nature, restorative design principles promoting biodiversity could be applied to retrofitting both rural and urban areas. This could be achieved by building bird/bat habitats when extending eaves or adding green roofs where the structural integrity of the existing roof will not be compromised, as suggested by Pelsmakers.⁹ Use of nature-based solutions can provide a correlation with nature supporting the role of people as stewards of the place in the ecological dimension.

Beyond carbon emissions

Current drivers for retrofit activities are primarily dictated by the reductions in carbon emissions and physical ill health resulting from poor housing conditions.

Image:
BE-ST Workshop, BE-ST

Sociological and psychological aspects of retrofit are not yet well recognised nor represented. There is perhaps a requirement for a standard to support challenging to quantify aspects of interventions, such as happiness, belonging and quality of life, in recognition of the importance of sensory perception in response to delight in design and effects of wildlife-rich environments on health and wellbeing. ■

¹Green J, Tones K. Health Promotion: Planning and Strategies (2nd ed). Thousand Oaks, USA : AGE Publications Ltd, 2010

²Choices, NHS. <https://www.nhs.uk/common-health-questions/lifestyle/can-damp-and-mould-affect-my-health/>. [Online] NHS. [Cited: May 15, 2023.]

³Department for Levelling Up, H. and C. <https://www.gov.uk/government/news/government-to-deliver-awaabs-law> . [Online] 2023. [Cited: May 16, 2023.]

⁴Punk retrofit: fighting the lack of vision on energy upgrades. Rickaby, Peter. 41, s.l. : Passive House Plus, 2022.

⁵Pelsmakers, Sofie. Designing for the climate emergency: A guide for architecture students. London : RIBA Publishing, 2022.

⁶Griffiths, Nigel. <https://stbauk.org/wp-content/uploads/2021/10/From-Retrofit-to-Regeneration-2021-STBA.pdf> . [Online] 2021. [Cited: May 15, 2023.]

⁷Golembiewski, Jan. https://www.researchgate.net/publication/255971085_Salutogenic_design_The_neural_basis_for_health_promoting_environments . [Online] October 2012. [Cited: 05 16, 2023.]

⁸ASBP. <https://asbp.org.uk/webinar-recording/webinar-healthy-buildings-conference-2022>. [Online] 2022. [Cited: May 15, 2023.]

⁹Pelsmakers, Sofie. The Environmental Design Pocketbook. London : RIBA Publishing, 2012



Image:
Sandy Halliday delivering her introduction to Schumacher, Jo McLelland



The 2023 Howard Liddell Memorial Lecture: seeing Schumacher's relevance now

David Seel

On 03 May, it was a real pleasure to get a good group of members and others together, in Edinburgh and on-line, for the first Howard Liddell memorial lecture since 2019, to hear about another of Howard's heroes (which Sandy Halliday explains fully below). If you have joined SEDA in the last years, you won't then have been aware of this great ongoing series, where Sandy looks back through the pioneers and visionaries that shaped Howard's outlook (and SEDA's as one of its founders). One principle being the need to make not just design, but our society more ecological and equitable. Key themes when looking into the legacy of Fritz Schumacher. Sandy's research had found video from the 1970's of Schumacher explaining his ideas, and as previously with Ian McHarg and Barry Commoner, brought the man to life. With the gap of 50 years it seems ridiculous, that we are only just starting to act on these ideas now, with plans like the Wellbeing Economy now starting to be implemented.

This gap was bridged effortlessly by the irrepressible Satish Kumar, who co-founded the Schumacher College, after working with him on Resurgence magazine, again more details below. Satish had clearly also been an inspiration for speakers Paul Chatterton and Simon Trace, as well as on the day for Nela Gonzalez, who was proof that you can start to be the change that you want to see. We heard the links between the apparently small scale of our personal actions and the apparently big scale economics that form most policy, and that one needs to support the other.

The debate on how this can be made to happen formed a lot of the discussion after, with a set of insightful questions from the audience, led well by Sam Foster. The fact that major cities are now looking to try and define their policies according to Wellbeing 'Doughnut Economics' that follow on from Schumacher, and we could see how that is starting to happen in Leeds as outlined by Paul, shows it can be done.

When it looked like it all seemed too involved or entrenched to unpick economic and political orthodoxy to prioritise our planet and people more fully, Satish was able to give us all a burst of energy, telling us to just do it. Much has changed already socially, and that it starts with us, by our actions, our votes, and by our joining together in groups like SEDA, that makes a difference in a positive way. Do watch the [video](#) on the SEDA Resources page if you couldn't be there, to be inspired, and get involved with the others who came out of this great event wanting to do more. ■

An Overview: The 6th Howard Liddell Memorial Lecture: the legacy of Fritz Schumacher

Professor Sandy Liddell Halliday MPhil MCIBSE CEng FWES HonFRIAS HonFRIBA
Principal, Gaia Group <http://www.gaiaigroup.org/>

This lecture series was initiated by me in 2014 in memory of my late husband, one of SEDA's founders and its first Chair. Howard's seminal book "*eco-minimalism the anti-dote to eco-bling*" was a justifiably angry response to the greenwash, techwash, bullshit, bling and soft solutions that had sought to undermine his attempts to design in a way that was environmentally & socially responsible. Eco-Max, which he was planning at the time of his death in 2013, was intended to turn the tables. Having highlighted the stupidity of so much do-bad thinking, it was time to shine a bright light on those who really had shown the right way. Howard wanted to pay his respects to those eco-pioneers (Patrick Geddes, Rachel Carson, Barry Commoner, Ian McHarg, Fritz Schumacher, Sherry Arnstein, Bucky Fuller and James Lovelock) who had inspired him.

In the 50th anniversary year of the publication of *Small is Beautiful – economics as if people mattered*, the phenomenal legacy of its author Schumacher was an appropriate focus of our attention. This event aimed to bring together discussions about economics, good work, technology and well-being in a climate & bio-diversity crisis. In the end it was all about optimism.

Schumacher

Ernst Friedrich "Fritz" Schumacher was a hugely influential economic thinker, statistician, and economist with a tad of a 70's rock star hippy aura and

hair style. Born in Bonn in 1911 his education took him to Berlin, Oxford and Columbia. He was a businessman, farmer and journalist in Germany. He moved to England in 1937 to escape fascism but was considered an 'enemy alien'. From his place of internment on an isolated farm he became hugely influential in the economic recovery of Europe post WW2 and advised the Burmese, German, Indian and Zambian governments on development issues and became Chief Economic Advisor to the UK National Coal Board. In *Small is Beautiful – technology as if people mattered, Good Work, Buddhist Economics* and *Guide for the perplexed*, he promoted the idea that the purpose of economic activity should be meeting human needs - including meaningful work - not pursuing profit or growth for its own sake. He believed strongly in the power of local organisation to meet local needs.

Hazel Henderson, Kate Raworth, Jason Hickel, Katherine Treblink, Tim Jackson, indeed most sufficiency, degrowth, GDP sceptic, enoughness economists pay tribute to "*Small is Beautiful*" with its now well understood critique of GDP. And, whilst, the impossibility of *Infinite growth on a finite planet* is, like all those good ideas, set out in my 1st memorial lecture *A short history of good ideas* <https://www.youtube.com/watch?v=byXGJjp5vVs> - a truism that has been ignored for 50 years, it has at last got some traction.

But this event was designed to go further. To delve into the less well explored legacy concerning the role of work and

technology in meeting human needs. Schumacher's experience in developing countries led him to be sceptical about new technologies – especially those dependent on intensive energy and viewed so-called advances in technology as something that was not always self-evident. It led him to promote what became known as appropriate or intermediate technology. He died too young in 1977, but he lived his life.

The Schumacher College, Resurgence & Ecologist, Green Books, the New Economics Foundation, the Schumacher Center for a New Economics, the Soil Association, are all inspired by Schumacher. Also, Schumacher with George McRobie, founded the development charity *Intermediate Technology Development Group*, now *Practical Action*. A fundamental of ITDG was that technology should be able to be installed and maintained with local skills. This paradigm was instrumental in the development of the *Centre for Alternative Technology* and my own degree in Engineering Design & Appropriate Technology.

Watch it

At the Memorial Lecture, by way of introduction, I put together a short film compiling clips about and by Schumacher. The content was clearly dated in many respects but also contemporary and ahead of its time in equal measure. This was followed by a talk from the heart by Satish Kumar. In composing the programme.

I found Doughnut Economics to be the unifying factor in bringing together the two aspects of Schumacher's legacy and Kate Raworth's chalk board sequence *Seven Ways to think like a 21st Century Economist* was shown as an introduction of the concept.

Paul Chatterton talked about how the Doughnut Economics Action Lab was progressing in Leeds and Simon Trace author of *Rethink, Retool, Reboot – Technology as if people and planet mattered* gave an overview of Technology Justice using the Doughnut as a model. Nela Cadiñanos Gonzalez, Wellbeing Economy Alliance (WEAll) Youth Representative closed the session with an overview of an economy for human and ecological wellbeing. We said goodbye to our zoom participants at 6:30pm and tucked into plenty of delicious food prepared by David Somervell. An open mic session allowed anyone to talk about a relevant initiative in more depth and was eagerly embraced by Andrew Whitley of Scotland the Bread, Phillip Revel SCCAN, Aythan Lewes and Joanna McLelland and others until I eventually wound it up and the networking began in earnest (pun intended). ■

People will talk about this one for years. If you missed it you can watch it at :

<https://www.youtube.com/watch?v=riGX8A0g37k>



Images:
Top: Sandy Halliday introducing Schumacher, Jo McLelland
Left: 'standing on the shoulders of a giant', Sandy Halliday

Impressions: design like we give a damn!

Joanne McClelland, Conservation Accredited Architect RIBA RIAS ARB

SEDA inspired me from afar. I was living in London and found SEDA online, I saw the series of talks and events, I looked at the members CV's and their practices, and read about their actions and aspirations. I knew I wanted to be part of a movement like that. I read up on SEDA, I read up on GAIA Architects, the co-directors Sandy and Howard. On return to Scotland I joined SEDA. SEDA had inspired me on my journey. What had inspired SEDA's journey?

SEDA's 6th Howard Liddell Memorial Lecture: The Legacy of Fritz Schumacher, was a wonderful insight into the inspirations to SEDA. Perhaps those who have been fortunate before me to attend the previous memorial lectures, longstanding members of SEDA, or were even part of GAIA Architects, will be well versed in these inspirations

The journey

Many of the subjects I recognised from my own journey. Sir Patrick Geddes, ecological design, community planning, community leadership, minimal technology, meaningful work, local work, designing for people and planet. These were all the tools of a way of practicing in the built environment.

Small is Beautiful, Fritz Schumacher, 1973, was on my Edinburgh College of Art reading list in first year. Was it a fluke it was on my reading list? Well done to the tutors you may say, or have we all

been trying to teach this mindset shift this whole time? Have students been seeking alternative routes from 1991 as they are now in 2023? That's 20 years of handing out Small is Beautiful, embodying the tools and inspiration in practice. So where is the block?

The Small is Beautiful generation set out on a way through the block. Resurgence magazine, founded in 1966, for those of us that 'choose reading that carries value for the future' (James Hillman). I found the magazine advocating peace, social and environmental justice. It advertised the Schumacher Collage, founded in 1991, by Satish Kumar, a progressive college for ecological studies, a people and planet based education.

But there still seems an intergenerational fault of failing to prepare society, underpreparing students and the public. Students disappointed in their ultimate tech-bling education options, and the unrelenting reality of the tech-bling industry, and tech-bling consumer demand. At the same time the public abandoned to mass consumerism and marketing, to the point that we may need a marketing strategy to sell survival to ourselves! It turns out survival is not commercially attractive.

Perhaps there is no block, and it just takes time. This makes me think of the quote coined to Mahatma Gandhi 'first they ignore you, then they laugh at you, then they fight you, then you win.'

System change

Alas, the speakers concurred regarding the cause of the block; systems change. Kate Raworth said that our 'high-income economies are degenerative and divisive by default and must become distributive and regenerative by design'. Nela Cadiñanos Gonzalez, Youth Representative of the Wellbeing Economy Alliance, asked for radical transformation to a system designed by humans. Paul Chatterton, hand-held the Leeds Doughnut Economics Action Lab in Leeds to champion a commons economy. We need to intentionally design a system that will deliver change.

I would have loved to have heard Howard talk too, but I strongly suspect the message would be the same, a call to action, as Sandy put it, 'let's design like we give a damn.' ■

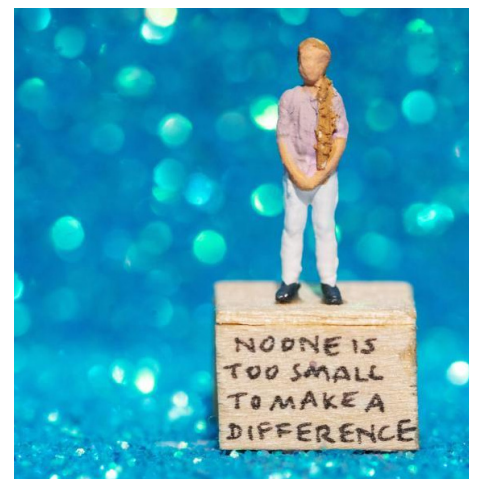


Image:
2013 Lisa Swerling's Glass Cathedrals

Professor Paul Chatterton: how do you get a city into the safe and just space of Doughnut Economics?

Joanne McClelland, Conservation Accredited Architect RIBA RIAS ARB

In Doughnut Economics, an economic model pioneered by Kate Raworth in 2017, she explains that the doughnut economy is based on the premise that "Humanity's 21st century challenge is to meet the needs of all within the means of the planet."

Doughnut Economics is based on the premise that all human activity should be bordered on one side with social thresholds which ensure that nobody is left without basic needs, and on the other by an ecological ceiling, which ensures that human activities do not overshoot planetary boundaries. The space between these two can be represented as a doughnut, and human activity that takes place within the doughnut is both ecologically sustainable and socially just.

Humanity's 21st century challenge is to meet the needs of all within the means of the planet. Note: 'needs', not expectations, desires, aspirations or presumptions. What are your basic human needs that should be within the doughnut?

The DEAL

Professor Paul Chatterton- University of Leeds Professor of Urban Futures in the School of Geography- talked through the Doughnut Economics Action Lab (DEAL). This is a method of turning the Doughnut Economics idea into transformative action. In April 2022 Climate Action Leeds ran a 'Launch of the Leeds Doughnut' event to introduce the

Doughnut Economics model and gather people's thoughts on how they could use Doughnut Economics in their work and everyday life, creating a city plan to help create a zero carbon, nature friendly, socially-just Leeds by the 2030s.

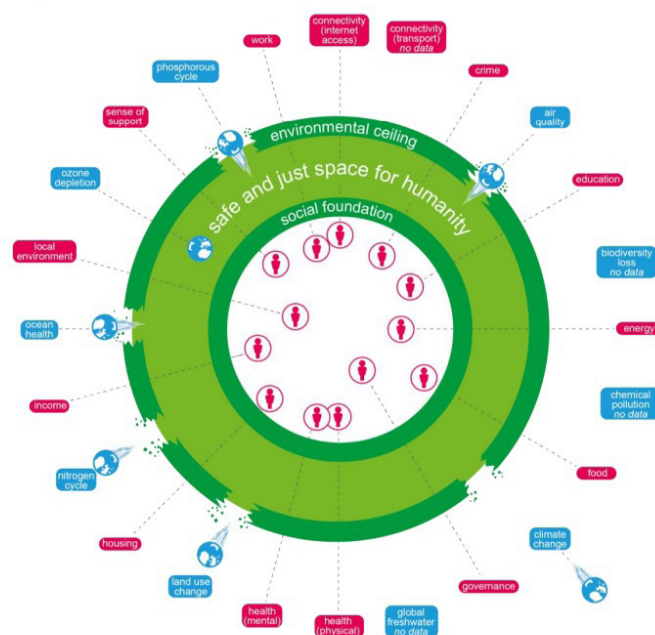
The Leeds DEAL carried out a gap analysis of data across the social and ecological boundaries, confirming that life in Leeds falls below the social floor and negatively impacts the planet. The Scotland Doughnut, Oxfam 2014, identifies the same:

"Almost one-fifth of households in Scotland are living in relative poverty.... Too many people are going hungry, living in overcrowded housing, experiencing poor health, anxiety and depression, with

little access to social support networks... Scotland's environment is degraded by our methods and patterns of production and consumption. Moreover, our activities degrade the environment globally, as changing Earth systems undermine the bio-productivity of ecosystems, creating global food and water stresses. These are the statements of fact presented within the Scottish Doughnut."

Paul and Leeds identified themselves as a hand-holder. A hand-holder to take the data into action. This is a call out for cross sectoral coalition and action. Please reach out to SEDA if you are already part of a climate and just transition movement and would like to be connected to others. ■

[The Scottish Doughnut, Oxfam, pg63](#)



Simon Trace: Schumacher's concept of "intermediate technology"

Aythan Lewes, Director EALA Impacts CIC, Chartered Building Surveyor MRICS

Simon Trace is a civil engineer, who for 16 years was the Chair of Practical Action and is currently Principal Consultant, Natural Resources and Energy, at Oxford Policy Management. He presented on Schumacher's concept of "intermediate technology". For me, however, many of the concepts discussed through the evening had clear antecedents in our current discourse, yet "intermediate technology" isn't one I know. Simon's presentation explored the concept and illustrated it across three key risk areas.

One of the reasons for 'intermediate technology' not breaking through may be the words used. 'Intermediate', but between what? And 'technology' seemingly conflicts with ideas of 'good work' and 'small is beautiful' present in the rest of Schumacher's thinking.

Simon explained that 'technology' in this context is knowledge and skill, not just constructs of steel and plastic. He linked current technological approach to our violent treatment of the natural environment and human spirit. He noted that we don't need something industrial or mass produced, or something 'low tech', but something in between. A particular take-away for me was the identification of technology as being ideological: it's method of implementation is a choice made by humans rather than a logical inevitability.

Options

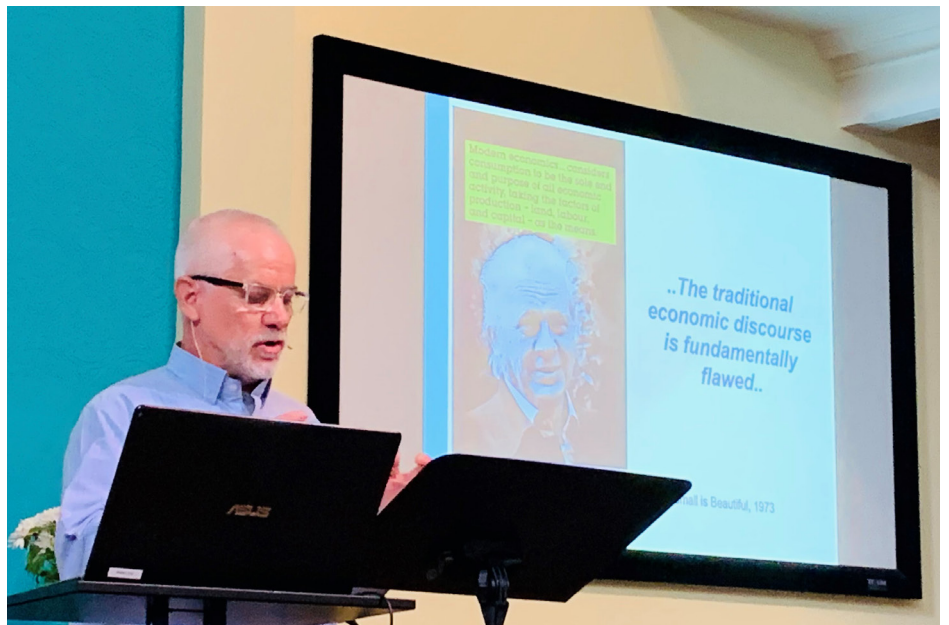
To illustrate this he talked through three 'critical technological risks': energy,

antibiotics, and food production. In each he illustrated how our current perilous situation started with massively positive impacts. Subsequently, over-exploitation and mass production techniques, coupled with an ideological acceptance of violence towards the majority of humanity and our environment, resulted in degradation of nature to a point where we now face the likelihood of not only losing the technological gains, but also destroying the wider environment in which it developed and thrived.

Simon concluded by linking this to Doughnut Economics, Buddhist Economics, and to technological justice. His closing reflection was on the accusation of Schumacher as a 'crank' for his ideas on intermediate technology, quoting his elegant response that "a crank

is a piece of simple technology that creates revolutions", neatly linking concepts of technological simplicity, holistic impact, and the wry sense of humour, which was notable in many accounts of Schumacher's work.

My conclusion is that the low-impact labelling of "intermediate technology" doesn't mean this isn't a powerful framework of how to apply broader holistic frameworks to humankind's relationship with knowledge, skill, and materials. A new wave of technological threats is staring us in the face with the rise of AI and the collapse of previously powerful technological systems. Simon showed how our humanity survives may rest of the implementation of Schumacher's ideas, but the detail must be filled in by us. ■



Nela Cadiñanos Gonzalez, WEALL Youth: the legacy of Fritz Schumacher

Sam Foster, architect

Those who were there in person at the 6th Howard Liddell Memorial Lecture on 3rd May will remember various parts of that amazing afternoon. I remember two most vividly: the first is meeting, and then listening to, Satish Kumar. The second is watching 23 year-old Nela Cadiñanos Gonzalez describe her introduction to the Wellbeing Economy Alliance (WEAll), its principles and its immediate relevance to all of us.

For those who haven't come across it, the Wellbeing Economy Alliance Scotland is a pretty fabulous network of community groups, activists, NGOs, businesses, academics and bottom-up organisations that share the view that the economy should 'deliver good lives for all on a healthy planet'. As such, it is a practical rollout of exactly what Fritz Schumacher repeatedly called for in books such as 'Small is Beautiful: Economics as if people mattered.'

"A Wellbeing Economy is an economy designed to serve people and the planet, not the other way around. Rather than pursuing economic growth at all costs, a Wellbeing Economy puts our human and planetary needs at the centre of its activities, ensuring that these needs are all equally met, by default." Wellbeing Economy Alliance

WEAll's five targets (Participation, Fairness, Dignity, Purpose and Nature) and four principles (Pre-distribution, Purpose, Prevention and People-Powered) are aimed squarely at encouraging national governments to implement wellbeing economies. It has seen some success, with

six countries signed up – New Zealand, Finland, Iceland, Wales, Canada and Scotland.

In June 2022, Kate Forbes MSP helped to introduce the Scottish Government's Wellbeing Economy Monitor "to look beyond GDP to measure how Scotland's economy contributes to improving things that people really value, such as health, equality, fair work and environmental sustainability" Whether this is anything more than lip service from the SNP remains to be seen as, despite the Scottish Government appointing in March 2023 its first Wellbeing Economy Minister, Neil Gray MSP, his role majors on 'economic growth' and 'inclusive growth' – distinctly non-Schumacher aspirations.

Elsewhere, Wellbeing Economy Wales is designing a series of workshops to help communities across Wales develop their own priorities, plans and actions – using various tools and resources including those developed by the Doughnut Economics Action Lab. Similar initiatives are kicking off across urban Scotland too, and you should be able to find these and join in. I'm certain that SEDA will develop its relationship with WEAll Scotland- see SEDA magazines Summer & Autumn 2020.

From everything that Nela spoke about, what's most clear is that the WEAll Framework seems to be that rare beast: a coordinated tool that can be used to empower grassroots communities and drive bottom-up action and a structure to enable top-down government policy to

actually deliver an economy that meets the needs of everyone. Let's see how far we can take this. ■

<https://www.weallscotland.org/>

<https://doughnuteconomics.org/>



Images:
Top: WEAll's five targets
Bottom: Nela Cadiñanos Gonzalez and Satish Kumar share the stage, Sam Foster Overleaf: Simon Trace, Jo McLelland

Satish Kumar: "I am an optimist because I am an activist"

Professor Sandy Liddell Halliday MPhil MCIBSE CEng FWES HonFRIAS HonFRIBA
Principal, Gaia Group <http://www.gaiagroup.org/>

It was a delight to open this homage to an eco-pioneer event with Satish Kumar's intimate personal experience of the legacy. Satish is an Indian British activist and speaker. He has been a Jan Monk, nuclear disarmament advocate and pacifist. In June 1962, with a companion, E. P. Menon, he undertook a peace walk for two and a half years, through the capitals of the world's earliest nuclear-armed countries from New Delhi to Moscow, Paris, London and Washington D.C.

Satish's close personal relationship with Schumacher from being pressed in 1972 to take over as Editor of *Resurgence* (now *Resurgence & Ecologist* magazine) to Schumacher's untimely death, was only 5 years. Yet it has spawned so much. The immediate establishing of the Schumacher Society with its unsurpassed ability to bring together the world's "stars of new thinking" in an annual forum and the founding at Dartington of the Schumacher College international Centre for Ecological Studies have been hugely influential.

Satish has an extraordinary form of social commentary embedded by, one feels, a lifetime of care, passion, curiosity, listening and simply, elegantly, being Satish. He can move deftly and sublimely from a contemporary known researched fact, say the identification of the *right side of the brain as a source of our creativity, intuition and relationships* to a full-blown social critique of a system that is trashing billions of yen, pounds, euros, dollars or whatever on the education of only the left

half of our children's brains. They avoid this waste at the Schumacher College through holistic human centred learning based on Schumacher's passion for the teaching of hand & heart & head (all of it) and a direct link to Gaia theory. All of it is a vital part of the big picture that is emerging through the Eco-Max series.

Eco-Max

I sought to bring together two aspects of the Schumacher legacy:- the critique of an economic system that serves profit rather than people & nature, with some sense of what "alternative success" might look like. Gross national happiness is an admirable target but how do we get globally happy when the dominant triggers are increasingly consumption, competition, centralisation and complications?

Ranging widely over the subject but never far from practicalities Satish scorned the use of humans and nature as resources for, and mere servants of, a master – the economy. And disparaged how human dignity has been reduced to shopping. Instead he asserted that the true purpose of economics is to *retain the integrity of nature* and without a pause proffered a tax system that can restore nature / support NGO's as the source of innovation / properly reward all workers / and maintain investment in what matters. Dah-Dah!

Satish advocates *making* over shopping, *creativity* over competition, *local autonomy* over centralisation and *elegant simplicity*

over complication. He urged us to create a society of makers: of gardens, food, buildings, friendships, clothes, music and poetry. "An artist" he said "is not a special kind of person. Every person is a special kind of artist." I was reminded yet again of Callenbach's novel *Ecotopia*.

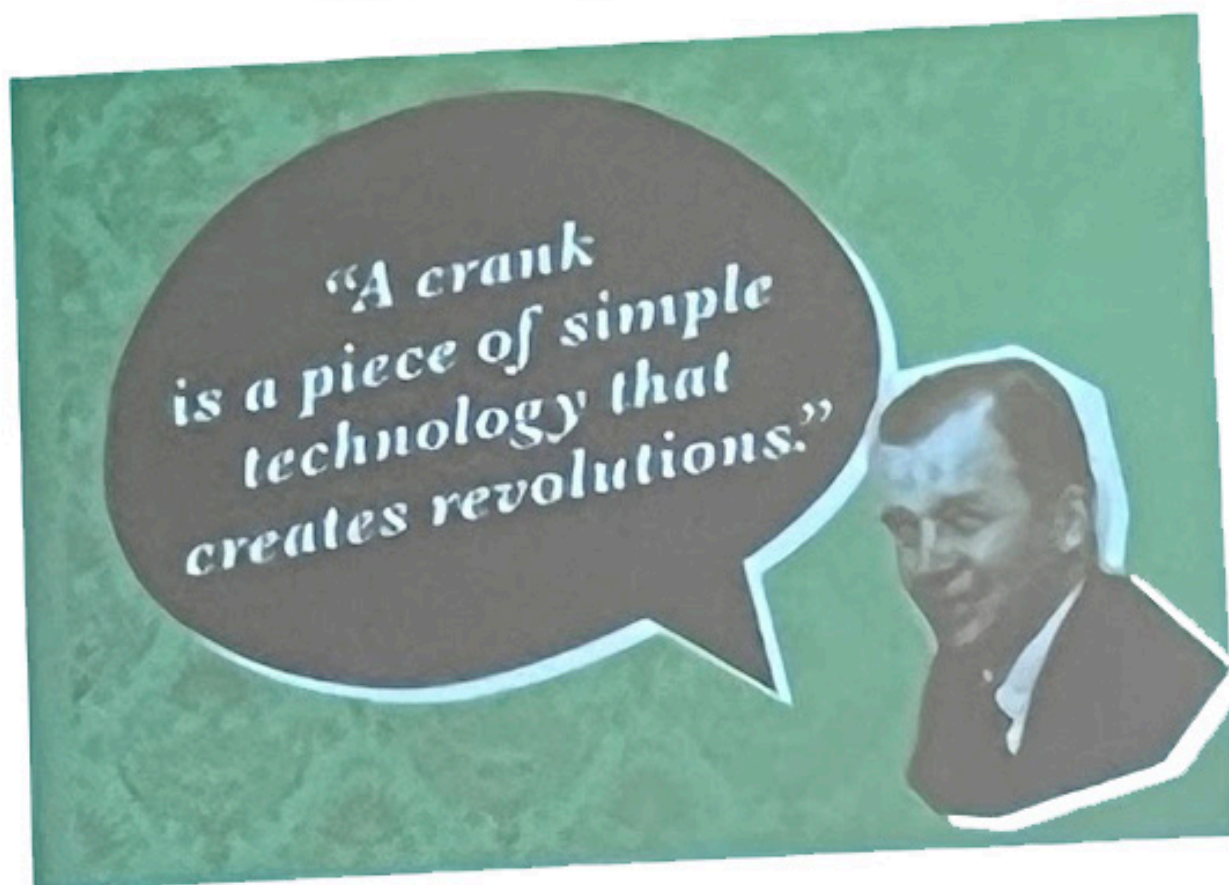
Optomistic responsibility

Without ever moving far from serenity, yet passionately, Satish channelled and directed the frustrations that we all feel to an optimism: That change is possible. That anything created by humans can be changed by humans. That it's not too late. All based on utter faith, inspiration, positivity and love. Satish was at his most powerful when he urged us to act because something is worth doing. We cannot determine an outcome but we can do what is right.

Satish's reverence for nature is evident in every breath and we can only hope through his ever-optimism that it can increasingly find its way to become the heart of every political and social debate. What people I hope took away was optimism, but also a responsibility to be the "change you want to see in the world," and to be "a radiator that attracts others to you" as well as an enhanced desire to work together to deliver system change. Satish also rightly pointed out the pressing need for us all to learn how to communicate. We should ask him for tips. ■

Image:
Lecture slide with Schumacher's 'crank' quote, Simon Trace

Was Schumacher right about technology, or just a crank?



Mass Timber Manufacture: a no-brainer for Scotland

Peter Wilson: architect and founding director of the Mass Timber Academy Ltd.

<https://www.masstimberacademy.com>

The past six issues of the SEDA magazine have included short summaries of the various mass timber systems available - or possible - in the UK. Yes, nail laminated timber (NLT), dowel laminated timber (DLT), Glulam, cross laminated timber (CLT) and laminated veneer lumber (LVL) only add up to five types, but the series began with a discussion on whether or not Scotland had sufficient forest resources of the requisite quality to manufacture any of these here, the short answer to which was - and is - that we do. The value added trick is in the transformation of the material qualities through lamination, whether glued or unglued.

Yet, of these, only Glulam is produced in this country and at present mainly in the form of bespoke items which are, whenever possible, manufactured using UK-grown timber. Two companies in particular, Buckland Timber Ltd in Devon and Inwood Developments Ltd in Sussex, are responsible for this output, but whilst both companies fabricate excellent products for which orders continue to increase, their overall market share remains frustratingly small.

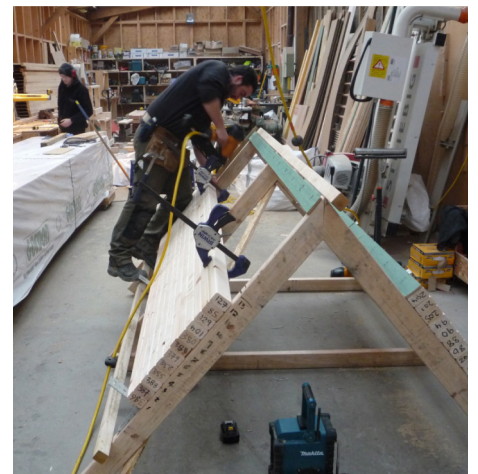
Euro-wood winning

The cold hard reality is that - notwithstanding the fact that specification of mass timber products and systems continues to grow apace in the UK - the bulk of these materials are imported from central and northern Europe, France and Spain. Indeed, despite Brexit's negative impact on imports and the severe

restrictions now existing and likely to remain indefinitely on trade with Russia, more than 80% of the construction timber used in the UK is still obtained from abroad.

The reasons for this are manifold: many UK importers of commodity timber have long established trading links to Europe and preference supplies from there; contractors with outdated, negative perceptions of the strength and stiffness of home-grown timber; previously inconsistent but long-resolved moisture control issues in home-grown timber supplies; the non-alignment of home-grown timber availability with building contract timescales; previously poor (but now vastly improved) supply chains from forest-to-processor-to-manufacturer-to-distributor-to-builder; and the perpetual desire of volume house-builders to secure construction materials from wherever and whoever they can at least possible cost.

Many of these issues are historic as regards softwood supply to the stick-building sector; hardwoods, however, are still predominately sourced from other countries, and usually, but frustratingly not always, from certified sustainable, well-managed forest sources. Harvested timber of dubious provenance remains a global challenge, despite the best efforts of FSC, PEFC and other Chain of Custody certification bodies.



Images:

Below: Interior of study module at Fettes School, Edinburgh - glulam floor, CLT walls, wood nail laminated ceiling - all made from Scottish-grown timber

Overleaf, top: Fabrication of nail laminated stacked board panel at MAKAR workshop, Inverness

Overleaf, bottom: Structural testing of dowel laminated timber connection at COCIS, Edinburgh Napier University

The Timber Age

Happily in our fast-changing construction world all is not doom and gloom: the growth in demand for mass timber products and systems, far from being a passing fad, is based on positive credentials that align with current imperatives: their contribution to combating the climate emergency, our future ability to achieve net-zero carbon targets, the enablement of a true circular economy in construction processes and products, the use and re-use of renewable materials, and - importantly - an increasingly widespread recognition of the need for resilience in manufacture, i.e. local production from locally-available raw material. If the 18th, 19th and 20th centuries saw revolutions in the use of brick, steel and concrete respectively, the first half of the 21st century will arguably be looked back upon as the new age of timber.

Certainly this first quarter century has witnessed something of a paradigm shift in the way we think - and need to think - about our constructed future, but this has only been made possible by continuing significant technological developments in mass timber manufacture, CNC machining, robotics and the use of parametric design. Advances in these areas - singly and in combination - haven't just delivered pioneering exemplar buildings around the world, but the lessons learned from their design and construction continue to filter down through manufacturing processes to create an ever

greater range of mass timber options and possibilities.

Arguably, however, the exemplar buildings are the exceptions that prove the rule, with any lessons learned hanging been secured in the absence of formal education in mass timber technologies: the practitioners are invariably self-taught, the subject being largely missing from schools of architecture and departments of civil and structural engineering in UK universities.

This absence has two consequences: first, these departments and institutions have no contribution to make to modern timber technological research and development and thus unable to work alongside industry to support greater use of engineered (mass) timber in construction in this country and, second, with professionals untrained in the design, specifications and use of these products and systems, the market for their manufacture from home-grown timber in the UK remains underdeveloped. This apparent lack of a market has to date resulted in no investment and no production: a Catch22 that has prevented the evolution of a domestic manufacturing industry that could provide an important value-added dimension for the products of our forestry and timber processing sectors.

It's true that glue lamination requires a substantial scale of production and a throughput of resource to be economically viable - currently, new CLT factories in Europe cost between €20-70mn+, a

level of investment almost unheard of in the UK industry, where, unlike our continental cousins, achieving a speedy return on investment (ROI) is considered an essential short-term requirement. The acquisition in late 2022 of BSW, the UK's largest sawmilling group, by one of Austria's two global industry leaders, Binderholz, initially suggested a more European approach to investment might quickly materialise, but for a variety of reasons, not least that company's exponential successes in other markets around the world, the impetus appears to have stalled.



Images:

Below, left: Example of home-grown mass timber housing module displayed at BE-ST during COP26
 Below, right: Full assembled home-grown timber study module in grounds of Fettes School Edinburgh
 Overleaf, top: Prototype two-storey pavilion at BE-ST constructed using Glulam floors, CLT wall panels, CLT stair and wood-nail laminated ceiling

Home grown developments

But back to Scotland's production timber resource and the potential. It offers Over the past two decades, the [Wood Science and Technology Centre at Edinburgh Napier University](#) has taken timber from forests around Scotland, the North of England and Northern Ireland to test the average strength and stiffness of the raw material. Its team has mechanically broken literally hundreds of thousands of sticks to produce the data needed to identify potential new, value-added uses. In parallel with this, the University's Centre for Offsite Construction and Innovative Structures (COCIS) has carried out extensive R&D with this home-grown material to determine its efficacy in the production of four mass timber products,

viz. Nail Laminated Timber, Dowel Laminated Timber, Cross Laminated Timber and Glulam.

From this work, and subsequent manufacturing at the [BE-ST](#) prototyping facility in Blantyre, it is now proven that lamination - whether glued or unglued - of our mostly C16 home-grown softwood species significantly increases the strength and stiffness characteristics of the material to meet European standards for engineered timber products. Built examples using beams, columns and panels fabricated at BE-ST from home-grown timber were exhibited at COP26 Glasgow in November: the challenge now is to grow domestic demand sufficient in the first instance, to justify investment in small-to-medium scale commercial manufacture.

At present domestic demand is being led by [Ecosystems Technologies Ltd in Invergordon](#), with prototype examples of its now-regular production of modular units using CLT, Glulam and (wood) nail laminated panels produced on BE-ST's vacuum press now available for examination by visitors to that facility. To an extent, this production still falls into the bespoke category but it need not remain so. Elsewhere, Edinburgh Napier University has recently acquired a Glulam press, enabling further R&D to be carried out that can hopefully lead companies in the timber processing and manufacturing sectors in Scotland to consider investing in their own equipment.





Scottish mass timber

Aside from CLT, the other products referred to in this article are eminently producible from home-grown timber. CLT has a range of technical demands that require a high level of investment, plus the fact that current international demand for this product means long lead-in times to obtain the necessary manufacturing equipment. And with more than 20 continental and Scandinavian CLT producers shipping their products into the UK, the level of competition is substantial from companies that already have well-established distribution systems and technical support services in this country.

Conversely, Glulam and the two non-glued systems could be brought to market at relatively low cost, manufacture implemented in a relatively short timescale and with small-medium production possible on a regional or local basis. Indigenous, sustainable manufacturing of this sort could supersede the need for much of the commodity timber and engineered timber products we currently obtain from abroad.

With 20-years of research under its belt, Scotland hasn't entirely come late to the mass timber party but if we are to get properly up to speed, we urgently need collaboration between sectors: a virtuous circle in which forestry, timber processing, manufacturing, design (architecture and engineering) and construction recognise the benefits of working together. In doing so, the value of our domestic forest

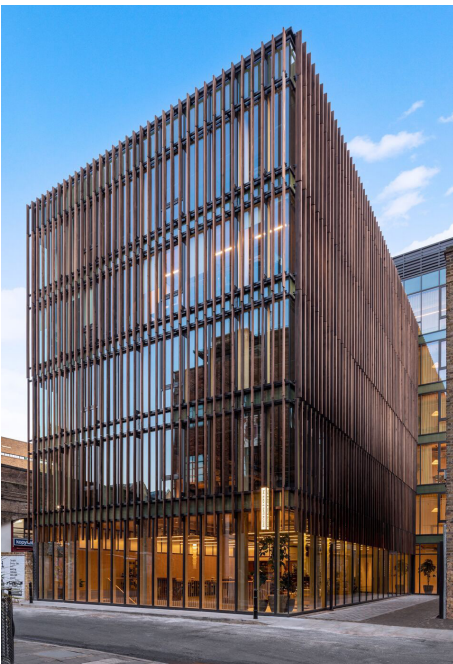
resource can be increased, a new and sustainable manufacturing sector created, design innovation opportunities initiated and improved construction methods implemented to successfully deliver the airtightness, thermal efficiency and zero energy targets needed to combat the climate emergency we currently face.

When viewed in the wider economic, environmental, health and social context outlined above, there is no question mass timber has an important role to play in all our lives: making it here makes absolute sense. ■

The Mass TimberAcademy provides introductory and specialist training courses in all forms of mass timber to architects, architectural technologists, structural engineers, building control officers, planning officers and other construction professionals. For details, see <https://www.masstimeracademy.com/>







Images:

Inspiring engineered timber....

Top: Glulam construction has moved a long way beyond simple post and beam assemblies - Naples Central Underground Station by EMBT Architects

Bottom: The Black & White Building in Shoreditch, London takes LVL construction to a new and important stage: hardwood LVL used to form this commercial building's frame with thermally modified Tulipwood providing the external cladding

Overleaf: Glulam viewing tower at Wellcome Building, Bishop Auckland by Niall McLaughlin Architects

Stone-Engineering for 'long-life, loose-fit, low-energy'?

James Simpson OBE HonDSc FRIAS FSAScot, architect, Edinburgh

Stone was traditionally a locally sourced structural material of great compressive but minimal tensile strength. In the post-industrial 20th and 21st centuries, stone ceased to be used in the traditional way, while new buildings of concrete and steel are often finished with thin stone cladding: no longer structure, but pure 'window-dressing', to make them 'fit in' with the surrounding buildings. This is not the best use of stone.

The masons who built the mediaeval cathedrals exploited the compressive strength of stone to an extraordinary degree, using columns, vaults, arches and flying buttresses to enclose massive and complex volumes. They understood stone's lack of strength in tension: Openings were arched, lintels were treated not as beams, but as vousoired flat arches, well restrained with buttresses at the ends and sometimes helped by more or less formal relieving arches above.

At the same time, walls of unworked rubble were normally brought to flat surfaces without recessed joints, were protected from rain by copings or cornices. They were frequently brought forward to a plane with stones partly covered by the bedding mortar or finished with harl or plaster and often with struck joints and limewash. The recessed joints which are now so popular were not traditional and were derived from an archaeological 19thC Ancient Monuments approach. The word 'pointing', now used to mean 'joint filling', was probably derived from the use of pointed tools for striking joint lines to

simulate ashlar. Stone was structure, not decoration which, if desired, was applied.

Modern construction

Today, cladding is what keeps the stone industry alive. Quarrying continues, though much reduced, and the industry is now well mechanised with machine shops for sawing, drilling, and finishing. Repair and restoration work preserves the old hand skills.

Stone, lime and timber, assembled with labour and skill, were perfectly complementary, used negligible energy, were carbon-neutral and produced buildings which were maintainable and sustainable in every way. Contrary to common assertions, they can, if properly managed, be economical of energy in use. With routine and timely maintenance, their life is infinite; they are easily improved and re-purposed and, if they become terminally redundant or have to be replaced, their components and materials are easily re-used or re-cycled.

When tensile members were required in traditional building, mainly for floor and roof structures, the available material was timber: in the Middle Ages generally native oak and, as development increased in the post-mediaeval period, pine brought in sailing ships across the North Sea from Scandinavia and the Baltic. Most importantly, and something which has tended to be forgotten, 'traditional building' was a system which used local and natural materials which were relatively

soft, weak, flexible and permeable. With the industrial revolution, everything changed: cast iron, then steel, Portland cement, concrete and now plastics produced what we now recognise as 'modern construction'. Steel and concrete frames superseded loadbearing walls and building envelopes became impervious insulated skins, faced with metal, glass and plastic

Post-Modern construction

'Traditional building' and 'modern construction' are entirely different systems: the latter being dependent on hard, strong, inflexible and impermeable, materials processed and assembled with the aid of machinery and a minimum of labour and skill. While often being described as 'maintenance-free', it would be more accurate to describe much modern construction as 'unmaintainable' in the normal meaning of the term: when components like plastic windows fail, as they do, they have to be removed and replaced. The life of such buildings is distinctly finite and, if they have to be demolished, most of their materials are fit only for landfill.

That the mixing of these two systems created more problems than it solved has had to be learned the hard way. The application of Portland cement mortars and renders to traditional buildings, the insertion of damp-proof courses and membranes of various sorts and the restriction of ventilation simply created condensation, dampness, efflorescence

and wood rot, which had previously been familiar only as symptoms of maintenance failure. The destructive treatment of wood-rot with toxic chemicals and the growth of the so-called 'remedial treatment industry' were disastrous consequences of short-term thinking and of a failure to understand traditional building as a mature system developed over many centuries. Sadly, this sort of thinking was all too common in the 20thC. and the climate-change crisis is one of the results.

Construction world-wide, and the manufacture of cement and steel in particular, are massive consumers of energy and emitters of carbon. Returning to traditional building might seem to some to be desirable, but, except on a tiny scale, is clearly impractical. More possible now is a new form of 'post-modern construction' which is relevant to contemporary needs, but which is as sustainable and as environmentally benign as pre-industrial traditional building used to be. Lessons could be learned from the past, but there can be no going back. Such a system might initially be more expensive, but costs would come down and might still be 'cheap at the price'.

The extent to which modern economies have been built on energy from fossil fuels is too easily forgotten. The resulting prosperity has brought great benefits of many sorts but has stored up equally great problems for the future. The impact of modern construction on climate-change is very substantial and is comparable to that of modern agriculture.

Image:
Post tensioned stone sculpture, Pierre Bidaud



Engineered Stone

Concrete is no better in tension than stone, while most stone is stronger in compression. Is there an opportunity for the stone industry to develop new ways of using stone structurally? The term ‘engineered timber’ has become commonplace: why not ‘engineered stone?’ Could it become possible to create sophisticated buildings to suit contemporary needs from more local, more natural and less processed materials and components?

Such a new post-modern system of construction could produce buildings which followed the ‘long-life, loose-fit, low-energy’ principles first proposed

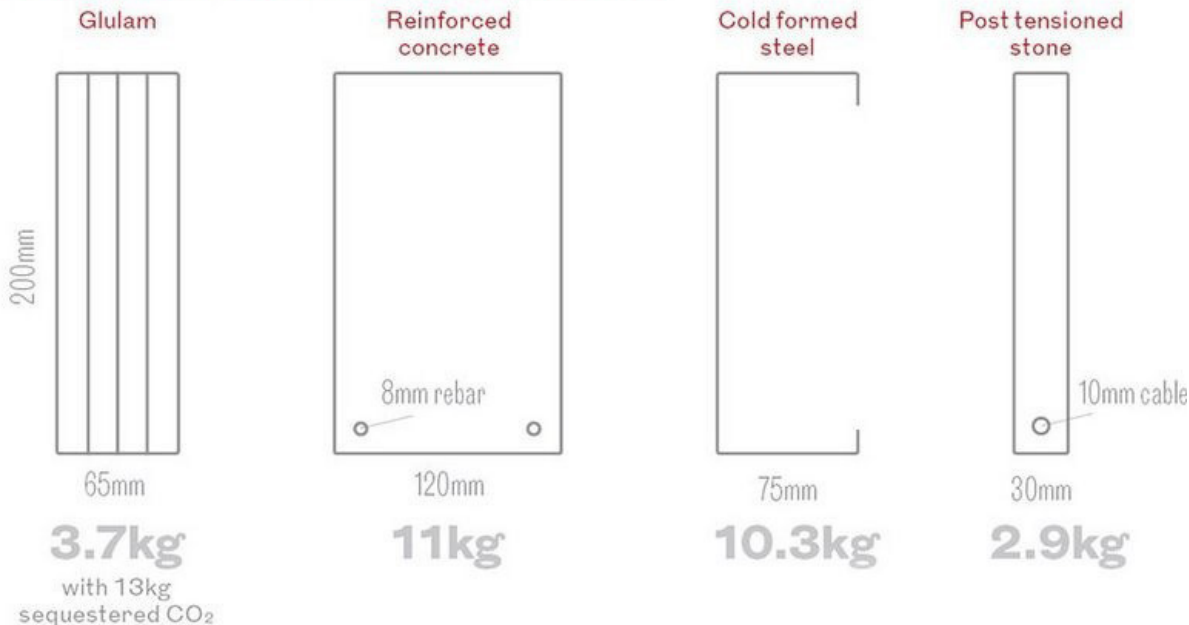
by RIBA President Alex Gordon in the 1970s – and ignored ever since. The result could be buildings which were flexible, designed to be ‘re-purposed’, and which were capable of being dismantled, not demolished, with all their components and materials capable of being re-used or recycled.

The most exciting possibility for the stone industry, and the challenge being thrown out in this article, is the creation of a system of ‘engineered stone’ for framed structures. This would exploit the compressive strength of stone, combined with post-tensioning by steel rods. Walls, columns, beams and slabs could all be made from small pieces of factory-sawn stone, cut and pre-drilled to a system of

standard components. The basic principle for spanning elements would be that of the post-tensioned flat-arch or lintel.

This approach can be easily dismissed as being impractical and uneconomic. However, quarrying is becoming more efficient and large machine shops, which can make stone components as rapidly as precast concrete, are beginning to emerge. Construction contributes a large proportion of greenhouse gas emissions and the move to low-energy, low-carbon, natural, local and unprocessed materials must be part of the solution. ‘Engineered timber’ is already well understood and on the masonry side, there could be less use of cement, concrete and steel and a very substantial role for ‘engineered stone’. ■

Carbon cost of structural members in different materials



Images:
Top: Post tensioned stone fabrication, Pierre Bidaud (The Stonemasonry Co)
Bottom: Post tensioned stone construction, Pierre Bidaud (The Stonemasonry Co)
Overleaf: CO₂e comparators, Pierre Bidaud



Retrofit: the elephant in the room

Beattie Passive

Let us start by saying how pleased we were to hear that Scotland is taking steps to mandate Passivhaus, or a Scottish equivalent, for all new builds by 2024. That will go some way towards achieving the nation's ambitious climate change goals, which set a date of 2045 to reach net zero, with interim goals of 75% by 2030 and 90% by 2040.

However, when it comes to carbon, there is still an elephant looming large in every room that does not meet the required energy efficiency standards. Given that around 80% of the buildings we will be using in 2045 have already been built, constructing new net zero homes is simply not enough on its own. To achieve our net zero objectives, we must decarbonise Scotland's existing housing stock, we must do it now, and we must do it properly (because a bad retrofit can actually be a good deal worse than no retrofit).

Beattie Passive's innovative TCosy Deep Retrofit System could be used to transform housing across Scotland – regenerating existing housing stock to zero carbon, while also eradicating fuel poverty and revitalising local communities through skills development and employment.

The Beattie Passive TCosy deep retrofit system

As the name suggests, the Beattie Passive TCosy works much like a tea cosy on a teapot. Basically, the system wraps a building with a timber frame structure, creating a continuous void from foundations to roof, which is then injected

with insulation to create an airtight envelope, with no thermal bridges.

The TCosy system incorporates 3 key innovations: firstly, Modern Methods of Construction (MMC) to prefabricate the component parts of each TCosy under controlled factory conditions; secondly, adhere to the 5 fundamental principles of Passivhaus: thermal-bridge free design, superior windows, ventilation with heat recovery, quality insulation, and airtight construction (EnerPHit standard applies these principles to retrofit projects). Finally, once the TCosy is complete, simply add a renewable energy source, such as PV panels, to balance out the remaining (and significantly diminished) energy demand to achieve net zero for operational carbon.

At a glance: Tech Specs (u-values)

Walls: 0.12w/m2k

Roof: 0.11w/m2k

Floor: 0.43w/m2k (perimeter U-value)

Insulated U-value: 0.13w/m2k

Windows and doors: Triple glazed, Passive-certified U-value: 0.78w/m2k

Mechanical Ventilation and Heat Recovery (MVHR): for healthier homes

Heating: Reduction in heating demand of up to 90%

Renewables: Photovoltaic panels (PVs) can be added to achieve net zero

The system in action

In 2020, Beattie Passive completed a BEIS-funded pilot scheme to breathe new life into a 1950s block of flats in the coastal town of Great Yarmouth, Norfolk. The TCosy system brought the building up to EnerPHit standard - the Passivhaus certification for retrofit.

The project was monitored by Oxford Brookes University and Enhabit, and assessed in terms of the building fabric (airtightness and thermographic survey), energy (electricity and gas use) and indoor environment (longitudinal monitoring of temperature, relative humidity, CO2 concentration and indoor air quality). Results captured in the post-retrofit period (October 2020 to September 2021) were compared with pre-retrofit (January 2019 to December 2019) to quantify the changes in the building as a result of the retrofit. In addition, qualitative feedback was gathered from residents, the design team and the construction team to give an insight into what worked well, any challenges that were encountered, and how they were overcome, and how conditions in the flats were perceived to have changed as a result of the retrofit.

Key results

Fabric performance

Air permeability was 0.67ACH@50pa (an 80% reduction compared to pre-retrofit).

Energy performance

Gas consumption was reduced by up to 85%.

Environmental monitoring

Warmer and more stable temperatures.

Pre-retrofit, the relative humidity was high, with damp and mould prevalent throughout the building. Post-retrofit, relative humidity was significantly reduced, virtually eliminating damp and mould.

CO₂ concentration was dramatically reduced following the commissioning of Mechanical Ventilation with Heat Recovery (MVHR).

Feedback from residents

Residents described their flats as warmer, with better air quality and lower heating bills.

Summary

By adopting a 'fabric first' approach, the Beattie Passive TCosy deep retrofit system significantly reduced heating energy demand and improved the indoor environment for the residents, many of

whom were vulnerable in terms of fuel poverty. The project actually exceeded its airtightness target and achieved the EnerPHit standard.

The retrofit was successful in reducing heating energy demand, to the extent that one energy supplier contacted a resident to find out why they had not turned their heating on throughout the winter. Lina, a resident said, *"I used to have mould and condensation in my living room, kitchen and bedroom, but now that's all gone. I don't have to use the heating very much now either, and when I do its only for an hour or so."*

It was also successful in improving interior comfort. Post retrofit, the flats were warmer with reduced relative humidity and CO₂ levels. Pre-retrofit

condensation, damp and mould were all but eliminated.

Unlike many other retrofit solutions, residents remained in-situ for the entire duration of the building works. There was no reduction in interior space and the system enhanced the aesthetic appeal of the building. ■

See also a Birmingham retro fit:

<https://www.birminghammail.co.uk/news/midlands-news/birmingham-council-tenant-wraps-house-26594681>

and

<https://www.beattiepassive.com/projects/deep-retrofit-in-birmingham/>

Image:
Beattie Passive TCosy Retrofit System being installed, Beattie Passive



Images:
Top: King Street Flats - Before
Bottom: King Street Flats - After



Flying Factories: bringing passive to the masses

Beattie Passive

How can we build enough affordable housing and retrofit existing homes in Scotland, given the skills shortages we're facing in construction? Passivhaus pioneer and modular offsite specialist Beattie Passive believes it has the answer with its Flying Factory partnerships.

When he established Beattie Passive over a decade ago, Ron Beattie was motivated by a desire to raise building standards and narrow the performance gap that continues to plague the construction industry to this day.

He developed the Beattie Passive Build System and the TCosy Deep Retrofit System, designed and modelled in the Passivhaus Planning Package (PHPP) and constructed around a sustainable timber frame. Fast forward to today and the proprietary system has been used to build over 450 low and net zero carbon homes to Passivhaus standards – from 8,000 m² 'Grand Designs-style' buildings to 50+ unit net zero social housing schemes for homeless families in Cardiff.

"Construction is changing," says Ron Beattie, "We need to find new ways of delivering homes. We cannot do it the old way, and with young people not wanting to come into the industry, it is struggling." He believes the Beattie Passive system is so simple to construct that even unskilled and semi-skilled people can be trained to build it. He explains: "Our system is used under license by our Flying Factory partners, who establish temporary, offsite

manufacturing facilities that can be ramped up, scaled down or mothballed according to demand. The socioeconomic benefits of this approach are enormous. We hire and train local young people and use local subcontractors and local supply chains wherever possible. For every £1 spent on our factories, £2.74 is put back into the local economy."

With the pivot towards Passivhaus in Scotland, and the sheer scale and urgency of the retrofit challenge ahead, Beattie Passive have a Flying Factory project on the go in Glasgow and are looking for more Passivhaus partners in Scotland. ■

Image:
Flying Factory, Beattie Passive



Building Futures

Gail Halvorsen, architect

NPF4

Mass housing developments are the scourge of the countryside. They're often built without any infrastructure and there has typically been no obligation for developers to consider the wider context of "placemaking". NPF4's emphasis on placemaking could change this, but will the framework turn out to be another well-intentioned policy that doesn't filter down?

Building Futures, the SEDA Land Conversation held on 18th April, aimed to explore how we might ensure the policy doesn't fall flat on its face. A panel of experts and practitioners discussed ways of making NPF4 work in practice, using existing examples of sustainable placemaking.

To make a sustainable place, you need to consider all aspects of living, including home, work, energy, transport, intergenerational living (including the related care needed for the young and elderly) and community. Although there has been a move to home-working post-Covid, people still need communities and face-to-face interaction. Communal places to work, whether in large enterprise hubs, shared workshops or even a digitally-connected room in a pub offering this.

Planning

All panellists agreed that the existing planning system is incapable of implementing the changes that are

required. The Royal Town Planning Institute's Scotland director, Craig McLaren argued that with more investment, including 700 additional planners across Scotland, and more ecological training, this might be achieved within the existing planning system. He also advocated a longer-term approach measured by outcomes and including all stakeholders in the community.

Ariane Burgess, Scottish Green MSP and convenor of the Scottish Parliament's local government, housing and planning committee, called for independent facilitators with ecological skills to help communities with the procurement process. This would help pool resources and speed up the challenging building process. [North West 2045](#) is a good example of a collaboration of community trusts, private landowners, community landowners and statutory authorities working together to build sustainable places.

[Balcaskie](#) estate manager Sam Parsons pointed out that the projects being considered are all small-scale, and therefore likely to be handled by junior planning officers with insufficient experience to deal with their complexity. To deal with multiple small-scale developments, he said a more sophisticated and supple system is required. "Simplification and streamlining" won't help, said Sam.

There was also a proposal that the planning system ought to positively discriminate in favour of sustainable placemaking, fast-tracking small-

scale ecological developments ahead of repetitive, unsustainable housing schemes without any sense of place.

Funding

There was a discussion of possible innovative funding models for the construction of large numbers of high-quality homes. [NPF in Ireland is accompanied by a significant capital investment programme]. To get these off the ground we need partnerships between the public and private sectors, landowners, developers and investors, along the lines of public interest-led developments – in which local authorities buy land and provide services before selling on to communities or self-builders, as commonly happens in Germany.

Local authorities, regional development agencies and the Scottish Government definitely need to do more to support alternative housing models such as co-working, co-living and self-build. Last month Perth and Kinross Council launched the first self-build register in Scotland and will provide serviced self-build plots on smaller rural sites. As always, the fact VAT is applied to renovation, conversions and extensions but not to new builds was raised, as was the Scottish government's powerlessness over this inequitable situation.

IT infrastructure

For people to move back to or remain in rural areas and set up businesses there,

the existence of reliable and fast broadband connections is paramount. If Scotland was to invest at the same scale as Ireland has with its [National Hub Network](#), high-speed broadband would have been rolled out right across rural Scotland by now. Rural people are used to balancing several jobs and, given enhanced digital connectivity, they could spend half the week working on a croft and the other for an Edinburgh-based financial institution.

Bioproducts

The UK still imports 80 per cent of its timber even though Scotland is well placed to produce all our timber needs and to plug gaps in the existing supply chain. Neil Sutherland, speaking as a director of Makar Ltd, called for investment in

advanced timber products, a more digital and biogenic approach to new buildings and a more locally-focused supply chain. (At present advanced timber products are almost all manufactured in mainland Europe).

If the Scottish Government were to make a long-term commitment to Scotland's timber sector, it would act as a catalyst for third-party investment in it, permitting the establishment of a "roadmap" for the production of local natural materials. [The French government has stipulated that 50% insulation must be natural, galvanising investment in the sector]. We need alternative funding strands for the production of engineered products, insulation, and high-quality timber components from the

Scottish Government, Scottish National Investment Bank, businesses, foundations, trusts and institutions - banks, insurance companies and endowment funds. We should piggyback the trend towards divestment from damaging industries such as fossil fuels towards investment in natural capital.

As chair, Debbie Mackay, director of both Savills and Rural Housing Scotland, managed to steer this very lively discussion admirably, weaving in the musician and the three poets representing youth, middle age and old age to reflect the intergenerational living espoused at the event. Each one beautifully described what it means to live in a thriving rural community.

Images:
Below: Redeveloped Steading at Balcaskie Estate, Balcaskie Estate
Overleaf: Poster campaigning against the lack of homes



Models

1. [Balcaskie](#), Fife – a 2,000-hectare single ownership estate in the East Neuk of Fife – Sam Parsons, estate manager.

2. [Beldorney](#), Aberdeenshire – a 349-hectare estate owned by [Highlands Rewilding](#) – a mass-ownership company using crowdfunding, – Neil Sutherland, director.

3. [Assynt Glebe Land](#) - 22-hectare estate owned by [Assynt Development Trust](#) near Lochinver – Ewen McLachlan, Development Officer, ADT.

All three models, delivering affordable homes of varying sizes alongside enterprise hubs, are at different stages of development. But what they have in common is they are all using, or intend to use, locally-sourced renewable energy, local natural materials, a local workforce, local food production and intend to improve biodiversity.

Balcaskie Estate has been developing its model (although Sam admitted there was no plan at the start) since 2008 and, being privately owned, has managed to achieve at least some of its ambitions more quickly than the other two. The intention is to renovate the estate's existing building stock, much of which is semi-derelict, first. The 17 mainly Georgian farmsteadings are gradually being converted into sustainable homes and micro enterprise zones. The work units are clustered together and share facilities including a garden where tenants can grow their own food. There are no second homes or holiday homes

on the estate, which is near St Monans in Fife. Accommodation is not advertised but relies on word-of-mouth to prioritise local interest.

At Baldorney, near Huntly, Aberdeenshire, Highlands Rewilding aims to build a larger number of homes more quickly than at Balcaskie, and there will be more new buildings including zero-carbon affordable and premium homes in a mixed-use development, which will include workshops, studios and glasshouses. The ruins of previous crofting sites will be resurrected for contemporary regenerative land management, with new purpose-built “crofts”. The 16th century Beldorney Castle has already been fully restored in order to be rented out.

Assynt Glebe Land is predominantly looking at new-builds on 55 acres of former Glebe land bought from Church of Scotland, with support from the Scottish Land Fund in April 2021. The plan, being co-developed by the Communities Housing Trust, is for a smart township – a rural area that uses information and communication technologies (ICT) to digitally transform its operational efficiency alongside good public transport, environmental initiatives and progressive planning – adjacent to Lochinver in Sutherland. There are plans for woodland crofts and an outdoor centre that connects with a path network that extends to Lochinver primary school across Loch Culag. Getting the basic infrastructure in place – including fast digital connectivity – is paramount. ■

SHORT-TERM LET LANDLORDS



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Featuring:
Moteh Parrott
'Song for Insects'

Rachel Tennant
*'Humans share 50%
of their DNA with
Trees'*

From Solar Innovation and Knowledge Transfer to Production

Colin Porteous and Gloria Lo

Solar innovation moments

Innovation exemplifies the Kerr MacGregor Award to be re-launched by SEDA this summer. Predictably modern solar technology stems from precedence – therefore it is useful to illuminate origins of past innovations and current import.

The first acknowledged solar air collector was patented by botanist Edward S. Morse in 1881; a natural thermo-circulated variant mounted on his Massachusetts home (42.5°N).¹

This technique proved effective in preheating indoor air, sometimes preheating water, for northerly European latitudes, including Scotland. Kerr MacGregor, an avid hands-on experimenter, played a significant developmental role from the 1980s – with experiments being passive and actively assisted, glazed and unglazed, some with transpired (breathing) absorbers, some not, and including full-scale mock-ups on test rigs.

The first solar-thermal collector, a plumbing device to displace coal, was Clarence Kemp's 1892 'Climax Solar-Water Heater'. In 1909, William J. Bailey patented the first 'flat-plate' collector as the 'Day and Night solar water heater' – a grid of copper pipes welded to a copper absorber, and directly connected to an indoor, insulated hot water cylinder. This set-up still functioned via natural thermo-circulation without pumps, but required winter drain-down to avoid freezing.¹

Applying such devices to building design and space heating was driven mainly by academia – especially the Massachusetts Institute of Technology (MIT). Scientist Maria Telkes, took compact heat storage forward by developing suitable phase-change material (PCM, e.g. Glauber's salt) – notably in the 1949 Dover Sun House, designed with architect, Eleanor Raymond.²

There have since been numerous modern improvements to Bailey's flat-plate model. These include improved absorber efficiency (e.g. selective coatings), and indirect heating with anti-freeze – later challenged by Kerr MacGregor's alternative of the freeze-tolerant, water-filled SolarTwin, while also lobbying the Scottish Government on promoting renewable heat.

Evacuated tube collectors (heat pipes) were relative latecomers with Richard Gaugler of General Motors in 1942;³ up-to-date technology attributed to George Grover, Los Alamos Scientific Laboratory, in 1963.⁴ Modern times saw development of numerous other thermal variants, such as tracking and concentrating collectors, and there remains scope for continuing innovation to suit particular climates and applications.

Solar photovoltaic (PV) collection had much longer gestation – over a century from Edmund Becquerel's 1839 discovery to the mid-1950s when Bell Telephone scientists took his technique into a limited low-demand marketplace for off-grid rural

locations.¹ The present thriving global PV market is mainly due to the 21st century introduction of subsidised tariffs. Like solar-thermal technology, PV science continues to innovate.

The term 'passive solar design' allegedly dates from 1974 in the USA, with the first national Passive Solar Conference in Albuquerque, New Mexico in 1976.5 Prior, however, the 1957 'Living with the Sun' architectural competition produced a healthy mix of passive and active solar dwellings.² In Europe, Emslie Morgan's 1961-2 Wallasey School constitutes an early passive solar pioneer. This is also the case with the 1967 solar wall by engineer, Felix Trombe, alongside architect, Jacques Michelle, at the Odeillo solar research site in southern France, (climatically specific with generous winter sunshine).⁶ Israel's 1967 6-day War and the 1973 Yom Kippur War, further accelerated interest in passive solar buildings due to subsequent oil-price hikes. The early 1980s boosted interest with two 'Passive Solar Architecture in Europe' competitions. This decade then saw heightened European development in transparent insulation (TI); noting that one TI material, aerogel, dates from the 1930s. Despite this and many monitored demonstrations, passive solar exemplars appear to have gradually waned. It seems ironic that the 'Passive House' concept, not particularly dependant on orientation, may have contributed to such waning.⁷

Images:

Top: Kerr MacGregor's bespoke solar air collector under construction, 1992, at Easthall Solar Demonstration Project, Glasgow
 Bottom: SSEG members 1985, Kerr MacGregor top right, below early bespoke solar air collector above entrance to Stile Park passive solar housing, Stornoway

Knowledge transfer

Innovation is toothless without effective dissemination. The impact of specialist publications depends on scales of readership, with books such as 'Sustainable Construction' by SEDA's Sandy Halliday, setting solar technology accessibly within a wider environmental agenda.⁸ Face-to-face networking remains invaluable, say at international solar conferences with diverse communities of interest. Such events usually include technical visits to solar buildings and installations. Whilst today's electronic communication may achieve much, on-line events lack the impact afforded by the physicality and formal-informal mix of live ones.

Kerr MacGregor was a keen networker, also one to use his 'own time' productively – travelling by bus from Perth to Sydney after the 1983 Solar World Congress, he read four volumes of proceedings! Previously, at the 1981 Congress in Brighton, Kerr presented a potent analysis demonstrating "north was best" for solar space heating – this was publicised to architects via the weekly *Building Design*.

Furthermore, national societies and associations such as SEDA can represent good models for international extension.

For example, SEDA Solar's predecessor, the Scottish Solar Energy Group (SSEG), provided Kerr the means and incentive to launch an international series of 'North Sun' biennial conferences in the mid 1980s (12 in all), in turn leading to the



Images:
 Below: Kerr MacGregor's bespoke roof-mounted solar air collector above entrance,
 1994, at Easthall Solar Demonstration Project, Glasgow
 Overleaf: Solariskit, Dr Faisal Ghani



Eurosun series, running biennially from 1996 to the present. Such examples of global networking and enablement denote Kerr's modus operandi.

Realising products

Knowledge transfer fosters practical innovation, often as spin-off or 'additionality'.

A notable example of additionality is Kerr's 'solar slates', technically an unglazed, transpired solar air collector; nevertheless, innovative in its direct use of a traditional roof covering, adapting something that already exists.

Installing PV panels as shading louvres over south-facing glazing is visually impactful additionality, as is Swiss architect, Beat Kämpfen's, use of heat pipes as balustrading or shading devices.⁹ Another Swiss architect, Dietrich Schwarz, twinned development of advanced glazing with PCM with his SOLARXcrystal product.⁹ This overturned the downside of normal solar storage-walls, obstruction of sunlight and daylight to interiors. Its PCM stores daytime heat until its release due to phase-change in the cooler evenings or nights, also remaining translucent in liquid and solid states – thus a 21st century innovation in TI.

Twenty years prior, Kerr MacGregor developed simple DIY solar clip-fin technology to double as solar water heaters, simultaneously providing adjustable shade within unheated sunspaces – thereby disconnecting the absorbers of flat-plate collectors from transparent covers,

framing and insulated backing. This additionality was itself derived from Kerr's earlier economic DIY collectors, installed for the Iona Community.

A previous 2017 Kerr MacGregor Award winner, Dr Faisal Ghani proposed using dynamic neural network computational feedback to enhance use of PCM for latent heat storage – this technology adopted by Sunamp Ltd. Such commercialisation of compact solar storage units is making an impact on design and installation of solar thermal and photovoltaic systems, especially in projects where space may be limited. Subsequently, Faisal started a solar spin-off from Heriot Watt University. The venture launched after learning of the large portion of household income required for heating in Rwanda. Solariskit – an easy to assemble, flat-pack, low-cost solar thermal collector – was borne out of social and climate concern, exemplifying the capture of freely available solar energy as a prime means towards social justice, and reduced fossil-fuel footprints.

A key message is that known technology may be applied innovatively with other functional benefits. High-tech advances such as Helmut Köster's mirror optics or selective prisms within double glazing - (e.g. roof-glazing of 1992 Ökohuis, Frankfurt, by architects Eble and Sambeth)^{8,10} - allows variable transmission according to solar altitude. Some of the above products show, however, that applied science can engender simpler innovations. We hope to enthuse entrants to the 2023 Kerr MacGregor Award for Solar Innovation on that note. Don't be shy!

<https://www.seda.uk.net/seda-solar-blog/kerr-macgregor-award-for-solar-innovation>

¹ Ken Butti and John Perlin, 'A Golden Thread', 1980, Marion Boyars.

² Daniel A. Barber, 'A House in the Sun', 2016, Oxford.

³Richard S. Gaugler, US Patent Office 2,350,348, 'Heat Transfer Device', 1944.

⁴George M. Grover, US Patent Office 3,228,759, 'Evaporation-Condensation Heat Transfer Device', 1966.

⁵Bruce Anderson, 'Solar Building Architecture', 1990, MIT, p92.

⁶Colin Porteous, 'The New eco-Architecture', 2002/03, Spon, p73.

⁷Hemut Krapmeier and Eckart Drössler, 'CEPHEUS Living Comfort Without Heating', 2001, Springer.

⁸Sandy Halliday, 'Sustainable Construction' 2019 (2nd ed.), Routledge.

⁹Colin Porteous, 'Precedented Environmental Futures', 2019, CSP.

¹⁰Colin Porteous with Kerr MacGregor, 'Solar Architecture in [Cool Climates](#)', 2005, [Earthscan](#).





Thoughts from the Chair...

Catherine Cosgrove, SEDA Chairperson

Earlier this month I attended the 6th Howard Liddell lecture in Edinburgh. This year's subject, on the work of economist Fritz Schumacher and how it applies to us today, was thought provoking and generated a lot of discussion. Satish Kumar, the keynote speaker, spoke eloquently about the influence of Fritz Schumacher and how his ideas underpin our current ecological movement. Many of the key voices in modern sustainability debate, such as James Lovelock, were guest speakers at the annual Schumacher Lectures and at Schumacher College. Satish's key message was, we shouldn't wait for governments or businesses to set sustainability targets, but act and by acting together, we can make a significant difference.

After the Fritz Schumacher lecture, I've been reading more about his economic theories. Although created 50 years ago, many of them are very relevant today, including one that most SEDA members would say is self-evident – that an economy built on constant growth is not possible on a planet with limited resources. His widespread interest in people, society and the use of land gave him a different outlook than most of his peers. A lot of his predictions about the collapse of worldwide financial systems have come to pass within the last decade and are still occurring today.

While Fritz Schumacher wasn't taken seriously by business leaders in the 1970's, his influence lives on today through the Schumacher Society,

Dartington College, the Soil Association, the Centre for Alternative Technology, the New Economics Foundation and many other groups. Looking back on SEDA's founding principles and the work we do, we are part of his legacy as well. I think, SEDA Land in particular would have caught his interest, especially the community and nature led solutions they've highlighted.

The Howard Liddell lecture was also a good opportunity for many of us to catch up in person. The open mic slot at the end of the evening allowed SEDA members to tell us what they are working on and how we could help. I know that several collaborations were agreed and follow up meetings have already been held.

I particularly loved the way that a SEDA youth group spontaneously formed on the night with the stated aim of finding a way to transfer SEDA's collective knowledge to this new generation who are hungry to learn. I'm sure we'll be hearing more from them shortly.

And finally, one significant event change that I'd like to highlight is, Nick Domminney is stepping down as editor of this magazine. The SEDA magazine is a wonderful resource and Nick has been central to this for many years. On behalf of the SEDA Directors and the wider membership I'd like to thank Nick for all his efforts and his perseverance in bringing together so many interesting and relevant editions. I'd also like to welcome Shravya Dayaneni as the new editor, who will take over from the Autumn edition. I'm looking forward to hearing her ideas on how to develop our magazine and make it an essential reading.