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Landwards

ENVIRONMENTAL CHALLENGES

A NEW DAWN APPROACHES

In this issue

- *2017 Conference Report*
- *Passing of the Plough?*
- *Farewell to Elizabeth*
- *CLAAS Academy opens*
- *Listening to the Pests*
- *GDPR Update*

IAgrE

Biosystems Engineering

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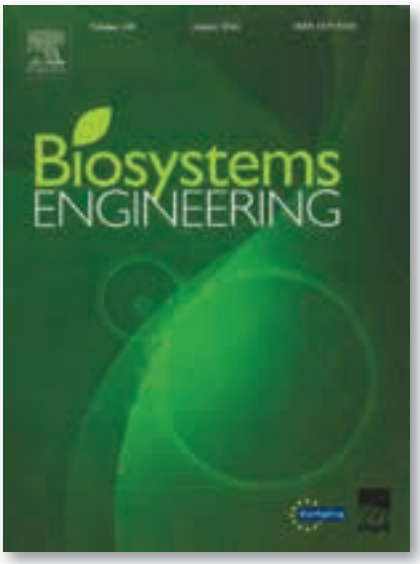

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The Managing Editor of Biosystems Engineering, Dr Steve Parkin, has kindly summarised a selection of papers published in the last three issues which he thinks will be of interest to IAgrE members.

Biosystems Engineering

Volume 162, October 2017, Pages 124-139
Terrain assessment for precision agriculture using vehicle dynamic modelling
Giulio Reina, Annalis Milell, Rocco Galati
University of Salento, Lecce, Italy
Institute of Intelligent Systems for Automation, Bari, Italy

Precision agriculture greatly relies on innovative control and sensing technologies that allow service units to increase their level of driving automation while ensuring at the same time high safety standards. Vehicle mobility and safety, and the successful implementation of important agricultural tasks including seeding, ploughing, fertilising and controlled traffic depends, or can be improved by, a correct identification of the terrain that is traversed. Terrain estimation was performed by using not only traditional appearance-based features, that is colour and geometric properties, but also contact-based features, that is measuring physics-based dynamic effects that govern the vehicle–terrain interaction and that greatly affect its mobility. Experimental results obtained from an all-terrain vehicle operating on different surfaces are presented to validate the system in the field. It was shown that a terrain classifier trained with contact features was able to achieve a correct prediction rate of 85.1%, which is comparable or better than using traditional feature sets. Merging all feature sets in an augmented feature space gave 89.1% correct predictions.

Biosystems Engineering

Volume 161, September 2017, Pages 24-36
Evaluation of the performance of portable visible-infrared instruments for the prediction of soil properties
José M. Soriano-Disla Leslie J. Janik Danielle J. Allen Michael J. McLaughlin
CSIRO Waite Campus, Urrbrae, South Australia, Australia
Universidad Politécnica de Cartagena, Cartagena, Spain
University of Adelaide, Waite Campus, Urrbrae, South Australia, Australia

Good soil management requires large amounts of soil data which are expensive to provide using traditional laboratory methods. Soil infrared spectroscopy including portable/miniaturized visible-infrared spectrometers offers a cost-effective solution. There is a need to test and compare the performance of portable/miniaturized mid-infrared (MIR) and visible-near-infrared (vis-NIR) spectrometers for the prediction of soil properties across a range of soils. The performance of these instruments was tested and compared to a reference benchtop MIR/NIR instrument. Mid-infrared handheld instruments provided the best performance, the vis-NIR instrument the next most successful, and the miniature NIR instrument with a restricted spectral range (950–1650 nm) being less successful. When models using the same spectral range obtained by different instruments were compared, similar performance was achieved, thus the spectral quality provided by different instrumentation was not decisive in determining prediction accuracy.

Biosystems Engineering

Volume 160, August 2017, Pages 179-193
Analysis of the parameters affecting the mechanical behaviour of straw bales under compression
MirkoMaraldi, LuisaMolari, NicolòRegazzi, Giovanni Molari
Department of Agricultural and Food Sciences (DISTAL), University of Bologna, Italy
Department of Civil, Chemical, Environmental and Materials Engineering (DICAM), University of Bologna, Italy

Improving knowledge of the mechanical properties of straw bales is important to understand the behaviour of straw bale buildings, especially in case of natural calamities, where straw bales may carry mechanical load and act as a "surviving cell". The influence of the material, bale density, bale orientation, baling process and loading rate on the mechanical properties of straw bales was investigated. Continuous measurements of bales lateral displacement allowed Poisson's ratio to be calculated and, using a simple model, the strain to which bale strings are subjected during loading was estimated. Young's modulus was shown to mainly depend on the square of the density, while no influence of the loading rate and of strings pre-tension was observed. The Poisson's ratio did not remain constant during loading and it exhibited a different trend depending on the orientation of the bales. Moreover, it was observed that for flat bales a rearrangement of the straw fibres during loading occurred and the maximum strings strain remained limited. Strings strain reached higher values for on-edge bales instead, and strings bursts occurred more frequently.

EDITORIAL: A DECADE OF LEARNING

WHERE has the time gone? As I began preparing this issue, there came the realisation that it is exactly 10 years since I was privileged to take on the editorship of Landwards.

There is an old adage that says 'those that can do, those that can't teach or write about it'.

Not sure about that. My roots lie in agriculture, grandfather on one side was a Somerset farmer, the other a cheese grader for the (then) Milk Marketing Board. My father sold milking machines for International Harvester before buying into a farm machinery dealership. I cut my teeth as a demonstrator for Ford Tractors in the 'heyday' of the Fordson Majors and Dextas, before spending almost 25 years in the family owned tractor and grasscare dealership.

I'd always hankered after being a journalist, so decided to test out that old adage and in 1988 launched magazines for the ag and turfcare industry.

The offer to take on Landwards was accepted with some trepidation, as it reached into areas of science-based academia and research that could be outside my comfort zone.

But any concerns were soon banished. With such IAgrE stalwarts as Richard Robinson (just elected President), Richard Trevathen, the irreplaceable Geoffrey Wakeham, and Chris Whetnall, all on hand to provide advice and guidance, my bedding-in period was made so much easier.

Over the past decade, I have been constantly blown away by the sheer breadth and scale of the work and achievements of the IAgrE community as they play their part in ensuring that we feed a growing global population

There's always been a fresh learning experience just around the corner – and rarely a dull moment. Our industry, in all its guises, is fast moving, ever-changing and brimming with innovative ideas and solutions.

So a heart-felt thank you to everyone in the IAgrE family for their support over the past ten years – and of course, Seasons Greetings to one and all.

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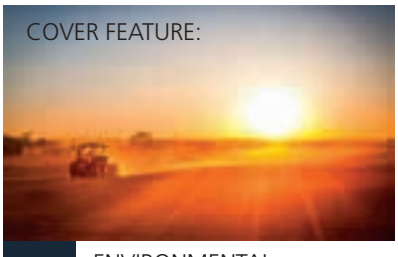

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SAVE OUR SOIL URGES GOVE

UK farm soils have 'only 100 harvests left in them'

The UK is 30 to 40 years away from "the fundamental eradication of soil fertility" in parts of the country, the environment secretary Michael Gove has warned.

"We have encouraged a type of farming which has damaged the earth," Gove told the parliamentary launch of the Sustainable Soil Alliance (SSA) "Countries can withstand coups d'état, wars and conflict, even leaving the EU, but no country can withstand the loss of its soil and fertility.

"If you have heavy machines churning the soil and impacting it, if you drench it in chemicals that improve yields but in the long term undercut the future fertility of that soil, you can increase yields year on year but ultimately you really are cutting the ground away from beneath your own feet. Farmers know that."

Arguing that farmers needed to be incentivised to tackle both the loss of soil fertility and the decline in biodiversity, Gove said that he hoped the SSA, a new body formed with the mission of bringing UK soils back to health within one generation, would hold the government to account and bring him ideas and inspiration. "We are listening to you now and it's critical that we do so."

There has been a spike in awareness of the impact that intensive farming techniques are having on the world's soils and its biodiversity. In 2014 Sheffield University researchers said that UK farm soils only had 100 harvests left in them, and a year later the UN confirmed that at current rates of degradation, the world's topsoil could be gone within 60 years. "It feels as if soil is now a hot topic," said Helen Browning, head of the Soil Association.

Goves words have been welcomed. The government has not been conducting regular soil monitoring since the last Countryside Survey in 2007, and in 2012 UK ministers helped block a critical EU soil health directive.

"There's been quite a dramatic shift in understanding around what we're doing to our soils," said Browning.

The National Farmers Union, who were present at the event, have long been defenders of intensive farming.

But three years ago they set up an environment forum, and yesterday its chair Mark Pope said that he is seeing a surge of interest and support for these issues from NFU members. He said in a recent blog "We only get one lot of soil on our farms, so poor management could have major, irreversible impacts for many years to come."

At the same meeting, Tim Smit, founder of the Eden Project said "The UK used to be the world's leading agronomic centre, and could be again" He wants to see "a new agricultural revolution", elevating agronomy to a better respected profession, and turning the UK back into a world leader in soil and farming expertise.

LAMMA TO MOVE TO NEC, BIRMINGHAM

Final year at Peterborough next January

Briefing Media has announced that the UK's largest agricultural machinery show, LAMMA, will move to the NEC from January 2019. LAMMA will continue to be a free-to-attend event and will remain on its proven January timeline.

Commenting on the move to the NEC, Elisabeth Mork-Eidem, Group Head of Events at Briefing Media, said "We are excited by the opportunities that this new venue creates for the LAMMA show. LAMMA has a deserved reputation as the meeting place for the entire industry at a time of the year when key buying decisions are made. The move to the NEC will provide an entirely indoor environment, bringing it up to the professional standards that are expected of a market-leading event."

She added"The NEC is the UK's leading exhibition venue and provides unparalleled scale, facilities and transport links, and we are looking forward to working with the NEC to ensure that LAMMA grows and develops further to serve this important market. LAMMA will retain its focus on farm machinery, equipment and services and will build on the reputation earned over more than 30 years."

Kathryn James, Managing Director of NEC Group Conventions and Exhibitions said: "We are delighted to welcome LAMMA, along with their exhibitors and visitors, to the NEC. We understand the importance of the event to the agricultural sector, and are honoured to be working with them as they bring their popular event indoors to serve the growing needs of the industry."

The first LAMMA show at the NEC will take place on Tuesday 8th & Wednesday 9th January 2019. LAMMA 2018 (17th - 18th January), which will be the last event to be held at the East of England Showground in Peterborough, will be the largest LAMMA ever, with more than 900 exhibitors and over 40,000 visitors from across the UK and abroad.

IAGRE TO CELEBRATE 80 YEAR ANNIVERSARY AT WREST PARK

IAgrE is to mark the formation of the Institution on 24 May 2018, the precise anniversary of its formation in 1938, by staging its Council Meeting at Wrest Park, Silsoe.

The anniversary will also be marked by a series of special articles in Landwards during 2018 reflecting on changes to agricultural engineering over the past 80 years.

Formed at a time when the spectre of the Second World War loomed large, the original title was the Institution of British Agricultural Engineers, but the 'British' was dropped 11 years later. The formation meeting was held at the Institution of Mechanical Engineers in London with Lt Col Philip Johnson of Roadless Traction elected as the first President, a role which he was to hold through the war years until 1947.

Queen's Award recognises agricultural research

Agricultural and environmental research initiatives at UK's leading universities and further education colleges have been widely recognised in the latest round of Queens Anniversary Prizes announced on 1 December.

The Prizes are part of the honours system and are awarded every two years by The Queen on the Prime Minister's advice. UK universities and colleges were invited in October 2016 to submit entries on any aspect of their work for assessment against the scheme's criteria of excellence, innovation and practical benefit.

Twenty-one UK universities and colleges of further education are recognised for the period 2016-2018, of which four are from the agricultural sector. The Prizes are unique in the honours system in being analogous to honours to individuals, but granted to an institution as a whole, will be presented in February 2018 by a member of the Royal Family at a ceremony to be held at Buckingham Palace. As a national honour the prize carries no cash value, but consists of a silver-gilt medallion and a Prize Certificate signed by HM The Queen.

The four agricultural-focussed prize winners are:

Cranfield University
Large-scale soil and environmental data for sustainable use of the natural resources in the UK and worldwide

University of East Anglia
Combined natural, social and environmental sciences to advance understanding and protection of the environment

Harper Adams University
Innovative applications in agricultural engineering and technologies to address UK and global food security

Scotland's Rural College
Large-scale breeding research for dairy cattle producing improved milk yield and environmental benefits

David Llewellyn, Vice-Chancellor of HAUC says "We are honoured to have been recognised with this prestigious award. I should like to pass on our thanks to the many companies, organisations and academic partners within the UK and around the world, with which we work, all of whom have contributed in some way to this successful outcome".

Professsor Leon Terry of Cranfield University said "As you can imagine, we are immensely proud of this achievement and hope that this will strengthen any messaging supporting soil science and precision agriculture both in the UK and overseas"

SCIENCE MUSEUM TO SHOWCASE AG-TECHNOLOGY

Working title of 'Feeding Tomorrow'

A £3m exhibition due to open at the Science Museum towards the end of next year aims to showcase modern agriculture – and highlight the challenges faced by farmers as they produce food for a growing world population.

The contemporary exhibition will include the latest agri-technology, robotics and biological science.

It will replace a 60-year-old display based on a series of dioramas and a combine harvester from the 1950s.

"The core message is that farming has changed and continues to change," says Mary Cavanagh, senior content developer for the proposed gallery, who has been working on the exhibition for the past two years. The new gallery has the working title 'Feeding Tomorrow'

Farm leaders believe the gallery could show millions of people the lengths that growers and livestock producers go to produce high-quality food – and encourage a new generation of youngsters to carve out a career in agriculture.

The Contemporary Agriculture exhibition will be prominently situated towards the front of the building – next to the museum's temporary "blockbuster" exhibition space.

At present, about one in four of the 3.3 million people coming through the museum visit this floor – which means some 800,000 visitors could see the new gallery every year – equivalent to 5 million people over the exhibition's lifetime.

Unlike the exhibition it replaces, which showed farmers hoeing crops, harvesting wheat into sacks and spraying fields without protective equipment, the new exhibition is classed as 'semi-permanent' – which means it will last for up to seven years.

APPRENTICESHIP RULING REVERSED

Level 2 now on approved list

On September 7th the Institute for Apprenticeships confirmed to the Landbased Engineering - Training and Education Committee Ltd (LE-TEC) that its previous decision to withdraw the Landbased Engineering level 2 'Service Engineer' apprenticeship from the government's approved apprenticeship list had been reversed.

This decision has been made after consideration of the representations made to them by LE-TEC, supported by the recent survey results. Furthermore the newly updated level 2 'Service Engineer' apprenticeship standard and its associated assessment plan have been approved.

The Land-based Engineering level 2 'Service Engineer' apprenticeship now joins the level 3 'Technician' apprenticeship as being fully approved and deliverable.

Publication of both the level 2 and level 3 land-based engineering standards will appear on the government's website when the IfA funding committee have reviewed the funding bands as being appropriate.

Meanwhile the advice given by the IfA is that training providers and employers should enrol new apprentices onto the published apprenticeship standards to enable them to start immediately and transfer the apprentices onto the new standards when they are published.

LE-TEC is the Landbased Engineering Training and Education Committee Ltd. It is a registered company formed from three industry organisations representing the Landbased Engineering sector, the Agricultural Engineers Association (AEA), the British Agricultural and Garden Machinery Association (BAGMA) and the Institution of Agricultural Engineers.

AGRICULTURAL ROBOTS TO BE A $12bn INDUSTRY 'WITHIN 10 YEARS'

Agriculture is one of the world's least digitised major industries, but this will change as data acquisition, agricultural robotics and analytic companies grow according to a report by technological research company IDTechEx. But it says that many agricultural robotic companies are graduating into the market and are in the process of transforming the value chain of agriculture.

The report, titled ***'Agricultural Robots and Drones 2017-2027: Technologies, Markets, Players'***, shows the investment in nearly 40 select farm data management and analytics companies.

It says that interest in the past three years has risen. Contrary to common perceptions, agricultural is in some areas at the forefront of technology adoption.

Taking autonomous driving as an example, GPS-enabled autonomous tractors have been in use for years in farming. Indeed, the report predicts that the number of GPS-enabled assets in farming will rise to nearly 1 million by 2024.

To set this in context, this figure was only 107k in 2006 and was nearly 430k in 2016 (this includes autosteer, tractor guidance, VRT equipment).

Agricultural machinery has dramatically evolved over the past century. The report says that the time is now 'ripe' for further automation as cost of sensing and data processing has fallen in recent decades.

IDTechEx forecasts that agricultural robots will become a $12bn industry by 2027.

Despite the strong progress on the machinery side, data and analytics still play a minimal role in traditional agriculture.

Data has been extensively used in R&D particularly when it comes to advanced seed and agrochemical production. Nonetheless, it is yet to propagate at scale into farming itself.

The report says that this is about to change, as agricultural robots and drones will help drive a transformation.

Sensor-equipped agricultural robots will autonomously navigate through farms, continuously building up a detailed spatial map of data about specific plants.

The report says that agricultural machinery may have to undergo a fundamental transfiguration to achieve autonomous machinery: large, fast, and heavy manned machine may have to be replaced with small, slow, and light autonomous robots.

In parallel to agricultural robotics, wireless sensing networks are also finding a receptive market in agriculture.

Agricultural robotics can help increase the resolution of the data, elevating the precision levels from a specific farm patch towards specific plants.

PRESTIGIOUS AWARD FOR CAROLINE DRUMMOND

Recognised at British Farming Awards

The 2017 British Farming Awards, held in Birmingham in October was headlined by a presentation for the Outstanding Contribution to British Agriculture award, given to Caroline Drummond MBE.

The leader of LEAF (Linking Environment and Farming) received rapturous applause from the audience for her achievements and influence on British agriculture, which has spanned 36 years. As Chief Executive, Caroline has made farming in the UK more environmentally responsible for the future by combining modern farming with conservation and engaging with the public out on the farm. She has held numerous positions on farming-related councils and plays a central role in changing the face of Britain's farming policy. She was awarded an MBE for her services to agriculture in 2009.

Caroline, who is married to a dairy farmer and lives in Cornwall, said: "I am extremely humbled, proud and excited to be receiving this award for Outstanding Contribution to Agriculture.

"But it is really LEAF and all our farmers, staff, board and supporters that this award is for, so it is to them I salute and give recognition to for all their great work and achievements.

"I am indeed flattered as this is such a prestigious award, I am very lucky my role at LEAF allows me to have made so many friends across the industry and I take great pride in the values we stand for".

FOCUS ON DELIVERY

Learn lessons from the war years

President's Musings

IAgrE President
Dr ROBERT MERRALL
MIAgrE, EngD

I need to start with a huge thank you to the speakers and the team at the IAgrE secretariat for delivering a tremendous conference at Rothamsted. The speakers gave us a balanced, thought provoking day, enabling us to cover the "environment management" aspect along with the "vehicle engineering" aspect in a way which gave something for everyone across our membership community, broad church that it is.

Thanks to all concerned for helping us to consider the carbon impacts of agriculture and I know that we will see significant innovation in this area going forward.

Our Institution is unique in that it embodies that interface between the environment and engineered food production systems. Anyone who has been talking to farmers and growers here in the UK much over the last year will know that, second only to Brexit, the most controversial issue has been the potential withdrawal of glyphosate (along with the recent withdrawal of other actives from the growers' repertoire).

This is an area where our profession's unique position, at that interface between the mechanised solution and the environmental impact, can be so influential. Whatever our personal views on the risks of a potential product, I know that machine vision, precision farming, robotics and drone technology will revolutionise crop protection to such an extent that the agronomic regime in 30 or 40 years' time will be completely different to what we have now.

The most controversial issue has been the potential withdrawal of glyphosate

Mechanical weeding will become much more feasible as a tool in the armoury, as the capabilities of machine vision based robotic systems improve and costs fall.

RESEARCH PROJECTS

In fact, I am being asked by farmers facing herbicide breakdown why it is that they cannot access more of this technology already. They see significant investment in research and development via levy bodies, funded centres and universities and quite reasonably they wonder why it is that they are not seeing more technology becoming available more quickly.

Now, I fully appreciate the level of effort that goes into setting up research projects, dealing with the politics of collaboration, even just winning research funding in the first place. However, a focus on delivery seems to be somewhat lacking.

I was reminded of this by my own father just the other day when he remarked on how it was possible that during the war we managed to telescope aircraft development from drawing board to full scale production (without computers) to timescales measured in multiple months rather than multiple years.

A cynic might suggest it is because the agri-tech research community is enjoying the journey rather than focussing on the destination. I know that there is rather more to it than that, but as an Institution we need to be motivating our members and informing our policy makers (where our input on autonomous vehicles and drones as applied to agriculture could be particularly valuable).

I think this is a time when, as the great John Kilgour might have said, we just need to get on with doing stuff!

John's passing is being marked elsewhere in this edition, but I wanted to say what a privilege it was to have known him and to have attended his Service of Thanksgiving last week in Silsoe. I know our community has lost someone who really made a difference, and our thoughts are with his family at this time.

Seasons Greetings to our members

GLYPHOSATE LICENCED RENEWED

EU countries have voted to renew the licence of glyphosate, a widely used weedkiller at the centre of environmental concerns. The proposal, tabled at the EU Commission's Appeal Committee on 27 November passed with 18 votes in favour and nine against, with one abstention, and ended months of deadlock. The Commission says the new five-year licence will be ready before the current one expires on 15 December.

The decision to re-authorise the use of glyphosate for five years was welcomed by the NFU. Guy Smith, NFU Vice President, said: "The decision will be welcomed by farmers who have watched with growing concern as what should have been a straightforward decision has become increasingly political. The NFU has repeatedly said that decisions like this must be based on science and evidence"

"Independent regulatory bodies around the world, including the European Food Safety Authority (EFSA) and the European Chemicals Agency (ECHA), have looked at all the scientific evidence and concluded glyphosate is safe to use. But their conclusions have been ignored and their credibility has been undermined. Glyphosate reduces the need to use other herbicides, it helps to protect soil and cut greenhouse gas emissions by reducing the need for ploughing, and enables farmers in this country to grow crops that help produce safe, affordable, high quality British food."

FAREWELL TO ELIZABETH

Retirement party at Cranfield University

COLLEAGUES and members had the opportunity to say "thank you and 'au-revoir' to Elizabeth Stephens on her retirement, after almost 25 years (bar 6 months), as Finance Officer of the Institution. A tea party and reception was held at Mitchell Hall, Cranfield University after the Executive Meeting on 13 September.

Elizabeth was presented with a selection of gifts and travel vouchers as a result of generous contributions from members.

Sabrina Sumpter has been appointed as the new Finance Officer, but Elizabeth will not lose touch with the Cranfield office as she will continue to work for the Douglas Bomford Trust and the AgriFood Charities Partnership so will still be involved in the sector and be in and out of the office occasionally (*still using her elizabeth@iagre.org email address for both these organisations)*

After a fitting tribute from CEO Alastair Taylor, she said "I would like to thank you all for your friendship and support during my time as Finance Officer of IAgrE; it has been a privilege to work with so many dedicated and enthusiastic members, and I have certainly been infected with your passion for all matters relating to ag-engineering. Working for IAgrE has been extremely rewarding and such fun!"

William Stephens (left) with Peter Leech and Chris Whetnall

Elizabeth Stephens

Alastair Taylor and Elizabeth Stephens

Elizabeth Stephens

IAgrE office team

Nicky Tinker and Trish Biddle

CEO Reflections on a changing world

UNINTENDED CONSEQUENCES

Collaboration rather than chaos

Alastair Taylor *IEng CEnv MIAgrE*

I very much enjoyed the IAgrE 2017 Conference on the subject of Decarbonising UK Agriculture. We chose five themes around carbon reduction policy, alternative fuels for tractors, the importance of soils as a carbon reserve, growing food closer to the consumer and the carbon impact of harvesting and storing renewable energies but we could have chosen five different subjects which would have been equally as engaging.

My enduring thought is that the subject of carbon reduction is hugely complicated with no easy solution. You do something here, and it causes a problem somewhere else! However, with a bit of joined up thinking, there is a chance that we can make a difference.

But are we capable of joined up thinking? Is the cut and thrust of business and the need for profit a barrier to working in a way where we can collaboratively reduce the carbon footprint?

A multitude of trucks together with the road repairs all point to carbon hungry activities

TO illustrate the concept of joined up thinking – or rather the opposite of that, I want to remember the demise of the Milk Marketing Board (MMB) over thirty years ago.

At that time I had a 20 mile commute from Shropshire to Cheshire and used a road called Coole Pilot Lane which runs between Audlem and Nantwich, both in South Cheshire. This road was rumoured to have the highest density of dairy cows in the UK and I would certainly vouch for that given my journey encountered umpteen herds of dairy cows crossing the road. On most days, I would encounter the Bulk Milk Tanker picking up milk from the various dairy farms. It was all rather genteel and feels like a lifetime ago.

Then came along deregulation and the demise of the MMB. I can remember that Monday morning very well, not for the various dairy herds crossing the road but for the many different liveried Bulk Milk Tankers I met on my journey. Before long the grass verges were ruined as these huge trucks tried to pass and on occasions, a truck would be stuck in the soft verge. In the intervening years, the road has been widened but these days more for the use of the four by fours which traverse Coole Pilot Lane on account of many of the dairy farms now being converted into housing.

None of us would be in favour of cartels and monopolies but you are left wondering whether the joined up collection of milk by the MMB might have been a more cost effective way of doing things when compared to the numerous separate collection services, not to mention the money spent to undo the damage they caused. A multitude of trucks together with the road repairs all point to carbon hungry activities. Of course this has been during a period of cheap fossil fuels so there is little wonder that no one seemed to bat an eye lid.

Agricultural Engineers are unique when it comes to working collaboratively

SO what is my point? My point is that if we are to reduce our carbon footprint, we have to work more collaboratively, find ways of avoiding duplication, think beyond the bottom line as the single measure of productivity.

The MMB did this quite well. Deregulation was part of the politics of the time and at that point in our history was an understandable move and for the right motives. I am not sure that, with the benefit of hindsight, we would say the same.

Agricultural Engineers are unique when it comes to working collaboratively. In fact we are such a multi-disciplinary sector given the need for us to bring together science and engineering, I would suggest we stand out when compared to other areas.

So when it comes to finding solutions, and particularly around decarbonisation of UK Agriculture, it is us Agricultural Engineers who are best placed to come up with the solutions. My enduring thought, following our conference, is that we are already well engaged in the agenda. I throw down the gauntlet to industry partners to see what they can do to work more collaboratively with a view to reducing the carbon footprint of UK Agriculture. We have the answers but do we have the will?

OPENING OF NEW CLAAS ACADEMY

£1.2 million investment in new training resource

Mayor of St Edmundsbury cuts the ribbon

CLASS UK officially opened its new training Academy on Wednesday 4 October when the Mayor of St Edmundsbury, Councillor Terry Clements, cut the ceremonial ribbon accompanied by the Speaker of the Board of CLASS, Lothar Kriszun, CLAAS UK CEO Trevor Tyrrell and a host of staff, dealers, suppliers and specially invited guests.

The new £1.2 million Academy had first opened its doors in July and is the first phase of a complete redevelopment by CLAAS UK of the site at Saxham Business Park near Bury St Edmunds. Scheduled for completion by 2020, the new facilities will include new admin ofices, state-of-the-art showroom, and parts and service facility for the Manns of Saxham retail branch.


Lothar Kriszun


David Kirschner


Trevor Tyrrell

Mr Kriszun said there was a constant need for ongoing development within the industry. "Independent of Brexit there will always be a constant demand for agricultural products. Although the number of farmers is decreasing in the UK and elsewhere, the land is there and it will be farmed," he said. "These farmers require professional equipment, and training is crucial to the firm's future success. The investment in the Academy shows the commitment of CLAAS to the Suffolk site"

Trevor Tyrrell said that the Academy will employ 11 trainers, and is also the focal point for remote online training which takes place with trainees throughout the country and would have "a positive impact on our growth strategy"

Industry consultant, David Kirschner provided an overview of the training requirements for the land-based engineering sector as a whole. "It is predicted that over the next 7 years, this country will need to recruit 1.3 million engineering recruits, and as a relatively small sector we will have to work hard to ensure we can attract the cream of that crop" he said.


Guests at Academy opening.


AEA CEO Ruth Bailey at the combine controls

2017 **LANDWARDS CONFERENCE**

Held at Rothamsted Research 11 October 2017

Report compiled by CHRIS BIDDLE, pictures by STEVE GIBBS

An excellent turn-out attended the 2017 IAgrE Landwards Conference held at the impressive conference facilities of the Rothamsted Research headquarters in Hertfordshire.
The focus this year was on carbon, and the role that agriculture can play in reducing the carbon footprint. At one end, tractors and mechanisation systems are big energy users whilst natural resources such as forests and the soil can be managed to capture carbon. The conference explored a broad range of solutions, technologies and practices required if reliance on carbon is to be reduced.
The conference hosted an excellent line-up of expert speakers including **Sean Lennon**, Head of the Tractor Line at New Holland Agriculture substituting for **Carlo Lambro,** President New Holland Agriculture who was called to Brazil on urgent business. Key presenters also included **Professor Jane Rickson** from Cranfield University, **Dr Jonathan Scurlock** of the NFU, **Dr Ian Shield,** Rothamsted Research and **Jonathan Lodge** from City Farm Systems.

MORE THAN ONE IN THREE FARMERS NOW IN RENEWABLES

Opening the Conference, IAgrE President, Dr Robert Merrall posed a series of questions relating to the conference theme **Decarbonising UK Agriculture**. "What are the facts and where are we now? What are the carbon impacts of UK Agriculture? What are the pressure points? How will things look if we don't do anything? Can we reach a view of the true carbon footprint of food production – field to plate? What will happen if we do nothing?"

"As the Institution of Agricultural Engineers, we are very fortunate to have secured input for this conference from a number of like-minded individuals who share a real passion for minimising the environmental impact of food production"

The NFU's Chief Adviser on Renewable Energy and Climate Change, **Dr Jonathan Scurlock** said that agricultural production accounted for 10% of the UK's greenhouse gas emissions, half of which was carbon dioxide (n2o) from soils and a third as methane (CH4) "but agriculture is an essential part of a competitive low-carbon economy post-Brexit"

"Climate change, energy security and food security converge to provide an opportunity, not a threat to British

Sean Lennon

agriculture. More than one in 3 farmers have already diversified into renewables. They own or host 70% of UK solar power, half AD capacity and the majority of wind power"

"Wind power capacity worldwide" said Dr Scurlock "is 50% more than world nuclear capacity, whilst world solar power is doubling every three years"

"Bioenergy is already the 4th largest form of primary energy after coal, oil and natural gas, and provided around 30% of UK power requirements during April to June this year"

Future energy systems are likely to be dominated by solar, wind, electricity storage and bioenergy with carbon capture, said Dr Scurlock "and we have to ask how these technologies impact on agriculture" He then gave a number of examples of new energy technology appearing on farms including electricity storage units and the gradual emergence of diesel-electric hybrid tractors providing 'vehicle to grid' network balancing services.

Continuing the theme, **Sean Lennon**, Head of Tractor line for New Holland Agriculture said that he imagines the farm of the future as being completely energy independent: a farm that produces not only food, but also the biomass it needs to generate the energy it uses to run its operations and power its tractors and other machinery. In other words an energy independent farm, a concept that the company had been testing and trialling for several years through the development of tractors powered by hydrogen, propane and more recently methane.

"Such a self-sufficient future is achievable today" he said, with New Holland's advanced technology and vision. "The recently unveiled methane powered concept tractor is the latest development in our pursuit of sustainable and efficient technology farming through innovation. The engine delivers the same performance and has the same durability as its standard equivalent, but with much lower running costs. It combines alternative fuels and advanced agricultural technology to create a vital link that closes the loop by running on the energy produced from the land and waste products".

It was the elimination of transport costs and reduction in CO2 involved in the distribution of food to supermarkets that was the focus of **Jonathan Lodge** of City Farm Systems. The company is developing food growing systems using mainly rooftops to grow and supply 'green' produce on the spot for retailers. "With current suppliers saying it can take 500 miles and 3 days to get bagged salads to the retailer, leading retailers say 60% of bagged salad ends up wasted. With a City Farm Systems installation they could give those 3 days to the consumer. The savings are enormous – no transport, less packaging and lower costs and pollution.


Jonathan Lodge

Looking out over a city there are a huge number of rooftops doing very little. Many of the larger, flatter rooftops cover retail outlets. Very quickly you can identify the food retailers... they are the ones with big air handling units in a corner. They are paying to dump the heat energy from fridges and freezers while their suppliers are paying to heat their greenhouses. By growing above a retailer we could do away with transport altogether"

"Rather than leave expensively heated and lit areas for the workforce to access the growing crops we do away with the need for a workforce to access the roof. Unlike some greenhouses where they need to drive a tractor inside (a big reason the crops need washing) we use the whole volume for production. By using automation to transfer crops to and from the rooftop facilities we can fill the volume. By doing away with the need for a rooftop workforce we have no problems with high insurance costs and can utilise typical low pitch roof areas" he said.

SOIL: Our Natural Capital

Professor Jane Rickson of Cranfield University and President-elect of IAgrE opened her presentation, **Soil: Our Natural Capital** by immediately altering the title of the conference by changing the word Decarbonising to Carbonising. "I want to focus on the role of soil and soil management in carboning" she said.

"The importance of soil has moved up the agri-environment agenda with increasing recognition that this vital natural asset underpins the sustainability of most agribusinesses"

Very small improvement is actually required "If we increased by 0.4% a year the quantity of carbon contained in soils, we can halt the annual increase of CO2 in the atmosphere - a major contributor to the greenhouse effect and climate change."

Professor Rickson focused on two key areas. First, carbon and climate change and the role that soil played in the carbon cycle. Secondly the question of how much soil carbon do we have - and how to increase the content?

"Increased CO2 emissions in the atmosphere are associated with temperature rises (global warming), climate change, extreme weather events, sea temperatures and even hurricanes" she said.

She quoted from a recent report by Stanford's School of Earth, Energy and Environmental Sciences which said the way that land was managed could increase soil's carbon storage enough to offset future carbon emissions from thawing permafrost. Amongst the possible approaches were reduced tillage, year-round livestock forage and compost application. Planting more perennial crops, instead of annuals, could also store more carbon and reduce erosion by allowing roots to reach deeper into the ground.

Professor Jane Rickson

The authors of the report found that about 70 percent of all sequestered carbon in the top metre of soil is in lands directly affected by agriculture, grazing or forest management - an amount that surprised the authors.

Turning to the rate of carbon loss, Professor Rickson said that as a result of a survey taken during 1994-2003, mean annual rate loss was 0.6 g of organic carbon per kg of soil, and for soils with 100g carbon per kg, the annual rate loss was over 2g per kg. To provide the bigger picture, she said "The annual soil loss for England and Wales alone has been calculated at 4.4 million tonnes"

So the key questions were. How can we reduce CO2 losses from soils, and increase soil carbon?

On the first question, she said we should avoid exposing soil carbon to the atmosphere through less inversion tillage; more non-inversion, reduced tillage systems; limit soil erosion and avoid draining wetlands.

As for improving soil carbon storage (sequestration), this will mean certain changes in land use (eg arable to forestry), reduced tillage systems in order to retain residues and reduce CO2 emissions, and an increase in soil organic matter such as mushroom or poultry compost, or approved biowaste composts.


Dr Ian Shield

The final speaker in the morning session was **Dr Ian Shield**, Agronomist at Rothamsted Research who spoke on Energy Crops and Carbon Reduction. He said "As the UK and much of Europe moves away from coal, the life cycle greenhouse gases (GHG) benefits of biomass compared to fossil fuel alternatives diminish. However we should not lose sight of those benefits and how to maximise them"

Energy Crops are very low input. Planting is a major operation, but only once in every 20 years, and the GHG benefits are in harvesting and post harvest management, and in soil carbon effects"

He said that the two most widely grown energy crops in the UK are short rotation willow and miscanthus, both having been subject to research programmes at Rothamsted.

Harvesting of willow could be carried out by baler, forage harvester, sugar cane harvester or whole rod harvester with the aim of producing wood chips, whilst miscanthus could be cut by forage harvester, baler, mulching mower or disc mower with the aim of producing high density bales, ideally with a moisture content of less than 22%.

Summing up the conference, **Alastair Taylor**, Chief Executive of IAgrE said "This is such a broad subject. We chose five compelling topics but we could easily have chosen five different interpretations of the carbon challenge. More than anything, this demonstrates the multi-disciplinary nature of Agricultural Engineering"

FOCUS ON ROTHAMSTED

The afternoon session was introduced by **Professor Achim Doberman**, Director and Chief Executive of Rothamsted Research who outlined the work undertaken at Rothamsted and the challenges faced by agriculture in the 21st Century.


Professor Achim Doberman

"Here we have unique science capabilities" he said "which comprises two campuses and four field sites covering more than 800 hectares for research and trials"

"We employ over 500 people from 35 different nationalities, and have an annual budget of £35-£37 million".

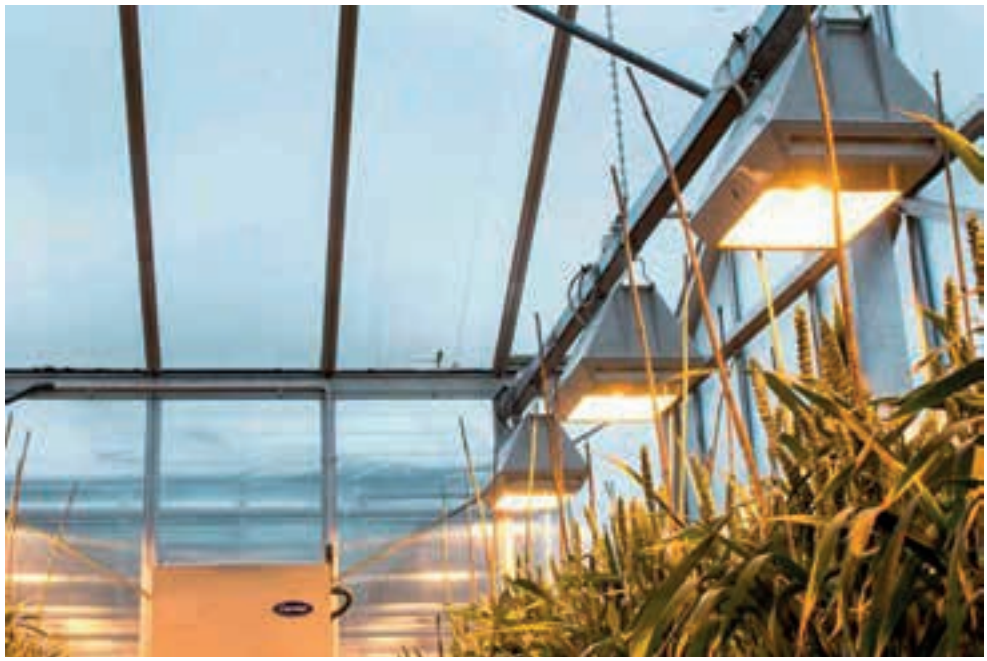
Delegates were then invited to see five different aspects of Rothamsted's current work.

The Field Scanalyzer

The Field Scanalyzer is a fully automated robotic field phenotyping platform with a dedicated sensor array that may be accurately positioned in three dimensions and mounted on fixed rails has been built at Rothamsted. This facility allows continual and high-throughput monitoring of crop performance within a 15m x 120m area

The Bee Radar and Suction Traps

Rothamsted Radar Entomology Unit, a specialised technical unit within Britain's oldest agricultural research institute. The unit was first established in 1971 and it has a wealth of knowledge and history in the use of remote sensing technology in study of insect movement around the globe.



Glasshouses and Controlled Environment

Almost half the energy used, costing in excess of £1 million, on the Rothamsted site is used to grow plants. Of this we estimate the majority is electricity to produce light. Whilst our glasshouses use free light we supplement natural light to extend day length as well as provide additional light all year round.

Cropping Carbon

An important component of the Cropping Carbon Institute Strategic Programme was the use of dedicated energy crops to substitute for fossil fuels. This aspect of the afternoon builds upon the presentation made in the morning. On display, was a Short Rotation Coppice harvester; based upon a forage harvester the machine has a purpose built cutting head capable of dealing with the high yielding crops produced on UK farms.

Rothamsted Sample Archives

With remarkable prescience Lawes & Gilbert saved samples of crops, soils, fertilizer and manures from the long-term field experiments dating back to the 1840s. Successive generations of scientists at Rothamsted have continued to add to the collection and the resulting Sample Archive now comprises about 300,000 samples. This unique resource is of immense scientific value.

Feedback

Responses to **Landwards** Feedback to the Editor chris.biddle@btinternet.com

PASSING OF THE PLOUGH?

Sirs

I appreciated the content in the last Landwards on issues surrounding soil degradation.

The world's farmers must now embark on profound changes because of food security issues. These changes are soil-quality driven, input-cost driven and follow from the need for farming to be much more sustainable.

Introducing Conservation Agriculture (CA) concerns a vast reduction in conventional farm work but also involves substantial differences in soil-focused, fuel-efficient machinery that is not concerned with ploughing or rotovating at all.

In future the central thinking process of all farmers needs to be directed to the emergence of CA, sometimes called No-Till in USA and Zero Tillage elsewhere (but has nothing at all to do with Min-Till, which simply adds to confusion).

Engaging with farmers is now essential to preserve the soil, to operate at highest levels of labour productivity, reduce fossil-fuel usage and drastically increase efficiency of machinery.

Farm tractors and machinery manufacturers must produce more fuel-efficient products for farmers - and to do so they will have to re-design both the tractors and the implements. Such changes must result in lighter weight and higher speeds.

In the professional engineer's world, there is a need to change the curriculum of students so as to move away from the notions of ploughing and onto the CA-system that concerns minimum soil disturbance.

By moving to lighter but faster tractors we will start to address the appalling problems associated with the appallingly low levels of farm transportation-efficiency, the soil-damage caused by farm machinery that is far too heavy, high fuel volume caused by heavy tractors and agricultural implements and the over-concentration on the expensive, time-consuming ploughing culture.

Because our country is moving out of Europe and into the Brexit era, we have created an associated company (to work in Europe) so as to support the European Conservation Agriculture Federation (ECAF) in Its quest to create much healthier soils in Europe.

Our new company, Trantor Farm Vehicles (Europe) Ltd, wishes to work with those, in Europe, that are sufficiently enlightened to understand that soil-health and machinery change have to be seen together - and that farm transportation has to become much more efficient

It is certainly time to bring Agricultural Engineers and Innovative Design Engineers in to this very important subject and we are seeking a broad-minded leader, with a knowledge of farming and an engineering design background to help our European company support the work of ECAF.

Finally, I thought Landwards readers might be amused by this poem, penned by John N Lander OBE for last year's World Conservation Agriculture Congress in Rosario

Yours

Graham A B Edwards FIAgrE
Trantor International Ltd

THROW YOUR PLOUGH

Throw your plough through the window
And revel in the crash
Of broken glass and paradigms
And non-organic trash

History had many reasons,
Learned from going wrong
But when there is a breakthrough
Don't listen to the throng

Inventions break the ancient mould
And open up the doors
To spread a new technology
That sets a better course

Man spent a lot of energy
Breaking down the soil
But ploughs and heavy tractors
Give less and less for toil

Horse and ox did not compact
The way a steam plough could
And later, heavy tractors
Turned our soils to pudd.

We've burnt the saintly particles
That held our crumbs as bread
And lost organic matter
So our soils are nought but dead

The devil takes the hindmost
And those who don't evolve
Will pay the price of blindness
And their problems never solve

Conservation is for soils, sir
Not for clinging on
To now outdated practice
In an everlasting con

So throw your plough through the window
And revel in the crash
Of broken glass and paradigms
And non-organic trash

AGRICULTURE AND THE ENVIRONMENT

A new dawn approaches post-Brexit

Farming and care of the environment has always gone hand-in-hand – and that relationship is set to intensify over the coming years.

Over the last forty years, the European Union's Common Agricultural Policy has profoundly shaped the UK countryside, farming sector and food system – for better or worse. While the CAP supports farmers' incomes across the UK (on average to the tune of 50-60%) and provides mid-term certainty, it has frequently been criticised for its complexity, its impact on the price of food - and its negative environmental effects.

Whilst the National Farmers Union's policy was in favour of a vote to remain in last year's referendum, subsequent polling suggests that around 58% of farmers voted to leave the EU.

In the on-going Brexit discussions, agriculture and fisheries stand apart. Whatever kind of Brexit is negotiated, responsibility for agriculture and fisheries will return to the UK. It is widely forecast that replacing CAP will involve additional environmental responsibilities for farmers.

Within the EU, the UK Government's priority for agriculture has long been to reduce agricultural support and to push for a more market-oriented sector without income support, with any funding linked to the delivery of environmental benefits

Brexit offers the opportunity to take stock of existing policy objectives and to redesign policies better tailored to the specific needs of the UK farming and food sector, the environment, rural economies and the priorities of the British public.

There will be opportunity to achieve more efficient integration of agricultural policies with related sectors, such as water and energy, to improve land management and environmental sustainability.

By recognising the wider role of farming in the landscape, a revised agricultural policy should seek to end the decline in environmental quality. Flood risk mitigation, soil quality, climate change adaptation, habitat protection and recreation services will all benefit as a result of an improvement in farmland ecosystems.

As it approaches it's 80th birthday, the role of IAgrE will have shifted during those years from a focus purely on mechanisation to achieve optimum food production to a role which places care for the environment on an equal, if not more important, priority. The Institution was one of the founding members of the Society for the Environment (profiled in this feature) – and the growing numbers of Chartered Environmentalists within its ranks is proof of new ways of thinking about the future

SOCIETY FOR THE ENVIRONMENT
A CHARTER FOR THE FUTURE

"We are the last generation with the resources – and the will - to do something about controlling climate change" says Dr Emma Wilcox, CEO of the Society for the Environment (SocEnv). A sobering view from the head of the umbrella body aiming to increase the ratification and recognition of environmental professionals.

Environmentalists can suffer from a bad press. They are often portrayed as 'tree-huggers', protesters who pitch up at the routing of new roads, at fracking operations or those who cause chaos by chaining themselves together at the entrance to Heathrow. All would describe themselves as environmentalists, but often for narrow, specific causes.

And yet vast numbers of our population display their environmental awareness and concerns by responsibly separating their household waste each week or by willingly pitching up at their local shop with their own carrier bag, accepting that the practice of accepting a throwaway plastic bag can harm the environment.

Dr Wilcox says such actions are well-meaning but often lose sight of the bigger picture. "We live in the real world" she says "what seems like an obvious solution can lead to unintentional consequences". That phrase "unintentional consequences" crops up repeatedly in our conversation.

"Take the installation of cycle lanes in London. Done with admirable intentions, but it has compressed the traffic lanes resulting in more idling traffic and an increase in traffic fumes in some areas".

Or perhaps the most obvious recent example of misplaced actions taken to try and reduce global warming emissions came when most countries were obliged to reduce CO2 emissions following the Kyoto agreement in 1997. As a result they chose to popularise - and incentivise - the purchase of diesel engine cars over petrol. It was intended as a quick-fix solution on the basis that diesel produced around 15% less CO2, but ignored the fact that diesel emitted four times more nitrogen dioxide (NO2) and many more harmful particulates.

Quick fix it proved to be. Diesel car ownership in the UK alone went from a lowly 10% in 1995 to over 50% in 2012. If ever there had been a time to ramp up development of electric and hybrid vehicles it was the mid-1990s following Kyoto, but CO2 reduction was the mantra with little regard or debate of a trade-off against harmful emissions injurious to health.

Add in the powerful lobbying of car making giants and rigged testing as in the case of Volkswagen, and you had a policy decision that most politicians now concede was disastrous and completely lacking in evidence-based research.

ROYAL CHARTER

It was about the time of the Kyoto agreement that a group of UK-based environmental professionals were prompted to consider forming an umbrella body to enable professional institutions to confer chartered status to their members who specialised in sustainability and environmental responsibilities.

They had been prompted after Margaret Beckett, then Secretary of State for the Environment in Tony Blair's government, suggested that she would be better placed to consider key environmental issues and advance planning if it came with the backing of a group of professional institutions, rather than from individual representations, all with slightly different nuances and views on specific measures.

Two well-regarded figures from the environmental world were central to the founding of the Society. Dr Peter Matthews CBE had spent his career in the water industry and was President of the Chartered Institution of Water and Environmental Management (CIWEM), whilst Professor William

"legislation drives everything we do"

Dr Emma Wilcox

(Will) Pope, with a long career in the health, safety and environmental sector was chair of the Institution of Environmental Sciences (IES). Both have served as Chair of the Society since its formation in 1999.

In addition to their respective bodies (CIWEM and IES), they partnered with 8 other leading Institutions (which included IAgrE) to become founder members of the Society for the Environment.

The core role of the Society is, and always has been, the awarding of Chartered status to those who had demonstrated a depth of knowledge, experience and commitment to their role as an environmental professional.

To achieve this, the Society had to gain a Royal Charter so as to be able to licence the institutional bodies under its wing to confer Chartered status on members with the appropriate qualifications. From a virtual 'standing start' the Royal Charter was granted in September 2004, barely four years since inception.

Today, the Society is licenced to award the Chartered Environmentalist (CEnv) status to 24 separate professional bodies including now the Arboricultural Association, Institution of Mechanical Engineers, Institute of Agricultural Management and Institute of Chartered Foresters.

The combined membership of the professional bodies exceeds 500,000 – and since receiving the Royal Charter has conferred CEnv status to more than 9000 professionals.

"There is little doubt that environmental issues have come to the fore in recent years for every company and organisation" says Dr Wilcox "which means that future strategy requires expert and highly qualified environmental representation on the Board or on Executive Committees. Someone with a CEnv qualification is therefore increasingly in demand across industry"

"Of course" she says "legislation drives everything we do, and as a licencing body we review our registration criteria on a regular basis. In our case, every 5 years with a major review now coming to a conclusion".

Emma Wilcox was appointed CEO of the Society in July 2015 having gained a PhD in Materials Science and Technology at Surrey University and a Diploma in Business Studies at Henley Business School. Prior to taking up the role, she had been Programme Director at the Energy and Efficiency Industrial Partnership. In the past two years, she has significantly increased the number of registered CEnv professionals.

GENDER SPLIT

There are two interesting membership statistics, first that the average age of a CEnv was 66 in 2004, and that has dropped to 39 in 2016. The second is that during the past 6 months, more than 50% of successful CEnv registrants have been women – and the gender profile is approaching a 50/50 split.

As to the age drop, Dr Wilcox says "That is slightly misleading in that early registrants had 'grandparenting' rights which has largely dissipated, but we are seeing many more excellent candidates coming through, both male and female".

"I think we are gradually winning the battle when the job of an engineer or scientist took second-place to more, so called, 'glamorous' jobs in retail or the media. There is little doubt that the younger age group, the school leavers have become more savvy, less accepting of traditional ways of doing things. Indeed you can see that in recent election results"

"They are also very environmentally 'switched-on'. I had to interview young candidates for a role at the Society recently and I was blown away by how 'clued-up' they were on environmental issues. It's a pity I only had one job to fill!"

In addition to its principal role in granting Chartered status, the Society acts as a facilitator and contributor of robust environmental knowledge to those who need to understand current issues says Dr Wilcox. "As mentioned, we are wary of short-term thinking and sticking plaster solutions. For instance, look at the media frenzy and ill-informed views on dredging rivers during the floods a couple of years ago."

"The benefit of having an extraordinary depth of experience on our Society Council (Alastair Taylor and Mark Kibblewhite are the IAgrE nominated Council members) means that we can take a broad view from a number of different angles. Yes, there are differences of opinion on the way forward from different institutions, such as a recent debate on feedback to the Government on the repeal bill. I respect all these views, but in the end we have to look at the bigger picture"

Currently the Society's two policy themes concern **'Greening government policy (including in implementation)**' and **Evidence-Based Decision-Making in Environmental Management** (back to the issue of diesel cars).

Of course, less than a year after taking up her post, Dr Wilcox was faced with the environmental ramifications of the UK voting to leave the EU. "I don't think it should be any surprise to say that when we polled our registrants, the majority were 'remainers'"

"But to use that well-worn phrase 'we are where we are', we have to work through the issues to ensure that care of the environment remains top of the agenda". A year on and still in the 'talking shop' phase, Dr Wilcox is quietly impressed with the words coming out from Michael Gove. "Although he was initially dismissed by many of the 'green' organisations, Gove is focussing on many core elements of essential environmental practices such as soil quality. We haven't heard that from an Environment Minister for some time"

"My main hope is that care of the environment does not take second place to other oft-used economic indicators such as GDP"

Meanwhile, one of the greatest thrills for Dr Wilcox and her colleagues at the Society are the tangible celebrations that accompany the awarding of Chartered Environmentalist status to those who have worked hard and have received the recognition.

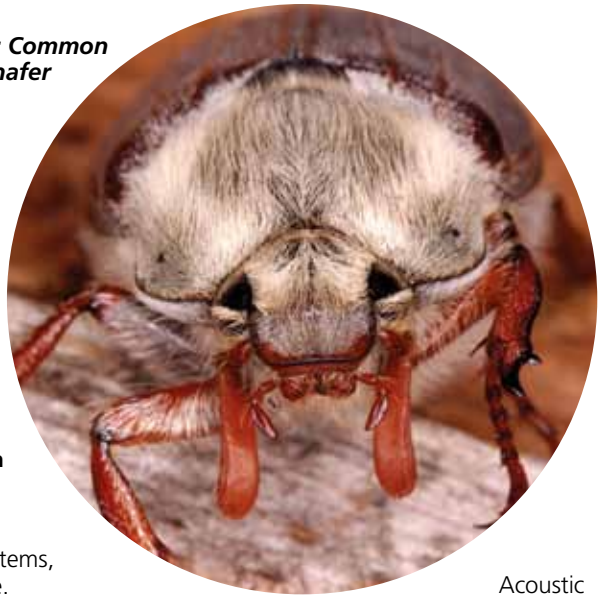
"It's a real privilege to head up the small Society team" she says "now we have to make sure that we stay relevant, we market ourselves and our views positively and that we have a strong collective voice beamed from the fantastic collection of environmental professionals in the Society".

"There is little doubt the tide is turning in favour of sound environmental practices – and not a moment too soon!"

Listening to the Pests

Application of bioacoustics to agriculture and horticulture

Dr David Chesmore, CEnv, FIAgrE, FRES, FIOA is Senior Lecturer in the Department of Electronic Engineering at University of York. His research interests lie in the application of electronics and computing technology to biology, ecology, entomology and precision agriculture, particularly in the areas of automated species identification and biodiversity informatics for pest detection and identification.



RIGHT: Common Cockchafer

Pests can cause devastating damage to crops and their detection as early as possible is vital. Integrated pest management (IPM) is becoming more important for reducing the use of pesticides. The cycle of IPM - inspection - identification - monitoring - action - evaluation (monitoring after treatment) clearly shows the need for detecting pests as early as possible in order to determine whether action needs to be taken.

Early action means lower quantities of pesticide and less damage to the crop. At present, the most common methods are either visual inspection for evidence of damage or animals which can be time consuming, or the use of traps of various types which may not be very effective. Manual methods and traps can work well for animals that can be seen or caught but there are quite a few species that remain "hidden" inside stems or underground, making them difficult to detect.

The use of technology for pest detection is still not widespread; there are some image processing applications mainly for plant diseases and some acoustic systems, the topic of this article.

Bioacoustics

We are all surrounded by sounds, some are pleasant and others annoying or even injurious to health, especially when they are very loud. There is an entire world of sounds we are not aware of, whether they are below (infrasound) or above (ultrasound) human hearing, or present inside plants, stems, in water or under the soil.

These so called hidden sounds require specialised sensors to detect them, e.g. bat detectors shift ultrasound to audio so we can hear bats echolocating (they are also good for listening to bush-crickets).

An acoustic (sound) signal is a pressure wave in the air, water or material and a bioacoustic signal is one originating from a biological source. Sources range from vocal chords vibrating to rubbing or vibrating of parts of the body together, or even hitting the surface with a part of the body (Deathwatch beetles hit their head on wood to make a mating call).

BELOW: Cockchafer larva

Acoustic signals can propagate through plant stems and wood as well as the soil, although not so well in the latter due to its granular and variable nature. Types of bioacoustic signals can be divided into two categories: deliberate or non-incidental and as a byproduct of activity (incidental). We are more familiar with non-incidental signals such as bird or grasshopper song for advertising, mating, aggression or predator evasion.

One unusual example of a non-incidental sound is in tiger moths where they can hear bat echolocation calls and respond with an ultrasonic "squeak" to confuse the bat. Other examples of "hidden" sounds include plant hoppers, Psyllids (Jumping lice) and lacewings which have mating songs that travel through leaves and stems; in fact, plant hoppers are known as "insect drummers".

Incidental sounds include movement, feeding and flying.

Both incidental and deliberate hidden sounds can be successfully used to detect and, in some cases, identify pests. Specialised sensors are needed that can pick up acoustic vibrations; these were originally gramophone styli but were fragile and difficult to set up.

Nowadays, piezoelectric sensors can be built at low cost which are just as sensitive and are robust and simple to use. One major advantage of vibration detection is that is non-invasive, i.e. the sensor just

LEFT: Sensor on tree trunk

needs to make good contact with the material instead of having to drill holes for embedding the sensor, particularly important for heritage conservation where holes in antique furniture are not welcome.

Application to Agriculture and Horticulture

Applications can be divided into preharvest and postharvest. In the latter, there have been many research projects to detect beetle larvae feeding inside kernels involving detection of feeding sounds, infrared or x-ray image processing with some degree of success.

However, the large quantities of grain to be examined either during harvest or in storage make this uneconomic. In the former, we have been investigating a number of applications aimed at early detection for IPM (some are in their early research stages) including:

Psyllids - vibration detection of mating sounds of the Eleagnus Psyllid. The calls are species specific and can be used for identification. Males and females also produce different sounds. Also, it is expected that all species (e.g. Box Psyllid) can be detected at very low densities by simply listening to the vibrations throughout the plant.

LEFT: Monitoring trees

Cockchafers - these are pests of many plant species and can cause problems in orchards and golf courses. It has recently been confirmed by a joint research project with Dr Carolyn Gorres at Geisenheim University in Germany that larvae in the soil actively produce deliberate stridulations (rubbing jaws together) which differ between species, and thus can be used to identify the species without digging up the larvae as is currently done. We are currently using acoustics to determine larval activity over long periods of time.

Wood/stem borers - research carried out with FERA funding investigated the detection of Asian longhorn beetle in imported trees and imported wooden goods. This species is a major danger to native trees and could be economically and ecologically damaging.

ABOVE: Sensor plate on strawberry

Outbreaks in Italy and the USA have had major impacts on trees. The larvae can live inside manufactured wooden products and live trees with little evidence of their presence. We have successfully used non-invasive sensors to detect larvae when they are small to give early warnings.

Other pests under investigation include vine weevil, cabbage stem flea beetle and soil invertebrates. We will be developing 3D earthworm tracking systems in 2018-19 through a Leverhulme grant.

Other Applications

Vibration sensors can be used in heritage conservation to detect the presence of woodworm (furniture beetle), Deathwatch beetle and powder post beetle. One application under investigation is to determine if conservation measures (heat treatment, pesticide, humidity control) are successful by monitoring larval activity over time; if successful then the activity should decrease and then cease.

Applications in ecology include detection of the presence of rare insects such as the Stag beetle whose larvae live in dead wood and produce deliberate stridulations, and underwater biodiversity assessment (fish, water boatmen and water beetles) all make deliberate noises.

The Future

Bioacoustic sensing is only just becoming a mature technology despite many years of research. The advent of powerful low power embedded computing and low-cost sensors is leading to new developments such as the ability to create devices capable of automatically identifying species through machine learning.

Such automated species identification (ASI) systems have application to pest monitoring as well as biodiversity assessment with the ability to log all calling species in an area. When coupled with wireless technology, networks of monitors can be created for high density early warning systems for, for example, migrating pests.

Many problems need to be solved including detecting quiet sounds and overcoming interference from other sounds in the environment.

ABOVE: Sensors on floorboard

Stopping the Storms

Reginald Ward MIAgrE, a resident of Argentina, says that the planet is increasingly suffering from extreme life threatening events and that restoring belts of trees will calm things down.

The modern world weather is becoming increasingly more extreme and this is said to be because of climate change.

I have been observing weather patterns for the last 2 decades mostly in an interest to frost and its prevention. What I noticed was the transition to more extreme changes. The amplitude was increasing, as time went on, more extreme cold and warm patterns with violent storms doing a great deal of damage.

The equal increased heat and cold patterns according to the season means that it is much colder and hotter than before, and it seems that the planet is really getting warmer and global warming is acclaimed along with climate change. The reality is that there is a very small rise in the global temperature and a costly change to clean production is happily put off. The planet though is suffering from extreme life threatening events.

The amplitude of the extremes involves all fronts, the warmer and colder parts of the oceans the atmosphere, the land mass and the poles are all linked to the extreme events that are causing immense destruction in many parts of the world today. Hurricane Harvey in Texas USA and extreme flooding from monsoon rains in India, killing more than 1000 people at the moment of writing.

The balance of the world has failed, the amplitude is too great and the world is vibrating in an uncontrolled destructive motion which can only get worse. Too much has to be done too quickly to reduce this high amplitude when this drops it will be seen by the lessening of extremes. This will be the indication of corrective procedure.

'War games'

With the planet suffering such dire circumstances one leader wishes to explode hydrogen bombs on others , wars are raging in other parts of the planet and as long as the sun comes up every day the planet´s plight goes on while people play out their childish war games.

Hurricane Harvey which caused 40 billion dollars damage in Texas travelled to a low pressure area created by increased human dwellings and the removal of park land .The dry hot conditions cause a low pressure area. Opening a door for the hurricane to move towards, the more the development, the more the pressure drop, the greater the hurricane. To lessen damage from hurricanes a constant high pressure belt has to be formed hand-in-hand with development. Rather than the 40 billion dollars - the total cost of damage from extreme weather events in the United States alone could top 300 billion dollars this year.

Belts of trees will produce constant high pressure areas. This will lock out hurricanes the winds can only move to the low pressure gradient. The South American Rain forest is a zone of constant high pressure and that is why the doldrums are in this part of the world. The rain forest is being rapidly cut down though, it's terrible to see lonely immensely tall trees, left behind when the forest was cleared these remainders mostly topple over when winds start to blow.

The natural forests all over the world have been replaced by asphalt and concrete and farming. Trees were a source of revenue or a place to deforest to grow a crop. They have never been thought of as providers of high pressure to keep the land safe.

High pressure over warm seas causes the air to become saturated with water which moves towards the low of the land and as the world goes more and more out of synchronization this will become more extreme.

The role of trees

The fools of war should never be allowed to govern, people have to be educated enough to choose leaders who will work hard mending the errors of the past and legislation must be brought about that will change the way development is carried out so that enormous belts of trees are restored all over the planet.

As the new world was discovered, traders saw the wealth waiting in lumbering and the vast forests of the world were devoured. Later farming and real estate development took over. The real function of the forests not understood or not wanting to be thought about. The easy money that the timber provided trumped all reason.

A tree, most people think, uses CO_2 and produces O_2, and used for firewood or timber, it is also seen to be dangerous and causes damage when it is blown down in a strong wind. A vast forest of trees however, lasts forever and is self-generating. It is necessary to provide a check in climate. The transpiration produces belts of high pressure and this blocks wind formation.

Not only do the trees produce high pressure blocks they also purify underground water in that mineral loaded underground water is imbibed by the vast root system to transpire enormous amounts of this same water now purified. The most important part that the transpiration plays is the production of the micro climate which will calm down all aspects of the world weather and bring about synchronisation acceptable to life on the planet. Belts of trees restored all over the world will stop the storms.

DOUGLAS BOMFORD TRUST

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Telephone: +44 (0)1234 750876
www.dbt.org.uk enquiries@dbt.org.uk
Secretary: Alan Plom
Administrator: Elizabeth Stephens

Alan Plom, The Douglas Bomford Trust's new secretary, provides this update on the Trust's recent activities.

The Douglas Bomford Trust Prize.

The best Foundation Degree (FdSc) Agricultural Engineering student at Harper Adams University (HAU), was awarded this year to **Mark Palmer**, 21, from Ely, Cambs. Mark graduated with a Distinction and HAU's Programme Manager, Greg Rowsell, said: "*Mark is a worthy recipient of the Prize. His outstanding performance while on placement with Claas UK led to him being offered a full time job, following graduation. Mark based his final year research project on a Claas product, entitled: 'Define an appropriate procedure for recovering broken-down Claas combine harvesters', and he is now working for Claas UK as a Service Engineer, based in Sleaford, Lincs.*"

Mark Palmer being presented with his Award by Dr Paul Miller (DBT Secretary) at HAU's Prize Giving Ceremony at the end of September.

DBT WEBSITE

(http://www.dbt.org.uk/)
Our website has been updated, with additional information on a selection of awards and projects sponsored by the Trust.

Douglas Bomford Trust Scholarships

The Trust has again awarded a number of Scholarships to HAU undergraduates. The short-listed candidates for 2017-18 were interviewed recently by two Trustees and the Secretary. Six students will receive financial support to assist them with their studies.
Scholarship Panel Chairman **Paul Miller** said: *"It was even more difficult to select those to receive awards this year. The students show great potential and we hope our support will help and encourage them all to pursue careers in agricultural engineering. We were particularly pleased that one of the (first year) students had previously been an Arkwright Scholar, who was inspired to study agricultural engineering after visiting John Deere at Langar with us earlier in the year"*

FAREWELLS

At the Trust's **Annual General Meeting** held at the Royal Agricultural University (RAU), Cirencester, on 8 November, we said farewell to **Peter Redman** (and also to **Dr Geoffrey Davies**, in his absence), both having served the maximum 6 year term as a Trustee. The Chairman thanked them for their work and commitment to the Trust. Of particular note is that Peter Redman has actually been involved with the Trust since 2003, having served as Secretary for 7 years before becoming a Trustee in 2010. Peter has also just retired from his role as a Trustee of the **AgriFood Charities Partnership (AFCP)** where he has effectively raised the profile of the Trust too. Peter's enthusiasm and wise counsel will be sorely missed.
Speaking of which, the Trustees also said 'Thank you' to **Paul Miller**, who has relinquished his role as Secretary after 7 years. **Dr Malcolm Crabtree**, Chair of the Board of Trustees, recounted Paul's long list of successes and the significant developments in the Trust during his tenure, and presented Paul with an engraved silver plate.
We are very fortunate that Paul will continue to support the Trust, [and thankfully help the new Secretary to settle in], as he has kindly agreed to join the Board as a Trustee. Also, although Elizabeth Stephens recently retired from IAgrE, she has agreed to continue as the Trust's Administrator. **Dr Keith Hawken** (known to many IAgrE members in his role as the Agricultural Engineers Association's Technical & Standards Director) has also agreed to stand as a Trustee.

Paul Miller (ex-Douglas Bomford Trust Secretary and new Trustee) takes 'centre stage' with his farewell gift from the Trust. New Secretary Alan Plom and the Trust's Administrator Elizabeth Stephens flank (from l to r): Richard Robinson (observer) and Trustees Dr Mark Moore, Prof Mark Kibblewhite, Nick August (Dep Chairman), Jonathan Bomford (Investment Officer), John Fox (Emeritus Trustee), Peter Redman and Dr Malcolm Crabtree (Chairman). [Dr David White participated remotely (by telephone), Mr Geoffrey Davies and Dr Keith Hawken were unable to attend the meeting.]

The Arkwright Scholarship Scheme

The Trust continues to be involved with the Scheme, sponsoring a school pupil who has shown an interest in agricultural engineering as a possible future career. The recipient this year is **Robert Gray**. We will be working with Robert to provide opportunities to experience commercial activities in the agricultural engineering sector, eg through visits to companies and short-term work experience placements – in collaboration with the Agricultural Engineers Association.

Robert Gray was presented with his award by Dr Paul Miller on 3 November at a prestigious ceremony, held at The Institution of Engineering and Technology headquarters in Savoy Place, London on 3 November.

THE INNOVATORS

AGRITECHNICA , the influential trade fair for agricultural machinery held in Hannover during November, has become one of the most prominent platforms for the introduction of innovations, showcased by the AGRITECHNICA Innovation Awards and announced at the show every two years. An independent expert committee appointed by the DLG (German Agricultural Society) determined the winners of the 2017 Innovation Awards from amongst 320 approved applications. This year, there were two Gold and 29 Silver Medals Awarded

KEMPER STALK BUSTER

Developed jointly with John Deere

Kemper's new StalkBuster is designed to break up the crop stubble directly below the self-propelled forage harvester's header, destroying the overwintering habitat of the corn borer pest and reducing the risk of fusarium in the soil. An additional mulching operation is therefore no longer necessary.

The StalkBuster is integrated into the base frame of Kemper's rotary crop header. A special flail crushes every row of stubble before the wheels of the forager and transport vehicles can flatten it. As a result, the stalks are not only cut down but also smashed into small pieces.

A special swinging gearbox allows optimum ground adjustment for each individual row, while a pneumatic pressure system provides additional close tracking of ground contours. This ensures that every stalk is fully chopped down to ground level. The flail has been manufactured from highly wear-resistant material to guarantee a long service life.

The StalkBuster's low cutting action and thorough destruction of the stalks eliminates the corn borer larvae's habitat in the stems and thus reduces the risk of fusarium developing. Furthermore there are no obstacles presented by bulky harvest residues to subsequent tillage operations.

Power consumption of the StalkBuster is surprisingly low. With its direct drive and optimum ground adjustment of the individual units, no more than 4hp is needed per row.

In areas particularly affected by the corn borer, the StalkBuster reduces the need for chemical applications, which also eases the following tillage operation. The total economic advantage of using the system is estimated at around €84/ha, compared to the best existing solution (ie mulching).

CEMOS AUTO THRESHING

the autonomous threshing system for CLAAS straw-walker and hybrid combine harvesters

CEMOS AUTO THRESHING is the first system that sets the tangential threshing system on straw walker and hybrid machines automatically. As such, it makes a significant contribution to optimizing the quality of work and performance

Currently operators have to find out by themselves which settings strike the best balance between the optimum drum speed, the optimum concave gap, the suitable aggressiveness of threshing and the

Turning original ideas into practical use

quality of the grain. Some operators find this complexity too difficult to come to terms with, and find setting up the combine a chore. Consequently, very often a combine is not set up perfectly to suit the current harvest conditions.

Depending on the strategy entered into the system by the operator, it sets the drum speed and the concave gap for optimum results in the current harvest conditions. The USP of the entire system is the fact that all controllers communicate with each other. For example, the throughput controller operates via a special communication module to control the throughput relative to the threshing controller, as well as the separation and cleaning controllers.

CEMOS AUTO THRESHING is networked with all the other assistance systems of the combine harvester, especially with CRUISE PILOT, the automatic ground-speed control system. Interaction of the assistance systems is monitored and controlled by means of a central module. Taking as its starting point the basic setting for the crop in question, AUTO THRESHING is therefore always able to find the optimal set-up for the threshing unit which allows it to thresh as gently as possible and as aggressively as necessary. It does this in coordination with the residual grain separation, the cleaning and the ground speed. This arrangement has the added benefit that the work of these downstream automated systems is made easier.

A selection from some of the **2017 AGRITECHNICA INNOVATION AWARDS Silver Medals**

FENDT MARS SYSTEM

The Fendt MARS System (Mobile Agricultural Robotic Swarms) is the first marketable application of swarm technology in agricultural engineering, and thus presents a completely new solution. The system relies on a number of small, auto-steered and electric units that are deployed for maize drilling.

The autonomous units are filled with seed by an operator, who also monitors their operation and who hauls them to the field on a trailer. Operating at very low noise levels and without lights at night, these units are suitable for drilling fields near villages and homes 24 hours a day. Manufactured to a cost-saving concept and weighing as little as 40kg each, the swarm units coordinate their work in the field, reduce compaction and minimise the hazard that big machines pose to humans and the environment. The robots log all job data into the "Cloud", and communicate with each other and the operator.

FENDT e100 VARIO ELECTRIC COMPACT TRACTOR

This battery-powered tractor is a world first and was developed to serve in a wide range of applications. Using the powertrain of a 50kW Vario model, it replaces the combustion engine, the exhaust, air and fuel systems and the radiator by a battery block, a compact electric motor and the necessary electric control system.

The 100kWh, high-voltage battery charges quickly and stores enough power to work for four hours at an average workload. An innovative thermal management system that comprises a heat pump ensures the cab temperature is controlled efficiently. The battery pack can also serve as intermediate storage for farm-generated power.

The modification does not affect the tractor's suitability for taking on any type of implements. The exhaust-free and very quiet machine is ideal for use in buildings, but also for transport work in cities.

POTTINGER CAMERA SUPPORTED SEEDBED PREPARATION

Jointly developed with New Holland Agriculture, Italy and Josephinum Research, Austria

When operators want their power harrow cultivator drill to produce a consistently fine and consolidated top tilth on sites with varying soils, they have to set up the tractor's ground speed and the power harrow speed manually, and then will still need to intervene manually.

This technology now introduced by Pöttinger uses cameras that take real-time footage of the surface and its degree of "cloddiness". The operator enters a target value and the actual cloddiness is measured behind the power harrow. This reading is transmitted to the job processor, which sends it the implement's ECU. The system will then automatically control the tractor ground speed and the power harrow PTO speed ("closed-loop control") to produce the selected level of top tilth. The system creates a uniform seedbed even in varying soils. At the same time, it reduces operator fatigue significantly.

MEMBERSHIP ENQUIRIES
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GENERAL DATA PROTECTION REGULATIONS: Update

Alastair Taylor, CEO IAgrE

Those members working in business will no doubt be very aware of the General Data Protection Regulations (GDPR) and that these regulations will be fully enforced from May 2018. There is a chance that you, like me, will read umpteen communications a day which often play on our fears to promote some kind of service to support our GDPR compliance. GDPR compliance is very important given that noncompliance may lead to a fine of up to 4 per cent of a company's turn over.

The other challenge is that if you ask ten experts, you are likely to get ten different answers. Is it little wonder that many people are confused?

At IAgrE, we start from a good place. Data protection has always been important to us and in many respects, GDPR will build on our current good practices. It is worthwhile reflecting upon the requirements of the original data protection act of 1998 which form the basis of a revised IAgrE Privacy Policy which is due to be approved by the IAgrE Trustees in the near future.

The Data Protection Act 1998 describes how organisations, including IAgrE, must collect, handle and store personal information. These rules apply regardless of whether data is stored electronically, on paper or on other materials. To comply with the law, personal information must be collected and used fairly, stored safely and not disclosed unlawfully. The Data Protection Act is underpinned by eight principals.

These say that personal data must …

- Be processed fairly and lawfully
- Be obtained only for specific, lawful purposes
- Be adequate, relevant and not excessive
- Be accurate and kept up to date
- Not to be held for any longer than necessary
- Processed in accordance with the rights of the data subjects
- Be protected in appropriate ways
- Not to be transferred outside the European Economic Area (EEA), unless that country or territory also ensures an adequate level of protection.

At IAgrE we do our best to comply with all of these requirements although in the future this will not be good enough. Under GDPR requirements we have an action plan in place which considers the following aspects:

- Raising awareness for key IAgrE staff and relevant members.
- Reviewing the personal data we hold and whether it is still needed.
- Communicating our privacy arrangements to members and other relevant stakeholders.
- Ensuring members are aware of their individual rights as regards the information we hold.
- Dealing with requests for information.
- Ensuring we understand the legal basis for processing members data.
- Ensuring we obtain relevant consents.
- Having arrangements in place for dealing with data on children.
- Having arrangements in place to deal with any breach of personal data.
- Making sure we have a named data protection officer.
- International data requirements.

As you will anticipate, there is a lot of work going on behind the scenes to ensure we are fully compliant as regards our GDPR obligations. Over the coming months you need to keep a look out for various communications and in due course we will share the privacy policy, how we would deal with a data breach together with what we do when it comes to passwords and on-line security. To be fair, none of this is especially complex but we do need to make sure you have the information you need to feel secure that IAgrE is protecting your personal information.

Terms and Conditions

An interesting aspect of data protection is the need for us to make sure you agree to the various terms and conditions which go along with membership of an institution and at the point of joining IAgrE, you will have signed up to these. We have recently revisited the language we use in IAgrE terms and conditions and whenever anyone applies, goes for an upgrade of membership or applies for professional registration, we will ask them to agree to these.

Assumptions should never be made, but as a member of various professional bodies, I actually join with the anticipation that there will be ongoing communications around the benefits of membership and to receive journals and membership related information. We are seeking to confirm that entering into membership with IAgrE constitutes an "opt-in" to receive various communications. However we cannot assume this and it is likely that we will be asking members to complete the declaration below:

Data Usage Permissions, Terms and Conditions

In order that IAgrE maintains compliance against the General Data Protection Regulations (GDPR), it is necessary that we seek Data Usage Permission as defined below:

I confirm my understanding that the Institution of Agricultural Engineers (IAgrE) holds my information on a central database for the purpose of administering my membership and/or professional registration and for the purpose of promoting, delivering and improving my experience of the IAgrE and its products and services or such other purposes as are described in the IAgrE Privacy Statement and Disclaimer.

I give my permission for IAgrE to access my information for management, administration and registration purposes

Key Points

- *Your information is stored securely*
- *You have a right to see the information IAgrE keeps*
- *Your information is only used for the purposes described above*
- *Your information is **never** shared with third parties for marketing purposes*

Clearly this response to GDPR and any IAgrE responses around compliance continues to be quite a fast moving agenda and we are expecting further guidance from the Engineering Council and others to make sure we are following the right procedures.

I feel sure we are but from a member's perspective, I urge you to keep an eye out for communications around this important matter and where needed, please respond in a positive way so that we can continue to support your IAgrE Membership.

Why wouldn't you!

OBITUARY

John Kilgour CEng FIAgrE
It is with sadness that we inform you that long-standing Fellow of the Institution, John Kilgour passed away on Friday 27 October. John, a member of IAgrE since 1957, was well known to many members as he lectured at Silsoe College for over 25 years. On behalf of IAgrE members, we extend our condolences to John's family.
A private cremation followed by a Thanksgiving Service was held at St James' Parish Church, Silsoe on Thursday 23 November at 12 noon.

Appreciation by Gordon Spoor, Dick Godwin and Tim Chamen
John Kilgour was an active member of the Institution for some 60 years, particularly within the South East Midlands Branch. He joined the Institution whilst an agricultural student at Reading University in 1959 and continued attending Branch meetings until some two years before his death in October 2017, despite in the latter years having a very serious infirmity.
John's professional engineering training started at Durham University, Newcastle, where he followed the MSc Agric Eng programme and was inspired particularly by the late Dr Alan Reece. After graduation, he joined Ford Motor Company at Dagenham following their Graduate Apprenticeship programme. This was the time, 1963, when the National College of Agricultural Engineering was being established at Silsoe and John took up the post of Lecturer in Engineering Drawing and Design. John continued working at the College until his retirement in 1999.
John's forte was very much in the practical 'design, build, test and modify' approach to machinery and equipment development and he was very successful in this throughout his career. His practical designs were always based on sound engineering principles and these together with a head brimming with ideas, were the secrets of his success. Being a very approachable person with these abilities, he was often the first port of call of Silsoe students and staff, whatever their particular programme, for ideas and assistance with the design elements of their projects. In this role he proved a great inspiration to the many students who passed through Silsoe's doors, providing them with enthusiasm and the basics in design on which to build their future careers.
In the research and development field he had little interest in producing academic research papers, his objective was to develop sound machine solutions to outstanding problems. A particular interest of his was to improve the lot of small farmers in developing countries, where the availability of small scale affordable equipment for them was often non-existent. His ideas here resulted in the development of the 'Snail' and 'Spider', both winching systems for cultivation work, the tools on the Spider being mounted on a wheeled tool frame. His prototypes performed well in field tests.
In addition to his teaching duties and R & D roles, John was at the centre of much of the machinery development work undertaken by the College. This ranged widely from the development of an apple harvester for use in the UK, a tea harvester for estates in Uganda, a 4-wheel drive date palm pruning and harvesting machine for Saudi Arabia to the provision of research facilities for overseas Universities and Research establishments. The latter included a soil bin testing facility for a Research Institute in Iran and a load car for tractor testing in India.
Outside Silsoe College, John was involved in many activities both in Silsoe village and beyond, whether it be constructing a bus shelter, a beacon for the Millenium, repairs to buildings and playing an important role in 'Remap', which involved the development of tailor made equipment to assist people with disabilities. John had a special interest in vintage steam engines and tractors, chairing the local Vintage Tractor Club, organising rallies and participating with his own steam engines and restored tractors. Not many people build their own steam engines these days, but John was the exception, building two. These were paraded on numerous occasions and although one was rather excessive in its water consumption and both managed to set alight to a few hedges whilst travelling, they were very successful in giving much pleasure and enjoyment at rallies to both the visitors and John himself.
Adventure was very much in John's bones and he entered into everything with great enthusiasm, no half measures. One unforgettable experience of a colleague who accepted a ride home with him from Cambridge, left him thinking that John could only have been a frustrated Formula 1 driver. His enthusiastic use of the accelerator and brake, meant that by the time Silsoe was reached our colleague was only capable of driving his own car home after a lengthy recovery period.
John will be remembered as a very active, competent and successful agricultural engineer, whose major legacy in this area will be the enthusiasm, drive and fundamental design knowledge he passed on to the many students who were associated with him. All who knew John express their sincere condolences to Pat and family at their great loss

STEM SUPPORT

The Institution of Agricultural Engineering is working with STEM Learning to raise the profile of our sector with young people and teachers in schools and colleges across the UK.
The National STEM Learning Network includes STEM Ambassadors – volunteers from a wide range of science, technology, engineering and mathematics (STEM) related jobs. They offer their time and enthusiasm to help bring STEM subjects to life and demonstrate their value in life and careers. STEM Ambassadors are an important and exciting free-of-charge resource for teachers and others engaging with young people in and outside of the classroom.
Why not inspire the next generation by becoming a STEM Ambassador and enthusing young people about exciting agritech or agrifood careers?
STEM Learning will provide all the training you need and connect you with schools and colleges who are looking for STEM Ambassadors to support events such as careers days and STEM challenges. To find out about the difference you can make to young people go to www.stem.org.uk/stem-ambassadors
You could also support schools and colleges to inspire the future workforce by hosting a STEM Insight placement – a professionally life-changing placement in a company or university faculty to equip teachers to bring careers to life in the classroom.
Find out more online at www.stem.org.uk/stem-insight

IP WORKSHOP
Intellectual Property Workshop
Marks & Clerk LLP, Longacre, London
1 November 2017
A select half dozen of us attended this workshop, *writes Sarah McLeod*, generously hosted by IAgrE Commercial Members Marks & Clerk LLP. Partner Robert Cartmael took us through the patent process and explained the benefits and pitfalls. He also described the process for registering a design and for registering a Trademark. I had certainly not realised what a complex and expensive procedure it was and to be guided by experts was very useful.
Robert a patent expert in Agricultural Engineering patents and his colleague Lara Sibley, whose expertise lies in electronics were then happy to answer questions and discuss options with the attendees.
It was a most useful afternoon and we hope to create an IAgrE webpage, where members can garner information on this technical process. Marks & Clerk would certainly be a good place to start if you are contemplating this route.

COUNCIL MEETING
19 October 2017
Lincoln University, Riseholme College

IAgrE's October council meeting was held at Lincoln University's Riseholme Campus and included a panel discussion with younger members of IAgrE about how the Institution can attract and engage better with young professionals.
In the afternoon Professor Simon Pearson Director of LIAT gave an overview of LIAT and the research work being undertaken. Professor Pearson said that the Agri-Food industry makes up 10% of agriculture in England and that Lincolnshire is the natural home for agri-food.
Dr Dionysis Bochtis, Professor in Agri-Robotics talked about agri-robotics, current advances and what the future holds. He gave an interesting presentation on the development of robots over the past few years and how these now have widespread use across agriculture. He posed the question "What Next?" suggesting that agriculture is at a new watershed in terms of how the future use of robots will develop.
Council members also saw the university's advanced, mobile robot – Thorvald - that is supporting agri-tech experiments at the University's agricultural field station. The robot, developed with scientists from the Norwegian University of Life Sciences, has been built to perform a wide variety of agricultural tasks, including deployment as a multi-purpose light weight robotic carrying platform, as a sensor platform to monitor crops and soils and, potentially, as a platform to manage crops and for precision weed control.
Professor Simon Pearson, Director of LIAT, said: "In much of our agri-tech research, the fields we use are our laboratory, which brings its own technical and logistical challenges with certain experiments.
"The Thorvald robot is a welcome addition to LIAT– in effect our own roaming, robotic lab assistant – capable of supporting a wide variety of research activities. The robot will support research on autonomous outdoor navigation and mapping, soil quality assessment, crop yield prediction, in-field logistics and transportation."

SOUTH EAST MIDLANDS BRANCH

Tea, Glorious Tea! Talk on tea processing by Dave Sharp on 6 November 2017
Report by Tim Chamen

Dave Sharp, who had spent 38 years with Unilever, shared his wealth of experience with tea processing, from field to bag at our November South East Midlands Branch meeting. It was illuminating, starting with the basics of the two principal varieties of Camelia, Assamica and Sinensis which make up the bulk of all the tea produced, the former being more suited to the tropics and producing more "catechins" (sweeter component), the other to more temperate regions but lower in catechins.
The surprising thing that I learned was the fact that all true teas produced, from "white" to "black", come from just these two varieties – the differences are all down to the processing and Dave being a Process Engineer was just the person to know all the key components that make for the very varying products that emerge from the different processes involved. Also key to the development of new processes (of which Dave was named on a number of patents) is that they can only be properly developed "on site" and not remotely such as at his site office at Colworth in Bedfordshire. Hence, at least a full year of the 14 years he spent working with tea was spent in Kenya.
Tea is a perennial but needs a "refresh" about every five years in the form of significant pruning in order that it continues (sometimes for 100 years or more) to produce the fresh new shoots and leaves that form the basis of all teas. Traditionally teas have been plucked by hand, with good hand pluckers achieving around 35 kg/day, while hand held "hedge cutters" can achieve around 150 kg/day with only a small reduction in quality. Full mechanisation can achieve an output of tonnes/day and is used extensively in Japan for example.
The finest teas come from the very top of the bush, with just the new shoot comprising the basis of "white" tea, while the shoot and a few top leaves make up the next highest in quality, reducing from there as more older leaves and stem are included. Segregation is continued from this point with differences in the process, with the finest being steamed to prevent natural oxidation, while the remainder are "withered" for up to six hours, losing around 8% moisture to initiate the production of Theaflavin and Thearubigin. Black tea then goes through a number of physical processes such as maceration through a Rotorvane and size reduction through a Stanley Tea Processor, but still at a moisture content of around 70%. It is then subjected to further maceration through contrasting speed rollers to produce "Crush Tear Curl", giving the leaf its distinctive twisted look, or greater crushing to produce the fine particles that make up the tea in tea bags. The tea then goes through further oxidation in the form of "Dhool" before moving on to fluid bed dryers, which require little in the way of manual input. The first section of these run at around 140 deg C. the next at 105-110 deg C and the third at around 90 deg C to bring the tea to around 85 deg C and 4% moisture content. Crucial at these stages is to prevent burning which can ruin the tea completely. The source of heat in Kenya is Eucalyptus, with one acre of woodland being able to service around 7 acres of tea plantation. Finally the process involves electrostatic rollers that pull out any pieces of stem that remain within the dried product. These I think Dave said were used to make iced tea.
Green tea, which comprises the shoot and some top leaves, is steamed following withering in the same way as white tea to prevent oxidation, but then goes through rolling, shaping and drying rather than maceration, while Oolong tea misses the steam process and only has a brief oxidation period. The different teas are made in different factories rather than running through the same lines due to the risk of contamination. Breeding is more about improving yields than achieving different teas, which are based on the two key species.
Innovations in tea processes have included teas that can be brewed with cold water (for the US market), "Linea" tea high in catechins for those who want to slim and quality blends such as Lipton Yellow Label and Lyons Gold Blend, both from the Unilever range.
Dave concluded with some interesting statistics. The country with the greatest number of tea drinkers per capita is Turkey, with Ireland, UK and Russia coming 2nd, 3rd and 4th respectively, while China, which we tend to think of as a big consumer, comes way down in the list at 19th! Another entertaining statistic is that the total weight of Lipton tea consumed per year is equivalent to the weight of 21 million elephants!
Dave's final message was "Make tea, not War", an aspiration which is easy to associate with the product and with which I concur wholeheartedly!

SOUTHERN BRANCH

Visit of members to Hillier's Nursery, near Liss, Hampshire.
Report by Brian Sanders
Photos by David Parnell

Seventeen members and guests visited Hillier's Andlers Ash tree nursery on Wednesday, 6th September. The nursery propagates and grows trees for their retail outlets and direct sales to landscape designers and contractors. There are three quarters of a million trees on this and an adjacent site – the largest of its kind in the UK. Our host was James Hillier, sales manger of the trees division. His great, great grandfather started Hillier's in Winchester in 1860 with a small shop and a few acres. James showed us the process from budding to the preparation of trees for sale up to 25 years old. It was from this site that Hillier's provided the trees for the Olympic Park in East London for the 2012 Olympics.
Of particular interest was a plot of elm trees which are resistant to Dutch elm disease and are now available for sale. These have come from of a breeding program in the University of Wisconsin and are imported through a nursery in Germany. The growth and disease status of these trees is carefully monitored and, to enable traceability, each tree is fitted with a microchip!
A growth area is the supply of mature trees, hedges, screening and archways to landscape designers for "instant" gardens and parkland.
We were also shown the machinery used for lifting and replanting trees every few years to form a root ball. The picture shows the group in front of the machine used for lifting the largest of the trees.

RIGHT TO BE INFORMED

As a valued IAgrE member, we want to make sure that you only ever receive emails and communications that are relevant to you. IAgrE need to move from an opt-out system to an opt-in system.

This requires us to confirm with each of you that you are still happy to receive IAgrE communications. The new regulations will be enforced from May 2018, you will need to actively 'opt in' to receive the information you want and are interested in.
The GDPR creates some new rights for individual and strengthens some of the rights that currently exist under the Data Protection Act (DPA).

GDPR provides the following rights for individuals:

- The right to be informed
- The right of access
- The right to rectification
- The right to erasure
- The right to restrict processing
- The right to data portability
- The right to object
- Rights in relation to automated decision making and profiling

We will be updating you regularly on different issues around GDPR and will notify you as soon as our 'opt in' system is ready to go. Please contact the office with any queries.
Email Sabrina ***projects@iagre.org*** or telephone ***01234 750876***

EAST MIDLANDS BRANCH

Visit to Witham Oil and Paint, Lincoln, 10 October 2017
Report by Charles Szabo

The Witham Group is a family run business whose headquarters are on the edge of Lincoln. They have been based in the city since 1921 and also have depots in Lowestoft and Soham.
We were welcomed by the group managing director, Nigel Bottom and Simon who gave us a very informative presentation about the groups history, their range of products and a tour of the works. Qualube is the brand name of their lubricants, oils and greases. Their range of lubricants cover nearly everything from cars, tractors and agricultural machines, heavy goods vehicles, stationery equipment, motorcycles to boats. The age of the machine does not matter they will find or blend the correct lubricant for your machine. Witham blends over 5 million litres of oil each year which are OEM approved by the majority of manufacturers. Witham motorsport also produce a range of oils under the MOTUL automotive banner for all types of engines from saloon cars, moto GP, 24 hour endurance racing both modern and classic to powerboat racing.
The company also blends in excess of 400,000 litres of paint for all manner of applications under the WOCO brand name.
On our trip around the works we were shown extremely large oil tanks containing the four base oils which are required for the blends and a large number of barrels containing the additives that are required to make up the formulations. The base oils are warmed by solar power and piped into mixing tanks in the works where the additives are added and pumped through a sonic blender. All batches are tested in the laboratories for the correct characteristics, viscosity and shear tolerances etc before they are containerised and ready for sale. They also produce oils for a number of own label companies.
Witham Oil holds the Royal Warrant to Her Majesty the Queen for products and services they supply to the Royal Estate in Sandringham.
This year they received the IAgrE award at LAMMA for one of their environmentally friendly products called 'Prolan'. This product is made from the lanolin that is derived from sheep's wool. It has excellent lubricating and protective qualities.

WREKIN BRANCH

Meeting report
Vicon FastBale by Tim Baker, Vicon
Report by Bill Basford

The use of round balers over many years has always been challenged by the need to stop to release the bale. This may have become an accepted face of baling but which now has been eliminated by the introduction of the Vicon FastBale. As the unit includes an on board wrapper a whole new era of baling has now evolved.
Wrekin members were royally entertained and informed about the Vicon FastBale by Tim Baker of Vicon, a long time crusader for efficient baling. Drawing on his long career in this sector he first outlined the many company transitions which took

WEST MIDLANDS BRANCH

Farm Walk at the invitation of Richard Postlethwaite to Grounds Farm, Wolston, Coventry 12 September 2017
Report by William Waddilove

The West Midlands branch were invited for a farm walk by Richard Postlethwaite who some years ago had wished to make the approach to his farm more attractive so he planted some conifers along the road fence.
Then he thought it would be nice to have a tree lined drive, then a pond for water fowl, and so the project developed. He added more trees beside the drive so they would give a park land effect. For ease of management these were planted in rows but with the rows being parallel to the curving drive they gave the impression of random planting.
Then he met someone from the farm woodland scheme. As the hill behind had a clay layer with a spring line that was difficult to work it was easy to see it being a good place to straighten out the field hedges and put in a coppice.
Richard is now keen to show off his work. With the exception of the one Farm Woodland grant, it has been completely designed and funded by his own efforts.
He led us on a walk around the grounds and when we reached the lake he left us to ponder as to where all the water fowl had gone? The pond is filled from a field drain so should have been free from pollution but Richard suspected some sort of contamination had persuaded the birds to find somewhere else.
We ended the walk with refreshment and an opportunity to contribute to Myton Hospice a local charity that Richard likes to support.

place around the years of the world's financial crisis from 2007 onwards. To try and follow what happened to Vicon as it was initially brought within Kverneland group and then through the years moved to within Kubota challenged most members. However members sympathised with Tim's position within such times when trying to introduce a new concept baler. The normal passage of development was not possible during such times and during 2012 Tim with one other was allowed the opportunity to build a proof of concept machine. Then member's envied how Tim had been able to do the build. This was that the two developers were allowed to hire a local workshop, develop the CAD ideas and then build up the conceptual baler as a team of two, rather than any committee. Excellent pictures as well as good engineering speak showed the simplicity of the task of the baler build resulting in a first bale within 3 months on 1 August 2012, the first non-stop bale 3 weeks later and a resultant demo to the company chiefs on 1 October 2012. The concept of two bale chambers with a flipping gate directing forage flow was described with the second chamber ejection control to the rear wrapper fully outlined. With so many processes involved within the machine Tim described the development of the monitoring equipment. This has resulted in an on screen display of all 3 main systems – 2 chambers and the wrapper, (as well as others) showing all limits and forage flow through the machine. Thus in preparation for the 2013 season a factory produced prototype was made and tested leading to small production runs leading to the FastBale launch in 2015.
Field experience has shown that 15-18 seconds are saved per bale by not having to stop suggesting 1.5 hours more output potential per day. That the baler remains on a single axle thus reducing the length even with the wrapper offers a fully manoeuvrable machine complementing the market thoroughly.

WESTERN BRANCH

WESTERN BRANCH
Enjoying the fruits of Somerset
Visit to Thatchers Cider and Helicopter Museum
27 September 2017
Report by Mike Whiting

After a successful visit to Wadworth's brewery in early 2016, a follow up visit to another local thirst quenching facility was kindly agreed by the Thatcher's Cider business at Sandford in Somerset.
As an introduction our guide, Phil Smith gave us some headline statistics on the family's commitment to producing cider.

- Cider was first produced in 1904, with the primary purpose to serve farmhands. Much before any health and safety legislation!
- The 1930's saw Stan Thatcher start to develop commercial sales.
- In the 1960's John Thatcher started investing in plant and equipment to support increases in production.
- The fourth generation, Martin Thatcher has continued the expansion to place Thatcher's the 2nd biggest poured cider in the UK. They now produce as much of the "liquid gold" in one day as they did in 12 months, 17 years ago. An eye watering £15 million CAPEX project is up and running to continue development of the sites storage and distribution division. The plant's current output of filling 100,000 bottles isn't breaking into a sweat, and that's without considering any move to a 24 hour continuous operation.
- Short of running a pipeline from Sandford to Michael Eavis's Worthy Farm at Glastonbury, ¾ million pints were shipped in via bulk articulated tankers for the revellers at this year's festival. Unsurprisingly they returned empty.

The Western branch received the full tour, observing the raw material freshly harvested apples been delivered in bulk to the 4 intake bays. Approximately 30,000 tonnes will be tipped through these reception areas, with a ratio of 1/3 produced from the Thatcher's own orchards covering 560 acres, and the remaining 2/3 from local contracted growers. Despite the exponential success of the business, John Thatcher keeps his roots as a farmer, and delivers on his promises, making sure suppliers are paid 5 days after delivery. After QC testing the apples are conveyed under a stream of recycled water and into the processing section.
The configuration of stainless steel pipework, vessels and associated steam raising plant is immense. A nest of 48 tanks with 24 of them acting as fermentation vessels each with a capacity of 68,000 litres ensures the annual harvest can be processed quickly and left to react with the yeast. Although the bygone era of cider making is still evident with the 160 year old English oak vats which are still in use, giving the Somerset nectar its distinctive character.
In addition to a fine tuned and efficient manufacturing and packaging process, the Thatcher's family also strives to maintain and improve their cropping regime. This has resulted in work with research organisations to develop deeper roots, rather than them spreading transversely which allows more trees to be planted in a defined area.
As part of the visit, the group somewhat reluctantly agreed to partake in some sampling of the finished article. Phil took us through different brands, with the well-known "Gold" and quickly rising in popularity, Haze. Katy Cider is the only one produced directly from the Katy Apple, the rest been a combination of blends.
An exceptionally enjoyable visit, concluded with a lunchtime meal from the menu at the Thatcher's pub, The Railway situated conveniently next door to the main site.
To give us some fresh air and exercise, our minibus chauffeur, Richard Robinson, kindly took us on a visit to the Helicopter Museum at Weston Super Mare. This is the World's largest dedicated exhibition of its kind to the non-fixed wing aircraft. All craft could be seen from warfare to record breakers and those used for flying Royalty. Overall a great blend of engineering, refreshment and education and much enjoyed by all.

MEMBERSHIP CHANGES

ADMISSIONS

Affiliates
Quigley F
Griffin G

STUDENT
Cranfield University
Ansell AJT
Arpono S
Azanon C
Berg I
Billam CT
Boodhai G
Chea C
Diez Gutierrez L
Elemo T
Gari Sanchez FJ
Greuillet C
Sanchez Del Rio I
Kirkham N
Kowalewski EJM
Milazw F
Miclo T
Ateb N
Oh S
Oleo Domiguez M
Rodriguez Sanchez
Singam VP
Tierno Rodreguez A
Torrelles Rafales R
Vasudevon A
Warrington A
Zhang H
Pulickal CT

Easton & Otley
Elsden Z

Hadlow College
Tollman G

Lancaster University
Blanchy G

Riseholme College
Ben Bailey
Ben Baldwin
Scott Chatterton
Olly Clark
Henry Fisher
Jack Hobbs
Dante Jarvis
Joel Jollands
Michael Kirk
Terry Kirk
Jack Wallhead
Jamie Warrilow

Royal Agricultural University
Anthony R

University of York
Bird M A

DEATHS

We have recently learned of the death of the following members and we send our condolences to their family and friends:
Barton PS IEng FIAgrE, Australia a member since 1957
Kilgour J CEng FIAgrE (see membership pages)

TRANSFERS

Fellow
Higginson GP (Wrekin)
Goodchild MS (South East Midlands)

Associate Member
Balidakis A (Greece)
Phillips HJB (Wrekin)

Technician
Moley C (Ireland)

ENGINEERING COUNCIL REGISTRATIONS

CEng
Watts CW

EngTech
Correction from Autumn Landwards – the following were incorrectly listed as being awarded IEng but have actually received EngTech status
Scott R (Northern Ireland)
Moulding SW (SE Midlands)

LONG SERVICE CERTIFICATES (1 October – 31 December 2017)

IAgrE extends warm congratulations to the following members on reaching significant milestones

Name		*Date of Anniversary*
50 Years		
Roger Anthony Ballard	MIAgrE	12-Oct-17
Peter Brook Percival Copeland	MIAgrE	12-Oct-17
35 Years		
Robert Colin Fletcher	MIAgrE	04-Nov-17
Mark Colclough	MIAgrE	04-Nov-17
James Howard Ward	MIAgrE	13-Nov-17
Glen Edward Mark Reeve	MIAgrE	15-Nov-17
Timothy Edwin George Lee	MIAgrE	15-Nov-17
35 Years		
Katherine Iris Stearne	MIAgrE	19-Nov-17
Jeremy Duncan Charles Green	AMIAgrE	19-Nov-17
Michael Wingrove Hallett	AMIAgrE	19-Nov-17
David Frederick Topping	MIAgrE	25-Nov-17
Peter John Kettlewell	FIAgrE	02-Dec-17
25 Years		
Ian Gardner	MIAgrE	09-Nov-17
Stephen George Williams	MIAgrE	19-Nov-17
Michael Paul Duggan	AIAgrE	17-Dec-17

ACADEMIC AND COMMERCIAL MEMBERS

ACADEMIC MEMBERS

Bishop Burton College
York Road
Bishop Burton
Beverley HU17 8QG

Brooksby Melton College
Asfordby Road
Melton Mowbray
Leics LE13 0HJ

Coleg sir Gar
Gelli Aur Campus
Llandeilo
Carmarthenshire SA32 8NJ

Cranfield University
Cranfield
Bedfordshire MK43 0AL

Duchy College
Stoke Climsland
Callington
Cornwall
PL17 8PB

Easton & Otley College
Easton
Norwich
Norfolk, NR9 5DX

Greenmount College
CAFRE
22 Greenmount Road
Antrim,
Northern Ireland BT41 4PU

Harper Adams University
Newport
Shropshire TF10 8NB

Institute of Technology
Tralee
Clash,
Tralee
Co Kerry, Ireland

Lincoln Institute of Agri-Food Technology,
Lincoln University
Lincoln LN6 7TS

Myerscough College,
Bilsbarrow
Preston
Lancashire PR3 0RY

Newcastle University
King's Gate
Newcastle Upon Tyne NE1 7RU

Pallaskenry Agricultural College
Co Limerick
Ireland

Plumpton College
Ditchling Road
Lewes
East Sussex, BN7 3AE

Reaseheath College
Reaseheath,
Nantwich
Cheshire, CW5 6DF

Royal Agricultural University
Cirencester
Gloucester, GL7 6JS

Sparsholt College
Sparsholt,
Winchester SO21 2NF

SRUC – Auchincruive
Auchincruive Estate
Ayr, KA6 5HW

Wiltshire College Lackham
Lacock
Chippenham
Wiltshire SN15 2NY

COMMERCIAL MEMBERS

Agricultural Engineers Association (AEA)
Samuelson House,
62 Forder Way,
Hampton,
Peterborough, PE7 8JB

AGCO Ltd
Stoneleigh, Abbey Park,
Kenilworth,
Warwickshire, CV8 2TQ

Alvan Blanch Development Co,
Chelworth,
Malmesbury,
Wiltshire SN16 9SG

Autoguide Equipment Ltd
Stockley Road , Heddington
Calne,
Wiltshire, SN11 0PS

BAGMA
Middleton House,
2 Main Road, Middleton Cheney,
Banbury,
Oxon, OX17 2TN

Bomford Turner Limited
Salford Priors
Evesham,
Worcestershire WR11 5SW

City & Guilds
1 Giltspur Street
London EC1A 9DD

City Farm Systems Ltd
25 Hepplewhite Close
High Wycombe
Bucks HP13 6BZ

David Ritchie (Implements) Ltd
Carseview Road, Suttieside,
Forfar, Angus, DD8 3EE

Douglas Bomford Trust
The Bullock Building
University Way, Cranfield
Bedford, MK43 0GH

DSL Systems
Adbolton Hall
Adbolton Lane
West Bridgford
Nottingham NG2 5AS

FEC Services
Stoneleigh Park
Kenilworth
Warwickshire CV8 2LS

Fullwood
Grange Road
Ellesmere
Cheshire SY12 9DF

HSS Hire
Head Office
25 Willow Lane,
Mitcham, London
CR4 4TS

John Deere Ltd
Harby Road, Langar
Nottinghamshire NG13 9HT

Marks & Clerk LLP
90 Long Acre
LONDON WC2E 9RA

Mastenbroek Limited
83 Swineshead Road
Boston, Lincs, PE21 7JG

Shelbourne Reynolds
Shepherds Grove Ind. Est.
Stanton, Bury St Edmunds
Suffolk, IP31 2AR

SSAB Swedish Steel Ltd
Narrowboat Way
Hurst Business Park
Brierley Hill
West Midlands DY5 1UF

TeeJet London Ltd
Headley House,
Headley Road, Hindhead,
Surrey, GU26 6UK

FORTHCOMING EVENTS

IAgrE EVENTS

Tuesday 20 March 2018
2018 IAgrE Young Engineers Competition
Perkins Engines, Peterborough

Thursday 8 February 2018
IAgrE Council Meeting
Moulton College, Northamptonshire

Thursday 24 May 2018
IAgrE Annual General Meeting and Awards
Wrest Park, Silsoe

Thursday 18 October 2018
IAgrE Council Meeting
Venue tbc

All enquiries regarding IAgrE Events. Contact Sarah McLeod. Tel: 01234 750876
secretary@iagre.org

BRANCH MEETINGS 2017-2018

EAST MIDLANDS
CONTACT: Richard Trevarthen
01509 215109
richard.trevarthen@gmail.com

Tuesday 12 December 2017 7.30pm
Visit to N J Froment & Co Ltd
Cliffe Road, Easton on the Hill, Stamford, PE9 3NP.

Tuesday 9 January 2018 7.30pm
Engineering Excellence: 50 years of Land Rover
Speaker: John Holland, Head of the Jaguar Land Rover Way.
Quorn Lodge Hotel, 46 Asfordby Road, Melton Mowbray, LE13 0HR

Tuesday 13 February 2018 7.30pm
Visit to Howard Marshall Engineering
Barracks Farm, Forest Lane, Papplewick Nottingham, NG15 8FG

Tuesday 13 March 2018 7.30pm
Visit to Chandlers Farm Equipment
Main Road, Belton, Grantham, Lincs, NG3 2LX.

Tuesday 20 March 2018 7.30pm
AGM and Annual Dinner (Partners are invited)
Quorn Lodge Hotel, 46 Asfordby Road, Melton Mowbray, LE13 0HR

NORTHERN IRELAND
CONTACT: Ian Duff
028 8673 6977 duffi@iagre.biz

January 2018 (tbc)
Plant Hire: How and Why it works
Speaker - Keith McIvor, Director, KDM
CAFRE, Loughry Campus

Tuesday 13 February 2018 7.30pm
Meeting customer requirements for horticulture produce
Speaker: William Gilpin
Gilfresh Facility, 56 Creenagh Rd, Loughgall, Armagh BT61 8PZ

March meeting (tbc)
AGM and CAFRE Landbased engineering courses
CAFRE Greenmount Campus

SOUTH EAST MIDLANDS
CONTACT: John Stafford
01525 402229
john.stafford@silsoe-solutions.co.uk

Monday 11 December 2017 7.30pm
The AGCO Ideal Combine
Speaker: Peter Delaney, AGCO
George Inn, Maulden, Berks

Monday 15 January 2018 7.30pm
3D Printers and Ag Technology
Speaker: Stewart Williams, Cranfield University
Cranfield University (tbc)

Monday 5 February 2018 7.00pm
AGM and Student Presentation
Maulden Church Hall, Church Street, Maulden MK45 2AU

Monday 5 March 2018 7.30pm
Pea Harvester Technology
Speaker: Robert Plant, PMC Harvesters
Maulden Church Hall, Church Street, Maulden MK45 2AU

Monday 9 April 2018 7.30pm
'Electricides': Benefits and commercialisation of electric weed control
Speaker: Dr Mike Diprose, RootWave 'Electricides'
Maulden Church Hall, Church Street, Maulden MK45 2AU

May meeting (tbc)
Visit to PGRO and Sacrewell
Great North Road, Peterborough

WESTERN
Contact: Mike Whiting
07751 345580
mike.whiting@newmac.org.uk

Wednesday 24 January 2018
SKF visit
Visit to SKF aircraft bearing manufacture at Clevedon followed by a visit to Oakham Treasures at Portbury.

Wednesday 14 March 2018 7.30
Western Branch AGM and Meeting
Torqueing Power: Future of Diesel Engines
Royal Agricultural College, Cirencester

Dates and details are correct at time of going to press.

Further information and updates on www.iagre.org

WREKIN
Contact: David Clare
01952 815087
dclare@harper-adams.ac.uk

Tuesday 12 December 2017 7.30pm
Technical Meeting
The Welding Institute
Speaker: Professor Chris Dungey of TWI
Agricultural Engineering Innovation Centre, Harper Adams

Tuesday 23 January 2018 7.30pm
Technical Meeting
Presentation on JCB's Hydradig wheel excavator.
Agricultural Engineering Innovation Centre, Harper Adams

Tuesday 20 February 2018 7.30pm
Technical Meeting
Lubication: Brief introduction for agricultural engineers
Speaker: Gregory Hunt of Librizol
Agricultural Engineering Innovation Centre, Harper Adams

Tuesday 20 March 2018 6.30pm
AGM and Getting the best from agrochemicals
Speaker: James Thomas of Syngenta
Agricultural Engineering Innovation Centre, Harper Adams University

Tuesday 17 April 2018 7.30pm
Technical Meeting
Heico-Lock Tension controlled fasteners
Agricultural Engineering Innovation Centre, Harper Adams University

Tuesday 15 May 2018
Technical meeting (tbc)
Agricultural Engineering Innovation Centre, Harper Adams University

OTHER EVENTS

3 – 5 January 2018
The Oxford Farming Conference
Oxford University

17 - 18 January 2018
LAMMA 2018
East of England Showground, Peterborough

21 – 24 January 2018
BIGGA Turf Management Exhibition
Harrogate Convention Centre

8 – 12 July 2018
AgEng 2018: EurAgEng Conference
Wageningen, Netherlands

Institution of Agricultural Engineers

2018 **YOUNG ENGINEEERS** COMPETITION

Perkins

Open to Sixth Form teams, Landbased Colleges and University Departments
To be held at
Perkins Engines Company Limited, Peterborough, PE1 5FQ
On **Tuesday 20 March 2018**

Further information and Competition Pack
Sarah McLeod 01234 750876
E: secretary@iagre.org W: www.iagre.org

Out of Hours

A new feature looking at the hobbies and past-times of IAgrE members when not engaged in their day-jobs. CHRIS BIDDLE REPORTS

DAVID PULLEN

David Pullen MIAgrE is a committee member of the Inland Waterways Association (IWA) Lincolnshire Branch and a Director and Honorary Engineer with Sleaford Navigation Trust. He was also Waterspace Director with IWA Festivals 2008-2012, and worked closely on managing visiting boats in London for the 2012 Olympic Games.

David Pullen has had a strong bond with water since childhood having grown up next to a 35 acre artificial lake. Walking, fishing, swimming and boating at every opportunity together with water level and flood control responsibilities created a deep empathy with water. For David, open water beautifully animates the weather and the seasons with ever changing moods and images. Canoeing the Rivers Adur and Arun for the Duke of Edinburgh's award was his first experience of navigation. David began canal boating in the 80's on holiday hire boats inevitably leading to ownership.

He owns a 55ft Narrowboat, *Rhoda Ellen*, which is moored on the River Soar Leicestershire and during May 2016 participated in a historic river cruise with fellow IWA member David Collin who skippered his 25ft cruiser, *Bouncing Brass*, from Boston to Spalding across the Wash via Tabs Head.

The cruise came after the IWA succeeded in persuading the Environment Agency to de-silt Fulney Lock, opening up the route through Spalding and further upstream to the head of navigation on the River Welland.

The cruise highlighted the recent improvements to the River Welland, funded by the Lincolnshire Waterways Partnership as part of the Fens Waterways Link project. Fosdyke, Spalding and Crowland are now very worthwhile destinations for slightly more intrepid boaters ahead of the rest of the Fens Waterways Link being completed.

The cruise dates were carefully planned around the spring high tides to get a sufficient water level of 3.1m at Fulney Lock on the outskirts of Spalding.

Fulney Lock

The boats left Boston Grand Sluice on the first level tide at 4.25pm on Friday 20th May, heading down the Haven River, via the Tabs Head marker beacon where they made a 180 degree turn. Conditions were favourable in the Haven but the breeze picked up as they entered the Welland River. The day ended at Forsdyke Bridge Yacht Haven at 7.35pm, with liquid refreshment at the Ship Inn.

The following day, the boats left Forsdyke at 6.20am and the 6 mile leg took 1 hour and 20 minutes to reach Fulney Lock where the EA had opened the outer lock gates open ready for the boats to steer straight in. A straight run into Spalding then for the boats who were able to tie up on the moorings near the town centre.

Low headroom further up the River Welland meant that *Bouncing Brass* had to remain in Spalding but the next morning David and *Rhoda Ellen* pressed on up the river to the head of navigation at Peakirk via Sunday lunch at the Old Bridge pub in Crowland.

On Monday, the boats left in the afternoon passing through Fulney Lock at 8.00pm to moor up at Forsdyke by 9.20pm. Leaving Forsdyke at 7.45am on a beautiful clear morning, the boats made their way back round Tabs Head, arriving back at Boston Grand Sluice at 10.40am on Wednesday morning. The return leg had taken roughly the same time as the outward trip.

David Pullen said "Being able to make this long-awaited journey was a great experience and we are talking to EA about how IWA can help prevent Fulney Lock silting up again."

Institution of Agricultural Engineers

2018 YOUNG ENGINEERS COMPETITION

Can your team create a remote or radio controlled vehicle to tackle our competition track?

TUESDAY 20 MARCH 2018

at Perkins Engines Company Limited, Peterborough, PE1 5FQ

www.iagre.org

Sponsors

Rexroth Bosch Group

Perkins

AUTOGUIDE EQUIPMENT

The Douglas Bomford Trust

IAgrE

FURTHER INFORMATION AND COMPETITION PACK

Sarah McLeod
01234 750876
secretary@iagre.org

Institution of Agricultural Engineers
The Bullock Building
University Way
Cranfield,
Bedford MK43 0GH
www.iagre.org