



The role of the Royal Swedish Academy of Agriculture and Forestry is, with the support of science and practical experience, to promote agriculture and forestry and related activities, for the benefit of society. The Academy was founded in 1811 at the initiative of Karl XIV Johan and started its work on 28 January 1813.

The Academy's 207th Commemorative Meeting

January 28, 2019

Academy President's speech

Lisa Sennerby Forsse2

Academy Secretary's speech

Eva Pettersson.....5

The Principal Speech

Martin Ingvar9



Academy President Lisa Sennerby Forsse

The Commemorative Meeting of the Royal Swedish Academy of Agriculture and Forestry (KSLA), January 28, 2019

Food, Flavour and Health

Your Royal Highness

Your Excellency

Honourable Fellows

New Fellows

Laureates

Fellows of the Academy

Distinguished guests

A warm welcome to 206th Commemorative Meeting of the Royal Swedish Academy of Agriculture and Forestry.

The theme for this year's Commemorative Meeting is Food, Flavour and Health.

This theme resonates with the work carried out within our Academy. It can be traced back in time to 1813, when the Academy first opened its doors. At that time, the vast majority of the Swedish population lived and worked on the land, many of them under very reduced circumstances. A recently published book by Magnus Västerbro titled *Svälten – hungeråren som formade Sverige (Famine – The Years of Hunger that Formed Sweden)* is currently in bookshops and tells the story of a Sweden with a starving population and large families of undernourished children. Given that it happened relatively recently, this is a part of our history that we would do well not to forget. In only 150 years, Sweden has undergone a formidable transformation into a democratic, wealthy and prosperous country.

Food production was very much at the heart of Crown Prince Charles John's – later King Charles XIV John – decision to establish the Royal Academy of Agriculture, the first meeting of which took place on 28 January 1813. The purpose of the academy was to modernise Swedish agriculture in line with new scientific findings, thus increasing crop yields. This primarily involved the cultivation of new land to replace land in Finland lost to Russia in the Russo-Swedish War and to ensure sufficient harvests to feed hungry mouths. Agriculture was also to be modernised and upgraded with the aid of science and research – something intended to improve the management of the country's resources. This is reflected

in our mission statement as it stands today: *The task of the Royal Swedish Academy of Agriculture and Forestry is to promote agriculture and forestry and associated activities with the support of science and practical experience and in the interest of society.* (It should be noted that, at that time, forestry was not part of the Academy's remit and, even if forestry management was an early addition, it did not have its own department until the 1940s.)

The history of cultivation attempts at the agrarian experimental field established in 1816, at what is today Frescati and Stockholm University, is well documented in KSLA publications. The history of the Academy has seen many dramatic exchanges and conflicts regarding the benefits of science and research trials to agriculture and even today this remains the case, as the debate on our foods continue to make waves; what is best and healthiest for us, for animals, nature and – not least – the environment. Several months of extreme heat and drought during the summer just past offered us a premonition of what the climate of the future may have in store for our part of the world. The climate is a direct threat to our basic agriculture and forestry industries, while agriculture is generally represented as a climate and environmental villain – with cattle farming most reproached of all. This is a one-sided and partly erroneous image that the Academy wishes to alter. With new scientific findings and foundations, agriculture has all of the prerequisites for becoming part of the solution. As part of this effort, in August last year the KDLA held an international conference on climate-smart, sustainable agriculture. The keynote speaker was the winner of the 2017 Bertebos Prize, Professor Ken Cassman of the University of Nebraska-Lincoln in the United States. In broad strokes, today we have sufficient knowledge of what sustainable agriculture should look like; however, opinions are divided among both researchers and practitioners as to the correct route to get there. A concept gaining ground both in the United States and Europe is something called *conservation agriculture*, a model that has shown itself to be effective in keeping carbon in the ground without reducing crop yields. This is an important step in climate-change work.

The role of the Academy of Agriculture in the agricultural sector began to change at the end of the nineteenth century, something that continued during the twentieth century. This led to the Royal Academy of Agriculture not only being reorganised – as forest management entered the picture, among other things in 1956 the academy was renamed the Royal Swedish Academy of Agriculture and Forestry – it was also tasked with new roles and responsibilities. Swedish households are modernised and new technologies are seeing the light of day. Dairies are organised and rationalised and issues such as preservatives in vegetables and fruit receive a great deal of attention. The Academy was engaged and, among other things, published a book on preservatives written by Gustaf Lind, the Academy's garden director (1900–1934): *Konserveringsbok.Handledning vid trädgårdsprodukternas och skogsbärens ändamålsenliga tillvaratagande. För de svenska hemmen (The Preservatives Book. Guidance on the Appropriate Treatment of Garden Produce and Forest Berries. For Swedish Homes)*. This also stated that Swedish produce tastes as good, if not better, than imported fruit and vegetables and that Swedish housewives should buy Swedish! Sound familiar?

And, speaking of taste – after all, our theme is Food, Flavour and Health – the importance of flavour itself has a long and interesting history. For, no matter where they are, humans have always gathered and cultivated spices and invented different cooking methods to make their food more flavourful, something that as interest has grown over time has resulted in a field of its own: gastronomy. Gastronet Nordic, a network of Nordic gastronomic academies and their friendship associations, defines gastronomy as, “the science, handicraft and art of

preparing food and meals”. Our own Academy has the pleasure of having fellows who are well versed in this field, from whom we shall be hearing a little later.

Finally, food and health is an ancient theme that dates back to the Ancient Greeks. What we should and shouldn't eat is something we hear and read about in the media every day, partly based on science and partly on more or less fanciful theories of what is best for us. The nutritional content of food is a highly relevant and topical subject and something that has risen up the global agenda with full force. Today, not enough of the right kind of nutrition, or too much of the wrong kind, is a major issue. Here too we can call on our own expertise within the Academy and conduct activities that contribute to an increased knowledge and understanding of the importance of food to our health. What we eat has an enormous impact on how we feel, something that applies equally to the brain. The various advice and tips we receive from public authorities and the media mostly deal with the effects of food on body weight and health; however, we do not hear as much about how our perhaps most vital organ – the brain – is affected by our diet. According to UNICEF, a child that suffers from malnutrition for the first three years of life will suffer life-long brain damage. This means a mental disability with both learning difficulties and impaired creativity and initiative. This year's commemorative address from Martin Ingvar focuses on brain function and the need for the right food and physical activity. In what way is the brain affected by our diet? Can we become more intelligent by eating correctly? Perhaps we will receive answers to these questions and more – after all, there is a great deal of exciting research being conducted in the field of neurology.

KSLA is an academy whose time has come and it is our role and responsibility to illuminate issues that are important for our sector. Today's theme – Food, Flavour and Health – lives up to both our traditions and the issues that are relevant to current societal development. Since its inception, our Academy has undergone major changes; however, we have stubbornly persevered through both success and adversity to safeguard the sector we have been tasked with serving. We therefore continue as an independent, freestanding stakeholder to engage ourselves in issues that are vital to our sector – as stated in our mission statement, vision and business idea.

Thank you for your attention.

Lisa Sennerby Forsse

Translation: Nigel F Ford, Marketing and Translations International AB.



Academy Secretary Eva Pettersson

The Commemorative Meeting of the Royal Swedish Academy of Agriculture and Forestry, January 28, 2019

The Academy's 206th year of activity

Your Royal Highness

Your Excellency

Honourable Fellows

New Fellows

Laureates

Fellows of the Academy

Distinguished guests

Time moves on and we can affirm that the Royal Swedish Academy of Agriculture and Forestry has been in existence for all of 206 years. Six years have elapsed since the KSLA celebrated its bicentennial with pomp and circumstance here in Stockholm City Hall!

As the President noted, the Academy has developed from having a broader responsibility as a public authority to being an independent organisation and an open forum for free discussion. In reality, the KSLA's only position is that agriculture and forestry are central societal functions and that science and practical experience are fundamental.

Just like the history of the agricultural sector itself, the KSLA's history is collected in the Academy's library – the largest agrarian historical library in northern Europe. Over recent years, the library has not only lent books, for some years now we have also arranged literary discussions there. The idea behind this is to remain agile in grasping the issues of the day, both large and small. The most recent discussion was between historian Gunnar Wetterberg and the Academy's previous Secretary General, Åke Barklund, revolving around Wetterberg's book *Träd – En vandring i den svenska skogen (Tree – A Walk in the Swedish Forest)*.

The meeting between history and the present day is under discussion in a number of contexts, for example in our seminars on contagions such as anthrax and plague, as well as mad cow disease. We hardly want to see history repeat itself.

Interesting stories can also be found on our donation estates, Enaförsholm in Jämtland and Barksätter in Sörmland. At Barksätter, we are working with the Royal Swedish Academy of Fine Arts to revitalise an old lime tree bower with a beautiful work of art.

The climate has been in focus and will continue to be so for many years to come. There is really no need for me to mention the forest fires and droughts, although perhaps we need to be reminded... time and time again.

The Committee on Climate and Land Use Towards 2030 arranged a conference on the climate benefit of forests in collaboration with our sister academies KVA (The Royal Swedish Academy of Sciences) and IVA (The Royal Swedish Academy of Engineering Sciences). How should we best utilise our northern forests to combat the effects of climate change, in parallel with sustainable cultivation? The issue is a complex one to which science is presently unable to provide a definitive answer. A working paper has been prepared titled *Forests and the climate – Manage for maximum wood production or leave the forest as a carbon sink?* You are most welcome to order this or download it from the KSLA website.

KSLA's Committee for Agriculture's Climate Adaptation arranged a seminar in December at which issues related to the future use of land for agriculture was discussed. Despite a changing climate, the production of food needs to increase while at the same time greenhouse gas emissions from agriculture must be reduced. A challenge, to say the least! The knowledge requirements identified by the committee were commended to the SLU's Future Food platform.

KSLA collaborates with the IVA on the Climate Crossroads project, in which food supply chain systems have been a subproject along with transport systems, industrial systems and energy systems. One of the main purposes of the project is to develop an action plan for how Sweden can achieve zero net emissions of greenhouse gases by 2045 while increasing competitiveness.

Another disputed issue that resulted in another meeting between the practical and theoretical is the scope of red listing for forests by 2050. The answer to this varies, as became clear when the topic was discussed at one of the year's gatherings. The red list is a knowledge base and must be interpreted and utilised in the correct manner. In the long-term, neither biodiversity nor sustainable forestry will be decided by the red list.

In order to reinforce research initiatives, the KSLA has formed an overall Board Committee for Research Issues. During 2018, the Committee has made a world wide scanning of present knowledge and has also engaged the entire Academy. The wisdom of our fellows will be utilised in work to introduce the government's forthcoming research bill. Here too we shall be collaborating with our sister academies. I would like to take this opportunity to remind you about the seminar "Facts and Values – What Steers Policies for Green Industries?", to be held on 11 February 2019.

The breadth of expertise within the KSLA is beneficial both in awarding scholarships and grants from the Academy's managed foundations and assessing and granting funds for major research projects.

During 2018, the final Wallenberg professorship in a series of seven was appointed. This research programme was a gift from the Knut and Alice Wallenberg Foundation to celebrate the KSLA's 200th anniversary and has been extremely successful. In 2018, the Academy Collegium decided to appoint Professor Christine Watson of Scotland's Rural College, Aberdeen, as the KSLA Wallenberg Professor, who will be a guest researcher at SLU's Department of Crop Production Ecology for one year.

Research grants have also been drafted and decided within the Tandem Forest Values programme. The awards were presented to grant recipients by Her Royal Highness.

KSLA's solid base of wisdom and knowledge must be supplemented by young courage and new ideas. Through the KSLA's Board Committee for Youth Issues, we work to increase engagement in the Academy's activities among young people. Regular and much appreciated activities include case challenges and mentorship. During the autumn, an alumni meeting was arranged for young people and fellows who have participated in the KSLA's youth work on the theme of the UN's Agenda 2030 Sustainable Development Goals. Among the participants were the Government Offices of Sweden and We Effect, which focuses to a large extent on the rights of women and girls.

These international issues are everyone's responsibility and the KSLA deals with them in a number of ways. The issues have been further concretised through our Board Committee for International Relations Issues. Given the many global challenges we are facing, the UN's 17 Sustainable Development Goals will increasingly be in focus. The issue of Agenda 2030 was highlighted at a seminar where delegates discussed how Sweden can contribute globally through its international policy and how the Swedish forestry sector and its value chain can contribute to and benefit from Agenda 2030. The International Board Committee has also visited and discussed other issues such as economics, trade, policies and international commerce.

Yet another international aspect was the Academy's excursion to Regio Food Valley in the Netherlands, where we visited Wageningen University & Research and the surrounding area. The EU's Refresh project was presented, the aim of which is to halve food waste. This is a highly topical subject!

Echoing the President, I would like to highlight the Bertebos Conference on "Global Food Security – ensuring sustainable food production at local to global scales", financed by the Bertebos Foundation. Bertebos Prize-winner Ken Cassman of the University of Nebraska–Lincoln was the keynote speaker.

To a large extent, the Academy's activities are financed by the return on our capital and from certain of the foundations that we manage. The demand for returns is high and our management of assets must be active. KSLA's Standing Finance Committee collaborates with highly skilled external fund managers and in 2018 we have once again achieved the required return on investments.

The stock market is unstable and everything is becoming more expensive, meaning that the KSLA must work even harder to increase funding while at the same time prioritising and focusing our operations. KSLA's independent collective expertise and the ongoing relevance of our mission statement are our most important weapons in the sharp pursuit of funding for the Academy's increasingly vital operations. The work of building up a clearer project organisation and developing a long-term approach to donations is ongoing and will intensify going forward.

The past year was characterised by a great deal of collaboration and networking. The conference "Small Town and Rural Development – Urban Planning from a Rural Perspective for Uppsala Municipality", arranged by Uppsala County Council together with SLU and

is a prime example. What opportunities are available to rural communities? What is so special about building and developing communities outside towns and cities?

Tonight we have in the region of 640 guests, so we have a great opportunity to mingle and network with both previous acquaintances and new ones; initially over a glass of bubbly and later over an exquisitely composed meal served in the Golden Hall. I hope that you will enjoy an outstanding meal in outstanding company.

Finally, I would like to extend my heartfelt thanks for the past year to all of our dedicated fellows, others who are engaged in the KSLA's activities and, last but by no means least, to the fantastic Academy Office.

Thank you for your attention.

Eva Pettersson



Professor Martin Ingvar

The Commemorative Meeting of the Royal Swedish Academy of Agriculture and Forestry, January 28, 2019

Making the Brain Last Longer

Your Royal Highness

Your Excellency

Distinguished guests

We live in trying times in a society that offers us both pros and cons. We have never lived as long nor had as many over-70s in good health as we do today. Another theoretical positive is that fewer people than ever live with restricted access to calories, with more than 90 % of the world's population living in cultures with constant access to food. Unfortunately, this also means access to additional foodstuffs on which we can gorge ourselves. This presents a magnificent challenge to our bodies and metabolic systems, which over millions of years have evolved adaptive capabilities to deal with periods of limited access to food and calories. Continuous eating has a profound impact on public health, something that we are only beginning to see the effects of.

An increasingly aging population makes it vital that we take a real interest in the sustainability of the human brain, since successful ageing rests on its functionality. The brain is the foundation for autonomy; that is to say, our ability to sustain ourselves and where necessary support others. Half of all healthcare costs are related to brain disorders and half of these go towards brain disorders related to ageing. Studies have demonstrated that half of the burden of disease on the elderly is preventable and, if we are to meet the costs of treating the unpreventable 50 %, the least we can do is to utilise this potential for prevention. It is possible to achieve a broad consensus in society regarding health-based behavioural changes, as demonstrated by the use of tobacco and seatbelts in cars.

To this end, it is my belief that all defenders of knowledge have a shared responsibility. Perhaps the Royal Swedish Academy of Agriculture and Forestry has failed to recognise the important role it can play. Now that smoking has been successfully reduced in our society, the Academy presides over the two most important factors affecting healthy aging; what we eat and the key to an active lifestyle, which is proximity to accessible natural surroundings.

Understanding the mechanisms behind a disrupted metabolism, or metabolic syndrome as it is known, is key to preserving the brain, which is after all a fairly demanding and highly

active organ that, given its own limited stores, requires the body to support it with continuous deliveries of nutrients to support cognition. Metabolic syndrome is close to a toxic state in which the ability to metabolise what we eat in a correct manner is impaired by overloading the system with “empty calories”. Our bodies are highly resilient and we can eat in a wide variety of ways while maintaining our health. An Inuit hunter and a Vietnamese rice farmer eat entirely different things – an Inuit’s diet contains almost no carbohydrates while a Vietnamese farmer may eat a diet consisting of 80–90 % carbohydrates – and yet they are equally healthy until exposed to modern foods and lifestyles, which will reduce their resistance as they lose the ability to maintain the balance of their metabolic ecosystems.

They are not alone in this – today a large proportion of the world’s population is out of balance.

Today, half of the population of the United States has diabetes or prediabetes, a pre-morbid condition that leads to approximately 30 % of sufferers developing diabetes within 4–5 years. This implies that the diabetes epidemic will recruit over 20 % of Americans by 2025. This is both an individual and a social challenge of enormous magnitude. Even given the availability of insulin and other drugs for the treatment of diabetes, both medication and the disease’s side-effects are a challenge for all bodily systems, including the brain.

And, as always when something unpleasant hits the fan, it is unevenly distributed across the bystanders. Take the Metro from Stockholm Central Station heading southwest, and the average weight of the inhabitants will increase by 2.5 hectograms for each station you pass. As such, public health declines and the need for healthcare and welfare resources increases. Lifespans decrease by seven years and the first visit to a doctor for a range of chronic disorders occurs 7–10 years earlier in life. In my grandfather’s lifetime, having one’s own teeth was a sign of social position; soon, maintaining a normal weight will be regarded in the same light.

The problem is that this kind of lifestyle takes a heavy toll on the brain. Evolution and market mechanisms combine to trick us into eating what we shouldn’t, while compounding things by refusing to stir from the sofa. Historically, calories were scarce and several hours each day were spent obtaining food. Local populations were regulated by the availability of calories; surplus calories are a very recent phenomenon. Bear in mind that 25–30 % of Swedes emigrated to the United States during the latter part of the nineteenth century and that periodic crop failure was a major driving force behind this exodus. Had the same thing happened today and given the current migrant crisis, who knows if Swedes would have been welcomed to the United States.

Taste and smell have guided us in identifying what is good and edible in nature. Those failing to recognise the smell and taste of bad food were immediately punished. Experimentation was constant and new discoveries were made such as fermentation and salting that could mitigate periods during the year when calories were in short supply. It is hard to imagine that anything other than a deficit of calories – indeed, starvation itself – would have led to fermented herring being categorised as food.

Just as evolution gave us the means to recognise the edible, so evolutionary mechanisms developed to maintain homeostasis, metabolic equilibrium, when nutrition was scarce. We have at least 14 hormonal mechanisms for conserving energy (i.e. calories) and increasing blood sugar to keep the brain functioning, and only one to achieve the opposite. The most

important genetic mechanism driving survival when we search for food is the reward sent to our brain when we find and eat something sweet. This drive for the sweetness of sugar remains intact and is the main cause of the current epidemic of metabolic syndrome. The vast majority of known genes associated with obesity are connected to the reward system in our brain. This is the biological basis for the force that drives the food processing industry, plant breeders and, indirectly, agriculture in the direction of sweeter products. It should be incomprehensible that a breakfast cereal contains as much sugar as milk chocolate. Cheap wine, as well as some of the expensive ones, have a sugar content of up to 10 %. Sugar is added to ready-made meals in various forms in order to disguise the fact that almost 40 % of the calories in some of them are sugars; modified starches, high fructose corn syrup (HFCS), concentrated fruit juice, glucose, molasses, dextrose – all different names for sugar. My own personal record for the ingredients on one package is nine different added sugar products.

There are several problems associated with eating sugary foodstuffs in terms of long-term harm to the health and brain.

First, the senses of taste and smell are compromised, with everything that is not sweet experienced as flavourless.

Secondly, otherwise inedible products, for instance imitation foods sold as low-fat alternatives, can be made attractive enough to sneak into our mouths.

Thirdly, eating becomes a quick fix at any time of day, rather than mealtimes forming the basis for human relationships.

Fourthly, sugary foods do not satisfy hunger in the way that fatty foods do and so have a tendency to promote overeating.

Finally, when we eat sugar, the body's defence mechanism for regulating blood sugar levels is activated. Insulin is the bearer of this signal. When the blood is flooded with this hormone there is a subsequent deficiency of blood sugar that leads to snacking between meals, when the only available alternative may be sweets and buns.

Now: if you think that sounds bad, hold onto your hats because here comes the really scary bit.

The Swedish National Food Agency recommends a maximum daily sugar intake of 50 grams, which in itself is an unhealthy dose from a medical standpoint and amounts to 17 kilograms of sugar annually or 10 % of the calories we consume. The reality, however, is that we eat between 35–45 kilograms each year. Government agency Public Health England calculates that the average British 10-year-old has consumed 18 years' worth of sugar. When this is combined with the knowledge that obesity is established early in life, it is easy to understand why waistlines have changed since the days when Brigitte Bardot reclined on the beaches of the Riviera. The hourglass figure that typified that era has been replaced by a rectangular form, the washboard stomach by the washing machine torso.

The major problem is not the isolated occasional instance of overdosing on sugar. The problem is that nowadays we consume sugar around the clock, with 80 % of all pre-packaged foods containing added sugar, sweeteners added to bread and fizzy drinks and sweets adding

to the problem. In Katrineholm, 60 % of 3–5-year-olds have caries, but it is not only our teeth that suffer.

It also means that in the majority of people, the insulin mechanism is activated around the clock, with the brain encased in a 24/7 fog of insulin, which is far from a good idea. This has a negative impact on the memory, with the brain's librarian responsible for keeping track of all of the books on the brain's shelves, the hippocampus, being especially susceptible. Insulin promotes inflammation and insulin-like growth factor (IGF) and inhibits normal fat metabolism, factors that are worth further consideration.

Inflammation and increased IGF cause disruption to cell-repair mechanisms, increasing the risk for both developing certain types of cancer and, above all, diabetes. A man such as I – a smoker with one close relative with diabetes and a waistline in excess of 105 cm – runs approximately 30 times the average risk of developing diabetes.

The disrupted metabolism of fat is worthy of particular mention, as this is both a symptom and a mechanism of other pathologies. The build-up of fat around the waist, a muffin top in colloquial terms, is a sign of an inability to metabolise fats. Increased blood lipid levels, disrupted cholesterol levels and increased blood pressure are only part of the problem. Increased girth is hardly the worst of it; the major issue is presented by the liver's inability to fulfil its functions efficiently when flooded with fats. The liver attempts to deal with this by increasing the metabolism of hormones, including the fun ones such as testosterone and oestrogen. While behavioural scientists place the blame for a declining interest in sex squarely on smartphones, I would contend that metabolic disruption is also part of the problem.

Metabolic disruption is no trivial matter. For many people it ends in type 2 or adult-onset diabetes, with the associated increased risks of contracting a number of common disorders: up to three times in the case of high blood pressure; two to three times for solid tumour cancers; three times for heart disease and stroke; and, importantly, four times for Alzheimer's. Taken together, these disorders account for approximately half of healthcare interventions for people over 30 years of age.

So, what do we need to do? We know that on an individual level, the so-called Big 4 – eating better, increased physical activity, sleeping better and lowering stress levels – will achieve 90 % of possible preventative measures. As you have heard, the Royal Swedish Academy of Agriculture and Forestry has an important role to play in this. Education regarding these issues aimed at all agents in the chain, from forest and farmland to dinner table, is probably the most effective and available measure for improving the situation.

The advice is simple: If you can walk two miles, why not walk three; if you are unable to name the raw produce in your intended meal, don't eat it; if you sleep badly and suffer from high levels of stress, do something about it. Cook meals from scratch and explore the shelves of the supermarket, avoid buying ready-made meals.

Unfortunately, the statistics on changing habits are not encouraging. Such changes never occur spontaneously. Promoting successful change demands education, environmental interventions, a nudge in the right direction to make it easier to do the right things, as well as the shouldering of responsibility from those sectors of society that present the choices.

Science and knowledge are the backbone of society and the Royal Swedish Academy of Agriculture and Forestry is a key stakeholder in preventative healthcare, and therefore in healthy aging. Just as we all want to see sustainability in forestry and agriculture, so society requires sustainable healthcare systems. Prevention is a matter of quality of life and sustainability. Maintaining the brain over a lifetime means doing the right things now.

Thank you.

Martin Ingvar

Editing: Nigel F Ford, Marketing and Translations International AB.