

Future directions for the meat industry

by Carrick Devine

There is always a future – but:
-Does it merely creep on us or
-Do we make it happen?

There are three ways to look at future directions and predictions.

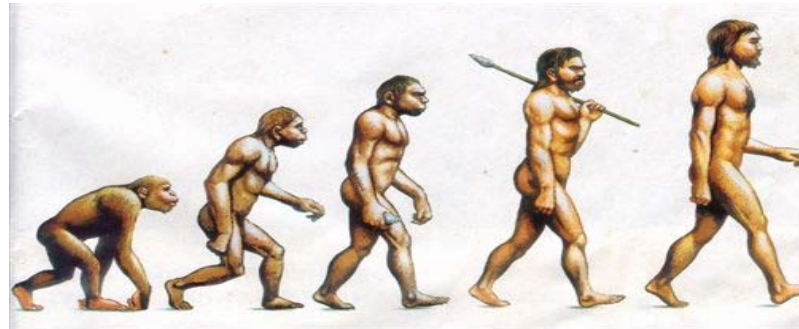
- The **first** is, “What is possible?”
- The **second** is, “**If** we don’t do this or that, something *will* or *will not* happen.” A bet both ways – you can never be wrong and you sound philosophical, but it is unhelpful (politicians come to mind).
- The **third** is when taking into account the known trends, issues, people problems and global actions: “**What will really happen?**” (sometimes it is not nice to be correct).

Previous research ensured we have come a long way – we are good

- Changes from throat cutting to electrical stunning, and halal.
- The introduction of electrical stimulation to produce reliable tenderness,
- Vacuum packaging improvements,
- CAPtech packaging of chilled meat shipped across the world and the world of microbiological monitoring.
- Then there is engineering, electronics and other measurement systems, rendering and so on
- **These are huge advances by anyone's standards and I doubt whether the significance has been fully recognized.**

Without this research New Zealand would be a “two bit” player

- We produce the best lamb in the world - yet the introduction of AC&A, one of the contributors, was not easy.
- “Something that produced an extraordinary benefit in terms of quality was difficult to introduce. A demonstration in 1974 took until 1989 until it became a specification.”
- **Would we do the same again?**
- New potential in beef - just imagine what it would do for us to produce (or at least select) the best **tender juicy lean beef** in the world!
- **Always**
- Back to the past?

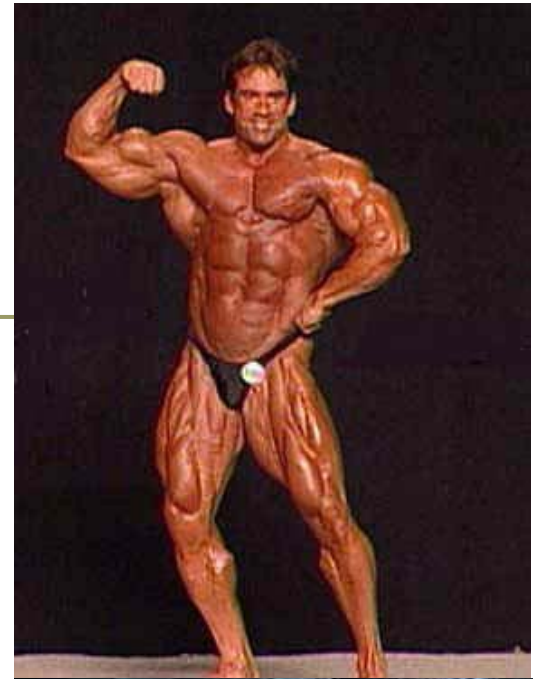


Consider the research you will hear today

- You may think it is interesting, “but the same old thing!” Not so! We are closer to defining what is necessary now more than ever before. The researchers will cover:
 - Shelf life
 - Colour and colour stability a limiting factor
 - Energy efficiency – of course
 - Microbiology, methods etc
 - Modelling
 - Meat quality measurements
 - Data bases
 - Flavours
 - All of this is being incorporated and it will be important.
- Everyone admires “Trade Me” or “Utube” or “Skype”. How many of us would have been there to put in money at the beginning if asked?
- Now be honest! There were only 5 or so for Trade Me!
- Not all research has the same impact so we need to be realistic and take account of the inertia of the meat industry – our industry

Looks are important – colour and shelf-life

- Appearance is almost everything – try to tell someone that the nice brown meat is well-aged!
- Actually people like to think meat is fresh anyway
- CO in packaging systems, especially with CO₂ will become normal



NIR – a new development

- You will see the NIR equipment. In 20 years (if I could still see and look around) I would fully expect to see to see NIR in a plant.
- We are ahead of every other major group working on it
- It **will** one day be used to measure meat tenderness – maybe not the way we think it might go
- **Maybe someone will measure the quality of your product without you knowing**
- I would like you to think of the possibilities for our industry – with it we can genuinely lead the world.
- **Measurement is power**
- The real issue is whether the future involves **our** meat industry in its development of whether it is the New Zealand Meat industry that merely uses such a development - **once someone else has done it.**
- If we are part of the developments we can drive it.

This is how it might work

- The NIR machine will be in one place or connected by fibre optic cables (or radio-link for data acquisition) connected to the
 - slaughter area,
 - chillers and
 - the boning room (and elsewhere)
- With other carcass ID measurements,
 - it will take measurements from carcasses soon after slaughter,
 - integrate these with the farm details,
 - predict ultimate pH, juiciness, fat and tenderness class.
 - collate all the data taking account of the temperature regimes



Measurement is everything

- Even today we could use NIR to replace the MIRINZ tenderometer for quality assurance on large numbers of samples instead of the usual 10 and measure quality at defined points on line – to get the best
- We could tune processing by continually monitoring
- There are immense opportunities for carcass measurements to feed back into breeding – we can measure every animal and create new data bases

With NIR who benefits? Producers and processors!

- **Producers** - low stress animals - financial returns depend on this. Breed hype reduced. Electrical stimulation removes the difference – if any.
- **Processors** - move into niche markets based on quality. There is still a lingering suspicion that it is breeding that dictates meat quality. This can now be measured – if true.
- **Is all this measurement worth it?** We must be ready for new markets. Trade barriers are not for ever – and food will be short somewhere
- But who am I to judge?

Costs of NIR developments?

- Less than the total salary of all players, reserves, beer sales, umpires, rent, television rights and officials for **one** day in one super 14 rugby game or Air NZ Championship.
- We need to get things into perspective
- (For the ABs even more)



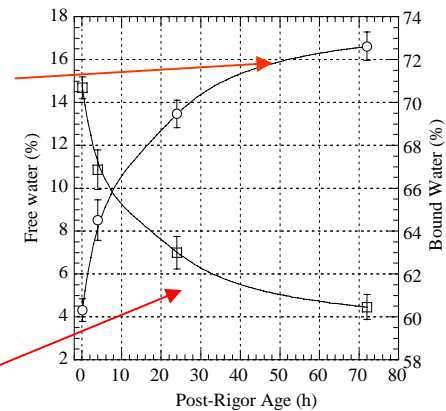
We need to know more about meat? A glimpse into the future - an echo of the past

- Because we have done so well
- We might forget where we have come from
- Some past discoveries haven't yet reached the level to be useful – but soon will
- Titin (not Titan – the moon of Jupiter) a muscle protein, the bungee cord in muscles, was discovered at MIRINZ by Ron Locker, its importance together with desmin and nebulin unrecognized at the time.
- The next slide shows where we can go from here and improve our product

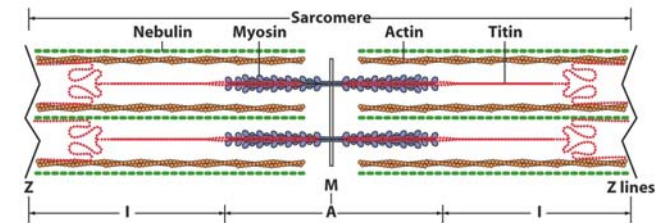
How is titin so important?

- Titin, nebulin, desmin and other cytoskeletal proteins break down as meat tenderises and water from the proteins is released
- **Some drip is therefore a by-product of tenderness?**
- **Other drip is through bad processing - this excess drip through denaturation of actin and myosin can be controlled by proper processing.**
- We need to separate these compartments out to get best characteristics.

Increase in drip



Decrease in bound water



A sarcomere with titin



Titin by itself

Electrical stimulation - a new era

- When electrical stimulation was introduced it was superb, but there have been many changes in order to conform to plants requirements and not all good. In some ways we need to go back to basics rather than continually modify some systems.
- Ad hoc changes with the belief that “they will be better” needs re-evaluation.
- **Correct stimulation protects meat from adverse processing conditions**
- **It removes the differences between British and tropical breeds**
- **It reduces drip**
- Do it wrong and we are chasing our tails