



**A Nuffield Farming Scholarships Trust  
Report**

*Award sponsored by*

**The Worshipful Company of Fruiterers**



**Cider Orchards :  
the Great British Success Story**

**Neil Macdonald**

**March 2016**

**NUFFIELD UK**

## **NUFFIELD FARMING SCHOLARSHIPS TRUST (UK)**

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# A Nuffield (UK) Farming Scholarships Trust Report



Date of report: March 2016

*"Leading positive change in agriculture.  
Inspiring passion and potential in people."*

Title	Cider Orchards: the Great British Success Story
Scholar	Neil Macdonald
Sponsor	The Worshipful Company of Fruiterers
Objectives of Study Tour	<ol style="list-style-type: none"><li>1. What might the future hold for producers of apples for the cider industry?</li><li>2. What do the cider-makers want from our apples?</li><li>3. Are there any techniques being used around the world that might benefit UK growers?</li><li>4. Where are the potential markets for the fruit and in what volume?</li><li>5. Should I plant 80ha of cider apple trees?</li></ol>
Countries Visited	Europe, USA, Australia, New Zealand
Findings	<ol style="list-style-type: none"><li>1. First and foremost cider-makers need tannin from apples</li><li>2. Our current apple varieties may not be fit for long term purpose.</li><li>3. UK production is in over-supply but the worldwide demand is rising.</li><li>4. The UK is well placed to respond to the increasing demands of the cider industry.</li><li>5. Much can be learned about apple production from around the world, but UK cider apple production is leading the way. It is, however, in need of research and development to maintain our future.</li><li>6. Yes, I am planting, because I believe in the profitable long term future of this industry</li></ol>

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## **DISCLAIMER**

The opinions expressed in this report are my own and not necessarily those of the Nuffield Farming Scholarships Trust, or of my sponsor, or of any other sponsoring body.

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Nuffield Farming Scholars are available to speak to NFU Branches, Agricultural Discussion Groups and similar organisations

*Published by The Nuffield Farming Scholarships Trust  
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## 1. Personal Introduction

I am a third generation Somerset farmer with a background in traditional mixed farming. I studied at Harper Adams Agricultural College, spent a year travelling, and then undertook an Advanced Farm Management course at the Royal Agricultural College.

During my travels I worked in the leisure, forestry, dairy, beef, sheep, deer, fishing, meat and fruit industries.

On completion of my Advanced Farm Management course I returned to the home farm of mixed cereals, sheep and cider orchards. I also set up the first of my diversification business ventures: a rare breeds finishing centre (Cedar Walk Farms Ltd) producing, processing and retailing meat from rare breeds on a smallholding in Street, Somerset.



Fig. 1: The author, Neil Macdonald

The west country of England, and Somerset in particular, is synonymous with cider-making and about ten years ago I started to focus on orchards and cider fruit. With a business partner I co-founded Orchard Pig, the cider and juice maker, a brand which continues to grow at a steady rate and has given me an insight into processing, retailing, marketing and branding.

My own company, Orchard Park Farms, now manages modern and traditional orchards all over Somerset for both their owners and for ourselves. In both 2013 and 2014 we won the prize for the Best Cider Orchard in the south west.

Our services include harvesting, processing, pruning and all aspects of tree care, and we trade fruit to the major cider-makers of the west country.

I serve on several industry bodies including the National Association of Cider Makers (Pomology Committee); the South West of England Cider-makers Association; the steering committee of Orchard Network of Excellence; and The Royal Bath & West of England Society. All of this allows me a privileged overview of the orchard business in England.

I am also a member of The Norton Cider Growers Association, the Country Landowners Association, the National Farmers Union and the Association of Professional Landscapers, giving me an additional farming and landscaping platform.

I live at Hornblotton, Somerset, with my family. My wife Emma is also involved in the food business as a founder of The Bay Tree Food Company. We have three young sons, Fergus, Arthur and Ollie. We have 220 acres of mixed farming, consisting of orchards, cereals, sheep, forestry and property lettings. In addition to our farming enterprises we provide services to the field scale solar energy industry in the form of land maintenance, utilising our orchard equipment in what we call 'metal orchards'. Tied in with our new apple pressing facility we are keen to maximise product value and efficiencies of scale.



## 2. Background to my study

### At the beginning of my study tour, this is what I knew:

- I have three young boys to feed, clothe, educate and possibly provide for their chosen futures; I have a farm with land and buildings that are in constant need of improvements; I have an aspiration to live well.
- I know that fewer than 25% of farmers in the UK are making money solely from farming. If you want to succeed you have to be in the top 10% of efficiently planned and executed businesses.
- The margins for producing cider apples are very tight and the long term view and scale of the investment is essential to success. An orchard is a minimum 15 years' investment and probably more like 25 years', with a payback period of up to ten years if the market and climate remain constant. There has been no real research in cider apple production since the closing of Long Ashton Research Station in 1986.
- Over recent years we have seen step changes in apple production: the introduction of fertiliser, followed by bush trees, then agrochemicals and dense planting systems; but what comes next?
- The price of, and need for, agrochemicals is currently only going up, while public demand and cost control is asking for them to go down.
- The next most valuable commodity after land will be water.
- In order to succeed you often need to form strategic partnerships. No one thanks you for being small! I want to be a part of this industry's success and to succeed within it.
- The UK cider market has grown from 1.2 % of alcohol sales in 2006 to 9.4% in 2013. Currently volumes are static in the UK with fluctuations in categories such as mainstream; fruit; flavoured; craft; pear; and artisan. In 2013, 70% of all cider worldwide was made (and consumed) in the UK. In 2015 the UK accounted for only 47% of the total volume by region, demonstrating the huge growth in cider globally.
- The US cider market is currently less than 0.6% and interest there is rising rapidly; not to mention growth in Europe and other western markets. You could say cider is the great British success story and has a real potential to help the balance of trade.

### This is what I needed to know:

- Where is all the fruit going to come from?
- How are we going to grow it?
- Who is going to grow it?
- How much fruit do we need to grow?
- What kind of fruit are we going to grow?
- How can we grow it profitably?
- Can we grow it sustainably?
- How secure is the future for growing fruit?

If we are to succeed as an industry we need to harness the opportunities, recognise what the consumer wants, execute a properly researched plan and take advantage of modern growing techniques to compete in the world market.



### 3. My study tour

Date	Location	Details
October 2013		Scholarship awarded
14-16 January. 2014	SIVAL, Angers, France	Annual trade fair for Viticulture, Arboriculture, Horticulture and Cultivation of Vegetables. Fruit cleaning equipment and mechanical pruning kit on display.
February 2014	London and Australia	Contemporary Scholars Conference
23 Feb-26 Feb, 2014	London	Highlights of London section of above: Prof David Hughes: <i>Global Food Industry Developments</i> Allan Wilkinson HSBC: <i>Current Strategic Agricultural Policies and Trends</i> Ali Capper 2013 NSch: <i>Developing Agricultural Policy</i> Maeve Whyte NFU: <i>European Agricultural Policy</i>
26 Feb-9 March, 2014	Australia	Highlights of Australian section of above: Woolworths: <i>National Trends in purchasing, distribution and retailing</i> Rabobank: <i>Global Food Production Issues</i>
9 March-16 March, 2014	Australia	Private travel in Australia
	Batlow, NSW	Batlow Cider Company, Batlow Cider Festival: decline in viability of orchards due to competition from China. Market dominated by Coles and Woolworths. Opportunity to export concentrate.
	Orange, NSW	Poor orchards, 3 acres bittersweet owned by Borry Gartrell. David Pickering, Cider Assoc of Australia: good cider. Expertise from wine.
	Hunter Valley, NSW	Loss making wineries. Liz Riley (2006 NSch) viticulturist.





Date	Location	Details
23-24 April, 2014	Harper Adams University College, UK	Highlights: David Northcroft, Waitrose, & Caroline Drummond LEAF: <i>Health by Stealth</i>
7 May, 2014		"A Year in the Orchard": presentation to Sanford Gardening Club, Somerset
28-31 May, 2014	Royal Bath & West Society Agricultural Show	Orchards & cider marquee, stand for Nuffield
4-24 June, 2014 European Research Tour	Netherlands,Belgium, Germany, Austria, Italy, N France	Highlights: Koen Carolus, Belgium: <i>Where to grow? "Yield is more important than price" 90 tonnes per ha on some of his fruit wall systems</i> Fabrizio Costa,Fondazione Edmund Mach, Trentino, Italy: <i>Organoleptics and apple quality</i> Prof Abhaya Dandekar, Univ Calif Davis - <i>genetics</i> <i>Value of a research establishment to the industry</i> Emmanuel Gayet, France: <i>Trials and experimentation. Scale of planting - France is producing nearly half the bittersweet fruit in the world.</i>
17 July, 2014	NACM Open Day Thatcher's, Sandford, Somerset	Highlights: Liz Copas: <i>Climate Change</i> Richard Johnson, Thatcher's: <i>What the Cider-makers want</i>
9 September, 2014	Parliamentary Cider Group	Martin Thatcher takes over as Chair of NACM. Networking opportunity
20 January, 2015	Sheppy's: Pruning demo for Orchards Network of Excellence	Presentation and Pruning demonstration for ONE members
4-8 February, 2015	CiderCON, Chicago, USA	One of only two Europeans invited to present to the US Assoc of Cider-makers. 760 this year, next year they expect over 1000. My presentation: <i>"English cider apples and orchard systems."</i>
8-16 February, 2015	UC Davis, San Francisco	Prof Abhaya Dandekar and colleagues.



Date	Location	Details
	Treco Nursery, Salem Oregon	Rootstocks nursery, beautiful land
	Wandering Aengus, Portland, Oregon	Top cider brand
	Cider Workshop Seattle NWBC	Invited by David Bauermeister, Executive Director, to repeat my Chicago presentation which he had first heard at CiderCon
24 February, 2015	ONE Conference	First UK conference for commercial growers and orchard owners.
9-13 March, 2015	Portugal research trip	Invited by major West Country cider-maker to consult on an orchard they own in Portugal.
16 March, 2015	Parliamentary Cider Group	Networking opportunity, prior to Budget, re duty on cider
21 March-2 April, 2015	USA, Michigan	Grower meeting, Michigan
		Grower meetings, Vermont, New YorkMaine
23-24 June, 2015	Romania	Invited by Ecotransilvania to present to conference on sustainability of old orchards
7 July, 2015	Bristol	Cider Trends Conference: Hosting Mike Beck, President of US Assoc of Cider Makers
11-22 July, 2015	New Zealand	
8-18 December, 2015	USA, Michigan Vermont	Great Lakes Fruit & Veg Expo Vermont Growers Conference
11-12 January, 2016	SIVAL, Angers, France	Horticultural exhibition
1-8 February, 2016	Portland, Oregon, USA	CiderCon 2016. Presentation: <i>"The cider industry: a UK perspective"</i>
10 February, 2016	London	Parliamentary Cider Group, House of Commons



## 4. The cider market

Before understanding what cider apple growers should be doing, it is important to understand the cider industry for which they are growing the fruit.

Cider, or hard cider as it is known in the US, is an alcoholic drink (typically 6.5% ABV) made from the fermented juice of apples. Additives such as sugar syrups are allowed and the typical apple juice content of English cider is a minimum of 34%. Concentrate is widely used. Only a few cider-makers use 100% apple juice.

There are special cider apple varieties used in traditional cider-making which are known collectively as 'bittersweet' fruit. Small, and laden with tannin, these cider apples are not for the table and some would be deemed inedible. They are classified into Sweet, Bittersweet, Sharp and Bittersharp according to the relative proportion of acidity and tannin found in them.

Cider apples have been grown in England and France since at least Roman times and over the years growers have bred hundreds of different varieties. These are the apples which give cider its characteristic depth and bite. Good ciders will contain juice from a combination of bittersweet and dessert fruit to give the cider the structure and flavour that the cider-maker wants. A blend of juice from several different cider varieties is thought to give the best result. Without at least a small proportion of bittersweet fruit the finished drink is considered to lack the finesse of a finely crafted product. However, in those areas of the world where cider apples are not grown, there is still plenty of cider being made with dessert fruit alone, and some of it is very good.

The renaissance of cider in the UK really started back in 2006 when the total sales of cider accounted for about 1.2% of the UK's total alcohol sales; they then rose very sharply to 9.4% of the UK's total alcohol sales by 2012. It is true to say that cider sales in the UK have remained static since 2012, and have hovered around 9% of total alcohol consumed and, indeed, some of the bigger brands have seen significant drop off, whilst artisan brands see some increase.

Some historic cider facts are shown in the table below:

2006	Cider consumption in UK was 1.2% of total alcohol consumption in country
2012	Cider consumption had climbed to 9.4% of total alcohol consumer in UK
2013	70% of all cider made and consumed globally was in the UK
2015	2 bn litres (globally) was produced, equalling 285 m tonnes of apples
2020	The prediction is for 3 bn litres to be produced globally, = 360 m. tonnes apples

In 2015, 2.4 billion litres of cider were consumed globally using approximately 285 million tonnes of fruit, and that consumption is projected to grow by 2020 globally to 3 billion litres requiring 360 million tonnes of fruit.



So where in the world is our cider being made? Not surprisingly, western Europe (UK, France and Spain) dominates, and there is a growing interest in America and some significant increases in markets in the likes of Australia and South Africa. Other European countries (that is, in addition to the UK, France and Spain) are also beginning to take an interest in cider.

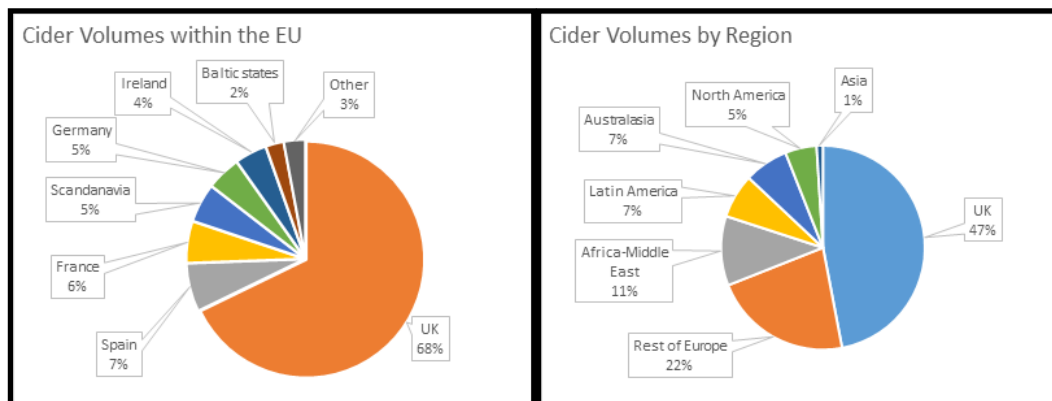


Figure 2: Pie charts showing the dominance of the UK in cider volumes for both the EU and the World (Source: NACM)

We have seen huge growth in artisan cider production all over the world, but a significant growth in the UK and a dramatic growth over the last four to five years in North America, Australia and South Africa; and, indeed, some activity now in parts of Europe, Poland and the likes.

The market share for cider **production** interestingly enough shows the UK clearly in the lead with some 68% of volume with, surprisingly, only 6% from France and 7% from Spain, the other two leading cider-making countries. Even Ireland, where there are great growers and cider-makers, is only 4% of the world production by volume. And if we look globally, you will see that the big movers are Australia at 7%, with the rest of Europe at 22% and North America only at 5%, but growing quite rapidly.

The American **market** has been one to watch and, since 2010, has climbed very steeply to more than quadruple its sales and, by 2014, was somewhere around 2 billion US dollars in value.

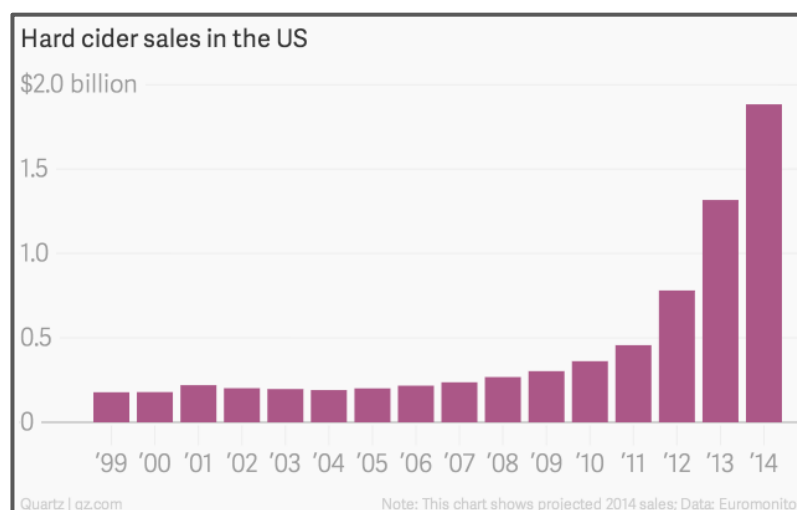


Figure 3: Graph showing the dramatic growth in US (hard) cider sales from 2010-2014. (Source: Euromonitor)

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In 2012, the American market's growth was some 90% year on year, and similar again in 2013. Yet in 2014/15 it was showing only 11% growth.



Figure 4: Graph showing the recent decline in actual growth in US hard cider sales for major commercial brands. (Figures are not available for the artisan brands, which continue rapid growth.) (Source: Nielsen)

Much of this has to do with the larger cider-makers losing volume, but a huge and growing number of artisan cider-makers is coming through with some interesting and diverse products.

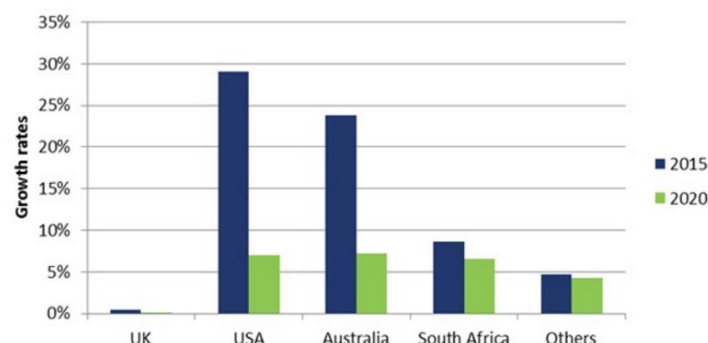


Figure 5: Growth in global cider sales is expected to decrease in the years up to 2020. (Source: Canadean)

Nevertheless, if we look at the cider industry globally, there is still a nice steady incremental growth. The big question mark is: where is the fruit/juice/concentrate, as well as ready-made cider, going to come from for this growth, and what fruit is required to fuel the growth of the cider market?

**It is important that we should be under no illusions: the vast majority of cider globally is not made with bittersweet cider apples. In fact, if we take our 360 million tonnes of apples required to generate the 3 billion litres globally projected for 2020, one might expect only 10% of those to be bittersweet.**

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## 5. Where and what to grow

If we consider the global stage for apple production, we can see there are two latitudes, 30 degrees north to 50 degrees north, and 30 degrees south to 45 degrees south. The northern latitudes quite clearly take in, not surprisingly, Europe, North America and large swathes of China. Our southern hemispheres take in Australia and New Zealand, South America, Chile and the likes.

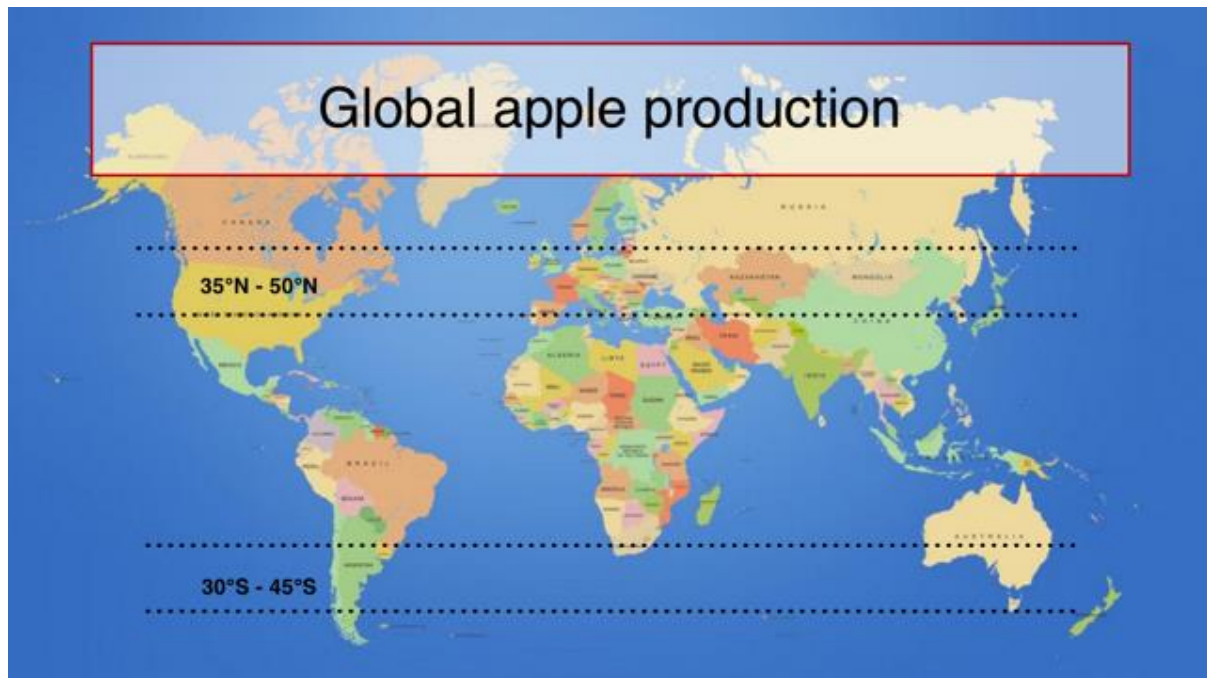


Figure 6: Most apple production takes place in a 15-degree band above and below the equator.  
(Source: my own business)

So no surprises that some of our largest apple production comes from China and the United States, with China having by far the greatest production at some 37 million tons. In fact, our global production is somewhere around 1 billion tons of apples.

There are interesting players from Turkey and Poland; around the Black Sea; with India and Italy being good producers as well. The UK and France are relatively small by comparison.

But where is the bitter sweet apple production taking place? Having travelled extensively to many of these regions, it is really only the UK, Northern France and some small areas of Spain that are producing any quantity of bitter sweet apples to date. There is huge interest in America, some in Australia and South Africa, but by volume, there is really very little elsewhere.

*See table on next page listing the major apple producers in the world.*



Rank ↕	Country/Region ↕	Apple production (tonnes) ↕
1	 China	37,001,601
2	 United States	4,110,050
3	 Turkey	2,889,000
4	 Poland	2,877,340
5	 India	2,203,400
6	 Italy	1,991,310
7	 Brazil	1,810,000
8	 Chile	1,625,000
9	 Russia	1,403,000
10	 France	1,382,900
11	 Iran	1,335,480
12	 Argentina	1,250,000
13	 Ukraine	1,126,800

Figure 7: The major world apple producers by tonnage.  
Bittersweet fruit makes up a tiny proportion of the whole. (Source: FAOSTAT)

So having set out to find out more about how to grow bittersweet apples, my research was really refined to looking at France and our own production, as well as trying to understand whether there are any crossovers from other industry techniques. I found research stations in America and Italy that were working hard on many of the apple growing issues that are common to both bittersweet and dessert apple production.



Figure 8: University of California, Davis is the part of UC devoted to food, health, the environment and society



Figure 9: The Edmund Mach Foundation carries out studies into innovation in the fields of agriculture, nutrition, and the environment.





On the basis that our cider-makers are looking for a blend of apples in order to make a more quaffable drink, there is no doubt that a good percentage of dessert apples is also being used in our cider apple production and what is really supplied by the bittersweet is the tannin more than anything else.

*So, when thinking what to grow, we want to be clear about what it is our cider-makers really want to pay for.*

So, when thinking what to grow, we want to be clear about what it is our cider-makers really want to pay for; and - besides liquid volume - tannin, acidity and sugar plus clean, crisp, easy-to-process apples are vital to good profitability.



Figure 8: Ireland had swathes of Bramley apples and high acid varieties – some 16,000 tons in Ireland alone predominantly going into Clonmel, Tipperary.



Figure 9: Sighisoara in Romania has native apple varieties growing on the hills, many of which have high tannin levels.





## 6. Techniques

When I first commenced my Nuffield Farming journey, I was keen to know whether there was anything we could be doing differently here in the UK as far as the techniques of growing bitter-sweet cider apples were concerned. I had many questions concerning varieties, root stocks, orcharding systems, managing our agro-chemicals and, indeed, the financial viabilities of what we were doing. On discovering that the majority of cider apple production was taking place in the UK, I found myself spending time looking amongst our own growers, but I also travelled extensively through Holland and Belgium looking at nurseries and different types of trees.

However, I do think we are very fortunate to have some very fine nurseries in the UK for the bitter-sweet industry. I looked extensively at research stations in Italy - the Edmund Mach Foundation - and research stations in France where the French pay a levy per tonne for research into their orchards. I also looked at research in the USA in Michigan, Washington and UC Davis, California, and I looked in New Zealand and Australia and found some great innovations on varieties: but little that struck me as being radical.



Figure 10: Poster at CiderCon 2015, held in Chicago

I looked at many different root stocks and believe that trials in the UK are still wanted, and I am setting out to carry those out on my own land.



Figure 11: Multiple leaders on apple tree trials at Edmund Mach Foundation

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I looked at different supporting systems to reduce the cost of production, but I think one of the most striking things I looked at was a system in Italy featuring co-operative growing and an extraordinary process of 6,600 growers under one co-operative, many of them not much more than a hectare in size, and being paid very specifically on quality. In fact, the grading lines had 48 different grades all paid differently, which incentivised the growers to do the job for best economic return.

*One of the most striking things I looked at was a system in Italy featuring co-operative growing .. with .. 6,600 growers under one co-operative .. being paid very specifically on quality.*



Figure 12: Hail nets over the orchards at Mezzacorona, Italy



Figure 13: 48 channel grading line at Mezzacorona, Italy.

- I looked at mechanical pruning.
- I looked at hail nets and I looked at irrigation.

Mechanical pruning is certainly a thing that is here to stay and we have much to learn which can be used to significantly reduce pruning costs. I have my reservations that a drink for pleasure and leisure should be associated with irrigation that may, over the life of our orchards, i.e. some 25 years, become a dirty word in some aspects of agriculture.

*(paying) attention to soil health was the single most vital learning point on my whole journey.*

- I looked extensively at composts and particularly soils which repeatedly came up as the key to successful and economic growing of any agricultural crop.
- Our attention to soil health was the single most vital learning point on my whole journey.



Figure 14: New traditional orchard plantings in Somerset, UK, trialling compost additions.



Figure 15: Emmanuel Gayet - possibly one of the finest growers I met in my travels. He considered his orchard to be a permanent experiment, a note worth remembering. He was trying split leader training, various different root stocks, different supporting systems, different nutrient management systems, experimenting widely with mechanical pruning and I felt it was one of the most vibrant and healthy orchards I visited in my entire Nuffield Farming experience.





## 7. The economics of growing bittersweet cider apples

Cider has enjoyed its renaissance since 2006, but apple **production** in the UK has risen more dramatically than the cider **market**: from some 3,500 hectares of fruit in the UK in 1996 to a little over 7,500 hectares in 2014; understandably on the back of falling wheat prices and firm contracts being offered by cider-makers.

*Since 2006 apple **production** in the UK has risen more dramatically than the cider **market***

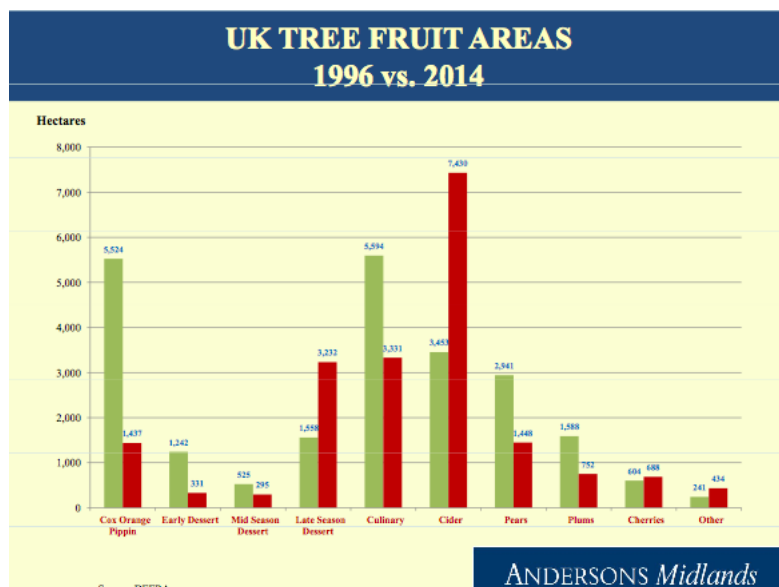


Figure 16: Surge in cider fruit planting in the UK. (Source : Andersons)

However, we are now **producing** some 380,000 tons of bittersweet fruit in the UK, and rising, but our **cider-makers** are in decline. As a grower, I know that the two most important lines on my spreadsheet are firstly price, followed by yield. If I am not on the right soil types, or growing the right root stocks, I am immediately flooded.

But it is important to look even more closely at some of our growing costs, and particularly the long term viabilities of our orchards, over the full life of an orchard.



Prepared:  
21/12/2015

ANDERSONS Midlands

Cider - Version 1  
Various

GROWER: Neil Macdonald

CIDER ORCHARD LIFETIME FINANCIAL PLANNER

ESTABLISHMENT, GRADE-OUT AND OPERATING COSTS

ORCHARD ESTABLISHMENT COSTS

	£ per Hectare	NOTES
Drainage/boundaries/clamp/land preparation	8,420	Land preparation=£3,285
Trees / stakes	3,750	Trees @ 6x2 metres = 835 @ £4.50
Planting costs	650	
Other Costs	2,465	Posts/wire/guards/fixings/plant food
Total	15,285	

Year 1:

	£ per Hectare	
Fertiliser/spray costs	397	50% Year 2 cost
Crop Sundries		
Spraying / Mowing		

DIRECT COSTS - GROWING

	£ per Hectare	
Fertiliser/Spray costs in Year 2 (inflated at 2% p.a.)	793	Fertilisers (N) = £112.50/Ha
Pruning / Clearing (inflated at 4% p.a.)	200	Fertilisers (Compound) = £320/Ha
Spraying / Mowing (inflated at 4% p.a.)		Fertilisers (T Elements) = £80/Ha
Other costs (inflated at 4% p.a.)	50	Sprays = £280/Ha
	£ per Tonne	Spraying/mowing included in Overheads
Harvesting & Haulage costs (inflated at 2% p.a.)	35.00	

OVERHEAD COSTS

	£ per Hectare	
Labour (inflated at 4% p.a.)	800	Based on 1 man for 40 hectares
Power & Machinery (inflated at 3% p.a.)	400	Non-harvest costs only
Administration (inflated at 2% p.a.)	125	
Property (inflated at 2% p.a.)	200	
Rent (or rent equivalent)	375	Market rent

Figure 17: Summary of financial planning outline for 2015,  
as applied to Orchard Park Farm, Somerset, UK.

We can all argue about quantities of fertiliser or agro-chemicals or other inputs.

We can all argue about pruning, costs and general maintenance.

But the truth is many of us are now selling cider apples at probably less than cost of production when weighing up the whole life of our orchards.

The first thing we can probably do to help this is to push out some of the older and less productive orchards, slow down our new plantings which are still taking place at relatively alarming rates, and focus very strongly on the most profitable areas of our fruit production. That said, we are commodity producers of fruit and our labour and machinery must be in proportion to our output: ideally somewhere around 40 hectares of production per one man and tractor and sprayer.

*the truth is many of us are  
now selling cider apples at  
probably less than cost of  
production*



Running the numbers shown on some Somerset soils - which are perhaps lower yielding than Hereford soils - £135 per tonne would leave a significant enterprise loss over its 25-year period, and £135 per tonne is already the top end of market rate. In fact, if we want to make money the financial models below demonstrate that we need to be over two times more than that. No matter how good our farming is, it's the price per tonne that makes the difference.

RESULTS SUMMARY			
Grower:	Neil Macdonald		
Crop:	Cider-Version 2-Breakeven		
Variety:	Various		
OUTPUT			
Lifetime yield	617	tonnes per hectare	
Average annual yield	25	tonnes per hectare	
Average sale price	£ 233	per tonne	
Average sale price	23.3	pence per kilo	
COSTS OF PRODUCTION - LIFETIME AVERAGE			
			% TOTAL COSTS
Growing, Harvest, Haulage	12.6	pence per kilo	54.2
Overheads	10.7	pence per kilo	45.8
Total	23.3	pence per kilo	
PROFIT			
			% TURNOVER
Lifetime profit	0.0	pence per kilo	0.05
Lifetime profit	£ 72	per hectare	
INVESTMENT PERFORMANCE			
Payback	In Year 25		
Internal Rate of Return	0.02%	before interest / taxation / risk	
Net Present Value at 15%	-£18,585.69		

Figure 18 : Break even forecast for the life of an orchard at Orchard Park Farm, Somerset, UK.  
Note: requires average sale price of £233 per tonne.

So what can we do to add value to our product?

- Understand clearly what our cider-makers want to pay for tannins, sugars, and clean fruit.
- Look for alternative markets for our expanding artisan producers,
- Look to encourage export of our volume to the likes of America
- Try to dominate the bitter sweet cider fruit market globally.



## 8. Discoveries and the future



Figure 19: Mature commercial bittersweet orchards in Somerset, UK.

So the key discovery is that there is an over-supply of bittersweet fruit in the UK but, clearly, an under-supply globally. As the UK is the leading producer of bittersweet fruit we have some very considerable advantages over any other country wanting to start this production:

*there is an over-supply of  
bittersweet fruit in the UK  
but, clearly, an under-supply  
globally*

- We have good quality nurseries, a stable economy and a law abiding place to work from.
- We have infrastructure of processing, an understanding of mechanical harvesting and engineers to back that up, and a great deal of experience in doing what we do.
- So much so, that we can get bittersweet concentrate across the water to America at a fraction of the cost they could produce it themselves, giving us a significant market opportunity. I would say this opportunity is available in many other countries around the world.

So, we are best placed in the world for cider apple production. The export opportunities globally are growing; the financial viabilities as discussed in the last chapter are slim but, nevertheless, I believe, can be made to be profitable with scale and good strategic partnerships.

*we are best placed in  
the world for cider  
apple production.*



However, one of my biggest concerns is the need for research and development **now**, particularly in varieties. Do we have varieties that are fit for the next decade to combat the growing costs of agro-chemicals and the static or reducing value of our product?

*However, one of my biggest concerns is the need for research and development now*



Figure 20: A pristine commercial orchard at Thatcher's, Somerset

What I do know is that Europe has become the envy of the world in apple production and the UK is often seen as the envy of Europe: notably our ability to have a quality brand - brand Britain - and to understand that we are commodity producers of a niche market product and that quality and quantity are vital to success.

*We should not underestimate the value to a cider-maker of a contract to grow.*

The world is now a very small place and our ability to export is high. We should not underestimate the value to a cider-maker of a contract to grow. A known price for a known period of time is a great deal bigger an advantage than many other commodity producers have, and our relationship with cider-makers should be as strong as possible and an understanding of their needs is vital to success.

The future does depend on cider remaining a higher value niche product and if the current tonnage does not slow, or a significant export liquid increase does not happen, we are heading for a potential problem.

We need to reduce our acreage by grubbing out our old and unproductive orchards, and to work hard at exporting and branding our produce. "Brand Britain" is a well revered brand and gives growers a great opportunity for the future.

*We need to reduce our acreage by grubbing out our old and unproductive orchards*

*Cider Orchards: the Great British Success Story .. by Neil Macdonald*

A Nuffield Farming Scholarships Trust report .. generously sponsored by The Worshipful Company of Fruiterers





## 9. Conclusions

When I embarked on this Nuffield Farming Scholarship two years ago I thought I had a clear idea of what lay ahead. I could not have been more wrong!

1. I thought that I could develop the industry by exporting the skills I have learned here in the UK. I thought that what I needed to look at was new growing opportunities in other countries. I thought there would be a need for my experience to help to plant new cider orchards and manage them to maturity. I thought I would find lots of expertise in apple growing all over the world.
2. What I discovered was that there is no Garden of Eden for cider apples, unless it be in England and France. There are plenty of places in the world with good affordable land and a pleasant climate, but they have an unreliable work force, or a difficult political situation, or labyrinthine bureaucracy, or no market. Climate change is also an unknowable factor affecting the planting of orchards, and scale is now vital to the success of any venture.
3. Cider is in growth across the world. It is a drink that appeals to men and women alike and, in this health conscious age, it has the great virtue of being gluten free. Far too much cider is made with little regard for the quality of the finished product but as more artisan producers come into the field the quality of cider worldwide will improve, as customers search out and demand a better made bottle.
4. Our cider-makers in the UK have led the industry in the past ten years, innovating and revivifying what used to be a drink for old men. It now comes in fruit flavours as diverse as strawberry and chilli. It is packaged to appeal to an expanding range of consumers. This baton has been picked up by Australia and the USA whose product diversity and marketing expertise have transformed the look of cider as we used to know it. Cider has found itself smack in the middle of the twenty first century.
5. In order to keep this growth going the industry has to continue to innovate. Cider-makers want quality, tannin and acid in the apples they buy. They want apples that will arrive at the cider mill in good shape. They want to prolong the season with varieties that will mature both early and late. As growers it is up to us to provide the raw ingredients that the cider-makers want. There is still hardly any research going into this in the UK.
6. Growers must take their share of the blame; for far too long, cider orchards have been under-managed with little thought being given to chemicals and their effect on the environment. Old varieties are nearing the end of their natural lives and there are few new varieties to replace them. Growers have shown very little interest in research, innovation or indeed cooperation. No two growers run their business in the same way; many are very poor at cooperation and communication with both fellow growers and cider-makers. Equally, cider-makers are not always very good at communicating with their growers, leading to an absence of clarity about what the cider-makers really want.



## 10. Recommendations

### 10.1. Orchards

- a) Reduce the orchard area, by pushing out old and less productive orchards and by planting fewer new ones. (Our current oversupply will lead to lower prices).
- b) 1 man per 40 hectares, in an optimum, ideal world
- c) Bittersweet fruit should be a commodity production but not at the expense of quality
- d) Variety choices are dependent on a clearer understanding of what cider-makers want (large and small)

### 10.2. Research and Development

- a) Every orchard is a permanent experiment and every experiment should be shared for industry benefit and knowledge share
- b) New variety trials must be started soon and must have the support and backing of growers with a focus on reducing agrochemicals
- c) Support modern technologies in plant development to deliver these advances in under 15 years
- d) Introduce a levy system on growers to support **real** research

### 10.3. Better communication

- a) Grower groups need to work harder at communicating among themselves and delivering consistent, desired quality produce to the cider-maker.
- b) Growers should value more highly a contract with a cider-maker and not expect any further incentives to grow
- c) Cider-makers need to seek out personal relationships with their growers whether they be individuals or groups
- d) Cider-makers should be prepared to pay a premium for the fruit that gives them the best margin (clean, low starch, high juice, high tannin etc)
- e) More effort needs to go into sharing knowledge between growers for best industry practice, using modern technology and organisations such as ONE (Orchards Network of Excellence)

### 10.4. Marketing

- a) UK bittersweet growers need to understand that their product, the raw ingredient, is unique and top quality and greatly in demand globally
- b) Growers need to value their contracts but they should also look further at more diverse and global markets, collectively or as individuals



## 11. After my study tour

As a result of my Nuffield Farming study tour I have gone on to accomplish the following things:

- 1) Planned and started the planting of 80Ha of cider apple orchards at Orchard Park Farm over the next 4 years including drainage, tracks, extensive soil improvement and high tannined varieties trials on various root stocks. Including contract growing agreements with cider-makers.
- 2) Installed a 3-tonne-per-hour apple press to supply local artisan cider-makers with increasing quantities of cider apple juice.
- 3) Installed a cleaner/ loading system to reduce damage to apples during apple handling and to improve the quality of pure fruit being delivered for pressing.
- 4) Worked more closely with the Orchard Network of Excellence to assist in knowledge share of growing techniques and industry best practices, including an annual growers' conference.
- 5) I am on the steering group of the NACM pomology committee looking to develop new varieties trials to provide commercial opportunities in 10 to 15 years' time. This includes raising funds, identifying partners and setting parameters for the research.
- 6) I have employed others to take key senior management roles in my cider-making, farming and solar maintenance businesses so I can focus on new opportunities for exporting.
- 7) I have started a consultancy business on cider apple growing and cider apple juice supply in the USA and Europe, including branding of British products and strategic partners around the world.
- 8) I have dramatically increased my investment in people and their training, including apprenticeships, share options and bonus schemes.
- 9) I have extended my succession planning.
- 10) I intend to develop a Centre of Excellence for cider apple production in Somerset with a view to increasing knowledge and new techniques.
- 11) I would like to see the UK cider apple industry as a world leader and net exporter of fruit, with the extensive wildlife benefits of orchards portrayed as a huge positive to our consumers and our countryside.

**Neil Macdonald**



## 12. Executive summary

Over the past decade few agricultural enterprises have seen growth to match that of the cider industry. In 2006 cider was 1.2% of UK total alcohol sales; by 2012 it had risen to 9.4% and has since remained stable. Furthermore, in 2012 over 70% of all global cider was made and consumed in the UK; in 2015 it was less than 43%, demonstrating the huge growth in the global popularity of cider.

Global consumption of cider is predicted to grow by around 5% a year, from a 2015 level of 2.4bn litres to more than 3bn litres by 2020, with some 70% of the extra consumption expected to come from the US, Australia and South Africa.

If the popularity of cider in both the UK and the rest of the world continues then it will require an increase in raw ingredients. The global consumer is recognising that the quality of cider apples is a key ingredient in the popularity of the product. There is currently an undersupply globally.

How can modern methods of apple production be applied to meet this global demand?

Which varieties of apples do the cider-makers want, and why?

What are the economic and environmental issues of growing cider apples?

The first part of my study looked at growing techniques and orcharding systems for apples used in the cider industry and for this I travelled extensively in the UK and Europe. Secondly I wanted to see at first hand where the biggest growth in cider production was taking place and this led me to Australia and Eastern Europe, but predominantly to America.

My travels indicate that there is no better location to grow cider apples than right here in the UK, where we have the knowledge, structure, stability and brand to deliver. I also witnessed first hand that America and Europe are indeed well under way with their projected growth of cider consumption, but have no ability to grow cider apples fast enough to meet this demand.

However, the orchard hectareage in the UK has grown very rapidly since the late 1990s to being now over 7,500 Ha with some older commercial orchards being removed to make way for new ones. This was driven by weak cereal prices at the time and was accompanied by the promise of firm and contracted prices for apples by cider-makers on the back of the revival of cider and its accelerated growth from 2004 to 2012. The popularity of growing cider apples over-reached demand two years or more ago with the likelihood that most growers are now selling apples at less than their true cost of production when considering the whole life of the enterprise.

My recommendations are:

1. We must reduce our orchard area and seek much higher average values for cider apples both in the UK and the rest of the world. This might be achieved through quality standards and understanding what ingredients our cider-makers really value.
2. Research and development into new varieties is essential. We do not have any other significant way of reducing the need for increasingly expensive and environmentally unpopular agro chemicals other than through tree breeding programmes.



3. Strategic partnerships and scale are key to success. A contract of guaranteed sale and price from a cider-maker is a gift that very few other agricultural enterprises have and one that brings stability to an unstable industry.
4. Farmers should recognise this export opportunity for the great British success story that it is. Exports of cider apples are vitally important to the health of the industry. We have both a need and a huge financial opportunity for export, simultaneously retaining our global dominance in the cider industry and providing significant opportunities to grow cider apples for profit.



**Figure 21: I was privileged to be shown around a number of professional growers in France by Ian Game, the French representative of Somerset Fruit Machinery, based in Normandy.**  
**I learned how well the French were commoditising cider apple production.**  
**Some French varieties but many English varieties are being used.**  
**A levy of three Euros per tonne goes back into research and development which the French consider to have huge value to forward thinking production.**  
**Note to the UK growers!**



## 13. Thanks and Acknowledgments

First and foremost I must thank my sponsor, The Worshipful Company of Fruiterers, without whom this wonderful opportunity would not have been possible.

Secondly I must thank my wife and family who have supported me throughout my study tour period.

Thirdly, of course, my staff who have nobly stepped up to the plate, taken on extra responsibilities, and generally ensured that I could go away on my travels with the minimum disruption to my business. They are all so much appreciated.

Anne Beckett – Nuffield Reports Editor	<b>Pre-CSC London</b>
Stephen Watkins – Nuffield, NFU	Baroness Byford
Louise Manning – Nuffield Trustee	The Duke of Gloucester
Mike & Poey Vacher – Nuffield UK	Allan Wilkinson HSBC
Andrew Dyke - NSch	Prof David Hughes – Imperial College
Robert Fovargue – Pearce Seeds	Peter Kendall – Past President NFU
Graham Collier – Worshipful Company of Fruiterers	Matt Ware – NFU London
Rupert Best – Worshipful Company of Fruiterers	Maeve Whyte – NFU Brussels, 2014 NSch
Stephen Ware – Grower, 2011 NSch	Ali Capper – 2013 NSch
Alistair House - NSch	
Lord Julian Darling – Nuffield Trustee	<b>CSC - Australia</b>
Caroline Drummond – LEAF Chief Executive	Rabobank International
Peter Mitchell – Cider & Perry Academy UK	Jim Geltch – Nuffield Australia
<b>INDUSTRY</b>	
<b>Australia</b>	<b>Portugal</b>
Borrry Gartrell – grower	Biofun Orchards
David Pickering – Cider Assoc of Australia	
Liz Riley – viticulturalist, 2006 NSch	<b>Ireland</b>
Robert Peardon - Farmer	C&C, Clonmel Orchards
<b>France</b>	<b>Netherlands</b>
Ian Game – Somerset Fruit Machinery	Henk Nooteboom – Verbeek Nurseries
Emmanuel Gayet – Grower	
M.Jean-Pierre Fontaine Producer	<b>Belgium</b>
Mme Natalie Dupont,(formerly of the IFPC)	Koen Carolus – Carolus Nurseries
M.Thierry De Ferrand – Val de Rance	
	<b>Italy</b>
<b>Romania</b>	Luca Granata – Cooperativa Melinda
Alan Clark – Cidru Clarks	Fabio Maccari – Cooperativa Mezzacorona
Luminita Holban - Ecotransylvania	Silvio Canestrini – Cooperativa Mezzacorona
	Fabrizio Costa – Fondazione Edmund Mach
<b>New Zealand</b>	
Guy & Topsy Mason	
Geoff & Gill Duncan	
<i>continued overleaf</i>	

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INDUSTRY continued	
UK	USA
Liz Copas – Pomologist	CiderCon 2016 – Portland, OR
Richard Johnson – Thatcher’s Cider	James Kohn – Wandering Aengus Cider
John Thatcher – Thatcher’s Cider	Prof Abhaya Dandekar – UC Davis
John Worle – John Worle Nurseries	Treco Nursery – Salem, OR
Nick Dunne – Frank Matthews Nurseries	David Bauermeister - NABC
Royal Bath & West Agricultural Show	Karen Mauden - NABC
Helen Thomas – Weston’s Cider	Mike Beck – Uncle John’s Cider, MI
Bob Wadey - Grower	Stephen Wood – Farnum Hill Cider
Simon Baxter – Norton Cider Growers	Eric West – Cider Guide
Heineken UK	Dr Nikki Rothwell – Univ of Michigan
Bulmers	Dan Young – Tandem Cider
Pixley Berries	Dr Terence Bradshaw – Univ of Vermont
Cobell	Drew Zimmerman - Grower
Edward Clifton-Brown – West Bradley Orchards	Prof Carol Miles - WSU
John Pelham - Andersens	Dan Smith – Cornell U
Richard Heathcote NACM	Prof Gregory Peck – Cornell U
Rob Collins - Grower	Ian Merwin
Gilly Pollock - ONE	Gayle & Paul Brown – Cold Hollow Cider
Bob Chaplin – Shepton Mallet Cider Mill	Florence Becot – Univ of Vermont
Rod Lees - Bulmers	Kevin Zielinski – EZ Orchards
Rod Clifford – Aston Manor	Harry Ricker - Grower
Allen Owen - Shepton Mallet Cider Mill	Jack King & Family – King Orchards
Alan Stone – Stone’s Bittersweet Ciders	Ed Gibson – Austin Eastciders
Martin Berkeley – Pilton Cider	Mark Darley - Processor
Matthew Naish & Son	