AUSTRALIA MAKE MAKE AGAIN
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TURNING BEER INTO SANITISER? THERE'S INGENUITY IN AUSTRALIA — AND THE POTENTIAL FOR A RETURN TO MANUFACTURING GLORY

Here's to your health:
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ack in March, as the realities of the Covid-calamity were looming, brewer Richard Adamson faced an unusual problem. It was a dilemma that in days of yore was considered a blessing – he had too much beer. Adamson is one of the founders of Young Henrys, a craft brewery based in Newtown, Sydney. Since it began in 2012 Young Henrys has muscled its way through a crowded, highly competitive field to become one of the premier independent brewers. And then, it faced the prospect of drowning in its own success. When the government announced severe social distancing restrictions, including turning off the taps at pubs and clubs, Adamson had more than 8000 kegs – 400,000 litres of lovely beer – sitting in warehouses that he couldn’t sell.

Young Henrys also has a gin distillery and, not long before the restrictions, it had distilled some bergamot essence to use in a fancy beer. “We had heaps of this high alcohol bergamot essence and it smelled fantastic,” Adamson says. “As the virus was getting worse and worse we thought we could turn some of it into hand sanitiser and put it behind the bar for customers, which we did. People were like, ‘Wow, you made this. Can you make some more?’ It was then that we realised how much demand was out there.”

A decision was taken to turn the warehoused beer into hand sanitiser. “Basically we emptied the kegs into the gin still and turned the beer into ethanol,” he says. Ethanol – a type of alcohol – is the active ingredient in hand sanitiser. That was the easy part. Everything from that point on was a “mad scramble” because everything else they needed came from China, where supply lines and freight were disrupted. The viscous base in hand sanitiser is glycerol, which is sourced from animal fat and vegetable oil and was almost impossible to get. “We spent hours on the phone and on the internet,” Adamson says. “We thought we had someone who could supply it and then they dropped out. We eventually got 100 litres from some guy on eBay, but we need more and it remains an ongoing issue.” They then had to find dispensers because, again, most containers come from China. Each new batch has had differently shaped bottles so each one had to be filled manually, greatly slowing the production process.

But still they persist because Young Henrys has become a vital supplier of hand sanitiser to the Chris O’Brien Lifehouse, a major cancer centre in nearby Camperdown. Each week it delivers its new product – some of it donated – for staff to use as they go about their work in the wards. It’s not surgery grade, but the Therapeutic Goods Administration swiftly approved its use. “I’m very proud of what we’ve been able to achieve,” Adamson says. “When you get a call from the Chris O’Brien Lifehouse saying they are desperate for hand sanitiser, then you just have to answer it, don’t you.”

Young Henrys has since begun supplying a range of customers, including police stationed at hotels guarding quarantined returnees, councils and charities for the homeless. There is enormous demand. The brewer is in a position to vastly up-scale its production of ethanol but is severely restricted in its production of sanitiser because it doesn’t have the glycerol to mix it with or the bottles to put it in. “We’ve been told there will be a big delay in supply until June,” Adamson says.

Young Henrys’ problems are shared by the nation. So much of what Australia consumes is manufactured abroad, particularly in China. The pandemic has laid bare fundamental flaws: we simply don’t make enough things and our industrialist Sanjeev Gupta says, Australia has had it far too easy for decades, relying on our resources and manufacturers to pivot to make other products when the need arises. As the industrialist Sanjeev Gupta says, Australia has had it too easy for decades, relying on our resources sector to make us rich and largely abandoning manufacturing. “Dig and load and be comfortable; you’ve not been forced to add any value, to create anything,” he says. The reckoning is upon us.

Former Dow Chemical Company CEO Andrew Liveris, who is now advising Prime Minister Scott Morrison on the way forward, says manufacturing in Australia is in need of a radical overhaul. “It needs a public-private partnership that, hitherto,
Australia has been loath to adopt, because we believe that free markets should do it all,” he says. “Well, big news, free markets don’t.

In most world rankings – healthcare, education, wealth, life expectancy – Australia sits smugly among the top tier of the world’s wealthy nations. But there is a table that thunders a warning and it’s called the Economic Complexity Index. The ECI measures the complexity of products a country produces. Japan sits at number one, followed by Switzerland, Germany, Singapore, Sweden, South Korea, the US, Finland… Australia staggers in at 59th, wedged between Kazakhstan and Lebanon.

“The lucky country needs to become the smart country, because we are running out of luck,” says Dr Jens Goennemann, the CEO of the Advanced Manufacturing Growth Centre (AMGC), a body set up under the Abbott government to promote the manufacturing sector. Australia has long relied on digging up commodities, particularly coal, and sending it to global markets. There is an urgent need for us to expand from an economy that extracts and farms to one that adds value and manufactures complex things in a sustainable way.

“The simple truth is that if you want to play a relevant role on the international stage, and you cannot make complex things, you will wake up empty-handed,” says Goennemann. And, if you cannot make complex things, you cannot respond effectively to a crisis, be it a pandemic, a military incursion or global warming. His argument is not an ideological one but a practical one: if the mining sector collapses, or there’s a trade war and China stops taking our agricultural products, then what?

Goennemann began his career as an engineer with Daimler-Benz and worked in Europe and Australia in the defence industry, including with Airbus, building military aircraft and helicopters. He has been picked for the Federal Government’s Manufacturing Working Group, charged with charting a way forward for manufacturing under the National Covid-19 Coordination Commission.

Manufacturing is not a sector but a capability, he says. “Health is a sector. Agriculture is a sector. Pharmaceuticals are a sector. Mining is a sector. Health is a sector. Agriculture is a sector. Manufacturing is a capability… My view is that the National Covid-19 Coordination Commission. The AMGC has been called on to print ventilator parts. When you think of advanced manufacturing, don’t think of textile looms and pollution,” he says. “That’s yesterday’s manufacturing. We need to be in drones and robotics, renewable energy, processed food for export… not just primary produce.”

Liveris, a Darwin-born engineer who has advised Barack Obama and Donald Trump on manufacturing policy, says the US and Australia became manufacturing powerhouses after World War II but when they began sending manufacturing offshore to Asia in the ‘80s and ‘90s, expertise and ingenuity drained away with it. “The US let its economy atrophy and manufacturing dropped from 25 per cent of employees to 11 per cent in just two decades,” he says. “Australia has done the same and because of our high labour costs we just assumed we wouldn’t be competitive in manufacturing and we could just live off our service sector, our education sector, our financial sector… with our staples of agriculture and mining.”

What we were left with was an economy that is vulnerable in a crisis. “We’ve looked around and thought, Oh my God, we don’t make all the things we need, where are we going to find it?” he says. It has become not just a supply issue but a national security issue. “Health, energy, defence, food – these are vital sectors and we need a national strategy.” Liveris believes there needs to be government help to kickstart advanced manufacturing, be it research and development tax credits or some form of assistance to help niche manufacturers scale up and break into export markets.

“We’ve long believed that free markets are the way to go – let the market decide,” he adds. “I have learnt that this is short-term thinking because most countries out there, especially top-down autocracies like China, or the planned Asian economies like Japan, South Korea and Taiwan – they had a plan that actually said, ‘I am going to industrialise and export to create wealth, and that then creates a virtuous cycle of innovation.’ These nations, he says, found ways of supporting their manufacturing industries that skirted along the edge of free-trade agreements. “The big fallacy is that it should just naturally happen, but it doesn’t.”

Liveris says we have some of the world’s leading researchers but all too often they get “picked off” and taken abroad to commercialise and scale their ideas. “We’ve got to find a way to keep them here,” he says.

One of the ideas the Manufacturing Working Group is exploring is the creation of industry clusters. “These would be special parks where we’d build precincts and incubators and accelerators – we’d put the best researchers alongside the best small- to medium-sized manufacturers and...
create a campus environment to leverage technologies.” Liveris says this has been done successfully in the US, where he was part of a program that created II manufacturing institutes in the so-called rustbelt regions, mimicking the tech sector in Silicon Valley. The government helped build the parks and then “matched dollar for dollar the private sector investment; it will share in the IP [intellectual property].”

Liveris says environmental concerns need to be at the forefront of our thinking in building this new economy. “Young people care about the environment like no other generation has before,” he says. “So if you say renewable energy, you say recycling, you say preservation of the resources of the planet like water... let’s invent the technologies to go there, let’s educate our young people to seek careers in this and reskill our existing workforce to get them out of yesterday’s industries.” And into these industries of the future.

So how do we connect our brightest minds with the manufacturers and entrepreneurs to create these industries? And how do we look after the environment while we do it? One answer may lie under the lids of our rubbish bins.

Professor Veena Sahajwalla, from the University of NSW’s Centre for Sustainable Materials Research & Technology, is a world leader in the field of recycling science; she’s been successfully working with industry and manufacturers for years, looking at ways to use waste materials to create new industries and products from stuff that would otherwise end up in landfill. One of her inventions, Green Steel, uses shredded tyres and shredded plastics in the steel-making process. Instead of using coking coal, the tyres and plastics are pumped into a furnace at very high temperatures to provide the carbon needed to make steel. This elegant invention has been commercialised by Australian steelmakers and the IP has been sold abroad to make millions of tonnes of steel, saving mountains of tyres and plastic from ending up in landfill.

Sahajwalla’s team has also been working on micro factories that use robots to mine useful waste, such as old computers and televisions. The plan is to roll out these micro factories across the country, tapping valuable resources at their source – the local dump. At its E-waste micro factory in Sydney the team has successfully transformed the plastics from clapped-out office printers into filaments (printer plastic) that can be used in 3D printers. In recent weeks it has used these filaments to make face shields for health workers at a Port Macquarie hospital – all from materials that were once bound for landfill. There is currently huge worldwide demand for 3D filament.

“Imagine if you could make filaments that were customised for different applications... we are doing just that,” Sahajwalla says. Copper has been shown to have antibacterial properties. “So imagine you could print door handles for use in hospitals, a premium product, that had copper particles embedded in them.” It is just one of the ideas her team is working on. “Let’s join the dots between that and the manufacturers and – shock, horror – we could actually be the country that is exporting high quality plastic filaments around the world.” All made from rubbish.

Sahajwalla has had phenomenal success working with industry in solving problems, such as reducing landfill, while developing new and innovative products. Thanks to her team, a new manufacturing industry is blooming in the NSW Riverina making high-quality tiles from old beer bottles and manky mattresses.

More than a decade ago, Andrew Douglas began Mattress Recycle Australia (MRA), operating out of Cootamundra. “Mattresses are the worst thing for councils because they are big and bulky and they take up a lot of space in landfill, which is not good,” says Douglas. Councils and individuals pay him to collect them. MRA then uses heavy metal shredders to deconstruct the mattresses. Magnets pull out the steel, which is recycled, and industrial blowers then separate the wood from the textiles. The wood can be reused but in the early days they were still left with a lot of waste fabric. “About seven years ago I approached Veena and her team and said, ‘Look, this is a big problem, we need to find a solution for all this textile waste,'” says Douglas. And they did.

Scientists and engineers from UNSW worked with Douglas and his team at MRA to develop incredibly strong, high-quality tiles made from glass bottles crushed into fine particles and the fabrics from the mattresses, which are mixed with a binder and pressed. “It has the equivalent strength of Caesarstone,” he says. Douglas, in conjunction with UNSW, recently won a contract to supply tiles to the giant construction company Mirvac. The factory is modular, he says, so they can move it to where the waste is.

The same process could also be used to make kitchen benchtops and, along with the scientists from UNSW, they’ve been exploring the possibility of using waste fabrics to make ceiling insulation. “It is mind-bending,” says Douglas. “You look at it and think, ‘Wow, that’s a pretty good looking tile’ and when you break it down it’s a few old beer bottles and a smelly old bed.”

In May last year, The Weekend Australian Magazine profiled the British industrialist Sanjeev Gupta, who had bought the Whyalla steel works in South Australia and saved it from closure. Gupta was, at the time, hatching ambitious plans to build electric vehicles in Australia. He reasoned that we’d all soon be driving EVs, whether we liked it or not, so why shouldn’t we build them locally rather than import them?

At the time he gave the impression the reception he was getting from the Australian Government for his EV plans was less than enthusiastic. When I spoke to him recently he said that had all changed. Governments around the world, including in Australia, now have a “great desire to localise supply chains and indigenise industry.” Gupta has been in regular contact with the Federal Government’s manufacturing guy, Andrew Liveris, discussing his plans to build EVs. He says he should be in a position “to make some announcements” within a few months.

“It is incredibly important to have foundation industries from which you build the rest of your manufacturing sector,” Gupta says. “Big industries like energy, aluminium, steel, chemicals, fertilisers – these basic foundations are critical.”

Australia is lagging, he says, because it hasn’t invested in its foundation industries for the past 30 or 40 years. But we could now use this to our advantage to leapfrog our competitors by investing in new technologies in a variety of industries. “You are not burdened by legacy industries... If you had a car industry today it would be very difficult. If you are Germany, where you have this massive car industry, to transform it from old combustion engines to EVs is a whole journey.” Electric vehicles are completely different: “It is much more tech, it is sensors, it is automation – it is almost not a car anymore.” The choice is ours, he says. Do we want to buy or do we want to build? The Covid-19 crisis has presented Australia with a tremendous opportunity to use its natural resources to create employment, he says.

It is an opportunity Goennemann of the Advanced Manufacturing Growth Centre is determined not to waste. Back when Australia’s daily...
subsidiaries. Ben-Mayor received the design and the next day he happened to meet Goennemann at the medical taskforce meeting. Stryker has no manufacturing capability in Australia and he mentioned to Goennemann that its US engineers had designed a bed. Within three hours Goennemann and his team had linked Stryker to Australian manufacturers that could help – mattress maker AH Beard, Amtek (which specialises in fitting out emergency vehicles), Fallshaw Wheels & Castors, and the advanced engineering and manufacturing company Varley Group. “That all happened on a Friday,” Ben-Mayor says.

Engineers and designers from the various companies worked through the weekend in consultation with engineers in the US. Alan Moses, director of Amtek, tells me he found out about the project on the Sunday morning. He had a quick look at the US drawings and realised they were all in imperial measure; his draughtsmen worked for 24 hours straight redrawing the beds so they were all in metric sizes. Everyone involved worked with the pressure of knowing that people’s lives were at stake. “The whole process, from the design being released from the US to us getting TGA registration, and actually getting our first order, which is for WA Health, was three weeks,” says Ben-Mayor. Stryker is now filling an order of 500 beds to WA. ICU beds usually cost between $30,000 and $40,000 – and these beds are selling for $1950.

Stryker and its partners now have a capacity to build 1000 beds a week. With the flattening of the infection curve it now appears that capacity will not be required in Australia – but the beds, which are easy to transport and assemble, may be required in other countries. The design was released at the same time to Stryker’s subsidiaries around the world but so far, Ben-Mayor says, Australia is the only country that has produced a bed.

This experience had led to a reassessment. “This whole Covid experience has obviously shaken the world and it is not going to look the same afterwards,” Ben-Mayor says. “Why don’t we manufacture here? What is viable? What changes and support does government put in place to encourage it? Do we want to encourage multinationals to bring manufacturing here or do we want to set up our own?”

To Jens Goennemann, the answer is obvious: we need to step up and make our own high-quality, complex goods that we can export. The AMGC’s database of 2400 manufacturers that answered the call, the coalition of the willing, is now a battalion that could take on the world – or whatever the next calamity may be.
Smart: Hartley with a face shield; making sanitiser at Young Henrys
Forward looking: Veena Sahajwalla; Andrew Douglas
Stripped back: Ben-Mayor (left) and team with the new ICU bed

WHY DON’T WE MANUFACTURE HERE?
WHAT IS VIABLE? AND WHAT SUPPORT
IS NEEDED TO ENCOURAGE IT?