Value Ventures: September 2019
Long-term thinking in a world of short-term orientation.

Herd Mentality, Solomon Asch & Carbo Ceramics (CRR)

by Mr. Bean on 07 September 2019

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Last Month's Must-Reads

Each month I collect various articles, blog posts, research materials, etc. and deposit them here. This month's collection covers profits (and why they matter), WeWork's upcoming IPO and two value investor 2Q letters.

Why Profits Matter (and value investing is not dead), LT3000 Blog

I know, I'm biased. But value investing isn't dead. In the post, LT3000 suggests that the current VC/PE/IPO markets smell like the dot-com bubble of 1999. Not only that, it argues that investors *don't care* about whether a business makes money. This thinking, the post claims, not only destroys value in financial markets, but destroys capitalism.

At the end of the day a business *must* generate an economic profit to be a positive to society. It's the quaint math of 1 + 1 = 3. A business should take inputs (labor and capital) and in turn generate value in excess of those inputs (vital products, services, etc.).

OuiWork? The quick case for WeWork as an actually disruptive business, Alex Danco

In spite of the above opinion, I found Alex Danco's blog post on WeWork fascinating. I found Danco's work after Alex recommended Danco's post on the video game industry. Taking a crack at the soon-to-be public company, Danco suggests that although WeWork claims to be a "software business", they're not.

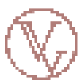
What does this mean for potential investors? I don't know. I wouldn't be too keen on their CEO selling $700M worth of stock before the IPO.

Greenhaven Road Capital 2Q Investor Letter, Scott Miller

Whenever Scott Miller releases a quarterly letter I stop what I'm doing and read. In his most recent letter, Miller discusses his current holdings, his decision to join the board of SharpSpring (SHSP) and his new investment in Nintendo (a company we've profiled at Macro Ops).

Greenwood Investors 2Q Investor Letter, Steven Wood, CFA

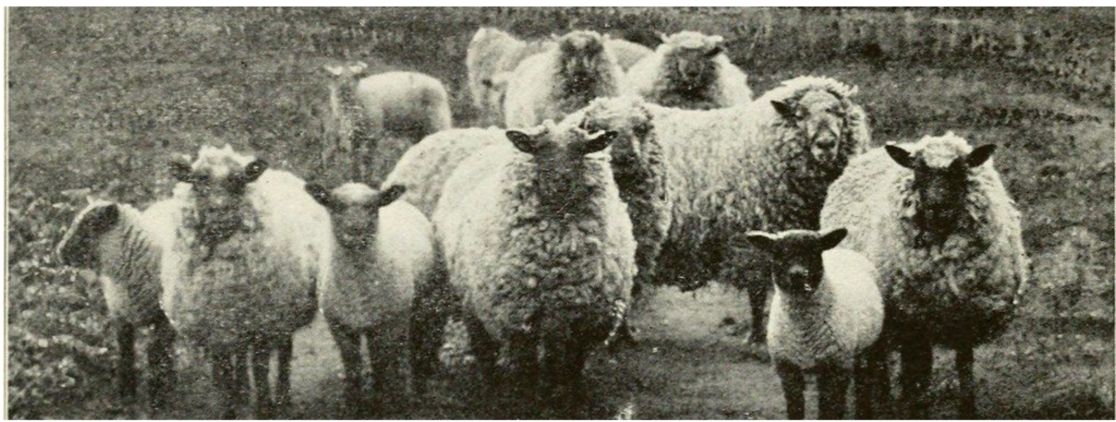
Steven Wood is a unique thinker in a landscape that is susceptible to groupthink. Steven takes a quantitative approach when viewing his portfolio, and is bullish on his collection of



businesses. He hasunderperformed the indices this year, but the *intrinsic value* of his holdings have grown much more than that of the indices.

Steven also discusses Efficient Market Theory -- spoiler alert -- he's not a big fan!

THIS MONTH'S
PHILOSOPHY CORNER



Herd Mentality, Mirror Neurons and Measuring Lines

Herd mentality, as defined by Herbet Simon in the journal article *The Concept of Herd Behavior: Its Psychological and Neural Underpinnings* is (emphasis mine), "**An alignment of thoughts or behaviors of individuals in a group** … such convergence emerges through local interactions among agents rather than some purposeful coordination by a central authority or leading figure in the group."

Sheep, buffalo or middle-aged women at Lululemon. We see herd mentality everywhere. In this section, we'll discover the physiological mechanisms of herd mentality, cover Solomon Asch's powerful experiment, and discuss how we can apply Asch's findings to our own Investment Process. Once finished, you'll be able to add a new mental model to your lattice-work toolbelt.

Why We Herd

Humans don't herd because we decided it would be fun. It's how we survived. We are, after all, the most advanced species on the planet. But we weren't always like that.

Our hominid ancestors utilized herding to pass their genes to the next generation. For example, if a lion's chasing you, it makes sense to run as a pack and play the numbers game.

Moreover, the journal offers ideas into *how* herding arises on a physiological level. A first principles level, if you will. By understanding *how* we herd, we can better apply these principles to other disciplines (investing, life, relationships, etc.).

Mechanisms of Herding

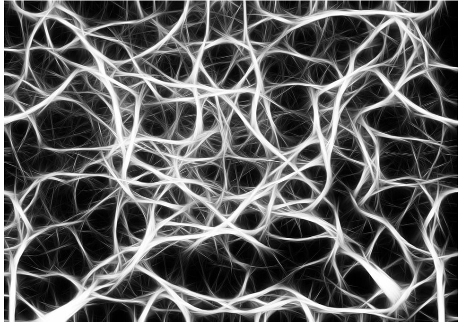
According to the journal article, herding mechanics fall into three buckets:

1) Emotional Contagion, Facial Mimicry, and Mirror Neurons
2) Social Norms, Shared Stories, and Mutual Expectations
3) Information Cascades

Let's dive in.

Emotional Contagion, Facial Mimicry and Mirror Neurons

Humans are like chameleons when it comes to showing emotions. *Emotional contagion* is the act of reflecting someone's emotional state upon ones-self. It's ingrained into our physiology. For example, infants begin mimicking emotions by day 21. To help us explain this phenomenon we need to go microscopic, we need to look at neurons.



Mirror neurons are the fundamental building blocks of mimicry and emotional contagion. Coined by Italian neurophysiologist Giacomo Rizzolatti, *this* neuron is what makes us social creatures. In fact, this gene goes so far back we can study it in chimps.

In his research, Rizzolatti revealed (emphasis mine), "[the neurons] ***fired both when an animal acted and when the animal observed the same action performed by another.***"

Moreover, Rizzolatti explained that (emphasis mine), "The same neurons fired when the monkey grasped something with its hand, ***and*** when the monkey ***observed*** the experimenter grasping it."

Neuroscientist at the University of California, Marco Iacoboni, used smiling to explain mirror neurons (emphasis mine):

> "When I see you smiling, my mirror neurons for smiling fire up, too, initiating a cascade of neural activity that evokes the feeling we typically associate with a smile. ***I don't need to make an inference on what you are feeling, I experience immediately and effortlessly what you are experiencing.***"

This is significant for two reasons:

1) It proves that it's easy for us to mimic others' emotions and in turn show them ourselves.
2) Beyond *showing* the emotions of others, we end up *feeling* the same as they do.

Thinking at the Neurological Level

It turns out mirror neurons impact every aspect of how we interact with others. Even how we process information.

Suppose you spend all day reading headlines of an impending market crash. You check Twitter and *voila*, the yield curve inverted! Reading other investors' reactions can pull you towards an altered state of thinking. *Mirrored thinking*, or their **thinking**. When the neurons fire, you become preoccupied with processing others' opinions. You even start feeling those emotions on a biological level. *You become trapped* in your own neurological web.

We see the same activity occur in individual stocks too. A hedge fund hotel is a collection of fund managers with mirror neurons firing in agreement. Short squeezes experience similar neurological mechanics. The first sellers cover, which triggers more sellers to cover, you get the picture.

Thinking with a mirror neuron framework provides us with a lens at which to view human interaction in financial markets in a brighter light. We know where sell-offs and bull-runs start: at the biological level.

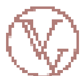
Social Norms, Mutual Expectations and Shared Stories

Social norms exist for a reason. They help us gain and keep friends, garner respect in our communities, and stay within the bounds of 'rational behavior'. We use mutual expectations and shared stories to develop and grow these social norms. Yet, even though social norms benefit society, they don't help us profit in financial markets.

To understand social norms and its influence on our decision-making, we must first understand *docility*. Docility, according to Simon, is our (emphasis mine), "*tendency to depend on others' suggestions, recommendations, persuasion and information obtained through social channels* ***as a major basis of choice.***"

Let's unpack this a bit more.

Simon argues that in honoring social norms, we tend to seek out what's popular amongst the masses. Once we learn what's popular, we adopt that *thing* into our standard of being.



It becomes our social norm. This has *devastating* effects when it comes to investing and financial markets.

The Power of News

There are no shortages of opinions on Financial Twitter (or as the cool kids call it, FinTwit). Have an idea you've been volleying in your mind? Shoot it out to the FinTwit masses and watch the piranhas attack.

Twitter is a *great* way to 'red-team' a thesis. But if you're not careful you'll enter an echo-chamber of confirmation bias. Even worse, your idea might be *so unpopular* that you throw it out for the sake of becoming a social pariah.

Financial news outlets -- *cough cough* CNBC -- fight every day to prey on your docility-space. They want you to adopt their expectations, share their stories. It's easy to fall into thinking that what they're saying matters. After all, they do have flashing headlines and "Breaking News" segments. These channels abuse our innate desire to connect with stories. To share in narratives.

When Stories Become Hindrances

In a similar vein, we leverage stories (narratives) to explain *any and every* phenomenon. We're pattern-recognition creatures, and most of our heuristics trace back to our African ancestors. These narratives do more than guide our minds during events in which we have no prior experience. It's deeper than that. Narratives give us *comfort.*

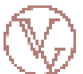
Yet its this desire for comfort that harms us the most when we're investing in public/private markets.

Start-up companies pitch *narratives* about what the future will hold -- even if they can't yet show it in profits. Venture Capital funds fire-hose cash into these *narratives*. And who can blame them? It's *ingrained* into our most basic genetic fabric. We *love* a good story.

The problem is that this behavior is value destructive. Our desire for a great story saps investment from good (albeit monotonous) ideas into high-flying stories about the world to come.

Given where we are in the cycle, it's not surprising that people want to invest in a money-losing company with a great *narrative* over a cash-gushing business with a boring *narrative*. Boring businesses don't make interesting stories for the 24-hour news cycles.

Stories become hindrances when they prevent us from making rational, reasonable investment decisions.



Information Cascades

Information cascades are like avalanches. Not only in that they're the culmination of the previous examples, but also in their destruction. All it takes is one silent tremor to send life-threatening reverberations further down. Hyperbolic bull runs and manic bear markets feed on information cascades. Even worse, the information *doesn't even need to be correct* for the cascade to work!

Let's take an example from Simon's journal article on the academic peer-review process.

Peer-reviewed journal articles go through many rounds of approval from fellow academics. Get enough positive remarks on your paper and you've got a spot in your industry's publication.

But what happens if the first peer leaves a poor review?

That decision, the first decision, *sends information down* to each subsequent reviewer of the paper. Whoever reviews the paper first will influence the opinions of each incremental set of eyes. That's a lot of responsibility.

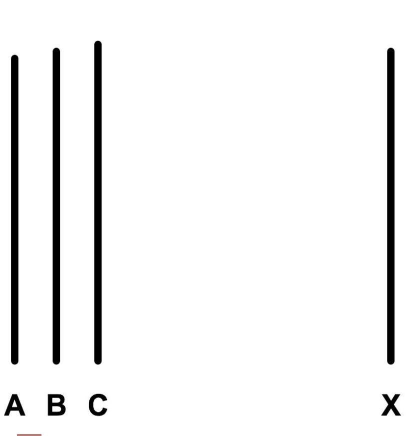
Intuitively this makes sense. If you receive a paper for review that has "rejected" on the front page, it subconsciously changes the way you view the paper. All this happens *before you read a single word!*

That's the power of information cascades.

The same thing happens with stocks. One person starts selling, which causes another person to sell, which leads to another person to sell … You get the picture. Information cascades happen fast and they take no prisoners. What's a 'Greater Fools Theory' other than an elongated information cascade to the upside?

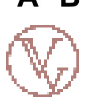
As we'll see next, information cascades lead us to act in abnormal, even irrational ways.

The Solomon Asch Experiment



Solomon Asch was one of the most influential social psychologists of the 20th century. Born in Poland, Asch's professional work focused on social influences, conformity and impression theory. Yet it's one experiment in particular that cemented his legacy:

Measuring lines (see photo to left).



The results of this study impact the very essence of what it means to be a stock market participant.

Questions such as, 'Do you have what it takes to be a contrarian?' have meaning. The old adage, 'contrarianism can't be taught' *has validity*. Things we didn't think measurable, Asch translated into data.

We'll provide an overview of the experiment, its results and how we can apply those results to our investment process. Another mental model to add to the toolbelt!

Let's dive in.

Overview of Experiment

Asch's goal for the experiment was to "study the social and personal conditions that induce individuals to resist or to yield to group pressures when the latter are perceived to be *contrary to fact*."

Asch believed it was "decisive fact" individuals are born with either the tendency to conform or to act independent. Famous value investor Seth Klarman ascribes to similar beliefs. He's well known for believing *contrarianism* isn't something one can *learn*.

The set-up was simple: one individual and one group of eight people. Both tasked with matching the length of a given line to one of three unequal lines. Asch then employed a control group. This group would write their answers on a piece of paper instead of saying them out loud and in front of a group.

Here's where the experiment proves potent. Instructed by Asch, the group would unanimously go against the judgement of the individual. If the individual thought the line was 1 inch, the group argued it was 1 ½ inches.

In his words, Asch wanted to know the "grounds of the subject's independence or yielding … whether he abandoned his judgment deliberately or compulsively."

In essence, **Asch was studying contrarianism at its psychological foundation.**

The Findings

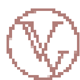
The results of the experiment were, to quote Asch, "*clear and unambiguous*." The data backs this

TABLE 2

DISTRIBUTION OF ERRORS IN EXPERIMENTAL AND CONTROL GROUPS

Number of Critical Errors	Critical Group * ($N = 50$)	Control Group ($N = 37$)
	F	F
0	13	35
1	4	1
2	5	1
3	6	
4	3	
5	4	
6	1	
7	2	
8	5	
9	3	
10	3	
11	1	
12	0	
Total	50	37
Mean	3.84	0.08

* All errors in the critical group were in the direction of the majority estimates.



up (screenshot from Asch's journal article):

Observing the data we notice **a *pull* towards the majority.** One-third of critical errors made by the individual were either *identical to* or *within the direction* of the majority's incorrect guess.

Phrasing it another way, our thinking is *very much* swayed by groups.

Things get *even* more remarkable when you compare the control group results. Nearly 95% of the control group had *zero critical errors.*

These results weren't binary, however. Distributions emerged between those that remained confident and those that caved under groupthink.

Asch broke the distribution into two quadrants: **independents and yielders**.

Independents were confident people, as one would assume. Yet they had a great feel for knowing they didn't know everything. They were *fallible.* For example, one of the *Independent* subjects claimed (emphasis mine), "I would follow my own view, though part of my reason would tell me *that I might be wrong.*"

Asch noted that Independents were generally, "resilient in coping with opposition, … relied on their own perception and effective at shaking off oppressive group opposition." Sounds like the required mantra when bag holding a contrarian position, right?

Yielders, Asch concluded, lacked confidence and appeared nervous when challenged by the group. One of the *yielding* subjects explained that (emphasis mine), "If they (the group) had been doubtful I probably would have changed [my answer], but *they answered with such confidence.*"

That last part is key: "*but they answered with such confidence.*" Excess confidence (especially in financial markets) gets you killed.

Using Asch's Results to Improve Investment Process

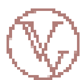
Before implementing this new model into our process, we need to ask ourselves:

What type of investor am I? A yielder or an Independent?

You might be a Yielder if:

1. You find yourself seeking confirming evidence on your existing holdings.
2. Sell at the slightest chance your opinion is unpopular.
3. Only invest in "trending" stocks.
4. Fail to do proper due diligence on your investments.

What should you do if you found yourself muttering, "damn, I do almost all of those things!"? Below are three ways that helped me turn yielding into independence.



1. ***Spend more time analyzing a business.***

Yielders have confidence issues. They wonder if others think their Axe body spray smells nice. Even worse, they lack conviction in their investments.

One way to reduce a lack of confidence is through deep diligence into one's holdings. Don't get me wrong, there will *always* be unknown unknowns. Yet understanding a business on a deeper level enables you to withstand the inevitable drawdowns.

If you *really* understand a business, you'll know the difference between a fire sale and an actual fire. You'll know if a 30% drop screams "buy!!!" or if it screams "GET TO THE CHOPPA!"

2. ***Buy illiquid stocks***

Want to kick-start your ability to generate confidence and conviction? Buy shares of *very illiquid* companies. Illiquid stocks force you to think more like a business owner.

There's two factors that allow this.

First, there isn't much public information out on some of the smaller, more illiquid names. This requires you to dive deeper and investigate like a *real* business owner. You can't just pull up the latest analyst report.

Second, you can't move in and out of illiquid positions with ease -- hence the name, illiquid. It takes a while to build a position, and as long to unwind the position. Selling an entire position at once could turn you from investor to market-maker. Doing this ruins your chances of getting the price you want.

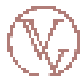
Because of these factors, your time-frame shifts from short-term to long-term, if nothing else for the sake of cost basis.

3. ***Protect Your Downside***

It's easy to be a Yielder when you're frightened of losing your skin on an investment. But it doesn't have to be that way. The margin of safety principle applies to your confidence levels. If you're betting the farm *and* sport a risk-averse personality, of course, you're going to yield at the slightest chance of being wrong. This is where downside protection comes in.

Downside protection manifests in various forms. It could be cash on the balance sheet. You could buy at less than liquidation value. On top of these, you could use stop-losses, which *literally* cap your losses.

Beyond these more quantitative measures, confidence is easier to keep if you're investing with a high margin of safety. If you can be wrong and still make money, it's easier to sleep. There's nothing better than investing in a net-cash business where even if you're dead wrong about the future, you can still make money.



What to watch if you're an *Independent*

One would assume that it's better to be an *Independent* than a *Yielder*. And while that is true in theory, it doesn't mean *Independents* skate through without issues. In fact, if left unattended, *Independents* could lose significantly more sums of money than their yielding counter-parts.

Here are two red flags to watch if you're Asch's *Independent*:

1. ***You discount any opinion / news contra to your current thesis.***

Confidence can manifest into arrogance. Where yielders struggled to hold any conviction, Independents can't think of a world where they're wrong. All their models are *the* truth, and their EBITDA multiple is without error. This isn't optimal and can lead to portfolio destruction.

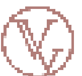
Cure: Read short theses on your longs, and try to keep an open mind. You *can be* wrong.

2. ***You refuse to sell because 'I'm right and it's going back up."***

Nothing's guaranteed in financial markets -- and it goes for valuations too. That a company is cheap doesn't mean the stock price will ever reflect that intrinsic value.

John Meynerd Keynes said it best, "Markets can remain irrational longer than you can remain solvent." Sometimes the market doesn't reward your idea on your desired time frame … or at all for that matter.

Cure: Be okay with selling. There are other opportunities out there. Don't get hung up on the one that *didn't work.*



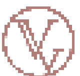
THIS MONTH'S
DEEP DIVE

Cliff-Notes: CRR

- **What We Like:**
  - **Deeply discounted (85% discount to Book Value) and trading around all-time lows.**
  - **Exceptional Leadership with CEO Gary Kolkrand**
  - **Insider ownership & voluntary CEO pay cuts**
  - **12% Investment by Wilks Brothers**
  - **Diversifying away from oil and gas volatility and move into higher-margin products.**

- **What We Don't Like:**
  - **Exposed to oil and natural gas industries**
  - **CRR's higher-cost product fails when companies are looking to cut costs**
  - **Currently money-losing business**
  - **Execution risk as management diversifies revenue streams**

- **What We Think It's Worth:**
  - **Book Value: ~$7-8/share**
  - **No-growth View: ~$1/share**
  - **Cautious Growth: $3-4/share**



Deep Dive: Carbo Ceramics, Inc. (CRR)

Carbo Ceramics (CRR) is a global technology company that provides products and services (such as proppants, software, and consulting) to oil & gas, industrial and environmental markets. The company's trading around all-time lows thanks to a near 90% decline in demand for their core product offering.

Yet, the CRR of the past looks nothing like the CRR of the future. In response to harsh commodity cyclicality, the company's diversified revenue streams reduced headcount and re-purposed idled assets. Management's also taken pay cuts or frozen pay increases while buying stock on the open market. One could lose sight of CRR's potential if they only focus on past financials.

CRR is a turnaround project that won't manifest overnight. Yet, we believe patient investors could be handsomely rewarded should management continue to execute on the transformation. There is also ample margin of safety built in as current prices state an 85% discount to book value. Even if one assumes a discount on those assets, the stock still trades at an attractive price.

How We Got Here

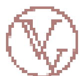
It's easy to see how CRR got to where it is today. In 2014, CRR was a company whose ceramic proppant products accounted for over 80% of their total revenue. This isn't a bad thing if the demand for the product is there -- but in 2015 it wasn't. And it hasn't come back since.

Between Q4 2014 and Q2 2015, CRR saw ceramic demand drop 80% and peak-to-trough revenues decline over 90%. At the same time, the price of oil dropped ~60% with natural gas following suit, declining over 50%. This had obvious negative effects on CRR's financials.

Total Revenues	648.3	279.6
Revenue Growth, YoY	*(2.9%)*	*(56.9%)*
Gross Profit (Loss)	181.3	(48.3)
Gross Margin	*28.0%*	*(17.3%)*
EBITDA	158.8	(56.8)
EBITDA Margin	*24.5%*	*(20.3%)*
Net Income	55.6	(109.5)
Net Income Margin	*8.6%*	*(39.2%)*

What was once a highly profitable business generating over $150M in EBITDA (25% margins) and $2.41 in EPS turned into a money-losing machine. Gross profits turned to gross losses. EBITDA turned negative as the company burned through cash, losing over $100M in 2015 (image via Koyfin).

And it's stock price? Capitulation. CRR lost over 50% of its market cap between 2014-2015, going from $924M to $400M and its stock declining over 80%. Ouch.

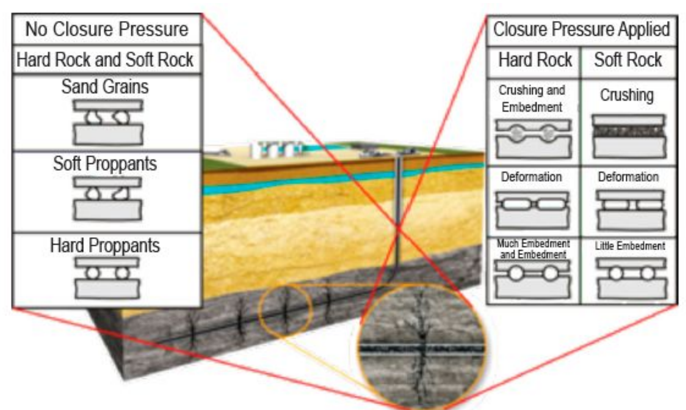


The Race To The Bottom (& Product Overview)

So why did CRR's ceramic demand collapse 80+%? The short answer: companies cut costs. The longer answer requires a dive into what proppant actually is, its purpose and why higher quality proppants get screwed in downturns.

What is Proppant?

Proppant is used by oil and natural gas explorers to 'prop' open fractures induced by hydraulic fracturing. In plain English, it keep the cracks open to allow for oil and natural gas to flow back up into the well for extraction. Check out the photo on the left for a visual example (photo source: scielo.br).



Proppant comes in three forms: sand, resin-coated sand, and ceramic. Sand is the cheapest option available, with resin-coated and ceramic costing incrementally more.

Companies don't have an issue paying for a higher-priced, higher-quality proppant when commodity prices are high. It's when commodity prices drop that well operators start slashing budgets. Most of the time starting with the choice of proppant.

Price Comparison

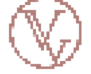
How much more does ceramic cost than its legacy sand competitor? A lot more. For comparison, one can purchase regular (raw) frac sand for around $0.015 - $0.05/lb (roughly $100/ton). Resin-coated sand fetches between $0.19 - $0.24/lb ($420/ton). Ceramic tips the scales at around $0.27 - $0.90/lb (~$1,100/ton). In other words, ceramic proppant is nearly 10x the cost of raw frac sand, and 5x the cost of resin-coated sand[1].

The Rationale For Paying More

Ceramic products aren't priced higher only because they cost more to produce. They actually perform better than their frac sand counterparts. Some of the benefits to using ceramic proppants (as seen on the right) are:

1. Increased conductivity within fractures (resulting in higher % of hydrocarbons captured by well).
2. Increased overall productivity of well.

[1] Source: Oklahoma Minerals



3. Increased life expectancy of well.
4. Long-term economic benefits greater than raw frac sand

Ceramic proppants work under the old adage, “you get what you pay for.” Yes they’re more expensive upfront. But the supposed long-term economic benefits far outweigh the initial investment.For example, [Monte Besler] of FRACN8R Consulting suggests that the use of ceramic proppant in well production can, “add 20-30% more oil from the well for a greater amount of years than traditional sand proppants.”[2]

The problem is none of that matters if a well is fighting to stave off bankruptcy. In this mode, well operators don’t care about the next 3-5 years, they care about the next 3-5 *months*.

In the current world, **the world oil and gas companies have lived in for the last 4 years**, raw frac sand makes economic sense. Oil hasn’t recovered from its fall in 2014, with prices hovering around $55/barrel. So for the foreseeable future, a lower-cost proppant simply makes sense. Carbo needed to adapt.

Carbo’s Radical Transformation

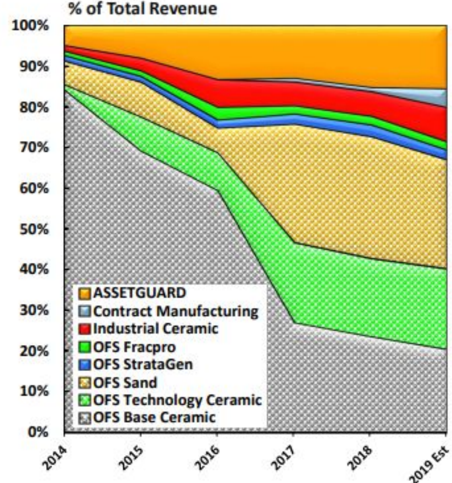
As I mentioned earlier, ceramic proppant products accounted for 80% of CRR’s revenues in 2014-2015. Seeing the decline in demand (and negative future outlook), management diversified revenue streams through two levers:

1. Industrial & Environmental Products and Services
2. Contract Manufacturing of Idled Assets

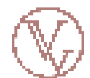
The Switch to Industrial and Environmental

CRR has some of the best manufacturing facilities in the world to produce not only proppants, but a plethora of industrialized goods. The company sports over 40 years of manufacturing experience and (coupled with their top-notch facilities) can quickly shift gears into different industrial sectors.

Beyond their current exposure to Grinding and Foundry, management believes they can branch out to other sectors such as: coating, sintering, chemical-infusion, packaging and polyurea coating (we’ll see later that they’ve already moved into coating).



[2] Source: http://epicproppants.com/proppants-advantages/



Carbo's also advancing their environmental assets. ASSETGUARD, which provides spill protection, containment, and other environmental services has grown from less than 10% of revenue to nearly 15% since 2014. The product should continue to grow in proportion to the demand for environmental regulations and compliance.

CRR relied so heavily on ceramic proppant production that when demand fell through, facilities didn't have anything to produce. This resulted in sky-high facilities costs and no products to push out the door. By venturing into new markets and products, CRR has been able to repurpose idled factories. They were able to shift production from proppants to industrialized goods.

The good news: **it's working**. Take a look at CRR's "Revenue Evolution" image above. What made up 80% in revenues (base ceramic) will likely make up only 20% in 2019.

Management's shift towards higher-margin, higher-growth products are working as shown by increases in both Industrial Ceramic and Contract Manufacturing (as a % of revenue). This helps explain the fact that despite declines in top-line revenue growth of ~9% last quarter, adjusted EBITDA *improved* 4% YoY.

Contract Manufacturing: PicOnyx Partnership

CRR's partnership with PicOnyx is a great example at their diversification efforts. PicOnyx is a manufacturer of black pigments, targeting the carbon black industry. In short, CRR acts as a toll bridge to PicOnyx. CRR provides PicOnyx with the facility, manufacturing and consulting.

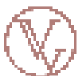
In exchange, CRR gets equity ownership and a margin on top of the PicOnyx product. Management believes PicOnyx's market to be around $1B. Regardless of how well the product does at the end market, CRR's assets are up and running and not burning cash. How much cash were the idled facilities costing?

On their latest earnings call, management revealed that idled assets burned through $14M in cash for 2019. Getting these facilities back online preserves cash on the balance sheet, reducing CRR's chances of running out of money.

From There To Here: Where Are We Now?

Carbo's talked the talk and walked the walk. In less than five years time, management's shifted the bulk of their revenue away from a commodity-dependent, highly volatile sector to more predictable, less commodity-dependent avenues.

The company's coming off of three years of consecutive revenue growth. Better yet, EBITDA is rising, even amidst slowing top-line growth over 2019. From 2016 - 2018 the company improved EBITDA from -$73M to -$29M, and **they're projecting breakeven EBITDA by 2020.** What's also important to note is incremental EBITDA fall through in 2018 was around 90% and management anticipates 2019 will be around the same.



Insider Ownership & Wilks Brothers

Management owns roughly 15% of total shares outstanding, with Gary Kolstad owning the lions share with over 537K shares. Alongside insiders, the firm Wilks Brothers LLC owns over 10% of the stock. The Wilks Brothers interest coupled with recent insider purchasing activity provide more firepower to the bullish turnaround taking place inside the company. But before we dive into recent insider buying, let's take a look at just who the Wilks Brothers are and why it's generally a good idea to invest alongside them.

Quick Hit on Wilks Brothers

Dan and Farris Wilks own roughly 10% of CRR through their investment vehicle, Wilks Brothers LLC. Who are they exactly? The Wilks brothers started their business ventures in 1995 when they founded Wilks Masonry (which was an extension of their father's trade).

After successfully running the masonry business, the brothers took a leap into the fracking/oil and gas space, founding Frac Tech in 2002. This is where they hit the jackpot. In 2011, the brothers sold Frac Tech to the Singapore government for over $3B -- netting each sibling $1B.

The brothers are using their cash to buy up farmland, timber, and oil & gas stocks. Their equity portfolio is worth roughly $95M per latest 13F.

Equity and Credit Investment

Wilks, Equify Financial, and Carbo agreed to a new credit arrangement in June 2019 for $65M. The arrangement kept the credit amount, interest rate, and date payable the same. Yet one major difference in the Wilks arrangement is CRR no longer has to pay down the previous credit facility with the sale of their GA property. In other words, CRR gets to keep the cash and reinvest it where they see fit.

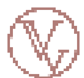
This deal works out well for both CRR and the Wilks Brothers. CRR achieves greater optionality with their cash and keeps existing covenants from previous debt facility.

The Wilks Brothers receive a 9% interest bond on an underlying investment while extending their potential ownership cap from 15 - 29.5% through warrants (which are exercisable at $4/share). They also have authority to designate board members.

All things considered, it appears that the Wilks Brothers are in this for the long haul. Given their previous track record of success within the industry, I'm confident they'll appoint the right members and remain a pillar of permanent capital for Carbo.

Management Buying After 2Q Earnings

Insider ownership is important, especially in a turnaround project like CRR. If management can back up their turnaround story by purchasing shares when they're trading at all-time



lows, it increases my confidence in their ability to make it happen. In the case of CRR, management's done just that. Take a look at the screenshot below (via Fintel.io):

Tran Date	Form	Insider	Code	10b5-1	Direct	Share Price	Shares Changed	Remaining Shares	Post Value
2019-08-07	4	Kolstad Gary A	P - Purchase		D	1.18	25,000	537,650	634,427
2019-08-02	4	BAUTISTA ERNESTO III	P - Purchase		D	1.50	30,000	156,240	234,360
2019-07-31	4	Conkle Don P	P - Purchase		D	1.31	75,000	228,237	298,990
2019-07-30	4	Kolstad Gary A	P - Purchase		D	1.12	17,650	512,650	574,168
2019-07-29	4	Kolstad Gary A	P - Purchase		D	1.034	32,350	495,000	511,830

Valuation

Carbo is interesting in that if management can execute on the transformation and get it back to profitability, we could easily see 3-4x returns. While I don't think the transformation will be *that* smooth, the company is still *massively* undervalued compared to its book value.

For example, if we take book value at face value (which is highly unlikely on open markets) we get roughly $8/share, or 400% higher than current prices. Even if we assume a 50% discount on CRR's book value, we still get around $4.50/share -- a meager 170% increase over current prices.

I'm also more comfortable in CRR's book value due to the wide variety of industries their facilities can accommodate. I'm fairly confident in the underlying value of our downside protection.

Returning to Positive EBITDA / Cash-flow

Management expects neutral/positive EBITDA by 2020, and current estimates have CRR generating $4M in 2020 EBITDA. The company's grown revenues $100M+ over the last two years, but for our valuation we'll assume a more conservative top-line growth rate.

If we assume 5% top-line growth after 2020's $201M revenue (current estimates), we arrive at 2023 revenue of $232M. We're also assuming CRR continues EBITDA margin improvement as they transition into higher-margin product mix. Note we're still assuming *relatively* low EBITDA margins as the company transitions from money-losing to profit-generating.

If the company can hit 5% EBITDA margins by 2023, a trend they're currently on, they'd generate roughly $12M in EBITDA. After subtracting Capex (~1% of revenues), accounting for working capital and adding back D&A, we get around $10M in 2023 FCF. Under these circumstances we get a fair value around $3/share (see breakdown on the right).

	Perpetuity Approach
Enterprise Value	$95.39
Net Debt	$11
Shares Outstanding	27.00
Equity Value	***$3.13***
Upside %	***89.43%***

At this point one should question, “is this feasible for CRR?” Going back to their last profitable year (2014) offers us answers.

In 2014, the company generated over $640M in revenues, $158M in EBITDA (24% EBITDA margins) and over $100M in Operating Income. Applying a conservative 5x multiple on operating income gives us a $500M company.

This isn’t to say CRR will return to those types of figures, but we know its not out of the realm of possibility.

Risks

There’s a handful of risks to note on Carbo:

1. Oil and Gas volatility / cyclicality
2. Carbo is still the higher-cost producer
3. Contract Manufacturing Failures
4. Execution Risk

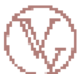
Oil and gas volatility is the reason CRR wants to diversify their revenue streams. The volatility presents a risk as long as CRR stays dependent on that industry for their main source of revenue. While this is rapidly changing, the risk is still there.

Second, Carbo produces one of the highest-cost products on the market. Although the long-term value for the consumer is evident, we’ve seen a shift from higher-cost to lower-cost over the last four years. This could very well continue. If companies can’t justify purchasing Carbo’s higher-cost goods, they won’t sell.

Third, Carbo’s new contract manufacturing agreements might not pan out the way they hope. For example, while the PicOnyx prospects look appealing, their product could fail. This means that Carbo’s equity stake in the company would be worth *very little*, eliminating the ROI on such a venture.

Encompassing the majority of these risks is execution risk from management. If management fumbles in their turnaround project, CRR might never realize their intrinsic business value. How would they fumble?

- Increasing the amount of idled assets on their books
- Taking on excessive levels of debt
- Engaging in poor ROI contract manufacturing deals
- Selling lower mix of higher-margin products



Value Ventures Portfolio Review

Company	Ticker	Price at Issue	Current Price	% Change
S&W Seed, Co., Inc.	SANW	$2.79	$2.66	-4.89%
Covetrus, Inc.	CVET	$12.61	$13.29	5.12%
Carbo Ceramics	CRR	$1.75	$1.75	0.00%

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