

Cincinnati Literary Society paper

Animal House-from Ego to ID!

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Introduction

I thought I might introduce myself by an attempt to write about my Wall Street experiences like Michael Lewis. Basically, it's Animal House with the World's Money instead of toga parties with the dean's daughter. Of course, if some client wanted a toga party

Prologue

There are strange things done in the midnight sun

By the men who moil for gold

The Artic trails have their secret tales

That would make your blood run cold

Robert W Service ... from The Cremation of Sam McGee

Chapter 1. In the beginning, I did it for ego.....

Like ancient Gaul, my life has become divided into three parts. My mother once said it unraveled into three parts. I was a scientist, a Wall Street no-good doer and a "buy-side" portfolio manager. I learned from each experience but sometimes not too much.

I start in the beginning. I was born and brought up outside Philadelphia in Bryn Mawr, Penna. My father worked at Fidelity Bank and, as the song goes, took the same train in the morning (to work). His boss (then partner) was Harry Danner, Blythe Danner's father (who became Gwyneth Paltrow's mother).

My father had wonderful friends whom he knew since grade school. What these friends did could be the subject of several papers.

One of his friends was Kite Sharpless, one of the inventors of the ENIAC (the world's first true electronic computer). Another was Tom Bevan, treasurer of Penn Central during that company's bankruptcy. Another was a Chinese missionary during WWII. The stories were exciting. I wanted to make my life exciting too.

Thus when I went to college I decided to be an academic.

In my sophomore year in college I was blessed with a wonderful teacher. He said something that transformed learning from memorization to thinking. He said, "For the rest of the semester, I will tell you what I think we know. Today I will tell you what we don't know."

The ten problems he chose were across many disciplines - math, physics, physiology, etc. The most interesting discussion to me was "the few to many" problem. He presented it across many fields but the most interesting to me was the eye. How can so few receptors tell us so much about the world? Said differently, how did the eye help the brain model the visual world?

Chapter 2. Neural modeling in academe - Confessions of a penniless scientist.

The history of this problem goes back to at least 1604. Kepler, an astronomer, had a sense of how small the spot of light was on the eye but was amazed at the number of different colors he observed.

The "few to many" problem arises in mathematics – for example, three dimensions describes much of the space we see (forgetting space-time for the moment). The three coordinates of length, width and height span the three dimensions of space.

Hermann von Helmholtz (a German physicist) in 1855 proposed that the colors we see were the result of red, green, blue receptors. Combinations of their activity could give us all the colors we see much like the three spatial dimensions describe the "normal" world we live in.

In 1877, Ewald Hering, a physiologist, asked "Could there be a fourth-Yellow"? He also was the first to propose opponent processes. That is, somehow unique hues arose because the vision system had some "digital like" properties. You saw one color or the other. Thus, we have analog concepts (Helmholtz) and digital concepts (Hering) in the color vision process in the 1800's!

His evidence was behavioral. Yellow doesn't seem to have red, green or blue in it.

That is important. The three spatial dimensions are unique. Knowing length tells you nothing about width or height. The three dimensions are unique.

Similarly, if one doesn't see red or green or blue in yellow, it is unique also.

Suddenly, the power of behavioral observation in the modeling problem became clear to me. Behavioral data needed mathematics to describe it. In turn, the mathematical models needed a firm grounding in physiology otherwise the mathematics could be elegant but not relevant.

Another way to say this is behavioral data was like macro-economics to me. It defined what was to be explained. Mathematics distilled the data into functions. Mathematics created input-output black boxes that physiology hopefully made transparent.

In the 70's, Indiana University in Bloomington, Indiana had an amazing group of people trying to crack the color vision problem. Psychologists were gathering behavioral data, mathematicians were analyzing it and physiologists were recording from monkey's using single unit, micro recording techniques.

I took graduate courses in all these disciplines.

I did my dissertation on how additive the different colors were in brightness. If (say) one measured the energy to see a green light in darkness and separately a red light, was the mixture able to be seen at $\frac{1}{2}$ energy for each when the two colors were combined? Did the system sum linearly? Did $\frac{1}{2}$ plus $\frac{1}{2}$ equal one?

The answer was about $\frac{7}{8}$ red and $\frac{7}{8}$ green was required to see the mixture. The system was far from summing linearly.

So much for the behavioral data. The mathematics were trivial – the system didn't sum linearly- $\frac{1}{2}$ plus $\frac{1}{2}$ didn't equal one.

Now the physiology. There must be some mechanism to explain this lack of additivity! Why didn't God just pool the outputs from the receptors in some simple way. Could God have an ego too?

In the 1970's, state of the art physiology was single unit recording at the lateral geniculate of the thalamus. This is the first place the neurons from the eye synapse in the brain. The amazing finding was that there were neurons that fired more than darkness to some colors and the same cell fired less than darkness to other colors! The most logical neural model was some receptors in the eye fed into cells in the brain exciting them. Other receptors in the eye fed in inhibiting the very same cells in the thalamus.

Red and green light mixtures turned on both receptors in the eye and one partly cancelled the other in the brain. Thus it took $\frac{7}{8}$ red and $\frac{7}{8}$ green to see the mixture. Even more interesting was that the result was different for different color pairs!

These results seemed to open up the proverbial Pandora's box. What does a cell have to do to convince you it is critical in making you see what you see? What is the neural code? Is it the cell that fires the most (the naïve thought), the one that fires least (could inhibition carry information in the nervous system?) or the one that taps out Yahwah in Morse code?

I kept pursuing these and other wonderful questions. The problem was I wasn't making any money. I was putting my wife through Columbia U in NY and we were borrowing to live. Also, I was in Philadelphia and she was in NY.

My first year, I got an NSF grant and published three papers. I went into the dean's office and was told I was doing a wonderful job. My raise was two. I called my wife and told her I was going from 10,500 a year to 12,500 a year. Imagine my spirits when I actually went from 10,500 to 10,700 per year!

That was enough. I decided to apply the modeling training to business. It took me several years to get there but get there I did.

As an aside, my dissertation was published in the Optical Society of America and is in NASA's database. It is still on the Internet and can be seen if you Google "Howard Lodge and color vision". While alive, my mother made sure there were sufficient hits to keep it there.

It should also be mentioned a Ph.D. researcher at Weill Medical College (Cornell's Medical Research School) in Manhattan in 2011 claims to have created a prosthetic eye. Sheila Nirenberg claims the prosthetic eye produces the same pattern in the brain when wired to blind patients as in normal patients when both are presented with the same object. She measures these patterns with an MRI.

The neural code issue will be solved if she proves you see the same thing through the device. The only experiment she can do to tackle that issue is to wire the normal person with the prosthetic eye and see if the object looks the same through the prosthetic vs normal eye. She has not done that to date to my knowledge.

She is so lucky to have the MRI to use. No anesthesia and simultaneous recording from many areas in the brain at once! Sure beats single unit and anesthesia and monkeys!

But, onward fearless and perhaps patient listener.

Chapter 3. Biomedical research – still doing the ego

I was tired of being poor and in the 1970's I went to New York to find my way (and live with my wife). My first job was with Bell Labs computer people in Rye, NY. We had state of the art equipment. For example, a 50 megabyte hard drive the size of a washing machine! You initiated a "seek" on that thing and the floor would shudder!

We wrote programs for Union Carbide's "Centrifam". This was a device to type blood, freeze dry and store it. Blood was put in the center of a rotating wheel. Centrifugal force made the blood go down several paths. Pools of chemicals either caused the blood to clump or not, depending on the blood type. Light sensors shined through the pools and if the blood clumped, light was scattered and a detector sensed that. It was then passed through a salt-gel solution and "freeze-dried".

This was fun but biomedical consulting was feast or famine. You were either a part of a booming and well-funded effort or you were "on the beach". I asked my friends – "what pays well and consistently"? They said "Wall Street finance if you can stand it".

Chapter 4. Math Modeling at Bankers Trust – going for the id.....

In the late 70's, PhD's on Wall Street were hired as consultants. They weren't viewed as business people. Business people smoked cigars, played golf and got deals done. When they needed eggheads, they rented them.

All this changed with the "Capital Asset Pricing Model", Black-Scholes options equations, indexing of investments and other "numerical" applications to business coming from academe. Could business behavior be modeled mathematically? I wondered the intellectual side but mainly wondered if I too could get in on the money gravy train.

My break came when I was hired by Banker's Trust in NY to create a "quadratic optimizer". This was a fancy term for something that got an efficient frontier – the best returning mixture of stocks, bonds, and cash for a given level of risk. You put in assumptions about the level of returns, their fluctuation and the relationship of the returns to each other and out came the percentage of each class to invest in.

I wrote the program. The math was very familiar. Replace stocks, bonds and cash with red, green and blue. Two asset classes negatively related (one went up while the other went down), seemed no different than two colors that partly cancelled each other. The mixture didn't go anywhere in both cases because one was pulling in the opposite direction than the other.

The program worked, I was hired and I got five times my academic salary or twice my consulting salary. Joy returned to Mudville! I was doing things and getting paid for it.

I was introduced as Howard Lodge who used to do it for ego but now did it for id. Everyone seemed to understand and forgive me for my early mistake. Id was the clear way to go and I was just a slow learner.

After six months on the job, the senior investment officer invited me to lunch. After we ordered, he bubbled forth "I really like this new way to pick the percentage of stocks, bonds and cash we invest in". Thinking I was at the right firm, one with vision for the future, I naively questioned," what do you like about it"? He said, "It is really easy to figure what I have to enter to get the results I want".

Something told me I wasn't in Kansas and it had nothing to do with Toto or Tonto or anything rationally related. At this time, gut ruled and one simply searched for a math model to support gut.

It was 1977 and I could afford to live in NY but I felt pangs of regret. Were there any interesting problems that could be modeled? Could systematic thinking suggest something to gut it could digest?

In walks Black-Scholes.

Prior to Black-Scholes, options were priced by expectation. If I expect an option to pay 10% and it costs 8%, I should buy the option.

Black-Scholes can be thought of many ways. One approach is that we are uncertain as to the future prices of the security the option is on but believe they form a distribution of results. That distribution might have a mean that increases some % every year and a variation or spread about that mean.

A call option will be worth more if the mean goes up more over time. Since it either pays you or expires worthless, it will also be worth more the greater the spread. That is, increasing the spread allows you a chance to make more money since the payoffs are greater and the losses are limited to initial cost.

So, to price the option, we set out the possible scenarios, define the option payouts and express them in today's dollars.

Thus, option pricing went from classic physics to quantum mechanics. It went from one number ("my expectation") to a probability distribution reflecting the concept that what really happens in the future is uncertain.

This sounds great but the model is really just a convention. In fact, financial pricing is simply a convention. For example, you tell me a bond price, I will tell you a yield because the price today is simply the worth today of future cash flows. Yield is the number that brings the future cash flows back to today's worth.

But what is the correct yield? If we wish to know that independent of price, we need another equation. We don't have one. Thus, pricing in finance is one equation in two unknowns. Since the solution isn't unique, we have "experts" endlessly debating whether something is cheap or not! To uniquely solve two unknowns, we need two independent equations and no one has defined the second to date.

But Black-Scholes opened up a new world for me. To this day it is used to trade options. When one is told an option price, one asks the volatility implied by the price. This sets the spread of the future distribution of outcomes. The mean of that distribution is a function of today's price. Knowing mean and spread defines the distribution of future outcomes. This allows one to calculate option payoffs in each scenario. Summing the payoffs times the probability of each scenario gives us price.

Chapter 5. Salomon starts a derivatives operation.

I was told Salomon Brothers was starting a derivatives operation. The unit was a bankruptcy remote sub to protect the parent from the sub potentially going bankrupt. It started to create legal documents that were thus valid for the derivative business. It was rated AAA by a legal trick. If it got into trouble, all positions were liquidated. Thus, it couldn't owe much to anyone. Great except in a disaster, if you bought from them, try to establish the same position again without huge incremental cost!

For a variety of reasons, the derivative group got folded back into the main corporation. This entangled the derivative documents in bankruptcy law. That is, in a corporate bankruptcy, nothing could move until courts seized the assets and determined who should be paid what. Since derivatives require funding and other daily tending, this was a disaster. If something happened to a derivatives unit under bankruptcy, it is virtually guaranteed bankruptcy law will pull down everything if the corporation has a derivatives unit!

In hindsight, the derivatives unit should be bankruptcy remote to protect it from the parent's evil ways. Exactly opposite from the original intention!

I never applied or worked at Salomon. That turned out to be lucky given what happened at Salomon – in the late 90's Paul Moser brought them down.

I knew Paul well. In fact, I went to visit him once by boat and got hung up on his jetty in Sands Point, Long Island.

As it turned out, I went to work for Citi – the firm who eventually bought Salomon.

Chapter 6. Math modeling at Citibank.....

In 1982, a wonderful opportunity opened up. Citibank was starting a derivatives operation. It would broker and take principal risk in derivatives for the first time. Taking principal risk means that Citi was the other side of the trade. I was one of three people chosen to start that business for Citibank. I was finally really in the finance business and not just building mathematical models for other people who were in the finance business as I did at Bankers Trust.

6a. On the first day

After filling out my paperwork on the first day, I asked whether I should report to the Citibank building at 53rd and Lexington (uptown). I was told no, I was to report downtown. It was patiently explained to me that Citibank built their flagship slanted roof building to house all their employees but discovered they could rent out the space for a lot more money than it cost to house their employees at other locations sprinkled around Manhattan. This fragmentation became a Citibank trademark for me and allowed everyone to function independently – for better or for worse.

6b. On the second day

My second day was also fraught with surprises. I reported to Citibank's bond trading floor. I looked out over the group and spotted some interesting vignettes. For example, a totally naked woman was dancing in front of a man smoking a cigar getting his shoes shined. It turned out it was his birthday!

I decided to get cracking. Who knows what I might get on my birthday if I was viewed important! So, I asked the head trader if he needed some numerical work. He asked me if I knew how to build an oscillator.

It was my lucky day. I did all my own electronics in my eye research days and had kept some operational amplifiers, etc. I built one that night and had a switch so if he wanted a square wave or sine wave I was ready. I figured he thought some financial instrument was periodic and he wanted to measure the price swings so he could describe them better to predict them better. I added a Fourier wave analysis capability to break down the pattern even more.

6c. On the third day

I took in the equipment onto the trading floor on the third day and asked the head trader to "show me the pattern to analyze". He looked at the Oscilloscope, the op amps, the potentiometers and let out with a bellow, "Where did we get this idiot"?

I was flabbergasted. What was wrong?

The trader's assistant came to my aid. "You see, an oscillator means if the 10 day moving average of price goes above the 200 day moving average you should buy". He simply wants you to calculate different price averages.

The head trader overheard this. "I don't buy then, I sell", he snorted. I realized that the markets might be efficient either because all people knew everything or no one knew anything.

6d. On the remaining days, I tried to rest but they kept bugging me

I decided to concentrate on the derivatives business - a brand new business for commercial banks because of the Glass-Steagall Act of 1933. Commercial banks were prohibited from doing "risky things". One was investing in stocks. Another was derivatives.

As an aside, long ago, I asked my father if he thought the Glass-Steagall regulation was effective in protecting "mom and pop's money". He laughed and said no. I asked him what the real problem was. He said bad loans – the assets the operating units of banks put on their own books. I countered with "Why didn't the regulators make rules about that"? I will never forget his answer – "Regulators don't want to really tell people how to run their businesses – that would cut too deep and end up with costly litigation".

Citibank was the second commercial bank to do derivatives, JP Morgan was the first. For one year we met with regulators, defined risk parameters and finally were open for business.

6e. Our first client

We searched for clients. The first was our own treasurer.

Treasurers were paid for efficiently issuing debt. They basically had to be market timers. If you issued at times when yields were high, the next golf game was tough.

The problem was that they didn't always need the money. So they couldn't simply issue when they thought rates were low. That would generate money they couldn't use. Their solution was to write letters to each other. An example request would be to have the other treasurer pay Citi's treasurer if rates went up in six months. Thus, if today's 10 year rate was 5%, the other treasurer would pay if rates went above that. In this way, the Citi treasurer would be compensated for issuing in the future at the higher rate. They would have "locked-in" today's low rate.

All was well unless all treasurers were going the same way. You couldn't find the other side of your trade.

The solution was the capital markets - short 10 year treasury futures. If rates went up, you were paid.

Our first trade was 200 million dollars. I calculated the hedge ratio (it wasn't 1:1) and we were off. It worked out beautifully, thank goodness.

For a year, all was well. Then, in typical Citi fashion, something went wrong.

I was seeing a client and he said "but, someone from Citi derivatives was just here one hour ago". I asked to see the business card. I had never heard of the person.

About one week later, the mystery was solved. The treasurer was so happy with the process he started his own competing business!

Could we stop it? No.

This duplicity had hilarious consequences. For example, I was in London giving a very formal talk to a group of people. Interpreters were being used. After the talk, I asked if there were any questions. Someone got up and said "I love your firm". I asked in a self-indulgent way "good research"? He said no - "I can buy from one area of your bank and sell to another and make profit"! I could tell when the audience got it. It was after much merriment from the interpreters!

My boss then went to Morgan Stanley and asked if I would come. They were starting a derivatives operation at the investment bank. Sound familiar?

Chapter 7. Morgan Stanley

Morgan Stanley was dramatically different than the other firms – especially Citibank. It was managed. Two people ran the bond division, John Mack and Robert Mulhern in 1985.

7a. Morgan Stanley's first Interest Rate Swap

My third day, I got a call from someone I had done business with at Citibank. Would I do a derivative trade with him? It was for 200 million.

It was called a swap. One receives dollars associated with a fixed rate on some base amount and pays floating rates. It is useful for converting floating rate debt to fixed rates, for example.

I stood up, yelled "do we do swaps"? and was told "of course, this is Morgan Stanley". I wondered in the back of my mind why I was hired if we did derivatives but concluded I joined a great organization and did the trade. I stood up again. "Who do I book the trade with"? I was told anyone but "what bond did I buy and what bond did I sell"? I told them it had nothing to do with that!

I realized they didn't know the difference between swapping bonds and doing derivative swaps so I laid-off my risk using futures – that is, approximated the opposite side in the capital markets. The next thing I knew, the treasurer of Morgan Stanley was at my desk. “What did you just do with my money”, he exploded in my face. He physically pulled me against the wall and sat for three days at my desk trying to understand what I had done. Luckily, the trade worked out fine.

I was taught what a partnership really meant with that encounter. Of course, a year later it went public. That really taught me what a partnership was but mainly the importance of timing.

7b. Morgan Stanley leadership was decisive

Leadership was decisions in the face of uncertainty. I also learned if there wasn't uncertainty, it was important to create it.

The first event had to do with the research area. Morgan Stanley had an excellent one. They were very bright people and wrote wonderful papers. I thought about trying to join that group but something told me to stick to the execution part of the business. Better to bring in business and use half your brain than use all the brain and be labeled an egg head!

I soon learned how true that was.

The problem with egg heads is the ego. Egg heads want to learn and tell the truth. Big mistake.

Have you ever had a car salesman say “these are the good things about this car but here are the bad things?” Or a bond salesman who says “here are the reasons to buy my bond and here are the reasons to sell it.”

The research area was caught messing with the truth bag. That was a disaster when your trader said a client should buy their security but the client heard sell from the research area. This was a flow business and you couldn't be caught impeding the flow.

One day the research group was all milling around on the floor. All the half brains immediately knew today's game – musical chairs. The best stay and the rest go.

I immediately scotch taped my business card on the back of my chair. At least if I had to go, I would leave some crumb of proof I had once existed here.

Luckily, I stayed and we acquired a very famous MIT PhD. After about 30 days, he asked a profound question. “If the markets are efficient, how can we all make so much money?”

I pointed to a person whispering into the phone a couple of seats over. I suggested he was whispering for a reason. He was trying to make the markets as inefficient as he could.

8. Dodd Frank and the new world

After Morgan Stanley, I left New York and ultimately arrived at Western and Southern here in Cincinnati. I am in charge of derivatives and alternative assets. As such, responding to Dodd Frank is one of my duties.

For those who think that Dodd Frank might be a person with two first names or the name of a way to have your hotdog, I digress.

There are two derivative markets, over the counter (OTC) and the exchange. The exchange is open outcry like the New York stock exchange. People scream and signal each other with their fingers.

In the (OTC) market, custom trades are done. It is the private placement market of derivatives. Two people decide what they want. The customer says "I'll do it" and the other side or trader obligates his firm to perform.

This is the market blamed for 2008. So, Congress in its infinite wisdom decided to fix things by making the OTC market like the exchange. Like the exchange derivative trade, the OTC trade would be margined. This means the trade is marked to market and money is posted each day depending on which side has bigger worth. In this way, the trade "clears" every day. Everyone is "square" every day. The worth one side thinks they have in the derivative is there at the exchange.

To date, the glitch is that bankruptcy laws still allow bankruptcy courts to grab that collateral if one side goes bankrupt. The logic seems to be that it takes time to figure out what to do. So freeze everything and debate. These are the "stay" provisions of bankruptcy law.

Problem. The "good" side wants (and maybe needs) the margin otherwise it is in trouble. In a bankruptcy, the margin protecting you can be snatched away from you. Sure sounds like catch 22 to me.

The other big non-solution is the creation of an exchange. Exchange derivatives are executed on well-known floors – the Chicago Board of Trade (CBOT), the Chicago Mercantile Exchange (CME), etc. Dodd Frank says OTC derivatives will be also.

The glitch here is that an exchange is simply a club of dealers. That is, if one does a trade and the dealer goes bankrupt, the other dealers must support their fallen member. An exchange has no balance sheet to speak of - all members for one and one for all.

But wait, haven't we just created an entity too big to fail? Aren't these the same people the government had to bail out in 08 but now they are linked for sure by law?

Thus, I submit the two main things suggested in Dodd Frank are flawed. Bankruptcy laws need to be modified to allow the other side to grab the margin and exchanges need to have balance sheets that have substance. Exchanges need to be well capitalized entities that don't simply pass through problems to their members but are or become a substantial part of the first line of defense when problems arise.

9. Things we might do to help the financial mess we are in

I have already mentioned two things. Fence off OTC margin from bankruptcy laws. Second, those who trade face a real exchange entity – one with a real balance sheet. No pass thru entity that is simply looking at members balance sheets which allows one member to bring all down.

Third, I think we must punish people that break the law. The law is far too cumbersome and lenient.

Fourth, we need real regulation. For example, a rating agency should be paid by the investor based on track record. Currently, the issuer pays the rating agency and neither is on the hook if something goes wrong– think there is reason for the two to collude?

The investor should pay the rating agency a yearly fee. If downgrades occur, the fee is reduced. Thus, the money kept by the investor floats up with downgrades as it should. More risk, more return.

Fifth, reporting should be far more transparent. Today, for example, much is made of a (say) hedge fund being SEC registered. However, it is not well known that the 13F security report required quarterly can leave off derivatives! It can also leave off positions that are “building”. In short, it can leave off the very instruments that need transparency!

Sixth, lobbying is a disaster. I have had several experiences with these groups and they all end the same. They will distort what you are doing just to win. For example, we wanted some work on student loans and hired a lobby group. When they found the security had a big coupon relative to financing rate (so called positive carry), they put in the health care bill that the government could buy them. This reduced the cost of the health care bill but didn't help the investor who hired the lobby group to begin with! When confronted with who are you trying to help, they answered they could win this way but not with the original task as posed! This is beginning to sound like some football teams of recent date.

Finally, the structures should be simple. Currently, one structured deal is about 400 pages of documentation. Think an investor knows what happened at the deal table? He wasn't there. All others who were at the deal table are out of the deal. He's the one left holding the bag. Even if he succeeds in making the bag a baguette, it still can smell stale and harden in a few weeks.

10. Conclusions

First, we should remember how this country was built. The early “robber barrons” weren’t nice guys. It is hard to make money and there are only a few “nice guys” in the business that do it. From several articles, Steve Jobs, Bill Gates, JP Morgan and most others were not “nice guys”. They pulled a lot of tricks to get done what they accomplished. The good they did was after much hurt by many people.

Investment banks have stepped in and provided many services to legitimate businesses. Could the ends partly justify the means?

Investment banks have helped many businesses reduce risk.

A few bankers have caused much harm. Can we hold blameless others (for example rating agencies) and blame just the bankers? Do the lawyers have a part in this?

In the end, GREED IS NOT GOOD.