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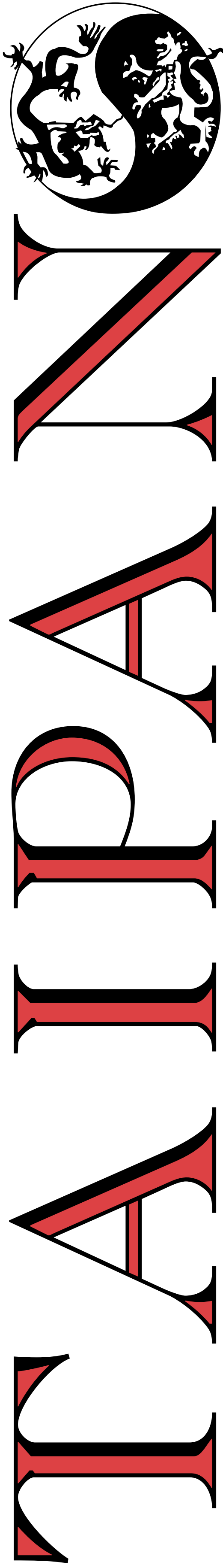

Hackers, Highlanders and Trojan horses

How to profit from lawlessness and swindles on the information superhighway

by Christian DeHaemer

On Friday, June 30th, President Bill Clinton took time away from whatever it is he does these days and signed the *Electronic Signatures in Global and National Commerce Act*—a law that enables electronic signatures to carry the same legal weight as pen and paper.

It was the usual smarmy politico babble: "fresh momentum to the longest economic expansion in our history" … "almost unlimited potential" … "expand opportunities" … "if we can save one child from using a pen" … (OK, so I made that last one up.)

With the new laws regarding e-signatures and the constant threat of hackers, Baltimore Technologies looks like a good bet for the foreseeable future. Taipan believes this is a fantastic way to play the summer rally.

The mouse is mightier than the sword

A few days earlier, on July 10th, Irish President Mary McAleese electronically inked Ireland's new Electronic Commerce Bill, which also makes electronic signatures as binding under Irish law as a drunken oath sworn against the British.

Sweet Mary used an e-security system developed by Irish-based Baltimore Technologies (**BALT:NASDAQ**).

Know Nikes

Incidentally, on or before June 21, 2000, somewhere in the world, unknown scalawags penetrated a Scottish ISP by the name of FirstNet. It was a flanking attack against Nike—the ancient god of cobblers who had the immortal power to manufacture shoes for about the cost of a spinach pie and sell them for one hundred and ten drachmas.

In this case the victim was Nike.com, the modern incarnation of the ancient demigod, known for its pseudo-rebellious athlete endorsers and its sweatshops in Indonesia.

The mad instigators of this insidious plot redirected e-mail from Nike.com to an anti-Nike activist site in Australia. Nike insiders acted quickly, took up arms and requested that the highland ISP redirect traffic back to its servers as an emergency measure, while Nike counterattacked in resolute effort to regain control over its domain name.

Nike climbed once more into the breach and was victorious. However, as it basked in the spoils of war, Nike forgot its allies. When FirstNet submitted an invoice for its services, Nike demurred, refusing to pay.

I Love You, et al

This is far from the first instance of online warfare, and it certainly it won't be the last. We have all heard and grown tired of the e-wars on e-mail. NASA, the CIA, the Defense Department, even your own humble site, taipanonline.com, have been beaten and bat-

(over, please)

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tered by the unseen forces of virtual guerrillas.

The difference with this particular battleground is that it ended up in the courts. You see, FirstNet has the awkward and irrational desire to be paid. And not just for a nominal sum, either—the Highland technocrats aim to claim recompense for the disruption caused by the vast quantity of traffic generated by Nike.com.

In fact, FirstNet claims that Nike's poor security is responsible for the cybercrime and should be held responsible for the ensuing commotion.

So tight they'll explode

The upshot of this particular cyber-sin is that any particular company, perhaps even yours, might be held responsible for unsecured transactions. This is new, or nouveau, anyway. Couple this trend with the recently enacted laws allowing contracts to be signed via e-mail—and you has got you a big problem.

I've always said that the point of business, and therefore investing, is to find problems that need fixing and then buy the solutions.

Baltimore Technologies

At *Taipan* we've been talking about online privacy protection for a number of years. We turned you onto PGP (Pretty Good Privacy) back in 1996. And Jeff Siegel on the *Taipan e-dispatch* has been ranting about this stuff for the past few months. But we were ahead of our time. The time to profit is now.

There is a company that will benefit greatly from this ongoing problem and you've heard about them before. They are go by the name of Baltimore Technologies plc.

Baltimore Technologies is the third largest company providing e-security solutions for the Internet, e-business and mobile commerce. It is an innovator in Public Key Infrastructure (PKI) products and services, wireless security, cryptographic toolkits and the like. BALT sells software worldwide to organizations like VISA, The Australian Health Insurance Commission and Price Waterhouse Coopers.

Knowing the secret code

PKI is the leading solution for electronic coding. You see, cryptography encodes a message using a secret key associated with an algorithm.

This produces a scrambled version of the message that the recipient can decrypt using the original key. The key is kept secret between the two parties. The hard part is managing these keys and keeping them secret while still allowing for easy communication.

PKI solves this problem by replacing the secret key with a pair of keys, one public and one private. Information encrypted using the public key can only be retrieved using the complementary private key. Public keys of all users can be published in open directories, which makes its easy for all parties to talk amongst themselves. Furthermore, public and private keys can be used to create and verify "digital signatures."

In short, Public Key Infrastructure is the software and methods that defines the management, distribution and storage of these keys.

According to Datamonitor, PKI is set to be the fastest-growing segment of the e-security market. It is expected to double six times between 1999 and 2003. IDC forecasts the global market for PKI products will be worth US$1.4 billion in 2003, compared with just US$123 million in 1998. Taipan believes the numbers will be much higher, due to the fact that the computations are old and only include the PC model, not the explosive growth of the mobile Internet market.

Triple threat

It's a high growth business and there are three big players: Entrust Technologies (**ENTU:NASDAQ**), Baltimore Technologies (**BALT:NASDAQ**) and the monster in the field, VeriSign (**VRSN:NASDAQ**).

VRSN has a market cap of US$20 billion and trades at a price-to-sales of 183.45. They grew revenue 63 percent year over year and 23 percent sequentially in Q1 00. Currently their share price is down to US$172 from a high of US$258.

ENTU has a market cap of US$1.71 billion and trades at 18 times sales with a P/E of 201. Revenue grew 54 percent year over year and 12 percent sequentially. Its share price has been bitch-slapped down to US$31 from a staggering US$150 in March. Most of the damage was caused recently, when ENTU pre-announced that it would earn 7 cents a share for its Q1 versus the street estimate of 15 cents. That'll do it.

Baltimore Technologies has a market cap of US$3 billion and trades at 180 times sales. They grew revenue at 66 percent year over year and 100 percent sequentially in Q1 00—up to US$15 million from US$7.5 million. That's the best growth numbers in the group.

In fact, software revenue grew 800% over the same quarter last year. Software license revenue now represents 55 percent of total revenue. These numbers suggest that there is a growing demand for BALT's software products, and that it won't meet with ENTU's sorry fate.

BALT's share price is around US$15, down from US$45, or 70 percent compared to a drop of only 50 percent for VRSN. BALT trades at a severe discount to VRSN relative to its growth rate. This is due to VRSN's high visibility in the United States and its consistent 100-percent growth rate per annum.

Given this growth rate, VRSN will bring in revenues of US$162 million for 2000 with a market cap of US$20 billion. BALT will likely bring in US$71 million with a market cap of US$3 billion. Granted, VRSN has a longer track record and should trade at a premium. But a 240 percent premium is absurd. Historically VRSN has traded at a 100 percent mark-up over BALT.

Catalysts for upside

First: Along with the obvious upside through revaluation, there has been an improvement in the company's fundamentals over the past six months through acquisitions and changes in strategy to go after high-growth software segments such as PKI.

Secondly, BALT's software is the only one that will integrate easily with companies that want to, or have, insourced their PKI. It's a hybrid solution that meets the pragmatic difficulties of the market.

Third, BALT has made a number of acquisitions in Japan, which Taipan believes will be a turnaround story going forward. Partners include NTT DoCoMO, Softbank and Tokyo Electric Power, among others.

But the biggest catalyst for share price appreciation is the growth in mobile commerce. Though this market is still in its developmental phase, BALT is well positioned to take advantage of the problems of wireless-based e-security.

There you have it

Baltimore is not for widows and orphans, as they say. But it is a high-growth business with plenty of buzz. The chart looks like it has put in a solid bottom and is just about to cross over its moving averages, thus signaling an uptrend.

With the new laws regarding e-signatures and the constant threat of hackers, Baltimore Technologies looks like a good bet for the foreseeable future. Taipan believes this is a fantastic way to play the summer rally. **Buy BALT today under US$16.**

Book 322 percent profits on Oracle

We've made some fantastic gains with **Oracle (ORCL:NASDAQ)** over the past year in *Taipan.* I recommended the world's second largest software company on the basis of a pre-Y2K sales drought. The scenario has now played itself out and *Taipan* members are up more than 322% in ten months.

(over, please)

At a time when the economy is slowing and Oracle is priced to perfection, top brass in the company is leaving. Ray Lane, the company's president and chief executive officer, has bailed.

I could be wrong, but it's better not to be greedy. Pigs get slaughtered. If you stick around this play could turn into another Computer Associates, which took a header earlier this month—falling 40 percent after pre-announcing an earnings shortfall.

Don't get me wrong, ORCL is well poised to benefit from the growth in IT markets. But when it has multiples corresponding to the likes of Cisco, along with uncertainty in upper management, it becomes obvious that there is more downside than up.

Sell Oracle, buy a new car, take your kids to Disneyland or free up some cash for the next opportunity. **Lock in 322 percent!** Congratulations.

Media 100 jumps 64 percent in three months after joining the Russell 2000

Like ducks following their mother, the gaggle of Wall Street wallflowers waddled in and put out "strong buy" recommendations on **Media 100 (MDEA:NASDAQ).** I told you about this company two months ago in *Taipan*. If you bought at US$17, the day the issue was stuffed into your mailbox, you are up 64 percent—congratulations.

A streaming bargain

MDEA is running based on the annual reshuffle of the Russell 2000—an index of the bottom two thirds of the 3000 largest stocks in America. Small cap funds that are indexed to the Russell 2000 must buy new inclusions.

MDEA also announced that it beat top-line growth expectations for the quarter, while hitting the US$0.10 EPS number the street foresaw. Revenue for Q2 was US$20.6 million. Expectations were US$18 million.

The most promising portion of the Q2 report was the growth potential in its Streaming Media business, which has growth to US$9 million from US$7.6 million in Q1.

This is an 18 percent sequential growth rate. This segment should continue to grow. I expect it to represent 2 thirds of the business next year and maintain an 80% annual topline growth for the foreseeable future.

MDEA is massively undervalued in comparison to its peers **Loudeye (LOUD:NASDAQ)** and **Sonic Foundry (SOFO:NASDAQ).** MDEA is trading at less than 4 times 2001 revenue; SOFO has a multiple of 12, LOUD has a multiple of 40. Recent acquisitions by MDEA have transformed the company into an end-to-end supplier of streaming video solutions.

Time for a run

The next product upgrade, Media 100 iFinish version 3.2, will be available in August, 2000. Further upside will be created by the ever-increasing broadband capabilities of the Web, the growth in video-enabled websites (from 100,000 to 300,000), and a revaluation in comparison to its peers.

Valance powers up 46 percent in two months

Valance, *Taipan's* play on advanced rechargeable batteries for wireless devices, has graduated from its developmental stage and is beginning its ramp up. Recent positive news from the annual report has propelled the stock up 3 points in the last few days.

If you bought below *Taipan's* suggested price of US$14 you now have a solid 46% gain in a difficult market.

Electric ramp-up

Revenues are expected to grow from US$1.2 million this year to US$25 million next June and US$100 million by June 2002. But losses are expected to continue until fiscal year 2002. *Taipan* has a conservative one-year price target of US$40.

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The market's ready to rock: increase exposure to U.S. and emerging market small caps!

by James Passin

It's been a disastrous year for mainstream stock speculators. Most Internet cult stocks are spiraling down the toilet. The Dow's down 7.5% year-to-date. The precious NASDAQ Composite Index is flat. As I predicted in late 1999 and early 2000 issues of Taipan, the carnival-like gains enjoyed in tech paper have not survived the post-Y2K contraction of domestic liquidity. A textbook Chinese Year of the Dragon.

However, **2000 has been an excellent year for us**. My recommended portfolio is up an average 39%, crushing all major U.S. indices. Our biggest winners include **Avant Immunotherapeutics** (**AVAN, up 285%**), **Genus** (**GGNS, up 211%**), and **Lukoil Preferred** (**up 105%**). The best performing components of my recommended portfolio are Russian/Former Soviet Union commodity producers and U.S. small cap technology.

Hurricane Hydrocarbons (HHLF:OTC) has clawed back from the dead, rising 16x off the 1999 low of US$0.25. My recommendation to hold onto your shares has been vindicated. If you used a dollar-cost averaging approach before I downgraded Hurricane to a Hold, you may be near break-even on your investment. I am providing a special update on Hurricane in this issue.

The preconditions exist to support a broad summer rally in U.S. stocks. *This rally may have already begun.* But don't expect the old angels of Q1 to lift their once-golden wings any time soon. The market is rotating into new themes that will provide market leadership in front of the election. **I recommend increasing exposure to selected U.S. and emerging market small caps. I also recommend using the imminent rally as an opportunity to unload garbage (get out by September).**

What inflation?

I sold my car when I moved to New York. Personally, I am not feeling the pain of high oil prices. Maybe you should ignore everything I write about inflation. Maybe you already ignore everything I write. But I never owned a gas-guzzling SUV or similar suburban monstrosity (I'm an Acura fan). It's hard for me to sympathize with whining, self-indulgent motorists who share the Clinton dynasty's philosophy of entitlement and instant gratification (no one whined that oil prices were too low in 1998 when oil-producing countries were driven to the brink of depression, threatening global stability).

Yes, oil prices are high. Historically, high oil prices signaled the emergence of powerful inflationary pressures. And the perception of emerging inflationary pressures has driven the Fed to engage in a rate hiking campaign. While there has been some inflation in the economy, I believe that the bull market in inflation is dead.

In an inflationary environment, people tend to spend as fast as possible, since they expect price levels to rise. Psychological acceptance of price hikes by consumers allows companies to pass on rising input costs. In other words, *rising prices cause rising prices, creating a self-sustaining feedback loop*.

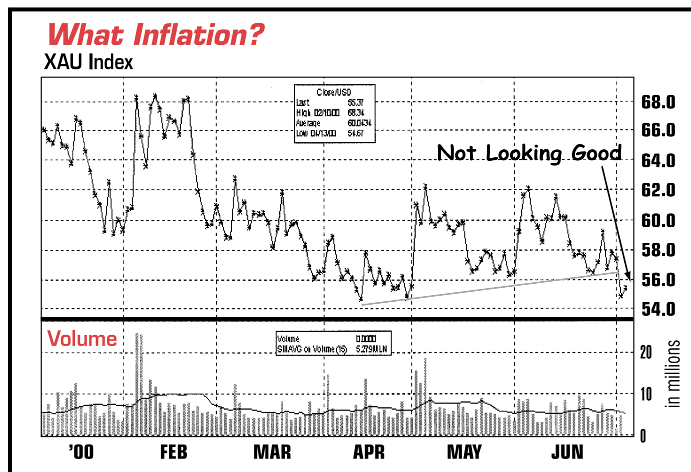
In the current environment, there *is absolutely no psychological acceptance of price hikes by consumers*. The biggest issues in the presidential race are gasoline and pharmaceutical prices. There is no broad expectation that the general level of prices will keep rising. In the absence of doomsday supply disruptions—like, maybe, WWIII (since Y2K was a dud)—don't hold your breath for the emergence of an inflationary spiral.

Voodoo analysis

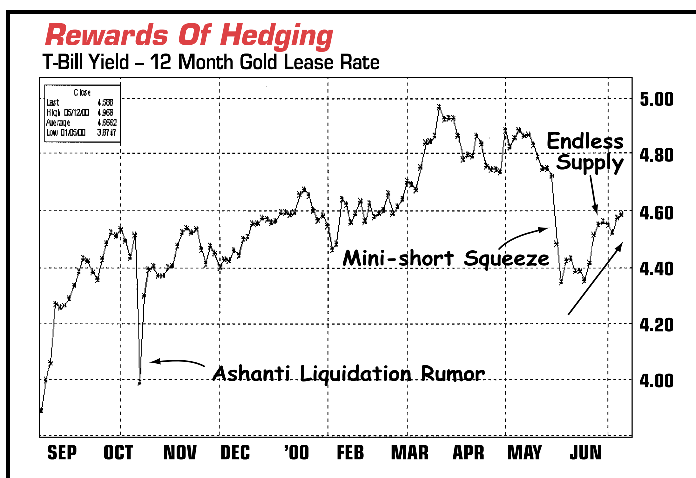
An objective technical analysis of leading inflationary indicators contradicts the "rising price spiral" thesis. I consider gold to be an excellent three- to twelve-month leading indicator of inflation. Gold recently spiked up to US$290 per ounce. In my view, this a sucker rally.

Sustainable gold rallies are usually led by or at least coincident with a rally in the XAU index. It's a simple concept: gold mining shares discount future prices of the metal. The XAU index has been diverging sharply from gold futures. *While gold has rallied, the XAU index is making lower highs and lower lows, penetrating significant support levels.* The poor technical behavior of the XAU index strongly suggests that the gold rally will reverse.

A highly reliable leading technical indicator of gold is



the spread between the T-Bill yield and the twelve-month gold lease rate. When the spread is wide, gold hedging is profitable (since you can borrow gold at the lease rate, sell it short, and invest the proceeds in risk-free T-Bills). When the spread is narrow to negative, gold hedging loses its luster (since your return on T-Bills no longer exceeds your borrowing costs). Since there is absolutely no retail "daytrader" participation in this spread, it is a clear reflection of institutional psychology. The spread has carved out a base formation in mid-June and is experiencing a sharp rally, *suggesting that a flood supply is about to hit the market from gold hedgers and short sellers*. In this scenario, it is highly likely that gold is about to tank.



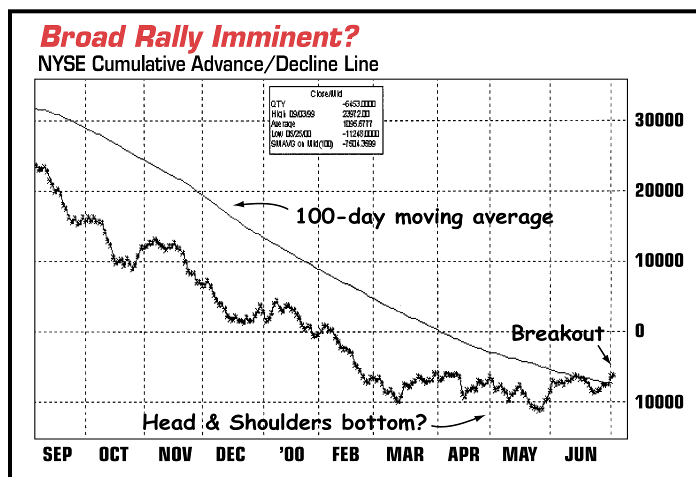
Not bad

Credit conditions in the U.S. are extremely tight. *Junk bond spreads are higher than they were during the peak of the Asian crisis* (although they have begun to relax). It's almost impossible for sub-investment-grade companies to obtain public debt financing. U.S. dollar swaps (the cost of swapping fixed rate for floating rate dollar debt) are also wide, although there is some technical evidence that conditions have begun to loosen. In fact, it's shocking that tight credit conditions haven't devastated the economy.

But the economy is slowing down. The triple combo of tight credit, monetary and fiscal conditions is beginning to take its toll. Not to mention the unfavorable climate for low-quality equity financing.

Interest rate-sensitive stocks, including major banks (MER, CMB, MWD, etc.) and insurance companies, are exhibiting bullish technical action—or, at least, feasible basing patterns. This confirms that the era of rising rates is drawing to a close.

Will earnings fall apart with the economy? Based on my assumptions that commodity prices will gradually soften and the dollar will modestly depreciate (offsetting flagging domestic demand), I expect that earnings for the Dow will be basically flat in 2000. This could make for some earnings disappointments in individual companies. However, given my projections for bond yields**, the Dow—believe it or not—is not overvalued**. Of course, the S&P 500 and NASDAQ Composite remain expensive.



The NYSE Cumulative Advance Decline Line, an important indicator of market health, has finally broken above the 100-day moving average. It also appears to be basing out. This is consistent with the scenario of a traditional Summer Rally.

I'm not worried about a "hard landing." NASDAQ crashed 40% without triggering bread riots. And the government, for the first time in decades, has tremendous backup fire power to fight a recession: <u>a massive fiscal surplus</u>. Whether Gore spends the surplus on grandiose redistribution schemes or Bush blows it on tax cuts, it wouldn't take too much time for the new president to juice up growth (whatever unpleasant distortions their policies would introduce).

I did it for the cookie

A few weeks ago, after wolfing down some fried red snapper with Szechuan sauce (and clawing through my cabinet for Pepcid AC), I opened up an amusing fortune cookie: "Now is a good time to buy stock." I agree: I have been increasing my exposure to equities.

I am upgrading **Orckit (ORCT:NASDAQ)** from a Hold to a Buy following **the Tioga (TIGA:NASDAQ)** spin-off. My fund has a position in ORCT. If you own ORCT, you have been paid a stock dividend of one share of TIGA for every share of ORCT. The spin-off created value for ORCT shareholders. However, ORCT crashed post-dividend following a shocking earnings disappointment. Given ORCT's leading position in the global DSL market, low US$280 million market cap, and the explosive growth in broadband, ORCT is a bargain at current depressed prices. The disposal of the semiconductor business has turned ORCT into an extremely attractive takeover target.

I am also reiterating my Buy on **Ashanti Goldfields (ASL:NYSE).** The stock has been destroyed. But gold hedgers should benefit from a rising T-Bill/gold lease rate spread. The current share price reflects hatred on the part of shareholders and analysts, not the sustainable cash-generating potential of the business. ASL has been priced for bankruptcy—an improbable outcome.

The perfect storm

Hurricane is back. Back from the dead.

Twelve months ago, it looked like **Hurricane Hydrocarbons (HHLF:OTC)** was finished. Oil prices plunged. Cheap Russian oil flooded the domestic market. Hurricane went to war with its only refinery. It defaulted on its mounting debts. Bondholders had the company over a barrel. Vulture funds were long the bonds and short the stock, giving them no incentive to negotiate with shareholders. The stock traded for pennies. I looked like an idiot for recommending the stock.

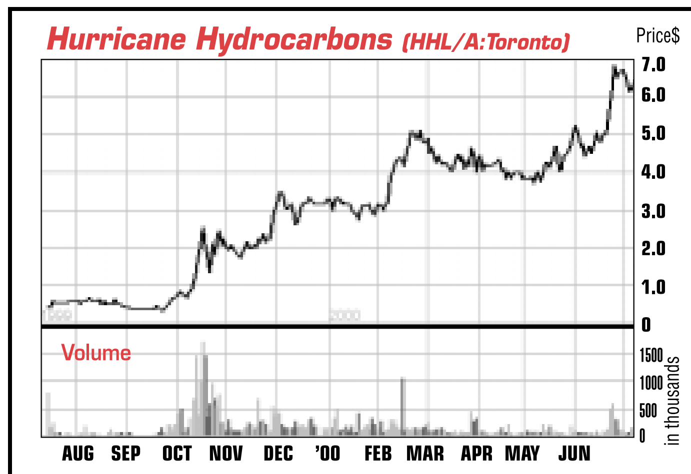
Staring into the abyss of total shareholder value destruction, I recommended holding on to your position. While other newsletters might have consigned such a disaster to the wastebasket of the occasional bad recommendation, I provided periodic updates on the stock—and even took a trip to Kazakhstan to sniff around behind the scenes.

There were two seminal events that saved Hurricane. First, major shareholders, including Firebird Management, formed a group to defend their interests. Secondly, Bernard Isautier became Chairman of the Board and CEO.

Isautier's heroism resulted in the most rapid creation of shareholder value I have ever seen. I am actually considering naming my son after him, should I ever have one.

There's no point in reliving the entire sequence of events that led to Hurricane's collapse and recovery. What is important is this: Hurricane has emerged from creditor protection, merged with the Shymkent refinery, and is now a highly profitable, vertically-integrated oil producer with an outstanding asset base and excellent growth prospects.

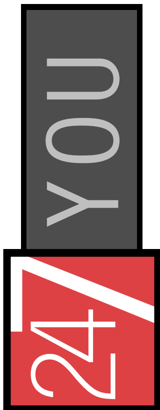
At current levels, Hurricane is trading an enterprise value/annualized EBITDA ratio of just 2.5! Russian vertically integrated oil companies trade an EV/EBITDA ratio of 3.5+. Hurricane's share price could appreciate 40% and still be reasonably valued.



Given the high price of oil and the further realization of synergies between Hurricane and its Shymkent refinery, I expect Hurricane to rapidly ramp up EBITDA. The recent discovery of 50 billion barrels in the Caspian Sea should indirectly benefit Hurricane, by hastening the creation of new export routes via pipeline and improving overall economic conditions in Kazakhstan. Hurricane remains the only U.S.-listed play on Kazakh oil.

I continue to recommend holding Hurricane for further gains.

James Passin manages the Firebird Global Small Caps Fund for Firebird Management and is a Contributing Editor with Taipan. Passin's fund is currently a shareholder in Orckit. Several funds managed by Firebird are shareholders in Hurricane. Passin's views are strictly his own and not necessarily those of Taipan or Firebird Management.



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The Last of the Undervalued Telecom Stocks

by Briton Ryle

As recently as 5 years ago, detailed analyst reports, earnings projections and sector-specific research were the *lingua franca* of the brokerage houses. To gain access to these sacred texts, investors had to cough up exorbitant broker fees, or be cozy with a big shot analyst. No more.

The Internet gives the average investor access to information that used to be *verboten*. I'm sure some insiders long for the old days when they held all the keys. Personally, I love it. That's because *Taipan* members are a breed apart. I know most of you venture out into cyberspace, call companies, and do some digging on your own.

Now, getting the skinny on some oil refinery in Tajikistan can be a little difficult. But overall, *Taipan* members have done pretty well by our recommendations, both the obscure and the mainstream. And your diligent approach to investing has given *Taipan* and its members a great reputation in the investment community.

In this era of instantaneous access to information, you'd think there'd be no undiscovered opportunities. (At least not this side of Tajikistan.)

Buying valuations

What if I told you there's a telecom equipment stock that's grown annual revenues at least 20% for the last six years, trades for less than 2x sales, less than 2x book, and has US$6 per share in cash? You'd probably think something must be terribly wrong. Telecom stocks simply don't trade at such ridiculous valuations unless there's a pending lawsuit or the company's equipment has been proven to cause sterility in lab rats.

Truth is, there's nothing wrong. In fact, the story gets better. An acquisition just completed will add US$90 million to the bottom line, and the company has also won a contract from the U.S. Military that could be worth US$418 million over the next 8 years.

So why does **Comtech Telecom (CMTL:NASDAQ)** trade at P/E of 13 while the industry average is around 60? It's a riddle, covered in an enigma, shrouded in a mystery, wrapped in bacon and deep fried. But mostly, I think it's a question of exposure.

Maybe you've seen the Nortel ads on TV, with the slogan "What do you want the Internet to be?" Or the Williams ads with the executive who doesn't know the difference between "telepathy" and "telephony". Cisco and Lucent both spend millions every year to make sure they stay in the consumer's consciousness. But why?

Consumers don't buy routers from Cisco. They don't buy power amps from Lucent, nor do they shell out thousands of dollars for Nortel's base stations. So why do these companies spend so much to advertise to people who don't buy equipment? The answer is simple—to sell stock.

Stock is, by far, these companies' most lucrative product. When a stock price is growing faster than sales, a company has no problem hiring and keeping the best people, making important acquisitions, funding new initiatives and so on. Stock is the life-blood of many tech companies. Without it, growth would be stunted.

Selling stock is crucial to the growth of some companies. But the little guys who can't afford a national advertising campaign, like Comtech Telecom, have to support their stock price the old-fashioned way. They have to run solid companies, aggressively pursuing new contracts and new markets. They have to remain on the cutting edge.

They earn it

Companies like Cisco and Nortel can, to an extent, dictate the market. Not so for a company like Comtech. Small players have to stay ahead of the market or get left behind. Pacing yourself with Cisco will only result in lost market share.

Comtech has been very successful signing up unnoticed and unglamorous customers, like the military and emerging foreign countries. The terms of the military contract may never be released. But you can bet those dollars will hit the bottom line. And most people won't care that South Africa is upgrading its satellite communications system. But Comtech will be glad to bank the cash.

Most stock prices are a combination of fundamental value and hype. Some, like Amazon, are pure hype. Others, like Comtech Telecom, are pure fundamental value. There are tradeoffs. Fundamental value companies don't jump 50% in a day. But they also don't lose 50% of their value overnight because the market has second thoughts about the valuation.

Based solely on increasing sales and earnings growth, Comtech Telecom stock will appreciate 40% over the next year—and is a screaming buy. And if even a little hype enters the mix, it's gravy. Ironically, I imagine the most probable source of hype is the low valuation. But, as you'll see, Comtech stock is about to jump a lot more than 40%.

The nuts and bolts

Comtech Telecom is a conglomerate, consisting of independently run subsidiaries representing three general product categories or segments. General product categories are: Telecommunication Transmission, RF Microwave Amplifiers and Mobile Data Communications Services. A fourth segment, the Wireless Local Loop, was

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discontinued owing to poor performance.

Incidentally, management showed great leadership in phasing out the Wireless Local Loop division. As an explanation, CEO Fred Kornberg said the division would need resources and time that could be better used elsewhere. Rather than burn a bunch of cash to turn around a lagging division that might never become profitable, Comtech decided to cut the deadweight and concentrate on the other divisions. Bravo.

The Telecommunication Transmission segment is, by far, the star performer in the Comtech family. This segment is made up of four subsidiaries that sell power amps, modems, frequency converters, satellite VSATs (very small aperture transceivers) and antennas, and over-the-horizon microwave communication products and systems.

The Telecommunication Transmission segment accounts for 60-80% of the company's sales. This segment is due for a sizable gain in revenue, which I'll tell you about later. The other two segments are also poised to see a substantial gain in revenues, and one may even supplant Telecommunication Transmission as the company's biggest division.

Introducing...

The other two segments of Comtech's business, each represented by a single subsidiary, are much smaller than Telecommunication Transmissions, but each has excellent growth potential. The RF Microwave segment makes solid-state broadband power amplifiers for the RF (radio frequency) and microwave spectrums. Applications include wireless communications, test equipment, instrumentation, and identification and jamming in defense systems.

Customers for RF microwave products include foreign and domestic commercial carriers, government agencies, and prime contractors. In fact, Comtech recently signed a US$1 million deal with Lucent to supply power amps for testing purposes. The high linearity of the Comtech product makes it possible to test equipment for both 2G (CDMA, GSM, and TDMA) and 3G (W-CDMA and EDGE) wireless networks. As wireless penetration increases, the need for test equipment will also increase. And Comtech has one of the most versatile products on the market.

Finally, there's Mobile Data Communications Services. This segment, represented by Comtech Mobile Datacom, markets a satellite-based data communications system developed through internal and government-funded research. The service uses GPS (the Global Positioning Satellite system) to provide asset tracking, two-way messaging, e-mail and telenetics. Comtech Mobile Datacom routes signals through leased satellite bandwidth. Customers in the transportation, remote sensing, utility and aviation markets can then access their data via the Internet.

Early in 1999, Comtech Mobile Datacom beat out a team of two other companies in competition for the U.S. Army's Movement Tracking System. The Movement Tracking System will be used by the Army to track its assets and allow real-time communication between fixed and mobile command centers. Comtech's team got the contract, which could be worth US$418 million over the next 8 years.

The contract is dependent on funding, which, if you choose to invest here, maybe be at least one good reason to vote for Dub-yah in the coming presidential election, though I still think Gore is the most tech-friendly candidate. Also, this contract opens the door for other government agencies in need of tracking and messaging services.

It's amazing to me that this company carries only a US$100 million market cap when revenues are literally about to explode. Its history of earnings growth alone should put the stock in the mid-twenties, at minimum. And the potential of the government contract should add another ten bucks. But incredibly, there's still another revenue catalyst that will triple sales in the Telecommunication Transmission segment.

Adopting Adaptive

On July 10, 2000, Comtech completed a deal to acquire the satellite equipment division of **Adaptive Broadband (ADAP:NASDAQ)**, called EFData, for US$61.5 million in cash money. Adaptive has unloaded several divisions because it wants to concentrate on the broadband wireless market. This acquisition will add around US$90 million in annual revenues to Comtech's balance sheet. You'd think that would turn some heads on Wall Street, but I guess not.

This acquisition will open up markets for one of Comtech's most innovative products, the Turbo Codec modem. I can't tell you how, because I frankly don't understand how the contraption works, but the Turbo Codec uses less bandwidth and power to send more data than traditional satellite modems. Comtech has demonstrated that this modem can cut data transmission costs by as much as 40%. I bet Iridium could've used something like that.

You might think that integrating EFData into the Comtech family would pose problems. Except that EFData and the Comtech subsidiary it will fit into (Comtech Communications Corporation, or CCC) are both located in Tempe, Arizona. And, ironically, I understand that some former EFData people helped get CCC off the ground. Serendipity, kiddo. Integration should be a simple matter, without a lot of merger-related charges. Comtech is financing part of the deal through a loan, and part through cash on hand.

Here come the numbers

Consider yourself warned. It's time to get down to revenues, earnings, estimates and all that other boring stuff. At least, sometimes it's boring. I'm actually kind of excited about Comtech's numbers 'cause they're so bloody good.

As I said before, Comtech has been growing revenues

	2000 (est)	1999	1998	1997	1996	1995
Sales	US$53	US$37	US$30	US$24	US$20	US$16
Gross income	US$13	US$11	US$8	US$7	US$6	US$4
(All figures in millions)						

at a minimum 20% clip since fiscal 1995, which was also the last year the company reported a loss. Net income has fluctuated a bit, but nothing out of the ordinary. I've broken down the total sales and income since 1995 in the neat little box above for your convenience. Fiscal 2000 just ended July 31st, so those numbers aren't included, which is too bad, cause they're simply smashing.

For the nine months that ended April 30, 2000, Comtech Telecom's sales were US$40 million, up from US$28 million for the first nine months of fiscal 1999. That puts fiscal 2000 sales somewhere in the US$53 million neighborhood.

Backlog for the second quarter of 2000 was US$38 million and dropped only slightly to US$35 million for the third quarter. R&D expenses for the first three quarters of fiscal 2000 were US$1.6 million, but Comtech managed to get customers to fund all but US$386,000. Not bad.

Until the EFData acquisition, Comtech's only long-term debt was lease agreements for various facilities. To complete the sale, Comtech borrowed US$40 million at 9.25% interest, payable in installments through 2005. They could've gotten away with borrowing less by using the proceeds of a recent secondary offering of 2.3 million shares. Comtech cleared around US$42 million from the stock sale, which, incidentally, went for US$17.50 a share. And when you consider Comtech is posting returns on investment and equity of over 20% (industry average 5 and 10%, respectively), borrowing the capital at 9.25% makes sense.

2001: An earnings estimate

Now for the "money shot," as they say in a particularly seedy biz. I'll lower the backlog to US$30 million, assume zero growth for EFData, use the low end of historical revenue growth (20%), and assume a minimal order from the government contract (US$10 million), and I still come up with 2001 revenues of US$163 million.

Telecom equipment stocks trade at some pretty high valuations. The industry average price-to-sales is 20, for instance. Comtech currently trades at around 1.8x sales. At current multiples, US$163 million in sales would value the stock at US$46 a share. That's 200% from where it is now.

I believe Comtech should trade at a higher multiple, but there needs to be more institutional support for the stock. 36 institutions hold 30% of the outstanding shares, but that only amounts to about 2.2 million. Insiders hold another 11%. Even with the 3-for-2 stock split last July, there are only 7.3 million shares outstanding, and another 6.5 million in the float. Comtech needs to have more shares out there for institutional investing to increase. With 30 million shares authorized, and only 14 million issued, I look for Comtech to announce another split in the near future.

Based on a pattern of growing sales, steady profitability, a potentially gigantic government contract and the acquisition of EFData, I rate Comtech Telecom a strong buy with a one year price target of US$46 a share.

I think we should be able to get in under US$15 a share, but I consider anything under the secondary offering price of US$17.50 a good entry point.

You can contact Comtech Telecom at 105 Baylis Road, Melville, NY, 11747. The phone number is (631) 777-8900, or you can e-mail them at info@comtechtel.com.

Trekking back for more profits: another premier investment expedition to South Africa

September 12-24, 2000!

Last year's South Africa expedition exposed a small group of adventuresome profit seekers to one of the most exciting destinations on the map. To all those who missed out last year, we're now offering the opportunity again.

This expedition combines the earth's rarest luxuries with the world's greatest investment opportunities. We'll see life inside a gold mine... and life in the wild kingdom.

Get ready to explore mineshafts, and maybe even cash in on some cheap diamond buys. We'll sit in on closed-door sessions with Chairman of the Chamber of the Mines… the president of Protea Gems… the Chief Operating Officer of the first Pan-African mutual fund… and many others.

Perhaps even more importantly, we'll put on our gear and head into the field, visiting some of the country's most successful businesses. We'll buy diamonds from one of South Africa's leading diamond wholesalers—and cut out the middleman markups!

No trip to South Africa would be complete without an authentic African Safari. You won't even need binoculars at this wonderful wildlife reserve, where skilled trackers will demonstrate how they follow the animal trails.

This itinerary is jam-packed with analyst and corporate presentations as well as cultural excursions.

We take care of every detail for you—just come along and enjoy the experience. A twelve-day expeditions of this caliber would normally range from $8000 to $9000. But we were able to slash our cost almost 50% for our subscribers. Call Agora Travel and Conferences at (800) 926-6575 or (561) 243-6276 for more information.

But what about your money that's NOT in stocks?

There's a question that goes unanswered in much of the advice on asset allocation

by Charles R. Wolpoff

High-flying bulls tell you to put 80% of your money into stocks. Every time Greenspan opens his big mouth, you see various analysts lowering their equity portion to 60%. A bear might tell you to keep your stocks to 40% or less of your portfolio.

But whether stocks constitute 80, 60, or 40% of your assets, the question that gets overlooked is: What the heck are you supposed to do with the rest of your money? Do you put it into U.S. Treasuries…corporate bonds…municipal bonds…bond funds… zero coupon bonds?

The term often used for nonequity assets is "fixed income." And too many people assume that fixed income assets are all the same, and it's only the stock part of the portfolio that demands your time and attention.

Not so. Sure, fixed income is supposed to be less risky, its main function to produce more predictable cash flow. But it's not an area to be ignored.

Deciding among fixed income options can have as much impact on your wealth as deciding which stock to buy.

Your portfolio could use a few bonds

Fixed income assets can help you achieve your financial goals by:

1. Helping you to hedge your bets. Often (but not always), bonds go up when stocks go down.
2. Providing a steady source of income. This is an especially welcome treat in your retirement years.
3. Cutting your taxes. Bonds can provide income in a tax-advantaged manner.

Later, we'll suggest particular investments and review certain fixed income strategies for lowering your taxes. But first, let's examine some of the options available in the fixed income area.

When looking at nonequity assets, start with cash. Well, actually you shouldn't have too much cash lying around. Put it in a money market fund. Check around to see who has the best rates.

For less liquid fixed income assets, look to bonds.

Choose your bonds carefully

Bonds vary in the following ways:

1. Creditworthiness. You want a bond whose issuer isn't going to default. Your chance of getting your money back when the bond matures is tied to the creditworthiness of the issuer.

For this reason, U.S. Treasuries are absolutely the safest fixed income assets from a credit standpoint. They're backed by the full faith and credit of the U.S. government. If these guys default, we're all in trouble.

Next up in terms of creditworthiness are municipal bonds. These are issued by state and local governments.

Finally there are corporate bonds. Some are real safe. Some are so risky they're commonly termed "junk."

To find out the creditworthiness of a particular bond issue, look up its rating with the various ratings agencies, such as Moody's or Standard & Poor's. The worse the rating, the worse the risk, but the higher the interest rate.

2. Capital appreciation on the upside vs. capital loss on the downside. In other words, will you get your money back…and then some? Or could you even end up losing some of your principal?

The value of your bonds can go up…or down…depending on what interests rates do. When interest rates go up, the value of your bonds goes down, because investors can get a higher interest rate by buying new bonds.

When interest rates go down, the value of your bonds rises. But keep in mind, with bonds you're generally looking for annual income as opposed to capital appreciation. Still, on occasion one can find fixed income assets that will make plenty of money beyond just the straight income.

3. Annual income per dollar invested. Another way to put this is: What is the yield of the investment? Yield is equal to annual income divided by the amount of your investment. Now, if you buy a bond at issue and keep it until maturity, the yield will be the same as the coupon rate—which is simply bond-speak for "interest rate."

But suppose you buy a bond on the secondary market. The yield will be the same if you buy the bond at par value and hold until maturity. But if you buy the bond at a premium, the yield will be less than the coupon rate.

You can compute the yield by dividing the annual income by your investment. Say you buy a 5% bond with face value of US$10,000 for US$10,500. The annual interest is US$500. The yield is therefore 4.7%.

4. How long your money will be tied up. In other words, what is the duration of the bond? You might be holding the bond to maturity. Or the bond might be "callable," meaning the issuer may have the right to force

you to redeem the bond before maturity. In addition, you can always sell a bond on the secondary market. For more (or less) than your initial investment.

Long-term bonds are those with maturities of 10 years or more. Intermediate term means five to seven years. Most analysts suggest that the average investor should stay away from long-term bonds. The return you can get from intermediate term is about 80% of long term, without as much risk. They don't dive as quickly as long-term bonds when rates go up. On the other hand, if you feel strongly that rates are going to go down, long-term bonds are a good investment, as long as you get out of them before rates bounce back up.

The yield generally increases the longer the term of the bond. But that's not always the case. In fact, at the moment, longer term bonds are yielding less.

So why would anyone buy the longer term bonds now?

Simple: if you think rates will drop, you want to lock in those rates for a longer period. The so-called "inverted yield curve" means most people think rates will drop.

5. The tax impact of your investment. Always, always, always look at the after-tax return on your investment. What this means is: how much money is left after the IRS and the state and local tax authorities take their cuts.

Let's look at three different tax aspects of fixed income assets. First, we'll talk about the different tax treatments. Then we'll see how to figure whether a tax-advantaged investment is better than a taxable investment that yields a higher rate. And, finally, we'll examine a neat little tax trick that lets you have your losses and your income too.

See how bonds can make the tax collector cringe

Income from corporate bonds is generally taxable. Remember, interest income is taxed at ordinary rates, and thus can incur more painful taxes than, say, capital gains from a stock you've held for more than a year.

Income from U.S. Treasuries is not taxable at the Federal level, but is generally taxed by states with income tax. So if you live in one of the 41 states that impose a tax on interest income, you can save by buying Treasuries.

Municipal bonds and other types of tax-exempt bonds are exempt from Federal tax, and generally from state tax, if the holder is a resident of the issuing state.

Since tax-exempt bonds usually pay lower yields, they are best for those in higher tax brackets, starting at least with the 28% tax bracket. How can you tell which is more advantageous? By learning a couple of simple formulas.

Learn the secret to comparing taxable apples to tax-exempt kumquats

OK. You have the chance to buy a corporate bond yielding 8%, or a U.S. Treasury yielding 6.5%, or a state muni—exempt from Federal, state and local taxes—at 5%. If you're looking at just the yield (leaving credit risk out of the equation, for now), which do you go for?

Well, you need to equate the yields. You know, compare apples to apples, kumquats to kumquats.

So you need to translate everything to its taxable equivalent. With the corporate bond, that's easy. Just the taxable interest, ma'am. But hold on. What if we put that bond in a retirement plan? Can we assume it will be treated like a muni, thereby enhancing its yield?

Not quite. Remember, this interest is likely to be taxed at some point. Unless you're using a Roth IRA, and the money's already in there (so you don't take into account you're losing a deduction). Problem with that: Roth is limited to US$2,000 a year, and corporate bonds are often sold in big bunches.

If the money will eventually be distributed, you have to figure at what rate it will be taxed and the present value of that money. Delaying payment is a help. But you don't know what the tax rates are going to be when you get it.

For Treasuries, you just *divide the taxable yield by [1 minus your "effective tax rate."]* Then multiply that result by the yield. The effective tax rate is your top marginal rate. For the purpose of U.S. Treasuries, which are exempt generally only from Federal taxes, we're talking you're highest Federal income tax rate: 15%, 28%, 33%, 36%, or 39.6%.

But with munis that are exempt from state, local and Federal taxes, it's a bit more complicated.

You start with adding the highest marginal Federal rate to the highest marginal state rate.

But this muni income, while reducing your state tax, also reduces your itemized deductions on your Federal income tax return.

You can deduct your state income tax if you itemize on your Federal return. Thus, each dollar of state tax you're saving is costing you some Federal tax.

There's an equation to figure all this out:

[Federal tax rate plus state tax rate] minus [state tax rate times federal tax rate] times yield.

Assume you have a top Federal tax rate of 28% and a top state income tax rate of 4%. Based solely on tax equivalent yield, the Treasury is the best bet for you (see table). Of course there are many other factors you should consider before making the final decision. But once you have a clear idea of the after-tax impact of your financial moves, you're way ahead of the game.

A timely bond swap can create a welcome tax loss

So far, we've looked at the tax impact of the income

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	Yield	Taxable equivalent
Corporate bond	8%	8%
2-year Treasury	6.5%	9.03%
Municipal bond (issued by your state)	5%	7.23%

from these investments. But what about the tax impact of selling a bond?

Unless the bond is in a retirement account, gains and losses from bonds are taxable. That even applies to muni bonds and Treasuries.

Now, if you buy a bond at par and sell it at par (or hold it until maturity) you'll pay no tax. But you still have to report the proceeds on your tax returns. You'll simply show that the cost and the proceeds are the same, with 0 gain or loss.

Par is normally stated as 100, or 100% of the price. If you buy the bond at 110, or 110% of the issue price, you're buying the bond at a premium. If you buy it at 90, or 90% of the issue price, that's a discount. Suppose you buy it at 90 and sell it at 110? In that case you have a capital gain on which you have to pay taxes.

You can have a loss too. Say you buy it at par and sell it at a discount on the secondary market. That is a capital loss, as useful to you on your tax return as a loss on a stock. Even if you don't have any gains, you can deduct up to US$3,000 in losses every year, and carry over to future years any additional losses.

Here's an opportunity for you to cut your taxes yet still enjoy the benefits of receiving bond income. You can sell your bond at a loss and buy back a similar bond at the same time. This is called a bond swap.

But if you've been paying attention to our tax advice over the years, something should bug you about this.

Namely…that annoying "wash sale" rule. That's the tax rule that says you can't take a tax loss if you sell the losing investment and buy back an identical one within 30 days before or after the sale.

So in the case of that bond you're holding, how do you get around the wash sale rule?

You could wait 31 days before buying another bond. Or you could buy a bond that isn't "substantially identical"—which isn't hard to do when it comes to bonds.

According to the IRS, bonds are not substantially identical if they are "substantially different in any material feature, or because of differences in several material features considered together." For example, you look at whether there are differences in identity of the issuer, or there are substantial differences in annual interest rates or maturity dates. So buy a bond that has a different maturity date and a different interest rate than the one you just sold and you should be fine.

Three bonds to buy now

Okay, so what bonds should you buy now? Here are some suggestions.

1. Try the two-year Treasury. The ten-year Treasury note was yielding 6.02% as of July 10. The 30-year bond is at 5.88%. And five-year notes were yielding 6.12%. But two-year notes were at 6.29%. Why? The Fed has bought up longer term Treasuries, leaving a smaller supply. Meaning that prices are high but yields are low. Also, the Fed has boosted short-term interest rates.

2. Buy intermediate-term municipal bonds if your state has an income tax. This is a good time to buy munis, but it may not last. Yields are still increasing, and supply is shrinking. As more and more people cash out of the stock market, they will be looking to get into munis.

If you keep your eyes open you might be able to find a premium bond yielding more than discount bonds. You would figure this couldn't happen, that the bond market would force all yields to come into line. But the muni market isn't as dominated by investment professionals as other bond markets. And relatively naïve individuals often shy away from buying munis at a premium.

So bargains could be available in your state.

3. Buy a short-term muni bond fund. You have a choice of how to invest in bonds: Bonds themselves or muni bond funds. If you don't have enough money to buy individual bonds, you may want to consider muni bond funds.

The biggest disadvantage of bond funds is that when you sell you may incur a loss. This would apply if you sold a bond before maturity. Of course, you may also enjoy a capital gain.

With a bond, you know how much you're getting back if you hold to maturity. With a bond fund you never know for sure how much you'll get. But if you limit it to short term, then you'll have a pretty good idea of the range. For example, the T. Rowe Price Maryland short-term bond fund has hovered between 5.07 and 5.15 for years. That's a pretty tight range.

In choosing bond funds, look at the fees. Expenses, such as management fees and overhead, should not exceed US$1.50 per US$100.

4. Buy a zero coupon muni or Treasury. These can give you a greater return—but with more risk. With a zero coupon bond, you don't receive any interest until the bond matures. Instead the interest is reinvested in the bond, compounding annually. Other bonds often pay twice a year. With zero coupons, you don't have to worry about reinvestment risk. But the value of a zero coupon bond tends to fluctuate more than that of other bonds. So there's more risk involved. If rates fall, the value climbs; when rates increase, value plummets. If you believe rates have peaked, now's the time to buy.

Income from these bonds is taxed each year even though you don't get the cash until maturity. So if you live in a state with income tax, not only is there no tax advantage on an annual basis, but you suffer from a cash-flow standpoint. A zero coupon can be a convenient financial planning device. You can choose a maturity term so the bond will come due when you need the money.

For more information on bonds, go to the website of the Bond Market Association, **www.bondmarkets.com.**

No tools yet, but this biotech handyman will soon help fix "bad" human genes!

by Siu-Yee Ng

Billions of dollars have been spent on sequencing the human genome. Soon it will be completed and the next effort will be to understand the function of specific genes, and to apply this information to medicine and related fields. A new generation of high-tech tools will play a significant role in the analysis of genetic variation and function.

Current efforts to understand the genome have centered around three principal techniques: SNP genotyping, gene expression profiling and proteomics.

SNP genotyping is a method of determining variation in genetic sequences; gene expression profiling is the analysis of which genes are active in a particular cell or group of cells; and proteomics is the process of determining which proteins are present in cells and how they interact.

The complexity of biology, with combinations of over one hundred thousand genes and potentially millions of genetic variations, will require an enormous level of experimentation using these techniques. Unlocking the full potential of the markets for these techniques requires a new generation of high-throughput, cost-effective technologies.

It's not the genes

The human body is composed of billions of cells, each one containing deoxyribonucleic acid, or DNA, which encodes the basic instructions for cellular function. The complete set of an individual's DNA is called the genome, and is organized into 23 pairs of chromosomes, which are further divided into over 100,000 smaller regions called genes. Each cell uses or expresses only those genes required for its specific functions.

Each gene is comprised of a string of four types of nucleotide bases, known as A (adenine), C (cytosine), G (guanine) and T (thymine). Human DNA has approximately 3 billion nucleotides and their precise order is known as the DNA sequence.

When a gene is expressed, a copy of its DNA sequence, called messenger RNA, or mRNA, is used as a template to direct the synthesis of a protein. Proteins direct cell function and ultimately the development of individual traits. Any variation in any part of a gene, called a polymorphism, may result in a change in cell function leading to disease.

Genes may be the components of life, but proteins are the mechanisms – the keys to understanding how life really works. So if you think about it, if the genes go bad they'll produce bad proteins.

Two to tangle

Every person inherits two copies of each gene, one from each parent. The two copies may be identical, or they may be different. Such differences are referred to as genetic variation. Examples of the physical consequences of genetic variation include differences in eye and hair color.

Genetic variation can also have important medical consequences, affecting people's predisposition to diseases such as cancer, diabetes, cardiovascular disease and Alzheimer's disease. It may also cause different people to respond differently to the same drug. Some people may respond well, others may not respond at all and still others may experience adverse side effects.

The most common form of genetic variation is a Single Nucleotide Polymorphism, or SNP. An SNP is a variation in a single position in a DNA sequence. It is estimated that the human genome contains between three and six million SNPs. The importance of SNPs is illustrated by the recent formation of the SNP Consortium, which includes nine major pharmaceutical companies, whose charter is to discover an initial set of approximately 300,000 SNPs.

While in some cases a single SNP will be responsible for medically important effects, it is now believed that the genetic component of most major diseases is the result of the interaction of numerous SNPs. So it's important to investigate many SNPs together in order to discover medically valuable information.

In addition to the knowledge gained from the analysis of SNPs, the study of gene function will significantly contribute to clinical diagnosis and treatment. This study focuses on the physiological functions affected by medically relevant SNPs.

Identity crisis

SNP genotyping is the process of determining which SNPs are present in each of the two copies of a gene, or other portion of a DNA sequence, within an individual. The use of SNP genotyping to obtain meaningful statistics on the effect of an individual SNP or a collection of SNPs, and to apply that information to clinical trials and diagnostic testing, will require the analysis of millions of SNP genotypes and the testing of large populations for each disease.

For example, a single large clinical trial could involve genotyping 300,000 SNPs per patient in 1,000 patients, thus requiring 300 million assays. Using available technologies, this scale of SNP genotyping is both impractical and prohibitively expensive.

Large-scale SNP genotyping, when commercially feasible, will be used for a variety of applications, such as genomics-based drug development, clinical trial analysis,

disease predisposition testing, and disease diagnosis. SNP genotyping can also be used outside of healthcare, for example in the development of plants and animals with desirable commercial characteristics. These markets will require billions of SNP genotyping assays annually.

Killing the messenger

Gene expression profiling is the process of determining which genes are active in a specific cell or group of cells, and is accomplished by measuring mRNA, the intermediary between genes and proteins.

By comparing gene expression patterns between cells from different environments, such as normal tissue compared to diseased tissue or in the presence or absence of a drug, specific genes that play a role in these processes can be identified.

Studies of this type, used in drug discovery, require monitoring thousands, and preferably tens of thousands, of mRNAs in large numbers of samples. The high cost of large-scale gene expression profiling has limited the development of the gene expression profiling market.

Once gene expression patterns have been correlated to specific diseases it is expected to become an important diagnostic tool. Diagnostic use of expression profiling tools is expected to grow rapidly with the combination of the sequencing of various genomes and the availability of more cost-effective technologies.

Finding utopia?

Proteomics is the process of determining which proteins are present in cells and how they interact with one another. Proteomics is another method of correlating the molecular state of a cell with disease, or with reaction to a stimulus such as a drug. This market remains undeveloped, as low-cost, accurate technologies for analysis have not yet become available.

Through proteomics, we may one day be able to fix malfunctioning genes and proteins. But the trick is to figure out the unique role of each of the 400,000 to 500,00 proteins – as well as the complex relationships they have with each other.

There are currently a variety of technologies available for analyzing genetic variation and function. But these technologies lack the combination of high throughput, cost effectiveness and flexibility necessary to adequately address the rapidly evolving markets of SNP genotyping, gene expression profiling and proteomics.

Thus, while numerous technologies and assay formats are currently being applied, growth in these markets is currently limited by the absence of a cost-effective technology that enables billions of assays to be carried out annually.

I first recommended **Sangamo BioSciences, Inc. (SGMO-NASDAQ)** in the April issue of *Taipan,* and then recommended an aftermarket buy in the May issue. Its Universal Gene Recognition technology platform enables the engineering of a class of transcription factors known as zinc finger DNA binding proteins, or ZFPs. By engineering ZFPs, Sangamo can selectively bind to and regulate a target gene, thereby creating ZFP transcription factors that can control gene expression and, consequently, cell function. *Sangamo is up 116% from its IPO and up 182% in* Taipan's *aftermarket buy!* In August, I'll be speaking at the annual Cutting Edge Biotech Symposium it Washington D.C. There's still space left, so call the Agora Conference Desk at (800) 926-6575. Until then, here's another play on the explosive biotech arena.

Illumina (ILMN:NASDAQ) has developed a proprietary array technology that enables the large-scale analysis of genetic variation and function. Its BeadArray technology combines fiber optic bundles and microscopic beads in a simple proprietary manufacturing process to produce array cassettes that can perform up to 3 million assays simultaneously. It offers a combination of high throughput, cost effectiveness and flexibility.

This information will correlate genetic variation and gene function with particular disease states, enhancing drug discovery, allowing diseases to be detected earlier and more specifically and permitting better choices of drugs for individual patients.

Genomic applications also require many different short pieces of DNA that can be made synthetically, called oligonucleotides. For example, SNP genotyping typically requires three to four different oligonucleotides per assay. An SNP genotyping experiment analyzing 10,000 SNPs may therefore require 30,000 to 40,000 different oligonucleotides, contributing significantly to the expense of the experiment.

Illumina's cost-effective Oligator technology allows parallel synthesis of many different oligonucleotides to meet the requirements of large-scale genomics applications.

Fiber optics sells

The first implementation of Illumina's BeadArray technology, the Array of Arrays, will be a disposable cassette with 96 fiber optic bundles arranged in a pattern that matches the standard 96-well microtiter plate. Each fiber optic bundle will perform approximately 2,000 unique assays. Therefore, one Array of Arrays can perform approximately 192,000 individual assays simultaneously.

In partnership with PE Biosystems, Illumina is developing its first products based on its Array of Arrays. These products will include disposable Array of Arrays units, reagent kits for SNP genotyping and instruments that automatically read data from the Array of Arrays.

The first SNP genotyping assay format that Illumina intends to commercialize based on the Array of Arrays will be PE Biosystems' proprietary OLA ZipCode assay format. This assay format enables the creation of a universal Array of Arrays that can be used to analyze any set of

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SNPs. Illumina expects to go commercial with this initial product in 2001.

It also has plans to design its first product for gene expression profiling to test selected sets of approximately 100 to 2,000 genes on large numbers of samples. This should also become commercially available in 2001.

Strategic Alliances

Illumina plans to commercialize its BeadArray technology for SNP genotyping through partnerships. Its first partner, PE Biosystems, contributes expertise in instrument and reagent development, as well as a large and experienced worldwide sales and marketing team.

PE Biosystems will also provide partial funding for developing the initial products from the partnership. It will develop the detection instrument and reagent kits required for use with these products and will provide sales and marketing support.

PE Corporation has invested $5 million to purchase shares of Illumina's preferred stock and agreed to provide Illumina with substantial research and development support over two years. Illumina and PE Biosystems will divide the profits from all partnership products, including instruments, array cassettes and reagent kits, after both parties have received repayment for cost-of-goods, sales and marketing expenses, and ongoing research and development expenses.

In June 1999, Illumina entered into a research collaboration with Dow Chemical to develop a BeadArray designed for the identification of chemical solvents used in Dow Chemical's manufacturing facilities. If successful, Dow Chemical could use Illumina's technology as a rapid and reliable method for performing a quality control check on incoming raw materials. Illumina retains all rights to commercialize any resulting products.

In December 1999, Illumina entered into a research collaboration with Third Wave Technologies to adapt their proprietary assay format, called Invader, to its BeadArray platform. If the research collaboration is successful, Illumina and Third Wave Technologies may negotiate a commercialization agreement.

In November 1999, Illumina entered into a research collaboration with PyroSequencing to adapt their proprietary assay format, called PyroSequencing, to its BeadArray platform. PyroSequencing provides instrumentation and chemistry to perform DNA sequencing and SNP genotyping. If the research collaboration is successful, Illumina and PyroSequencing may negotiate a commercialization agreement.

Illumina has also entered into collaborations with Tufts University, the Australian National University, Stanford University and the University of California, San Diego, to develop new applications for its BeadArray technology.

Illumina currently has no commercially available products. All its technologies are in early stages of development.

Making money

No revenues were generated during the period from its inception on April 28, 1998 through December 31, 1998, and there were approximately $0.5 million in revenues during the year ended December 31, 1999. Net losses were approximately $1.1 million and $5.5 million, respectively, during the same periods. As of December 31, 1999, Illumina's total accumulated deficit was $6.7 million.

Illumina's revenues for the year ended December 31, 1999, were from research funding – primarily from government grants, which accounted for 92% of total revenues for the year ended December 31, 1999.

Don't expect huge revenues at the beginning. The big payoff comes when Illumina's technology participates in the discoveries that will eventually help bring a drug to market. When everybody in genomics makes the transition to protein research, Illumina will be well positioned to play a big role.

Illumina intends to use the net proceeds of this offering for general corporate purposes, including commercialization of its BeadArray and Oligator technologies, research and development, working capital, funding operating losses, capital expenditures and possible acquisitions.

Competition is fierce. Affymetrix, Agilent, Aclara Biosciences, Caliper Technologies, Ciphergen, Genometrix, Luminex, Orchid Biosciences and Sequenom, have or are developing assay technologies for the same markets Illumina is hoping to conquer.

Experienced leaders

The president, CEO and a director has served since October 1999. Prior to joining Illumina, he was the co-founder, president, CEO and a director of Molecular Dynamics, a life sciences company. He was also the vice president of engineering and vice president of strategic planning at Plexus Computers, a UNIX computer company.

The vice president and chief scientific officer has served since March 2000. He was formerly vice president and chief science advisor at Amersham Pharmacia Biotech, a life sciences company. Prior to that, he was the vice president of research and business development of Molecular Dynamics.

The vice president and CFO was formerly CFO at Biogen, Inc., a biopharmaceutical company. He has also served as the director of finance at Allied Health Scientific Products Co.

One of Illumina's founders serves as the vice president of business development and has been a director since April 1998. He has also served as Illumina's acting president, CEO and CFO. While founding Illumina, he was an associate with CW Group, a venture capital firm.

Another founder has served as the vice president of genomics since June 1998. He was formerly director of

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e-Business is E-normous

by J.K. Riggin

Class envy isn't pretty.

In high school, it was the plain Janes who verbally assassinated the class babe behind her back. It's the same with workaday liberal journalists, who wax green over supposed environmental horrors caused by the sports utility vehicles they'll never be able to afford. Now it's the dot-com hangover hype, as the mainstream press gleefully reports on the pitfalls of life in the start-up lane.

Well as far as the Internet is concerned, don't believe the post-hype.

Despite a deserved shakeout in high-visibility consumer e-commerce plays that either had flawed business models or simply overspent on marketing, e-business is alive and well, thank you very much.

Last September, I told you about a handful of tech companies providing software and services to the world of dot-coms. Nearly a year later, the story has sweetened. Beyond the swath of dot-coms going belly-up and the overall pull-back among Internet blue chips, the market for e-business software, services and network infrastructure continues to boom.

And it's not just the big boys like **Oracle (ORCL:NASDAQ)** and **Cisco Systems (CSCO:NASDAQ)** keeping it all to themselves. There's plenty to go around – so much so that a new wave of companies is establishing real beachheads in the ongoing process of rewiring how companies do business over the Internet.

Why? It's a game of catch-up, and you have to look far and wide to find a company not joining the race. Because the semi-revolution amidst Web-enabled B2B and B2C businesses has sent the mother of all wake-up calls to corporate America. And every vice president worth his business casuals is patching an Internet strategy into his PowerPoint presentation to help explain how his division is going to sell more widgets.

Let's first check in on some of the companies I told you about last September. After a mildly successful IPO, database optimizer **Quest Software (QSFT:NASDAQ)** has performed nicely, more than doubling from US$21 a share to over US$55. If you got in early, you might have appreciated the ride up to nearly US$100. Quest survived the late spring correction well, and continues to move up.

Things have been bumpier for the king of content management software, **Vignette (VIGN:NASDAQ).** The company's stock price ballooned more than tenfold, then fell off from its high by more than half. But the stock has mounted a fierce comeback through the beginning of the summer, and is still four times higher than where it was last September.

CRM (customer relationship management) software maker **Broadvision (BVSN:NASDAQ)** followed a similar path, peaking in the spring at almost US$100. But like Vignette, Broadvision is a solid company and mini-category-killer; its stock also is now trading at more than four times the price from last September.

And finally, there's **AppNet (APNT:NASDAQ),** up more than double from September's price. AppNet recently announced that it would be acquired by online marketplace builder **CommerceOne (CMRC:NASDAQ);** market reception has been so-so. CommerceOne doesn't project profits until late next year (which will move up with the AppNet purchase). Profitable AppNet, however, appears to have sought preemptive shelter, as it announced disappointing earnings after the merge announcement.

The CommerceOne situation is murky. Buying AppNet does help their balance sheet, but the real playing field for business-to-business marketplaces on the Web has yet to emerge. Don't forget that several big boys – SAP not least among them – are zeroing in on this space, and CommerceOne is getting large enough that it may be difficult to switch gears if it has to at some point down the road.

With AppNet going away, take a look at **Viant (VIAN:NASDAQ),** a Boston-based e-business consultant. Viant's 1999 IPO timing was similar to that of AppNet, and both companies turn up on the same lists of high-end Web developers and consultants. AppNet's fall from grace could bode well for Viant, which could also be perceived as an acquisition target. Though profitable, Viant is trading at more than 50% off its 52-week high. Watch for Viant to return to good graces through the second half of 2000. Take a look at Viant, but rely on Vignette and Broadvision to continue to deliver.

At the same time, the e-business sector continues to generate emerging companies that are nailing down new service niches. Following are three companies to add to your hot list – two short- and long-term performers and a pre-IPO company that should make a splash by the end of the year.

First up is **BEA Systems (BEAS:NASDAQ),** a provider of e-business transaction services that's all of five years old. BEAS helps companies of all sizes build e-commerce systems that essentially glue together and extend the capabilities of existing computer systems. The company has worked within a wide variety of industries, including investment banking, securities trading, telecommunications, airlines, retail, manufacturing, package delivery, insurance and government. BEAS's tools run the gamut, from critical e-business processes, billing and provisioning; to customer

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service, electronic funds transfers, ATM networks and Web banking; to supply chain management, scheduling and logistics, and hotel/airline/car reservations.

Like everybody else's, the company's stock skyrocketed in March, and fell back sharply in April. But *unlike* the rest, BEAS has been riding a bullet since May.

New deals with Loudcloud (Netscape co-founder Marc Andreeson's ASP play), Nortel Networks and Nokia (yes, a wireless play to provide end-to-end mobile e-commerce) have stoked the fire, big time. Happy blue chip customers like First Union, Qwest, FedEx, Amazon.com and E*Trade don't hurt, either. The word's out, and although BEAS is not cheap, given the company's solid track record of introducing new products and rapidly delivering its services successfully, it's no wonder this stock has the Big Mo.

Next up is **Brocade Communications (BRCD:NASDAQ),** a storage area network facilitator that in five years has surpassed Amazon.com in market cap. The company provides a service called Fibre Channel switching for SANs (storage area networks), which enables companies to realize the benefits of a networked approach to the connection of computer storage systems and servers. As file storage requirements increase, this is rapidly becoming a critical need for e-businesses. Remember, every customer profile, credit card number, purchase order, etc., needs to be stored on a server somewhere. As e-business grows, not to mention Web content overall, the demand for additional storage grows with it. And don't underestimate the impact of broadband connectivity. Faster connections mean bigger files (memory hogs like streaming video and audio, for example), all of which will require increased storage capacity.

Brocade sells its products through leading storage systems and server OEMs, as well as through systems integrators. To date, the company has done an outstanding job of lining up strategic relationships with the market leaders in enterprise servers and data storage, including Dell, Compaq and EMC. In all, Brocade's network of OEM partners blankets 90% of the global storage market, easily outdistancing all other SAN vendors.

Brocade is profitable, taking US$104.8 million in revenue (up from US$18.5 million a year earlier) and net income of US$20.6 million for the six months ended 4/29/00. Put more simply, the afterburners are kicking in with this company, and it's reflected in the stock price. Brocade's price doubled from February to March before taking the correction pill. But as with BEAS, the post-hype consensus is smiling on Brocade, since only the most successful businesses, be they dot-com or bricks-and-mortar, need the company's services in the first place.

Brocade is well positioned. According to International Data Corporation, the company owns approximately 80% of the storage market. Moving forward, IDC is bullish on the space, projecting 112% compounded annual growth from US$34 million in 1998 to US$1.7 billion in 2002.

A June deal with none other than Cisco Systems helped to fire the stock's recent rally. But the deal has long-term strategic implications. Working with Cisco, Brocade can now enable customers to interconnect their SANs over Internet protocol-based metropolitan and wide area networks. This means broader reach for SAN applications, such as long distance disaster recovery, backup, and content distribution.

Storage may not be sexy. It's a step in the e-business process that's easy to overlook when you're patching together disparate systems or putting out deployment-related fires or managing volatile fulfillment issues. But effective storage solutions are as indispensable as water and electricity, and will eventually turn up on the checklist (not the wish list) of any e-business IT manager. Brocade jumped into this market early and quickly dominated it through a network of influential OEMs. This one's a keeper.

Finally, there's **Intira,** which comes with its own new category. In this case, it's "netsourcing." All e-businesses require a Web site, and all Web sites require a host (computer, high-speed Internet connection, power, real estate). When it comes to the hotly contested territory of hosting e-business Web sites, there are two ends of the spectrum. On the one hand, you can go with a company like **Exodus (EXDS:NASDAQ),** which provides everything but the computer. At the other end, you can outsource everything, including the software applications, with an ASP (application service provider), such as **USinternetworking (USIX:NASDAQ)** or **Breakaway Solutions (BWAY:NASDAQ).** As a "netsourcer," **Intira** is somewhere in the middle of this spectrum, providing more than just a high-speed Internet connection, but not getting tangled up leasing applications to customers.

For Intira, this means hosting and managing corporate networks. The company claims to be one of the first movers in a market The Yankee Group says will reach US$20 billion by 2003. Intira's pitch is network management: hassle-free, turnkey and guaranteed. The company even goes so far as to offer its customers one day free for every 15 minutes of downtime, by any standards an aggressive service level commitment for the industry.

Quality venture money has taken notice of Intira to the tune of nearly US$300 million. VC leaders Chase Capital and New Enterprise Associates have placed early stakes in the Pleasanton, California startup. Watch for an IPO filing later this year.

E-business is here to stay, and growth and corporate spending will continue to bubble over the next two years. Even the granddaddy of e-business, **IBM (IBM:NYSE),** realized this when they backed out of the hardware end to focus on services a few years ago. The difference with Internet-enabled e-business, however, is that new categories of companies are continually emerging, including content

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WEBHEAD

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management, customer relationship management, application service providers, transaction services, storage area networks and netsourcing. And dominant players within each of these categories are fast arriving on the scene.

IPOs

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genetics research at Affymetrix, a life sciences company.

The vice president of engineering has served since December 1999. He was formerly senior director of engineering at Molecular Devices and a director of microarray engineering at Molecular Dynamics.

There's a good mix of venture capitalists and industry experience among the directors. One of the founders is a general partner of CW Group, a medical venture capital fund. He is also the founder and director of FastTrack Systems, Inc.

Illumina's other director is a general partner of CW Group and also a director of Caliper Technologies Corp. He's worked at Johnson & Johnson, where he was responsible for identification, evaluation and negotiation of situations ranging from single product opportunities to company acquisitions, both domestically and internationally. He is a director of The Hastings Center, a non-profit organization devoted to the study of bioethical issues in medicine and the life sciences.

Illumina has a director who serves as a senior principal of venture capital funds associated with ARCH Venture Partners. He was formerly a senior manager at ARCH Development Corporation, a company affiliated with the University of Chicago, where he was responsible for new company formation. He is a director of Caliper Technologies Corp.

Also on staff at Illumina is a former chief science and technology officer at SmithKline Beecham, the international biopharmaceutical company. He is a director of SmithKline Beecham and Maxygen. He is also a research professor at the University of Pennsylvania and holds the William Pitt Fellowship at Pembroke College, Cambridge University, England.

Another director includes the president and CEO of IDEC Pharmaceuticals, a biopharmaceutical company. He is also a director of Spiros Development. He has served in various positions at Genentech and previously was a professor at the Massachusetts Institute of Technology.

A director and chairman of the scientific advisory board has been the Robinson Professor of Chemistry at Tufts University since September 1995. He has published over 100 papers and holds over 20 patents.

Most of these positions have been filled recently, but considering that this is a young company, I'm not too worried. Illumina is tapping into a fairly new market, and it has gathered enough talent and experience to help lead it into the new millennium.

Goldman, Sachs & Co. is the lead underwriter, and others include SG Cowen and Chase H&Q. Illumina plans to trade under the ticker symbol ILMN and will trade on NASDAQ.

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Company	Exchange/Symbol	Status	Action	Company	Exchange/Symbol	Status	Action
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SunMicroSystems	NASDAQ:SUNW	open	hold	Bionova	MAEX:BVA	open	buy
Oracle	NASDAQ:ORCL	open	sell	Aramex	NASDAQ:ARMX	open	buy
Safeguard Scientific	NASDAQ:SFE	open	hold	Uproar	EASDAQ:UPRO	open	hold
Internet Capital Group	NASDAQ:ICGE	open	hold	Restaurant Brands	NZSE:RBD	open	buy
Cell Robotics	NASDAQ:CRII	open	buy under US$5	Fischer & Paykel	NZSE:FAP	open	buy
Talk.com	NASDAQ:TALK	open	hold	Unicharm	TOKYO:8113	open	buy
Clearworks.net	OTC BB:CLWK	open	buy	Elron	NYSE:ELRNF	open	buy
VerticalNet	NASDAQ:VERT	open	hold	Elbit Ltd.	NASDAQ:ELBTF	open	buy
Valance Technology	NASDAQ:VLNC	open	hold	Orckit	NASDAQ:ORCT	open	buy
American Quantum	AMEX:AFV	open	buy under US$2	Hurricane Hydrocarbons	HHLFQ	open	hold
Media 100	NASDAQ:MDEA	open	hold	Hurricane Warrants	HUHY	open	hold
Fox Entertainment	NYSE:FOX	open	sell over US$30	Ashanti Goldfields	ASL	open	buy
Barnes and Noble	NASDAQ:BNBN	open	hold	Surgutneftegaz ADR	SGTZY	open	buy
"Red Hat, Inc "	NASDAQ:RHAT	open	hold	Suez Cement	SZCD	open	buy
Interwoven	NASDAQ:IWOV	open	hold	Sasol	SASOY	open	buy
Akami Technologies	NASDAQ:AKAM	open	hold	Monsenergo ADR	AOMOY	open	hold
FreeMarkets	NASDAQ:FMKT	open	hold	TyumenAviaTrans	TVAVY	open	buy
Sangamo Biosciences	NASDAQ:SGMO	open	buy under US$11.50	Ventspils Nafta	VNFT	open	buy
Silicon Laboratory	NASDAQ:SLAB	open	hold	Lukoil Preferred	LUKPY	open	buy
Web Methods	NASDAQ:WEBM	open	hold	Xoma	XOMA	open	hold
New Focus	NASDAQ:NUFO	open	hold	Avant Immunotherapeutics	AVAN	open	buy
AVI Biopharma	NASDAQ:AVII	open	hold	Williams Control	WMCO	open	buy
Aviron	NASDAQ:AVIR	open	strong buy under US$20	Exponent	EXPO	open	buy
Closure Medical	NASDAQ:CLSR	open	hold	Computer Learning Centers	CLCX	open	buy
Micros Systems	NASDAQ:MCRS	open	strong buy	Geoworks	NASDAQ:GWRX	open	buy
Modtech	NASDAQ:MODT	open	buy	Fastcomm Communications	OTC BB:FSCX	open	hold
Printrak	NASDAQ:AFIS	open	hold	Pliant Systems	OTC BB:PLNS	open	buy under US$10
MedImmune	NASDAQ:MEDI	open	buy under US$50	Illinois Superconductor	OTC BB:ISCO	open	buy under US$5
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Millennium Pharmaceuticals	NASDAQ:MLNM	open	hold	APA Optics	NASDAQ:APAT	open	buy
CheckFree Holdings	NASDAQ:CKFR	open	hold	Wave Systems	NASDAQ:WAVX	open	buy underUS$20
Univision	NYSE:UVN	open	hold	Interwave Communications	NASDAQ:IWAV	open	buy under US$15
Optimal Robotics	NASDAQ:OPMR	open	hold	CellPoint	NASDAQ:CLPT	open	buy under US$30
Ballistic Recovery System	OTC BB: BRSI	open	buy	Comtech Telecom	NASDAQ:CMTL	open	buy under US$15
Sensormatic Electronics	NYSE:SRM	open	hold				

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