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Nobel Laureate Malarkey

An aggressive company with huge long-term potential, Hittite is transforming itself into a hegemonic horde swarming into eight sectors.

In a pungent blog on Jim Cramer's famous limitations as a stock picker, Henry Blodget recently concluded with a concise summary of the prevailing wisdom in the investment world: "When you own a diversified portfolio of stocks, it is rarely the stock selections that make you money but the performance of the stock market overall—which, thankfully, usually goes up. What a truly talented stock-picker will do is select stocks that beat the market, after costs, without exposing you to more risk than the market. Because the vast majority of stock-pickers can't do this, you are almost always better off in a diversified portfolio of low-cost index funds. Properly constructed, such a portfolio will, over decades, make you more money, with less risk, than even an above-average stock-picker (let alone a chair-throwing, self-aggrandizing clown)."

Jim Cramer can defend himself, even throw a chair at an on-screen effigy of Blodget or me. Do it Jim! But Blodget's fashionable belief that stock-picking is a low priority in wealth creation and perhaps impossible over the long term is in fact a wonderful affirmation of what we do here. Blodget follows the guidance of investment sages as prestigious and diverse as Benjamin Graham and Harry Markowitz, John Bogle and Burton Malkiel, Michael Mouboussin and Ken Fisher. When these luminaries all join in upholding a theory of capital markets that is utterly false—and tens of thousands of mutual and hedge funds act on the Nobel Laureate delusion—it creates an immense opportunity for the *Gilder Technology Report* and gives me a new lease on life and youth.

The case for the futility of stock picking springs from numerology. You merely average out all the picks and show the inevitable reversion to the mean. To the Maytag mind of Nobel Malarkey, everything is a wash. Stemming from the model of alpha returns and beta volatility—with the beta applying to specific stocks and washed out by diversification—most estimates thus show that at most only an unreliable 10 percent of stock market yields, for around one percent per annum, are due to stock picking. As Blodget explains, there remains chiefly the market-wide alpha as the source of returns.

Correctly observing that past performance is mostly uncorrelated with future

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Inside:

Analog's Hittite Invasion

You need analog to link to the world. And your technology portfolio needs a voracious analog vendor, not a sated gent. Therefore, we remove **Analog Devices** (ADI) from our list this month and add a rising power, **Hittite Microwave** (HITT), one of several companies that piqued our interest among the throngs at this year's Needham Growth Conference in early January.

Absent a clear and ascendant vision, ADI has begun losing ground to some of its formidable foes such as **Linear Technology** (LLTC), **Maxim Integrated Products** (MXIM),

and **National Semiconductor** (NSM), all of whom have reported analog revenues trending upward over the past two years. By contrast, during the same period ADI's top line settled down 2 percent. And despite recent fab consolidations and analog sales second only to **Texas Instruments** (TXN), operating margins continue to flounder in the mid-20s, well below management's modest target of 30 percent, as they struggle with their power-management products and with a distracting digital segment where expert edge is flagging.

To outgrow rivals such as Agilent, Analog Devices, and Linear, Hittite management is stoking its research and development engine and accelerating its global thrust.

No thanks to operations, ADI's earnings have been buoyed this year by aggressive stock buybacks and bulging interest income—not exactly a recipe for long-term growth. In keeping with its lackluster attitude, management has peered over the horizon and sees operating income growing just 4.5 percent annually, assuming they can keep up with the 15 percent per year growth in their analog market and can attain their target operating margin of 30 percent. Don't hold your breath.

Win with a solid HITT

We shed ourselves of ADI in time to ride with the ascendant Hittite band. Its army mustered in 1985 and swiftly infiltrated the government sector on the strength of its analog chips and modules. Over the years Hittite added subsystems and mixed-signal products to its arsenal, began invading commercial markets, and is now transforming itself into a hegemonic horde. It is swarming into eight sectors, from automotive, broadband, cellular infrastructure, and fiber optics to microwave and millimeter wave communications, military, space, and test and measurement.

Hittite entered the public markets a year and a half ago at an IPO price of $17, soared to $51 last October, and since settled back to the mid-$30s on concern over perceived near-term weakness, creating a buying opportunity for far-sighted investors interested in an aggressive company with huge long-term potential. Though revenues rose an average 36 percent per year over Hittite's first two decades, projected sales of $128 million for 2006 are still only 5 percent of ADI's and a fraction of a percent of its total addressable market.

To outgrow these markets and rivals such as **Agilent Technologies** (A), ADI, and Linear, management is stoking its research and development engine and accelerating its global thrust. Underpinning Hittite's innovative prowess is its share of a seemingly endangered species made up of analog and mixed-signal designers. Particularly hard to find are good microwave engineers. To fill company ranks, management has had to go where the talent is; beginning in 2005, they opened design centers in Istanbul and Colorado Springs followed by a third center in Ottawa last year. Previously, Hittite had done all its design at its home office in Chelmsford, Massachusetts.

Some half of total revenues are supplied by sales of custom products, including a significant stream of sole source dollars from military and space subcontracts. This speaks well of the quality of Hittite's engineers and of the value of its intellectual property. On the standard side of the business, the company is quickly expanding its lineup of 461 high-end products. The 90 new products introduced last year (up from 80 in 2005) help systems houses reduce componentry in their products and enable Hittite to embed more of its own silicon in increasingly exacting high-speed modules and subsystems.

A proven innovator in new processes, fabless Hittite contracts with 8 foundries, including **Atmel** (ATML), **IBM** (IBM), and **TriQuint Semiconductor** (TQNT), to manufacture chips using 15 semiconductor processes, including GaAs, GaN, InGaP, InP, and SiGe. The company relies on a few Asian subcontractors to package its silicon, but final assembly of modules and subsystems and final testing of all products are done in Chelmsford, where productivity continues to climb. For example, last summer Hittite upgraded its RF high-speed test capability to reduce the number of set-ups required to handle the rising tide of high-volume products. And new, faster laser markers have given Hittite greater flexibility to customize markings without using hazardous chemicals.

Globally ambitious, the company in six years has spanned the planet with nine sales offices, having opened two as recently as the third quarter of last year. On track to swell international sales by 90 percent for the year (compared to a domestic 30-percent rise), overseas revenue comprised 55 percent of total sales, during the first nine months of 2006; by the third quarter that number had risen to 60 percent, up from 43 percent a year earlier.

All told, the third-quarter report (the latest available) was jubilant. Revenues should jump by more than half for all of 2006 with all eight markets up—particularly broadband, cellular infrastructure, and microwave and millimeter wave communications, which supplied two-thirds of revenue dollars during the third quarter. Ten customers accounted for 43 percent of sales, but customer concentration is decreasing as Hittite multiplies products and reaches more of its vast, untapped markets, partially represented by ADI's 56,000 customers (compared to Hittite's 2,300). Topping off the quarter were an eye-popping gross margin of 73.6 percent and operating margin of 47.5 percent.

But Wall Street, concerned over the outlook for flat fourth-quarter sales and slightly lower earnings, is busy boxing Hittite into its quarterly models and missing the huge upside that could play out over coming years. On the earnings side, management has been preaching all along that its recent stratospheric surge in gross margin is unsustainable, anticipating instead a still enviable long-term marker of 68 percent. In keeping with Hittite's ambitious

goals, R&D was up 52 percent during the third quarter compared to a year ago and surpassed 11 percent of sales on its way to 15 percent over the next 18 months. After the dust settles, expect a net operating margin in the high 30s and an after tax profit of 30 percent, on average (while ADI attempts to hold onto its 20 percent equivalent).

On the sales side, Hittite's march will be slowed occasionally by lags in the semiconductor markets and by the stickiness of customers entrenched inside enemy territory. As short as a month for standard products, sales cycles can last as long as two years for custom orders. Moreover, the average lifespan of analog products ranges from 7–10 years, and many systems have been designed around specific silicon solutions. Thus, it could take some time for Hittite to edge out competing products. Supporting its campaign is a war chest enriched by increasingly positive cash flows—net cash nearly doubled over the first three-quarters of last year, from $64 million to $116 million, with no debt and a highly liquid ratio of cash to current liabilities of 7.5 times.

Wall Street is busy boxing Hittite into its quarterly models and missing the huge upside that could play out over coming years.

Investors are now valuing the stock at 26 times anticipated earnings for 2006 of $1.32. Hittite's on the warpath, and its strategy to accelerate its ascent have already affected both its top and bottom lines. But even if the company just manages to maintain its average ascent of the first two decades, investors could be looking at revenue of $322 million in 2009 with earnings of $2.76 per share (based on management's long-term model) for a stock price of $69 at a PE of 25.

Still in National's League

As a master of high frequency, lower power, precision analog, National Semiconductor will be a significant beneficiary of the move to mobile devices and to high-definition video, which is taking off and is a key part of the paradigm. Counter-intuitively, the spread of digital content increases the need for analog connectors and interfaces to the real world. In a quest for enhanced displays, improved audio, better wireless, and longer battery life, critical-path semiconductors in consumer electronics are becoming increasingly analog and therefore increasingly National.

In wireless handsets, CEO Brian Halla's strategy to eschew commodity circuits in favor of value-added, higher margin silicon had made National number one in power management among standard linear analog players. Going forward, consumers will continue to expect their mobile devices to perform more functions with longer and longer battery life, or at least the same life each time a feature is added. National is helping to make this possible. In amplifiers, its new precision products are enabling the latest ultrasound machines, where it is critical that noise be eliminated over the entire temperature range of the chips.

Indeed, "new" is the word for National; nearly 40 percent of sales in both power management and data converters came from new products introduced during the last three years (compared to high 20s percent in 2004). And the push continues. For example, in power management, the company introduced 149 new products during the last two quarters, up from 100 during the same year-earlier period. As a result, standard linear products have increased to 78 percent of National's sales from 74 percent a year ago, and should soon exceed 80 percent. The transition is being lead by power management and amplifier products, which together drive two-thirds of company sales.

Revenue has declined 12 percent over the past two quarters (ending November) as Halla prunes nonaligning units and low-speed (legacy) linear, and cleans up inventory. Yet even with factory utilization dipping below 60 percent, gross margin has remained relatively strong at 60 percent (excluding stock compensation expense) compared to 50 percent during the last cycle trough in 2004. This reflects the rising sales of value-added standard linear analog products, where average selling prices continued to rise—up 10 percent over the year-ago quarter. Still expected over the near-term are gross margins over 65 percent.

During the current quarter ending February, revenue is expected to decline another 10 percent as the inventory clean-up winds down and as Halla further reduces foundry support for the digital cordless and super I/O businesses he sold over a year ago. He also expects wireless, display, and computing sales to drift down seasonally. Though his fabs will continue to run below 60 percent of capacity for the next several months, Halla is wisely planning for a coming surge in high-value analog sales and so is increasing his capital investment sequentially to $40–$45 million from $30 million as he converts fab capacity in Texas from 6-inch to 8-inch wafers.

If National reports a sequentially flat fourth quarter of fiscal year 2007 ending May, the company would earn about $1.30, up slightly from $1.26 for the previous fiscal year. This would give the stock an attractive, forward-looking price-to-earning multiple of 17.3 at the recent price of $22.50. Further assume that sales in fiscal 2008 merely keep pace with the standard linear market, now rising 15 percent annually, and with no margin improvements National would earn $1.50. At a PE of 20, the stock would rise to $30. That's the conservative scenario for the next year or so.

But even accounting for some likely upsides to this outlook, don't expect the stock to double over that period. However, *do* expect National to anchor your telecosm portfolio with steady, long-term growth.

— Charlie Burger, with George Gilder, January 30, 2007

Advanced Micro Devices	(AMD)
Altera	(ALTR)
Anadigics	(ANAD)
Broadcom	(BRCM)
Cepheid	(CPHD)
Corning	(GLW)
Energy Conversion Devices	(ENER)
Equinix	(EQIX)
EZchip	(LNOP)
Finisar	(FNSR)
Flextronics	(FLEX)
FormFactor	(FORM)
Hittite Microwave	(HITT)*
Ikanos	(IKAN)
Intel	(INTC)
Microvision	(MVIS)
National Semiconductor	(NSM)
NetLogic	(NETL)
PMC-Sierra	(PMCS)
Power-One	(PWER)
Qualcomm	(QCOM)
Semiconductor Manufacturing International	(SMI)
Sigma Designs	(SIGM)
Semitool	(SMTL)
Sprint Nextel	(S)
Synaptics	(SYNA)
Taiwan Semiconductor	(TSM)
Texas Instruments	(TXN)
Xilinx	(XLNX)
Zoran	(ZRAN)

*Added this month

Note: The Telecosm Technologies list featured in the Gilder Technology Report is not a model portfolio. It is a list of technologies that lead in their respective application. Companies appear on this list based on technical leadership, without consideration of current share price or investment timing. The presence of a company on the list is not a recommendation to buy shares at the current price. George Gilder and Gilder Technology Report staff may hold positions in some or all of the stocks listed.

Corning (GLW)

PARADIGM PLAY: GLASS DISPLAYS & FIBER TO THE EXTENSION

JANUARY 30: 20.68; 52-WEEK RANGE: 17.50 – 29.61; MARKET CAP: 31.72B

Corning is booming better than during the Boom. And for this leading glass house, the past is the future, at least if you're looking for more new records during the coming couple of years as sales of catalytic converters for diesel trucks begin to ramp, as fiber products rejuvenate, and as liquid crystal display (LCD) glass goes everywhere. Free falling prices of LCD color televisions are propelling Corning's glass-substrate business faster than anticipated. Since it's the world's premier process company (see August 2006 GTR) and can manufacture LCD substrates in huge volumes, demand elasticity probably benefits Corning more than its pigmy competitors.

Sales of $5.17b for 2006 increased 13% over 2005 and were Corning's fourth highest. Gross margin of 44.1% and net profit of $1.78b were both company records, surpassing the telecom top in 2000. And earnings of $1.17 per share (excluding one-time items and options expensing) rose by more than a third over the previous year. Don't say we didn't warn you.

LCD glass volume in Corning's display segment surged 52% over 2005, revenue rose 22%, and gross margin held steady even as prices eroded 16%, a testimony to the company's processing prowess. Glass volume also grew 52% at Corning's Samsung joint venture where equity earnings increased 36% despite a price decline of 9% and an unfavorable exchange rate. Net income for the total display business rose 30%.

During 2006, shipments of LCD computer monitors rose by a third over 2005 and penetrated 82% of that market by the fourth quarter. But really driving Corning's glass volume are sales of LCD televisions, which are expected to glom more than half of all substrates shipped this year. Unit sales of LCD televisions more than doubled during 2006, penetrating 26% of the global color TV market by the fourth quarter and a third of the U.S. market. Meanwhile, average screen size grew from 24.7" in 2005 to 28.3" last year and to 29" during the final quarter. The continuing shift to larger televisions greatly benefits Corning since every 1" increase in screen size increases glass demand by 10%.

Corning's leading-edge generation-8 glass capabilities continue to ramp, and the company shipped several million square feet to Sharp's gen-8 fab, still the only plant able to handle those newest substrates, large enough to cover a king-size bed. Flexing its muscle at the Consumer Electronics Show in January, Sharp unveiled a prototype 108" LCD set. Jumbo sets not only consume a lot of glass, their panels must be made from the largest substrates sizes, where Corning excels.

An overwhelming success has been Corning's unique extra green (environmental) glass, which it can't produce fast enough to fill requests. The company expects to convert all capacity to the new glass by the end of this year. As a bonus, Corning believes that this glass is improving its customers' yields.

Management expects the entire glass market to grow by 400m square feet this year to 1.2b sq. ft. after growing by an identical 400m sq. ft. last year. They believe LCD televisions will capture a third of TV unit sales for the year (up from 11% in 2005 and 22% in 2006) with the greatest concentration during the holidays. Average screen size should breach 30", which alone will require 10% more glass. While these are impressive numbers, we believe they may underestimate demand as prices of LCD sets drop below the tipping point that will enable them to quickly overwhelm the market during the next two or three years. For example, market research firm iSuppli estimates that the average selling price for a 42" LCD set will drop 37% this year to $1,283 by December from $2,036 at the end of last year.

Since television sales are highly seasonal and since panel makers appear to be avoiding last year's first-half inventory overbuild, Corning expects to ship 60% of its glass volume during the last two quarters. Management expects to hold the price erosion in its wholly-owned glass business to just a percent or two during the first quarter as it implements a tougher pricing strategy. This is a significant development which may reflect Corning's strong and perhaps growing lead in this technology.

Elsewhere, Corning's telecom revenue increased 10% with earnings of $51m, up notably from $18m in 2005 and expected to rise again this year as the industry continues to recover. Also improving telecom earnings has been the company's ability radically to improve productivity in last-mile fiber products to the delight of Verizon. The environmental segment grew 6% on the strength of a two-thirds rise in sales of catalytic converters for diesel engines, expected to ascend ever faster later this year and next, spurred by new emission standards.

Management is quickly digging out of its telecom debt on the strength of increasing free cash flow, which rose to $621m last year from $386m in 2005. During the year, net debt (cash and receivables minus all book liabilities) dropped from $2.61b to $1.86b and the "quick" ratio of cash and receivables to current liabilities, a good measure of short-term liquidity, rose to 1.7x from 1.3x a year early.

At $21, the stock is trading at a bargain 18x earnings for 2006 despite last year's rapid growth and the promise of more to come, greatly limiting downside potential from here. For an upside example, if the company can maintain just a third of its recent earnings growth rate, it would earn $1.49 next year for a stock price $37 at a more reasonable multiple of 25x earnings.

Longer-term, LCD glass could well repeat the 30-plus year run of cathode ray tubes (CRTs). The King of Glassmakers has just three serious rivals in a market with a

Online Bonus Material: For additional analysis on **Sigma Designs (SIGM)** and **Microvision (MVIS)** logon with your GTR subscriber ID at *www.Gildertech.com*

Himalayan barrier to entry, and it continues to lead the way to larger substrates and crucial process and structural advances. But, for Corning to remain a solid investment after the LCD "growth spurt" winds down by the end of the decade, it must move beyond a one-product company and succeed outside of LCDs with other ascending technologies, such as in telecom where most of the world's carriers are still nursing aging copper connections, in green lasers for mobile projections devices where it is working with Microvision, and in micro reactors for chemical processing.

If Corning successfully transitions—and that would be consistent with its history—then today's valuation is cheap indeed.

— Charlie Burger

Hittite Microwave (HITT)

PARADIGM PLAY: ANALOG LINK TO THE WORLD

JANUARY 30: 34.64; 52-WEEK RANGE: 26.32 – 51.25; MARKET CAP: 1.05B

Replacing Analog Devices (ADI) on our list this month, Hittite Microwave has emerged conquering and to conquer.

NetLogic (NETL)

PARADIGM PLAY: CUSTOM LAYER 3 AND 4 PROCESSORS

JANUARY 30: 23.94; 52-WEEK RANGE: 17.55 – 45.03; MARKET CAP: 482.7M

Why did NetLogic's market cap pop some 10% the day after its earnings release last week? Read the November *GTR* for the answer. Remaining intact is the unchanging story of a need for fast memory and pattern matching across the wirespeed reaches of the Net. Last quarter marked the passage of NetLogic's mid-winter doldrums as a distended supply chain relieved itself of excesses. Though recovery in Japan will have to wait until later this year when NTT begins transit to its triple-play network, it appears that CEO Ron Jankov will enjoy a wee rebound in sales during the first half as a spring thaw begins again melting his established markets and huge new opportunities come in view, from pullulating streams in video servers to hypertrophied headers in IPv6 network nodes.

A record 11 design wins in the quarter were spread out over all product categories, including eight in the NL6000, 7000, and 8000 lines. These content addressable memories (CAMs) store large databases of information about the network and use innovative processor architectures to make complex wirespeed decisions about packets traversing the network. NetLogic is the runaway leader in advanced processing of packet headers with its NL families of CAMs for high-end routers and switches.

As voice, video, data, and mobility applications converge onto the Internet, packet headers are getting longer and routing decisions are becoming more complex, pushing CAMs to process more at each node and at ever increasing speeds to facilitate latency sensitive applications such as IPTV. These demands are spurring initial design wins for the third-generation NL7000, which supports twice as many decisions with the same board space and power profile as the second-generation NL6000, and for the fourth-generation NL8000, which uses a new core architecture capable of 1.2 billion decisions per second and 50 gigabit per second (Gbps) throughput.

For low-end switches and routers, NETLite's simplified architecture reduces power and price. The line garnered two design wins in the quarter and Jankov expects sales to start swelling next year as voice and video put additional demands on Internet access boxes. An even lower-power version of NETLite, originally designed for Cisco, is now generally available for the lowest-cost, high-volume switches and access equipment with very strict power budgets. Jankov has entered into design and marketing agreement with Marvell, EZchip and Xelerated, and has teamed with Broadcom to develop Ethernet routing solutions, which could eventually propel NETLite across the access landscape through Broadcom switches.

Finally, Jankov announced a second big win for his 7-layer processor line, NETL7. At the access, where application processing and complex network security functions are performed, all packet content through layer 7 must be analyzed. Since 80 percent of a packet is content, this results in a massive increase in data to be examined. Content-aware intelligence enables access networks to distinguish types of data in order to accelerate traffic, to create tiered services, to route based on content, and to provide comprehensive security. NETL7 processes at 10 Gbps wire-speed, the fastest in the industry, enabling networkers to inspect each packet in real time.

NETL7 targets what should become one of the fastest growing markets over the next decade, as service providers, enterprises, consumers, and government continue their migration toward layer-7 routing and security. With NETL7, Jankov can expand into servers from the likes of Sun, HP, and Dell and into users of security software from McAfee and Symantec. Security appliances should push NETL7 out of the starting gate later his year, followed by sales into switches and routers, where layer-7 products will command selling prices some 4 times higher than in the network appliances and should propel NETL7 to the size of the Jankov's CAM business. Sales into computers and servers, not anticipated before late 2008, could finally push NetLogic's layer-7 business beyond its traditional CAM lines.

NetLogic furnishes more proof that you can't time the market. In November we speculated that the stock may show several more months of weakness until signs begin to point more definitely to a second sales ascent beginning later this year. A well run firm with stellar margins and a high barrier to entry based on 2-year design cycles and a wide technology lead, NetLogic is executing as promised. But investors may be catching on early, pacifying those who bought last year in the upper teens. As George reminds us, timing pirouettes are costly and treacherous. Don't try them.

But don't panic, either. With a long-term investment horizon, you still have plenty of time. Small cap stocks often experience wild swings as investor expectations ebb and flow. More importantly, it is unlikely that the full potential of NetLogic's technology is understood by the average investor or Wall Street analyst.

For five or six years a single chip will not be able to perform all the constantly expanding functions of networking. Among the various coprocessors still needed will be CAMs from the likes of NetLogic. Voice and video are driving network aware processors out across the network to the edge and access. To support these applications along with security at rising line speeds, customers are significantly increasing the number of NetLogic's most advanced processors dedicated to each line card—up to ten per card depending on the application. Wireless is also emerging as a huge driver of CAMs as carriers increasingly require embedded intelligence to deliver multimedia content and IP-based services over the air to mobile devices.

Armed for its mission with strong cash flows and no debt, NetLogic's cash and receivables net total book liabilities have swollen by half over the past year, from $55m to $82m. The new design wins, even in the core business, are weighted toward the second half of next year. Thus, coming off the depressed fourth quarter, Jankov is looking for a flattish to slightly up first half of the year before the second long-term ramp starts on the confluence of NTT's next-generation build-out and early sales of NETLite, of 7-layer processors, and of next-generation CAMs—all of which combined should contribute to an additional $5m of sales during the second half.

Thus, quarterly revenue should easily rise back to the peak of $26.6m reached during the third quarter of last year and toward $30m by early next year, pushing annualized earnings to $1.30 (including the 18 percent tax gouge expected to kick in later this year and excluding options expensing) for a price of $32.50 at a price-to-earnings multiple of 25. If NETL7 eventually moves beyond its traditional CAM slots, then $50m of quarterly revenue could be conservative by the end of the decade, catapulting earnings to $2.80 and the stock to $70 at a PE of 25.

Don't bank on that yet; we haven't discovered a crystal ball for predicting stock prices. But do use it to build confidence that at the current price, this stock has little downside risk past this year and huge upside potential.

— Charlie Burger

(CONTINUED FROM PAGE 1)

returns, the experts show that the path of market prices is mostly a random walk or even a fractal and they prescribe mazes of hedging schemes and technical maneuvers as the only way to beat the market. Thus they achieve the stunning feat of denying the possibility of stock picking as a way of exceeding the market indexes, when in fact stock picking is the only way reliably to beat the market—when without stock picking the market would be as devoid of information as the random walkers assume. We could all better enjoy our inevitable destiny of Gambler's Ruin amid the gaiety of Vegas.

The *GTR* looks for companies that can grow fast almost regardless of the condition in the overall economy. As the chief locus of innovation and the driving force of economic growth, technology stocks tend to offer more opportunities for growth than do stocks in other sectors. The prevailing theory says that arbitrage by investors ensures that firms in other sectors will eventually be valued by the market at a level that offers equivalent yields. Although that insight is true (all good things come to an end), technology generates a steady stream of new companies and new products with outsized returns. In time these too will revert to the mean, to be replaced by yet further innovations, reflecting new paradigms of change. Thus technology investing entails constant vigilance and vision.

As my longtime readers know, I am an exponent of Claude Shannon's information theory. A prime insight of information theory is that random white noise and informative (high entropy) messages are in principle indistinguishable on a graph. In other words, chaos and creativity limn out the same serial histories.

Many of you have done well with **Qualcomm** (QCOM), a company that is founded on this insight. As Irwin Jacobs and Andrew Viterbi told me some 15 years ago the secret of the superior efficiency of CDMA (code division multiple access) is that it contrives a signal that as much as possible resembles a digital rendition of white noise. Today this phenomenon is the secret to grasping the silliness of the idea that stock prices are random and thus unpredictable. As Richard Vigilante of Whitebox Advisors observes, the prevailing theory assumes that stocks are like commodities, as devoid of information as so many identical pork bellies or kernels of corn. But, just as we know a noise like CDMA signal can be decoded to reveal the very non-random messages or voices of its origin, so we all know that every stock price reflects the intense plans and projects of a particular company. It springs from a dense and dynamic interplay of unique and complex information.

The risk in such stocks has nothing to do with intrinsic volatility, which in turn, as recent academic studies show, is *not* demonstrably related to return. In our universe of technology stocks, the risk resides in the likelihood of the company succeeding in its business plans and generating a future flow of earnings. If those earnings rise fast enough, the stocks will tend to succeed regardless of the performance of the overall market.

Risk is a product not of volatility but of information or ignorance. The risk that a company will fail can be appraised through close scrutiny of its technology, market, and management. This risk is company specific and can be remedied by information. It is in no way analogous to the generic risk imparted by leverage. While the prevailing theory upholds the idea that leverage can achieve higher returns at the cost of incurring greater risk, the *GTR* believes that ignorance is the source of risk and attempts to remedy nescience with knowledge rather than compounding it with the additional risk of leverage. Leverage is merely a tool of good management and is desirable when it improves the company's return on investment.

As the chief locus of innovation and the driving force of economic growth, technology stocks offer more opportunities for growth than stocks in other sectors.

The Gilder Technology Index (GTI) is compiled independently by Dick Sears and posted daily and weekly (with sage commentary) on the Gildertech subscriber-only "Telecosm Lounge" message board (www.gildertech.com/board). It registers two episodes of successful stock picking, separated by a millennial eclipse when we mostly gave up on the business to respond to a series of suits and other attacks that prevented us even from benefiting from the initial rocketing rebounds of some of our favorite companies such as **Corning** (GLW) and **Equinix** (EQIX). The fact that without an inking of active management, we succeeded in outpacing the market over a 10-year period is nothing short of amazing to me. We did not do it by poring through the noisy gyrations of **Sigma Design**'s (SIGM) daily stock price movements or the mostly meaningless rearview data of **EZchip**'s (LNOP) or **Microvision**'s (MVIS) earnings reports.

Instead we understood that in an entrepreneurial

economy full of creative surprises, noise and signal will look the same. In order to distinguish between them the investor must use not an oscilloscope but a microscope. Rather than measuring meaningless rearview data, he must fathom the specific details and complexities of particular companies, including their finances, and follow the vectors of paradigm technologies and economic developments. That is what we do here. It does not guarantee success but it makes success eminently possible.

LAN's End

Visiting New York last week for the **Wave Systems** (WAVX) board meeting, I learned from sage CEO Steven Sprague about the coming end of the local area network, the lordly LAN.

The LAN will fall before the increasingly ubiquitous Trusted Platform Module (TPM), a hardware microcontroller vault that enables end-to-end security across the net and thus renders obsolete all the firewalls and physical LAN protectors in offices around the globe. In conjunction with biometric inputs, registering fingerprints, voice prints, iris scans, and other identifying tokens, TPM cryptographic functions invoke software and firmware to prevent unauthorized access to any computer or other TPM equipped device. With a hardware engine capable of up to 2048-bit encryption/decryption and where appropriate embedded in smart cards, dongles, and other removable media, the TPM performs digital signing, authentication, and key protection.

When security is end-to-end, the world can become an Internet and all the local nets can disappear.

It's going to happen sooner than you expect, as **Microsoft** (MSFT) Vista requires trusted platform modules for logo compliance, as **Dell** (DELL), **Hewlett Packard** (HPQ), **Apple** (AAPL), **Lenovo**, **Sony** (SNE) et al. build TPMs into all their machines, as nations around the world mandate IPv6 with its unlimited IP addresses removing all need for network address translation, and as **Seagate** (STX) and **Hitachi** (HIT) put them in all hard drives. There are now some 50 million machines with TPMs. Soon there will hundreds of millions. Every TPM provides a vault and an encryption engine that enable authentication and trust at every machine, fixed or mobile. Linked to biometric identification, security will move to the edge. When the edge is secure, network "security" and firewalls merely obstruct communication by imparting noise and disruption. Otiose security can actually reduce trust by providing more digital nodes to attack.

With the movement of trust to the edge, firewalls, LANs, NATs (network address translators), SSIDs (service set identifiers), and all the rest of the apparatus of the LAN will dissolve. As Steve Ballmer of Microsoft put it recently (I paraphrase), the only needed security is applications (are you authorized to use this service?), persons (are you really you?), and public (can others steal your money or identity?). Once these are assured through trusted platform modules and associated software, all transactions are end-to-end and no further encryption or intrusion detection or other security is helpful at all.

One of the first companies to fall is **Symantec** (SYMC), which is attempting to convert its market cap of some $16 billion into useful software systems from Veritas (storage virtualization) and Altiris (remote PC management). The only logic allowing the hopelessly conflicted anti-virus software tools of this company to survive is anti-trust pettifoggery against Microsoft. All computer owners have a strong incentive to have the operating system supplier also responsible for protecting its product or obviating protection altogether by producing a less porous OS (operating system).

Now we have to pay Symantec for services that Microsoft should obviously supply and pay Symantec to harass us with alarms about viruses, which may or may not be a threat, and pop up in our faces with patches that Microsoft tells us conflict with its drivers and impair the performance of the machine.

Meanwhile, studies show (though I have no idea how correct the studies are, they further the prevailing FUD—fear, uncertainly and doubt), that computers with virus protection from Symantec and **McAfee** (MFE) are no more successful than unprotected devices in escaping viruses.

> With every stream on the network encrypted, Cisco can throw away all its costly security chips from Cavium and Raza and abandon all its schemes for "intelligent" security in its routers.

One of these days this protection racket will end. Symantec and the rest are right to flee into greener fields before it does.

As your TPM supplies the needed keys and certificates for access to all your authorized services, you can throw away all your passwords. With every stream on the network encrypted, **Cisco** (CSCO) can

throw away all its costly security chips from **Cavium Networks** and **Raza Microelectronics** and abandon all its schemes for "intelligent" security in its routers, which won't be able to read the packets anyway. When all disk drives have TPM based encryption, as Seagate plans, all software full-disk encryption from **Checkpoint** (CKP) and such becomes otiose. **EMC**'s (EMC) EMC2 can dispense with its costly RSA software schemes and tokens and use cheap ubiquitous TPMs for a tenth of the price.

In the network core, software can harden at last into glass and on the edge hardware can soften into programmable teleputers and terminals. It will take awhile, but it will happen. If you know it will happen, you know something that finds the rest of the world entirely in the dark.

As a member of the board of Wave Systems, I obviously have an interest in this process. But I am not touting WAVX here. The process will go forward regardless of who writes the critical enabling software. No one now exactly competes with Wave Systems in supplying implementation software that works across all the hardware embodiments of TPMs from **Infineon** (IFX), **Atmel** (ATML), and **STMicroelectronics** (STM), which cover almost 100 percent of the PCs with TPMs. (Infineon supplies software for its own chip.) But in time Wave will be joined by such companies as Microsoft and **IBM** (IBM) and the array of existing and emerging proprietary security players from RSA (EMC) on down.

Falling first to the integrating thrust of Moore's law may well be the TPM chip suppliers, as the processing functions of TPMs continue to move from separate chips onto logic transistors multiplying on Seagate disk controllers, **Broadcom** (BRCM) gigabit Ethernet processors, and eventually on microprocessors chipsets as well. A key to the consummation of this trend of integrating TPM everywhere will be the development of non-volatile memory vaults that fit with CMOS (complementary metal-oxide semiconductor) industry standard processes. There are a score candidates, with Ovonyx from **Energy Conversion Devices** (ENER) clearly in the lead, but no incumbents, so Atmel et al. will have a ride of perhaps billions of (low-margin) units before integration prevails.

Next in the line of fire are the suppliers of customized applications such as digital rights management, customer authentication, and subscription control for the cable industry, telcos, and wireless service providers. These functions will succumb to the far cheaper universal industry standard of TPMs. Wave Systems will have to remain vigilant indeed to offer needed middleware and software implementations as the industry giants increasingly integrate all the TPM functionality.

Like many players who have eventually succumbed to Microsoft and **Intel**'s (INTC) integrating sweep in other areas, Wave's strategy is to keep focused and agile and keep moving ahead as the expert pioneer and standard bearer in the field. Enhancing this strategy is the current salience of proponents of intelligent networks, with Cisco in the lead, sustaining the illusion of the eternal LAN. Other security players and pretenders may well preoccupy themselves with otiose layers and barricodes for firewalls, routers and switches, and with filtering firm and fiddleware of packet inspection and correction out across the mazes of the smart web.

The ultimate beneficiaries of the movement of trust to the edge will be all the users of simple broadband networks. But before then the chief winners will be the vendors of components and systems, such as **Finisar** (FNSR), Corning, **Opnext**, and perhaps **JDSU** (JDSU), for all-optical communications, who can go full speed ahead supplying bandwidth rather than prying their innovations into the interstices of "intelligent networks" where headers and contents have to be digitized, decrypted and decoded at every node. Finally the winners will be the innovators on the edge—the **Google**s (GOOG) and **Skype**s (EBAY) of the world—relieved of the need to adapt to a menagerie of security standards across the net.

– George Gilder,
January 30, 2007

Got Questions?

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