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# GLOBAL ELECTRONICS

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Issue No. 100

January, 1990

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## GLOBAL ELECTRONICS TURNS "100"

As we officially begin our new year—publishing our January issue in early February—**Global Electronics** is passing a significant milestone. This is our one hundredth issue, perhaps most notable because the newsletter has survived without serious financial support or a large subscription base. We had hoped to serve an industry-wide workers' organizing drive in high technology electronics, but no such campaign ever materialized. We have continued to monitor the industry just the same.

Though we've gradually upgraded our publishing technology over the years, we haven't changed much. We highlight important developments in high-tech industry around the world, abstract the findings of other researchers, and report on labor and other organizing efforts whenever we hear about them.

Our readers still consist primarily of organizers, journalists, and scholars in North America, Europe, and Australasia. Fewer than 300 subscribers receive **Global Electronics** regularly, but it is our impression that many of those who read the newsletter incorporate its findings and analysis into their own work.

The industry that we monitor, on the other hand, has changed dramatically. Enormous advances in circuit speed, size reduction, cost reduction, and the level of chip integration have opened new applications and widened the market for high-tech devices. That technological dynamism has in turn fed a constantly changing industry structure. Many of today's leading companies had not yet been formed when we started publishing in 1980. Countries that only hosted assembly plants a decade ago are becoming major players in the industry's global structure.

Technological change should continue, and perhaps even accelerate over the next decade. The physical limits of silicon-based integrated circuits remain far away, and several new semiconductor and computer technologies are emerging—such as high-temperature superconductors, optical computing, neural networks, and gallium arsenide chips. Not all will succeed in the marketplace, but

the possibility for both quantitative and qualitative change is vast.

In such a large, dynamic industry, so much is happening that it is difficult to isolate, let alone rank, the key trends. Still, from our vantage point in Silicon Valley, we summarize here three of the most important. Frequent readers of **Global Electronics** will not be surprised.

- The most dynamic employment, market, and profit growth in high tech electronics will be in small and specialized data processing systems—including supercomputers—with an emphasis on software development.

Chips will remain the building blocks of electronics, and new design techniques and production technologies will continue to emerge. But the integrated circuit industry has always raced its own success. Every time a producer squeezes four times as many functions on a flake of silicon, it requires the market for processing power or memory to jump fourfold just to stay even.

As computers handle more data, more quickly, and are slated to carry out a wider range of functions, the task of developing software becomes more complex. Furthermore, as vendors attempt to serve users with a variety of models and peripherals, installed over many years, making sure—often, just creating the illusion—that each piece of software works properly on each machine, software development, including quality assurance and documentation, increases in significance. In the personal computer industry, big-name packages written originally by a handful of "stars" must now be upgraded and supported by casts of hundreds.

To a degree, high-tech hardware is beginning to resemble consumer electronics. One needs a VCR to play a tape or a CD-player to listen to a disk, and making those are big business. But the excitement, the stars, and the biggest money are in making the movies, recording the music, or creating the programs.

- Competition is increasingly global in nature, but the press and the companies exaggerate the significance of national identity. When we began

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publishing the **Global Electronics Information Newsletter** in June, 1970, U.S.-based companies still dominated the high-tech marketplace as well as state-of-the-art technology itself. Japanese-owned integrated circuit makers had just established themselves as serious competitors, but their most remarkable accomplishment was the capture, in 1979, of 42% of the U.S. market for 16-kilobit dynamic random access memory chips. Other Far Eastern countries remained subcontract assembly platforms, with relatively little indigenous ownership or expertise.

Japan's orchestrated rise as a chipmaking nation is now well known. Japanese-owned firms now dominate the market for many types of chips. But its well publicized computer development programs have proven less successful. Japanese firms have pioneered new disk drive and printer technologies, but microprocessor technology and software still remain U.S. strengths. Japan's greatest success has been in consumer electronics, where Japanese firms have created and almost monopolized whole product lines, such as video recorders, with little competition from the U.S.

The Japanese government, through the Ministry of International Trade and Industry, pursues aggressively nationalist economic policies, but we consider national rivalry a secondary feature of U.S.-Japan high-tech economic relations. It makes good press, and U.S.-based firms get a lot of political mileage out of the Japanese threat.

Individual Japanese firms, however, do not hesitate to form strategic alliances with American and other foreign high-tech firms. We report many of those joint ventures, technology transfers, and marketing agreements in **Global Electronics** because we feel that trans-Pacific cooperation among capitalists is the dominant aspect of the relationship, a partnership in which U.S. firms specialize in software and design while Japanese firms emphasize commodity production.

There are exceptions, but this empirical analysis is essential if activists in Japan and the U.S. are to devise a common strategy serving workers and consumers in both countries. To accept nationalism today as a guiding strategic principle would undermine what little strength industrial unions retain in the U.S. and Japan.

The Japanese, on balance, have achieved parity with the U.S., but the rising "four tigers" of Asia—South Korea, Taiwan, Hong Kong, and Singapore—still remain subordinate to the major economic powers. Though they have developed substantial indigenous talent and ownership, they remain thoroughly dependent upon foreign markets and technology. Their comparative advantage is

still their cheap labor. Now, however, they offer cheap professionals, not just assemblers. These countries undermine the U.S. balance of payments not because they are winning a trade war, but because U.S. firms find it profitable to distribute their products.

Again, we believe that cooperation between workers in the U.S. and industrializing Asia will best serve their interests. The owners of industry are already working together.

• Like the owners of many of industries before them, the leaders of the electronics industry are abandoning the pretense of entrepreneurialism and demanding government subsidies for commercial expansion. Anyone who has studied the early history of the U.S. computer and chip industries knows that the Federal government played an integral role in research, development, and early market growth, but the industry structure has allowed—even encouraged—extensive competition as well as easy entry into the business.

While striving to maintain a degree of autonomy, the electronics industry today seeks tax subsidies on the one hand, and financial aid for research and manufacturing consortia on the other. Government-backed joint ventures may indeed be an effective way to advance the state of the art in some fields, but no one has developed a mechanism to see that new technology benefits U.S. taxpayers. (Though we argue, in general against economic nationalism, we see no inherent problem in a country using its tax base to promote genuinely domestic industry.) Unless the U.S. government links subsidies to strict limits on the foreign operations of U.S.-owned firms, there is no way to limit the diffusion of that technology.

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Issue No. 100

published monthly by the Pacific Studies Center  
222B View Street, Mountain View, CA  
94041 - USA 415/969-1545

US ISSN 0739-0416

subscription rates (12 issues)

United States: \$12.00

Canada and Mexico: US\$14.00

Overseas: US\$17.00

all back issues are available

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Mountain View, California

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## NOTHING BUT A MEMORY

U.S. Memories, the ambitious joint venture planned by IBM and six other major U.S.-based high-tech firms, has dissolved without ever having produced a single chip. Considered by some to be America's finest response to the memory chip dominance of Japanese owned semiconductor manufacturers, U.S. Memories never was able to line up enough support from the U.S.-owned chip buyers, primarily computer producers, that it was supposed to help.

In January U.S. Memories' founder, former IBM executive Sanford Kane, announced the project's demise, and immediately participants and commentators drew broad conclusions about the readiness of U.S. industry to engage in collaborative, Japanese-style industrial policy. U.S. firms, it was said, were not ready to cooperate. The government seemed ill prepared to accept joint manufacturing ventures that might test the limits of anti-trust legislation.

No doubt many of IBM's competitors were suspicious of an operation that appeared, like Athena, to spring full grown from the forehead of the chief deity of high technology. But the demise of U.S. Memories really is the failure of a particular project which was not likely to serve the immediate needs of its prospective participants. Computer companies that rejected U.S. Memories would rather have a chip in hand rather than two in a bush that had not yet been planted.

U.S. Memories originally planned to build a chip production complex with \$500 million from participating firms and an equal amount in debt financing. By the time the founders threw in the towel, the goal for participants' investment had fallen to \$150 million. Four additional firms—Tandem, NCR, AT&T, and Compaq—had joined the original seven in contemplating investment, but only IBM, DEC, and four participating chip manufacturers—AMD, Intel, LSI Logic, and National—were prepared to honor their original financial commitments. (*San Jose Mercury News*, January 16, 1990). Other major firms, such as Apple, Unisys, and Sun had rejected participation outright.

But unwillingness to invest was really a symbol of a more significant lack of commitment. Chip-consumers did not want to pledge to buy large quantities of an unseen product in, by high-tech standards, the distant future. While computer producers may have viewed U.S. Memories as a good idea in principle, they need memory chips

now, or they can't ship computers. Thus, each major computer firm has by now established a relationship with suppliers, be they Japanese, Korean, or U.S.-owned. Sun Microsystems, for example, has reportedly guaranteed itself a steady supply of memory chips from Texas Instruments by paying up front.

It was perhaps naive of U.S. Memories to ask such computer firms to promise to buy its product, since joining the venture could be seen as a mark of bad faith toward the suppliers that they need to work with now. IBM and DEC, at least, can produce a substantial volume of chips in their own semiconductor plants.

Thus, the fundamental premise of U.S. Memories' business plan was flawed. All other start-ups limit their risks by starting small, building their markets as they build their competence and reputation. U.S. Memories, on the other hand, sought to limit its liabilities by passing them on to the partners.

Future proposals for manufacturing consortia must overcome that key obstacle. To succeed, they must not only appeal to vague notions of national interest, but to the interests of the individual firms that are expected to take part.

## GAS STORAGE ORDINANCE

After five years of study and negotiations, Silicon Valley's toxic gas storage and handling ordinance is about to take effect. A model ordinance, devised by a task force including area fire chiefs, representatives of high-tech industry, and environmentalists, has been fine tuned through input from local governments. Now, beginning with a unanimous vote by the Sunnyvale City Council, the cities of Santa Clara County, as well as the County itself, have begun the process of enacting it into law.

The law, which is designed to prevent a Bhopal-type accident in Silicon Valley, as well as less drastic accidents, is considered unnecessary by local industry. But the Santa Clara Manufacturing Group bowed to public pressure and endorsed the ordinance just the same.

It is significant that the law was developed before a major incident. In contrast, the county's model hazardous materials ordinance was written only after the TCA was out of the bag—that is, the toxic industrial chemicals had oozed into ground

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water throughout Silicon Valley.

Just as the standards of the hazardous materials ordinance were soon written into state and federal law, it is likely that the Silicon Valley toxic gas model law will be exported as well. Though the deliberations leading up to the ordinance focused on semiconductor dopants such as arsine and phosphine, it also covers chlorine and ammonia, chemicals used at swimming pools and sewage treatment plants.

Ted Smith, head of the Silicon Valley Toxics Coalition, anticipates that the costs of complying with the ordinance will prod the electronics industry to consider safer ways to manufacture, but taking steps to eliminate toxic gases should require extensive research and development. The toxic liquids used in chip production are process chemicals—that is, used as solvents and etchants—subject to substitution if cleaner alternatives can be found. The dopant gases used in chip production, however, are fundamental compounds that give semiconductors their unique electrical properties.

## MOFFETT FIELD MAY CLOSE

Realignment of the U.S. military posture may offer two Silicon Valley cities an unusual opportunity to compensate for the area's land use planning mistakes. In January the Pentagon disclosed that the Moffett Naval Air Station, located at the southern edge of the San Francisco Bay, may be closed within the next few years.

Moffett covers 2,300 acres in the heart of Silicon Valley's industrial belt. It is adjacent to Mountain View and Sunnyvale, but it is in nobody's "backyard." Consequently, if the base is actually closed, there is an opportunity to build a

new residential community adjacent to jobs and transit corridors, without posing a threat to the bucolic and suburban lifestyles of developed residential areas in northern Santa Clara County. Housing at Moffett could go a long way to solve the Valley's jobs-housing imbalance, the shortage of housing near employment that is driving Valley employees to commute vast distances.

In response the Defense Department's announcement, PSC is joining other local activists in establishing a citizen's committee to influence the future planning of Moffett. This task force will call for a *unified* approach to reuse and redevelopment. (Moffett lies within the sphere of influence of two cities and will be regulated by a variety of public agencies.) And it expects to consider other uses for portions of the property, including recreation, education, and infrastructure. It will promote redevelopment that is compatible with the clean-up of Moffett's many toxic hot spots. And finally, it will work to mitigate the negative impacts of closure, from lay-offs to the closure of on-base retail outlets used by military retirees.

It is still not yet certain that Moffett will close, since it is not clear where its operations could be moved. It is the sole home base for land-based anti-submarine patrol aircraft in the western U.S., as well as headquarters for those planes in the entire Pacific/Indian Ocean region. The airfield is also used by local military contractors to ship spy satellites and other secret equipment.

On the other hand, there has been no massive local outcry against the proposed closure, from any portion of the political spectrum. And politics, more than a rational analysis of military missions, may be the key to the future of all bases now being considered for closure.



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