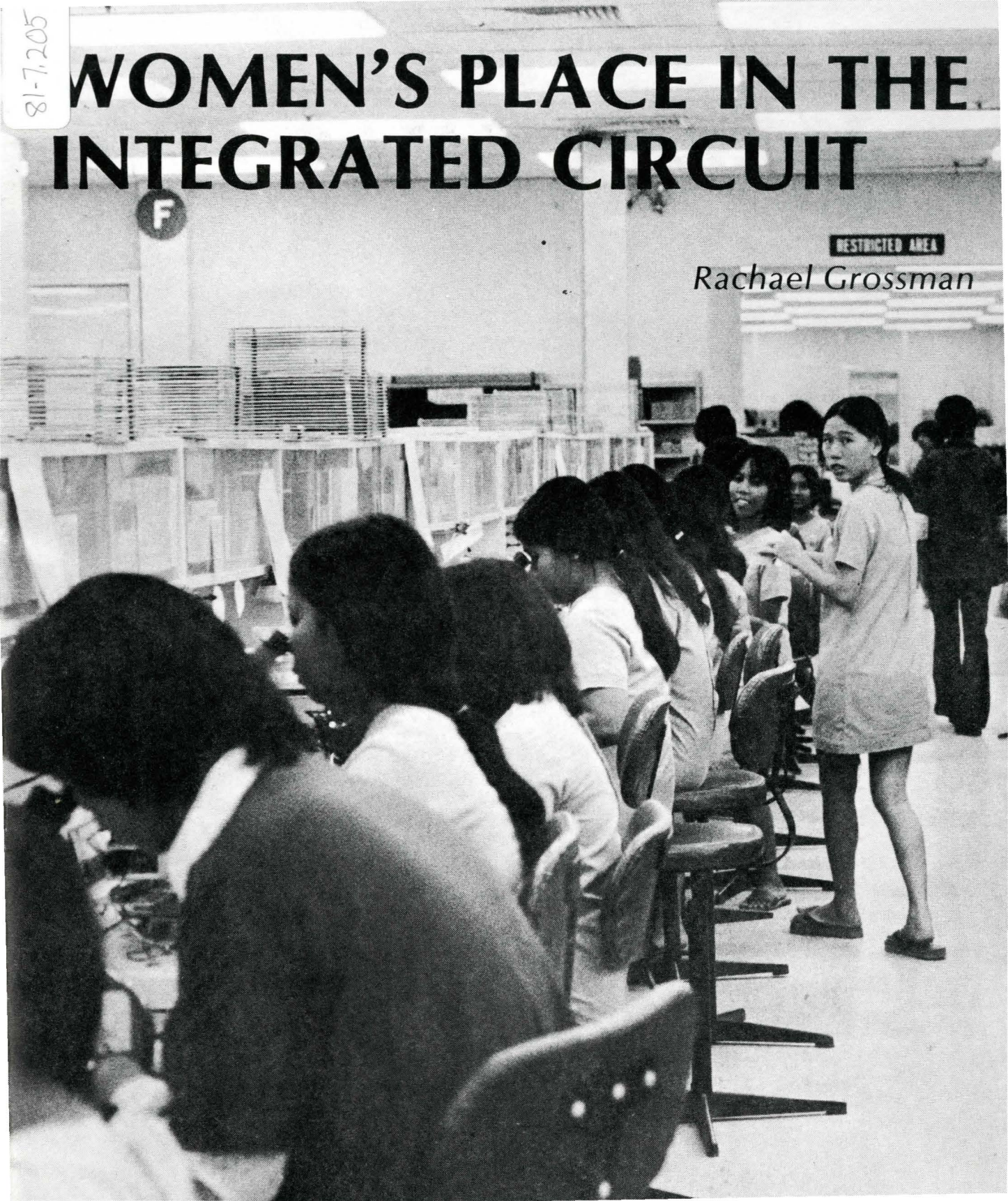
WOMEN'S PLACE IN THE INTEGRATED CIRCUIT



Rachael Grossman

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"We hire girls because they have less energy, are more disciplined, and are easier to control." — *Personnel officer, Intel Corp., Malaysia*

A group of women was wrapping gifts of talcum powder and candy for the upcoming Christmas party, while I talked to the personnel officer at the Intel plant in Penang. She described the charts which hang beside each operator's chair on the plant floor to record the quantity and quality of her daily production. She told me about factory-wide competitions and weekly quotas sent from California.

This personnel officer, a very likable Malay woman in her late 20s, spoke casually. But her message was brutally clear. There is a direct relationship between her ability to control and involve "her girls" and the numbers on the productivity charts. "Personnel operates with the goal of having management and operators cooperate. Otherwise, we can't survive."

The Intel plant in Penang, Malaysia, is a subsidiary of one of the largest semiconductor firms based in northern California's "Silicon Valley." Women make up 90 percent of the assembly workforce in this 1400-person plant, as they do in the other 18 electronics factories on the island of Penang. Approximately 19,000 women work in these factories, and several thousand more work in electronics factories in other places in Malaysia. In all, between 200,000 and 300,000 women work in electronics plants throughout Southeast Asia.

Electronics, especially semiconductors, is the fastest growing industry in Southeast Asia.

Cover photo by Jerry Elmer

It is also the technologically most advanced industry in the developed economies, providing critical components to all others. Governments, banks, factories, armed forces and other major institutions are changing their operations to incorporate new electronic products — all involving some kind of "brain" — while even individual consumers find themselves increasingly dependent on such gadgets as hand calculators. Ironically, the almost invisible element in this glamorous, breakthrough industry is the repetitive, semi-skilled labor of Asian women. Driven by the need to cut prices in their competition for profitable shares of the market, virtually all the major semiconductor companies have sought cheap labor to perform the labor-intensive parts of their operations. To a large extent, they have found it in Asia, where women assemble the tiny components of products ranging from digital watches to multi-million-dollar computers. Their labor makes possible the low prices which in turn have made possible the explosive growth in the market for semiconductor-based devices.

Because they must keep productivity high and costs low to be competitive, semiconductor firms have put a great deal of effort into developing a whole battery of methods to manipulate and control the women who work in their plants. Their personnel policies now combine authoritarian discipline with the most sophisticated human relations techniques. Most highly developed in Malaysia, these techniques specifically exploit the traditionally defined attributes of femininity — passivity, submissiveness, sentimentality, sexual desirability — while creating a factory lifestyle distinct from that of the general society. Their purpose is to make workers more immediately productive and to inculcate into them a long-term sense of identity with the company. At the same time, the emphasis on passive and ornamental femininity is intended to forestall the rise of any sense of independence or unified strength among the women workers. In the patriarchal societies of Southeast Asia, the sudden concentration of women in advanced industrial enclaves might well be expected to foster the emergence of a strong feminist consciousness among them. The carefully planned personnel policies work against this.

RECREATION AS TECHNIQUE

Beauty contests are the most dramatic example of the way electronics factories manipulate traditional concepts of femininity and gender roles. "The last beauty contest winner spent M$80 [US $40] on her evening gown. But she made so many slits up the skirt — to show more leg, you know — that she can't wear the dress anymore." The personnel officer was very matter of fact about the extravagance, which she saw as an example of how seriously the workers take participation in the beauty contest. This year's beauty contest winners will receive: first prize, a package tour to Medan (the nearest big city); second prize, a cassette player; and third prize, a night for two at the Rasa Sayang (the ritziest hotel in Penang). When I asked about the implications of offering a night for two to 18-year-old Malay women, primarily from rural Muslim backgrounds, the officer quipped, "We tell the winner, 'This is your prize. Whatever happens nine months from now, we aren't responsible.' "

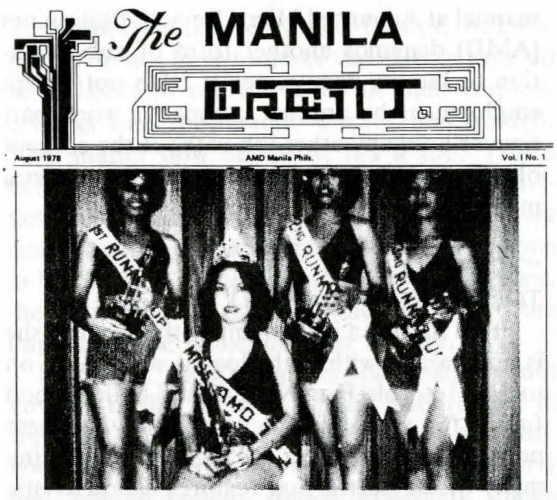
One American plant manager in Penang explained, "We've developed recreation to a technique. Recreational activities keep turnover down. We spend US $100,000 a year on personnel activities." He listed such stereotypically feminine activities as sewing classes, a monthly shoe sale, singing competitions and the beauty contest as well as a library, the company store and sports events. A plant manager in the Philippines described the only function of his large personnel staff as "creating activities." Monthly company publications contain an end-

less stream of images of women as sex objects and passive providers. Their features range from pictures of the scantily clad beauty contest participants to romantic poetry and sexist humor. There are also notices of such activities as classes in cooking or using cosmetics.

Much of the organized recreation takes the form of competition, which is intended, in the words of one personnel officer, to "develop incentive and motivation." Competitions also pit workers against one another, strengthening their sense of individualism and their willingness to work hard. The contests, highlighted again and again in the monthly publications, run the gamut of possibilities — singing contests, sports contests, "guess whose legs these are" contests, talent contests, crazy-costume contests.

Production competitions, also billed as "fun," barely mask speed-ups and provide the rationale for increasing quotas. Like the other contests, production competitions take place at all levels of the organization. They range from individual contests based on the individual daily charts hanging beside each worker to competitions between subsidiaries in different countries. Workers in one Indonesian factory reported they had been asked to compete with the productivity charts of workers in other Asian subsidiaries of their company. Individual winners usually receive special mention in the company publications, sometimes with a box of candy or some money. Departments win trophies, special outings or a party. At Intel two winners of a factory-wide competition for the most productive worker of the year even won a trip to company headquarters in California.

In the transition from beauty contests to production competitions, the guiding principle behind all the clever games becomes suddenly visible: control. Discipline is strict, because electronics components are either perfect or unusable. Workers are assigned quotas and monitored by daily productivity charts. They are



THE MISS AMD BEAUTY CONTEST

Miss AMD-Manila '78 The parade of contestants vying for the title "Miss AMD for 1978" wore casual dresses in the first round and "maong shorts" and daring red mid ribs in the final round. Miss Liwanag V. Ancog won the title for Miss AMD '78 on which she is entitled to a free trip to Penang, Malaysia.

prohibited from talking on the factory floor. They must wear uniforms. They are allowed an average of only 45 minutes break time during an eight-hour shift, and workers at the Fairchild factory in Indonesia reported having only one ten-minute tea break and a 15-minute lunch break. They also said about 20 women were laid off every week for failing to meet their production quotas.

Discipline extends beyond the factory floor as management uses a variety of methods to orient workers' lives around factory schedules. In Malaysia, factories rotate shifts every two weeks. "They like rotating shifts. They plan their lives around the rotation," explained a personnel officer at Monolithic Memories, Inc. Yet the workers complained that changing shifts every two weeks meant they could not plan many activities or enroll in classes outside the factory, and they found it hard to readjust their sleeping and eating habits. A workers'

manual at Advanced Micro Devices-Philippines (AMD) demands another form of subordination to factory requirements: "Do not accept employment by another company, work part time or hold any other job without the consent of the personnel manager and the general manager."[1]

"TOGETHER TO STAY, TOGETHER FOR GOOD"

From the day a worker enters the factory, she is bombarded with such slogans as "Catch on to the Motorola Family Spirit and build a good future for yourself and your family." These portray the factory as a family incorporating many of the patriarchal features characteristic of real families in Southeast Asia. "Big brother" male supervisors lord it over the female operators. The plant manager, usually an American, presents himself as a kindly — but nonetheless demanding — father figure, playing basketball with the team, kissing the beauty contest winner, eating in the factory canteen. As the manager of Fairchild's Indonesia plant explained, "What we are doing resembles a family system in which I am not just the manager but also a father to all of those here in Fairchild. This conforms to a very important Indonesian principle, that of the family [*kekeluargaan*].[2]

For the women, brought up in families in which the father's word is law, the image is compelling. While the culture of the factory is radically different from that of their homes, the stress on family ideology helps prevent them from recognizing the implications of their own independence from their families. At the same time, the family analogy legitimizes the combination of authoritarian discipline and "indulgence" (recreation) which management uses so effectively to keep workers in line. For management, the point is to preclude any desire by workers to organize themselves to challenge the management-imposed factory consensus. Management representatives throughout Southeast Asia express the same thought: "If management operates well, it is my hope that a union will be unnecessary." "Unions only set up an adversary relationship between workers and management." "Intel doesn't believe in unions. We believe in finding out what workers want. We conduct twice-yearly attitude surveys with workers." Back in California a semiconductor executive went further, explaining that the industry stresses human relations to prevent unionization, because it would raise wage costs now and "rigidify" the size of the work force in the future.[3] The industry wants to retain its ability to lay off workers if the market slumps or if automation becomes profitable.

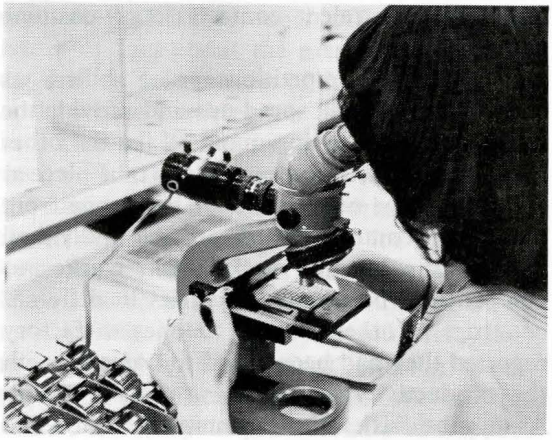


Photo by Jerry Elmer

AN INTEGRATED ASIAN CIRCUIT

The use of personnel policies to create a distinct culture within the factory is more dramatic in Malaysia than in the other Southeast Asian countries. Foreign-owned semiconductor corporations are now well established in Malaysia, particularly in Penang, and some of them have begun to upgrade their operations, adding testing and automated bonding processes. Malaysia is becoming the center for testing in Southeast Asia. National Semiconductor (NS),

for example, tests products from its plants in Thailand, Indonesia and Penang at the Penang plant. The automated bonding machines cost $50,000 per unit and allow a single worker to produce 10 times as much as one working with a microscope. These more complex processes require virtually fail-proof factory discipline. Malaysia has been chosen for upgrading because its educated, English-speaking workers have shown themselves to be easily trainable and controllable. Most of the electronics workers have not held any other industrial job, and many of them are the first female members of their families to hold such jobs. They are particularly susceptible to the appeal of the "Western culture" which is offered as part of the employment package. As a result, electronics workers are conspicuous wherever they go, identified by their elaborate make-up, tight jeans and high heels.

In Hong Kong and Singapore, where industrial work and Western culture are more familiar and job mobility is more common, workers hold out for hard cash rather than being impressed by such offerings as beauty contests and cosmetics classes. Both Singapore and Hong Kong have become regional headquarters for the electronics industry, providing high-skilled jobs and better wages to their workers. Singapore has become particularly attractive to international industry because of its highly controlled society, free port status, good harbor and well-developed communications infrastructure. Electronics subsidiaries there provide warehousing, final testing and some marketing services for other Asian subsidiaries of their companies.

In the Philippines and Indonesia, on the other hand, poverty reduces the need for elaborate personnel programs. The personnel manager at AMD-Philippines reported as many as 500 applicants a week for 50 openings, and a personnel officer in Indonesia reported 500 applictions *a day*. With the overwhelming unemployment indicated by these figures, the companies do not have to make the efforts they do in Malaysia to win the fealty of their employees. As one Indonesian worker commented, "No matter how bad it is, it's a job. That's better than nothing." Hence, personnel activities in Philippine and Indonesian factories are usually watered-down versions of what is done in Malaysia. Furthermore, in the Philippines, the pervasive American influence lessens the impact of the semiconductor culture.

Indonesia, the Philippines and Thailand (not covered in this report), are the last frontier in the highly integrated Asian circuit of semiconductor factories. In these countries, poverty and unemployment spawn extremely cheap labor forces, but they also threaten political instability in the future. At the same time, these countries lack necessary infrastructure. An American manager in Indonesia illustrated the problem when he complained that it is easier to telephone Santa Clara than the other side of Jakarta. The plants located in the poorer countries are the most labor intensive and least expensive, what one American manager called "jellybean operations." They are plants which can be closed down on short notice if the political climate appears too risky or if they become economically superfluous. The NS plants in Thailand, Indonesia and Penang, for instance, do the same work, so that political upheaval in one country will not precipitate a breakdown in the overall production cycle.

A GLOBAL ASSEMBLY LINE

The production process of which the semiconductor factories in Southeast Asia are a part is literally a global assembly line stretching more than halfway around the world. While it has grown with the general expansion of multinational capital, it has received a special impetus from the nature of the semiconductor industry. Semiconductors are the "brains" of the new generation of electronic products: hand

calculators, digital watches, computers, communications equipment, "smart bombs," and strategic missile guidance systems all share the same type of component. The industry has come into being since the 1947 invention of the transistor, and it has grown with help from generous Pentagon contracts and research done at Stanford and other universities. Many of the largest companies are headquartered in the area around Stanford, known as "Silicon Valley," because silicon is the basic material for semiconductors.

Competition in the industry is still so heated that prices for its products are falling faster than the cost of production. "A transistor which 12 years ago cost $25 now costs 15 cents," bragged one American executive in Penang. In the race to survive, companies have introduced new products, such as electronic toys and home computers, while cutting costs in every feasible way. Since, ironically, much of the production process for these labor-saving devices is extremely labor intensive, labor costs have been the major target for economizing. In California, 90 percent of the assembly workforce is young and female. More important than cutting costs in California, however, has been the division of the production process into smaller and smaller discrete segments. This and the microscopic size of the semiconductors (which makes it practical to ship unfinished parts from one plant to another) has allowed the industry to shift its most labor-intensive work to places where labor is cheap. Furthermore, the very equipment produced by the industry makes finely tuned long-distance coordination possible. As a U.S. manager in Asia quipped, "Santa Clara is just a telex away."

The first moves were to Mexico, but the industry soon looked to the even cheaper labor of Asia. Fairchild Camera and Instrument Co. set up the first Asian assembly plant in Hong Kong in 1962. During the 1960s, other U.S., European and Japanese companies expanded to Hong Kong, Taiwan and South Korea. Searching for ever cheaper wages, the semiconductor industry then moved into Southeast Asia, coming to Singapore in 1969, Malaysia in 1972, Thailand in 1973, and the Philippines and Indonesia in 1974. The manager of a plant in Malaysia explained how profitable these moves have been: "One worker working one hour produces enough to pay the wages of 10 workers working one shift plus all the cost of materials and transport."

THE FAST-FINGERED MALAYSIAN

The electronics industry has not operated in a vacuum in constructing its Asian circuit. Asian governments, looking for development capital and solutions to their employment problems, have actively sought labor-intensive investment. Semiconductors have appeared particularly attractive, according to one Malaysian government official, because "they are so fast moving. They come in and quickly soak up people."[4] In addition, governments hope to acquire new technology from the semiconductor industry. In wooing foreign investment, Asian governments have stressed the availability of large, cheap pools of female labor. Glossy brochures describe the prospects in terms similar to the following from *Malaysia: The Solid State for Electronics*:

The manual dexterity of the oriental female is famous the world over. Her hands are small and she works fast with extreme care. Who, therefore, could be better qualified by nature and inheritance to contribute to the efficiency of a bench-assembly production line than the oriental girl?[5]

Domestically, Asian governments have taken measures to make their country's women even more attractive as potential employees by ensuring that they will not resist demands made on them by the foreign firms. In 1970, when electronics companies wanted to locate in Malaysia, the government provided for excep-

"I TEST AROUND 3,500 CHIPS A DAY"

I started working at Fairchild in January, 1978. They put me in the optical test section where I have to look through a microscope to test the chips before they are bonded. It took me two weeks to get used to using the microscope.

When I first came last year, they paid me Rp 390 a day [US $.80]. After the three-month "training" period they gave me Rp 450 a day. Now I get Rp 490.

After the training period they set my quota at 15 trays a day. Now I have to test 25 trays a day. I think there are between 160-180 chips in each tray, so I test around 3500 chips a day.

I get up at 5:00 a.m. and take the bus to work. The shift starts at 6:00 a.m. and goes until 2:00 p.m. They don't let us talk during work, but we can talk during our breaks. We have a ten-minute tea break at 8:00 a.m. and a 15-minute lunch break at 9:15.

After six months I became sick with red eye [conjunctivitis]. I don't know why this happened. Other friends at work got sick too. The supervisor told me to clean my microscope so nobody else would get it. Then he gave me a two-week medical leave. While I was at home, my family all got red eye too.

I don't earn enough to give my mother much, but I give her food money sometimes. I like to buy my brothers and sisters *basko* [noodle soup sold by street vendors]. It costs Rp 50 a bowl, so if I buy it for all of us, it costs my whole day's salary.

tions in the law which protected women from night-shift work. In the Philippines, Presidential Decree No. 148, issued shortly after the declaration of martial law in 1972, reduced maternity benefits from 60 percent of pay for 14 weeks to 100 percent of pay for six weeks, and limited coverage to the first four children. According to the personnel director at one textile factory, "This made it profitable to hire women again."

Perhaps even more serious than removing legal protections has been the active role of all capitalist Southeast Asian governments in putting down all forms of worker protest. Over and over again the story is told — in the Philippines, in Indonesia, in Thailand, Singapore, Taiwan, South Korea: "As soon as the protest began, carloads of police and government officials descended on the plant..." Such actions are backed up by the laws prohibiting strikes in "vital" industry, which normally includes foreign-owned manufacturing plants.

At times, government officials address their own citizens in tones similar to those they direct at potential investors, seeking to convince them that government and workers share the same interests. In a recent article entitled "Why We Woo Foreign Investment," Malaysian Deputy Prime Minister Mahathir Mohamed asserted: "The government could not help the people if they refuse to realize the importance of a better economy and to be more responsible.... Workers must uphold their dignity and not cause problems that would scare away foreign investors. They should instead be more productive so that government efforts to attract investors would be successful."[6]

"SOAKING UP PEOPLE?"

In actual fact, the electronics corporations have failed to live up to the expectations of their hosts in providing employment. While they have brought thousands of jobs to Southeast Asia, their requirements for young edu-

cated (high school) female workers have meant that they have brought a new category of people into the workforce rather than reducing the ranks of the unemployed. A recent study in Penang found that over two-thirds of the workers had never worked before and came from families whose female members had never worked for wages.[7] Malaysia defines "active unemployed" as men who have registered as unemployed on the Labor Exchange, and government officials complain that the electronics firms are not helping them, because they rely almost exclusively on women. In the Philippines and Indonesia, many electronics workers are the daughters of teachers or low-level bureaucrats and had aspired to but could not find white-collar jobs.

The question of who is "unemployed" is a complex one in Southeast Asia, as in most of the developing world. The overwhelming unemployment characteristic of these countries arises from the stagnation and even impoverishment of agriculture while most resources are directed into building up an urban industrial sector. Because so much capital is required to create new industries and the infrastructure that must accompany them, the new industries do not grow fast enough to absorb the increasing flow of people pushed out of peasant family farming. In addition, a large proportion of each country's surplus is siphoned off by foreign investors repatriating profits. While there are many variations, peasants generally work for themselves as smallholders or tenant farmers. As long as they retain their land, there is a certain amount of choice possible whether

How it's done

Semiconductors are microscopic electronic circuits which are the latest in a line of technology that began with the invention of the transistor in 1947 and the development of the integrated circuit in the early 1960s. Integrated circuits now bring together up to 100,000 transistors, resistors and other circuitry on a single chip of silicon half the size of a small fingernail. The production of these products is an integrated and very segmented process which includes highly educated scientists in the U.S. and thousands of assembly workers throughout the world.

Semiconductor companies locate their research, development and the initial capital intensive stages of production primarily in the "Silicon Valley" in northern California. Scientists and engineers design complicated, multi-layered circuit patterns for each semiconductor device, drawing giant versions that range up to 60 inches square. Each design is then photographically reduced until it is virtually invisible to the naked eye.

Assembly workers in California fabricate the initial stages of the semiconductor based on the microscopic negatives. First they "dope" the layers of silicon with various chemical impurities in order to create electrically conductive and non-conductive areas. These positive and negative specks act as transistors, tiny electronic switches that shuttle the electrical circuit about. Other workers then photograph, the circuit pattern, etching the pattern into the wafer with acids and solvents. These wafers are then baked in ovens at temperatures over 900 degrees Fahrenheit. For this process, assemblers must insert special gases — arsenic, boron and antimony — into the ovens to alter

to reduce a family's standard of living or seek other employment. At the same time, however, the commercialization of agriculture results in the outright loss of their land for large numbers of peasants.

Until recently, it has been the men — fathers and sons — who have sought wage labor when family farming could no longer support the people dependent on it. The men have migrated to cities to take whatever jobs they could find, while the women often stayed behind to run the household and continue farming. In cases where the family lost its land, all its members accompanied the father to the city. When women migrate to look for work, however, it is not mothers, but daughters, who go. While they frequently send money home, their families do not accompany them. By its reliance on women, the electronics industry offers new opportunities and new hopes for women seeking income. However, the requirement that electronics workers possess a high school education means that these jobs are not available to the majority of women looking for work. In fact, a personnel officer at NS-Philippines reported that 30 percent of the assemblers there are college graduates and another 30 percent have some college education.

For the electronics firms, the newness of the work force they are creating is an advantage. Not only are the young women more tractable than older women or men might be, but since they are not believed to be supporting families, their wages can be kept low and they can be laid off with relatively few repercussions. Thus the employers give first preference to women with

the electrical characteristics of each device in specified ways. This entire process is repeated for each layer of the pattern, often as many as ten times.

Once the wafers are fabricated, women test each wafer with computerized equipment, sorting them into categories. Because the equipment needed for testing can cost up to $350,000 per unit, this process is generally carried on in or near company headquarters in California.

At this point, wafers are shuttled to Asia. There, Asian women perform the labor-intensive, routine, intermediary assembly operations. When the wafers — 2 to 4 inches in diameter — arrive in Asia, workers slice them into up to 500 separate chips. At this point, miles of aisles of assemblers take over to bond these chips to circuit boards. An assembler peers through a microscope for seven to nine hours a day, bonding each chip with as many as 50 gold wires — each the size of a strand of human hair. Each bonder must work at top speed as individual quotas run as high as 800 chips per worker per day.

Further along the Asian assembly line, other workers bake these chips in 600-1000 degree ovens, sealing each chip inside a plastic or ceramic protective coating. Testers then check the reliability of these components, dipping them in tanks of chemicals and applying electric currents to the components. This step in the process, previously carried out in California, is increasingly being transferred to Asia. Companies either send these components to their other Asian subsidiaries for assembly into simple products such as calculators or they ship the components back to California for the final assembly of products ranging from home computers to military surveillance systems.


A
RESTRICTED AREA

no work experience and generally refuse to hire married women, although they do not necessarily fire them if they marry after being hired. The ability to lay their workers off at will is essential to the electronics firms, because the work is almost by definition temporary. After three or four years of peering through a microscope, a worker's vision begins to blur, so that she can no longer meet the production quota. The unspoken expectation of the company is that she will marry and "retire" by the time she becomes unfit for the work, but she will be laid off in any case.

The nature of the industry also requires an expendable work force, for the fierce competition means each company experiences strong ups and downs. Some will survive only a few years before going under, but in the meanwhile, they have employed numbers of Asian women. An NS executive in California predicted that within ten years, only three or four semiconductor firms would still exist.[8] However, it is still too early to tell which three or four firms will survive. Hence, the host countries have no control over the durability of the investments they so eagerly seek.

The recession of 1974 provided a vivid example of the impact on Asian workers of world economic trends and decisions made in California (or elsewhere). Approximately 15,000 workers — one-third of all electronics workers — lost their jobs in Singapore alone.[9] Some factories in Penang laid off thousands of workers, while others cut the work week to three days. In the Philippines, where the first electronics plant had recently begun operations, one-fifth of its 200-person work force was laid off.[10] Meanwhile, more automated processes are available — enabling one worker to produce 10 times as much as she does now manually — and could be introduced on a wide scale whenever companies deem it profitable to replace workers with machines.

If electronics plants do not provide permanent jobs, then perhaps they train women for other work? Not so. As highly compartmentalized segments of a multinational production process, the jobs develop skills with no application in other industries. Bonding, for example, requires looking through a microscope, and testing, dipping into tanks of chemicals. As the only part of the electronics process which comes to Southeast Asia, there is not even an opportunity for advancement or transfer to other kinds of work within the same industry. Similarly, this kind of division of the production process does not lead to the growth of local semiconductor firms, because there is no transfer of technology to the local economy. Government officials whom I interviewed in more than one country expressed dissatisfaction with the failure to acquire tecnnology, and one U.S. Embassy official in Jakarta asserted, "The only thing electronics investments give the country is the RP 500 [US $.80] a day wages!"

SUBSISTENCE OR LESS

For the women on the production line, there are tangible consequences of their position within the international structure of the industry. The companies use various means to keep wages low, although many of the electronics workers are expected to contribute substantially to their families' income. In the Philippines and Indonesia, women are paid less than the minimum wage for as long as six months, during which they are considered apprentices. With legal minimum daily wages of 11 pesos in the Philippines and Rp. 500 in Indonesia, electronics apprentices receive eight pesos or Rp. 390 respectively. Yet personnel officers readily admit that a new operator can learn her job in a week, or at most, two. Such pay is in many cases less than subsistence for one person. In Manila, a worker living in the six-by-six-foot extension of a squatter hut told me she needed ten pesos a day to pay for the bare minimum of fish, rice, water and rent. A community organ-

izer in the province of Bataan reported that peasant families often had to support their daughters for the first months, and often the first year, of employment in factories in the Bataan Export Processing Zone or Manila.

Rather than institute adequate wages, companies use monetary bonuses as a means to put pressure on their workers even after the apprenticeship period. In order to earn adequate income, a worker must qualify for bonuses, which are paid for perfect attendance, punctuality, high production, work on the microscopes. With any infraction of company rules or a single absence in a month, a woman loses her eligibility for extra payment. This is particularly rampant in Hong Kong, where industry uses monetary incentives rather than recreational activities to discipline and motivate the work force. There a worker earning a daily base wage of HK $24 (US $5) can collect an additional living allowance (US $.60), meal allowance ($.40), and travel allowance ($.20). However, if she is 15 minutes late, she will lose all allowances for the day. Less extreme versions of this system coexist in other parts of Southeast Asia with nonmonetary incentives.

At plants in Hong Kong, Taiwan, Malaysia and the Philippines, employees receive a thirteenth month bonus at the end of the year instead of higher monthly pay for 12 months. A worker hired at mid-year has her bonus prorated, while one who leaves during the year receives none of the bonus. Workers in Hong Kong, Taiwan and the Philippines reported that their employers had tried to avoid giving them the year-end bonus, resulting in strikes and walk-outs.

Wages increase somewhat after the apprenticeship period, and most women begin contributing to their families once their own subsistence needs are met. In the Philippines many workers employed for more than two years report that they send half or more of their monthly earnings home. In Malaysia, where electronics workers come from slightly less severe economic backgrounds, they still turn over 25 to 50 percent of their wages to their families.

HEALTH AND SAFETY

A photograph of the interior of an electronics plant is striking for its sense of immaculate order: a spacious, well-lighted room in which rows of women dressed in white bend over gleaming microscopes. On an actual walk through a plant, however, the visitor often gags on the strong smell of chemicals, and a trial look through a microscope quickly produces dizziness or a headache. Toxic fumes and eye ailments are the twin enemies of electronics workers. Yet the companies do not inform them of the health hazards their jobs entail, and management-run health and safety committees actually divert attention from these problems.

"Hey, Grandma!" Young women greet their slightly older co-workers at the factory gate every morning. In Hong Kong most electronics workers over 25 are called "Grandma" because they wear glasses. While workers in Southeast Asia are much newer to electronics work than those in Hong Kong, they too are beginning to have serious eye problems. In 1975, just three years after the first electronics plant opened in Penang, nearly half the workers there complained of deteriorating eyesight and frequent headaches — the result of microscope work. Most workers suffer at one time or another from conjunctivitis, a painful and highly contagious inflammation of the eye. Individual comments echoed this worker's story: "After some time we can't see very clearly; it's blurred. We'll be looking into the microscope for over seven hours. We have to work with those gold wires, very thin like our hair...."[11] Virtually anyone who stays on the job more than three years must eventually wear glasses. Companies usually refuse to pay for the glasses — although they require 20-20 vision when they hire.

Caustic chemicals, all toxic and many suspected of being cancer-causing, sit in open containers beside many workers, giving off the fumes which so assault the first-time visitor to the plant. They include TCE, xylene, and MEK, all particularly dangerous acids and solvents which are used extensively throughout the production process. Workers who must dip components in acids and rub them with solvents frequently experience serious burns, dizziness, nausea, sometimes even losing their fingers in accidents. A major cause of accidents is the high speed at which workers are required to carry out their tasks. It will be ten or fifteen years before the possible carcinogenic effects of these chemicals begin to show up in the women who work with them now.

Management representatives deny or trivialize the dangers of electronics work. Sometimes their denials are unintentionally revealing, however. The manager at Hewlett-Packard in Malaysia answered my question about eye problems: "These girls are used to working with 'scopes. We've found no eye problems. But it sure makes me dizzy to look through those things." Personnel departments set up management-worker health and safety committees, but these seldom address the real hazards or consider ways to correct them. Instead of questioning the way in which chemicals are handled, they generally focus on health and safety poster or essay contests, fire drills, or an annual health and safety week.

A BED AND A CUPBOARD

As a new segment of the work force, many women — although not all — have to move long distances from their homes to take jobs in the electronics plants. The conditions in which they live away from home reflect both the meagerness of their wages and the social disruption caused by foreign-dominated industrialization in enclaves not integrated into the local economy. In Malaysia, where wages and living conditions are better than in the other countries I visited, electronics workers live in boarding houses. Four to eight women usually share a room. In a hostel where I stayed, each individual possesses a bunk space and a two-foot cube of a cupboard. The kitchen, outfitted only with 19 kerosene stoves, is shared by 50 women.

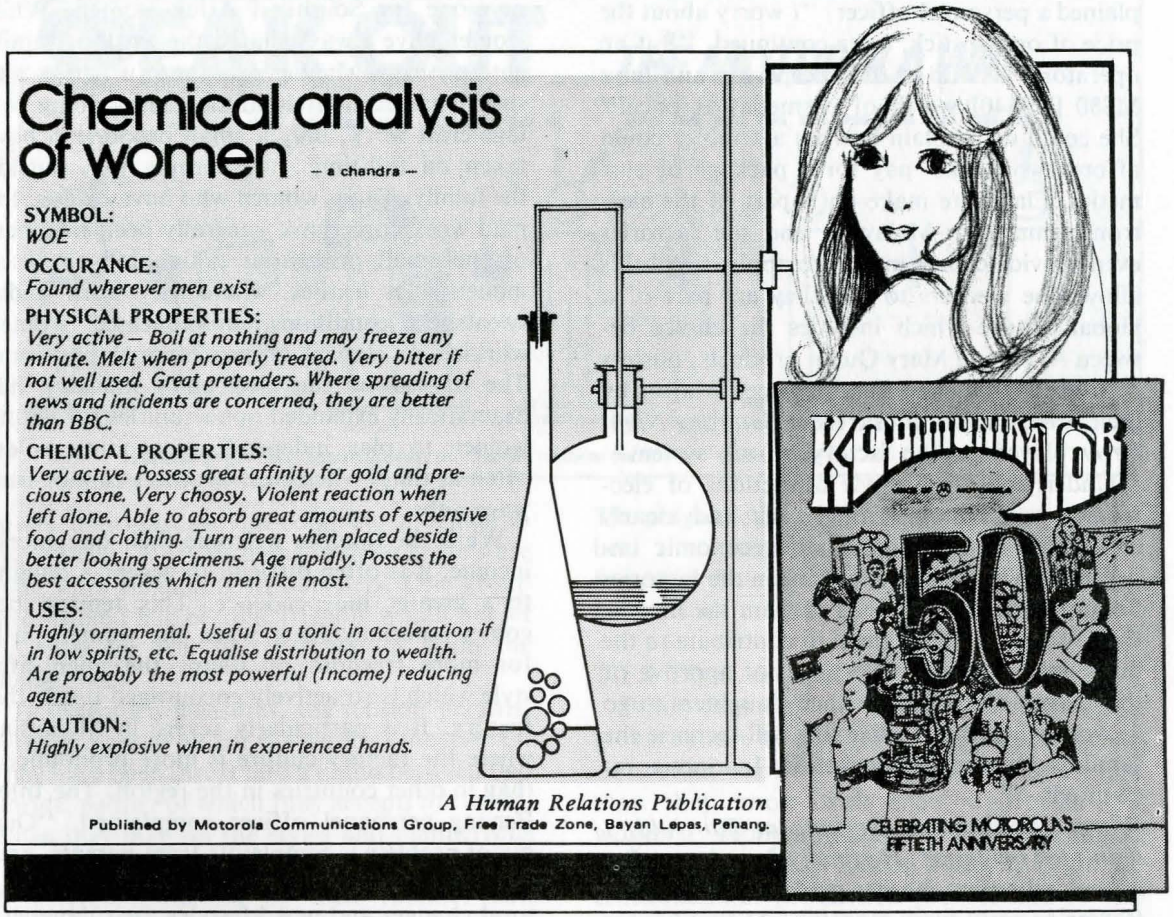
"Watch out for your camera. Someone might steal it." My hostess was carefully relocking her cupboard. I was surprised. Couldn't I relax in her room? Couldn't she relax? "No," she explained. "We work different shifts. I didn't know all of these people before, and we haven't all become friends. Besides, people are moving in and out all the time."

She doesn't rent a room, because she can't afford one. She rents the bed and the cupboard and has no control over the other women who rent beds and cupboards in the same room. In a society based overwhelmingly on families and stable communities where people have known each other for generations — and where women's roles have been defined only in family terms — the individual migration to an industrial center is a lonely one. Neither their own backgrounds nor the factory's encouragement of competitive individualism prepares these women for developing lasting relationships with strangers. In some cases, the physical living conditions are not much worse than those at home, but the isolation without privacy creates stress.

In the Philippines, factory women live in even grimmer conditions than in Malaysia. Many are able to afford only a place to sleep in a squatter shack pitched in a slum. In the boarding houses, ten women share a room, which is "furnished" only with straw sleeping mats.

COFFEE AND COSMETICS

After casting a sidelong glance at the men at



How a company newsletter describes women.

the next table, Tuti shot the rest of us a conspiratorial smile, eyes twinkling. I stared into the coffee I was stirring, pulling the Malay words together in my mind to ask why they had come to work in this factory. Suddenly I laughed to myself, realizing that part of the answer was right here at this coffee stand at 11 o'clock at night.

Malaysian workers' answers to my question were often similar. They come for the money, of course, but also for the freedom. They talk of freedom to go out late at night, to have a boyfriend, to wear blue jeans, high heels and make-up. Implicitly they contrast this social freedom with the sheltered, regulated lives they would lead with their families in Malay villages and small towns. They revel in their escape from the watchful eyes of fathers and brothers.

Complementing the sense of social freedom is the opportunity to sample a bit of the consumer society which is their image of the West and modernity. On pay day, the factories arrange for sellers of cosmetics and costume jewelry to come in during the lunch break. "Tee-shirt and clothing salespeople are not allowed in, because try-ons would take more than the half-hour lunch break. Whatever we do, we don't disrupt production time," ex-

plained a personnel officer. "I worry about the price of one lipstick," she continued. "But an operator walks up to the salesperson and buys M$80 [US$40] worth of cosmetics at once!" She could not explain how an assembler could afford two weeks' pay for a package of cosmetics. Elaborate make-up is part of the electronics image in Malaysia, and the factories even provide classes in how to apply it. All this allows the workers to feel they are part of a global culture which includes the choice between Avon and Mary Quant products, posters of John Travolta and Farah Fawcett-Majors by their beds, and the music from *Saturday Night Fever* played on the factory Muzak system.

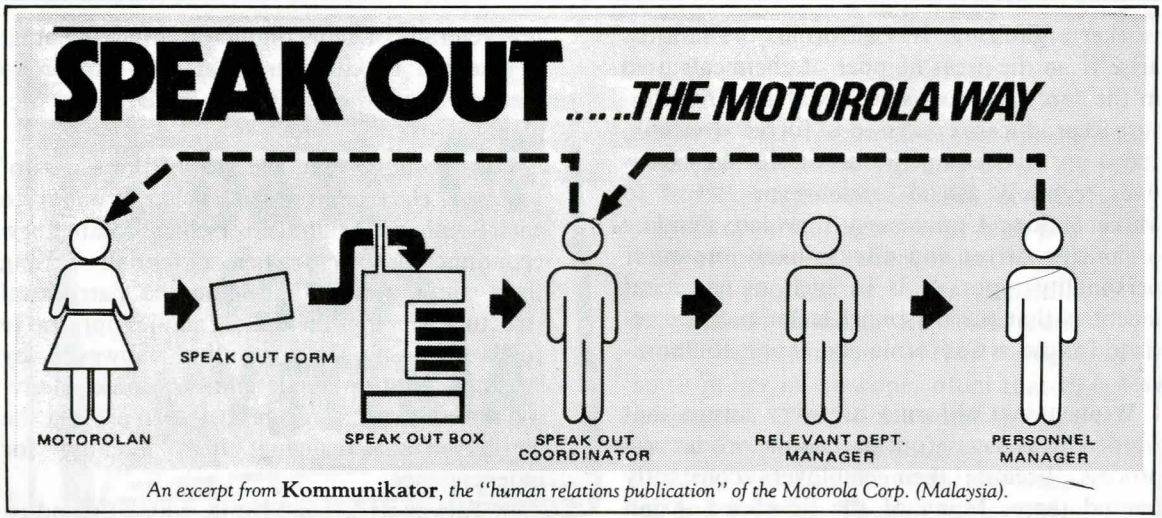
Underlying the lifestyle attractions of electronics work, most strongly felt and clearly articulated in Malaysia, is the economic imperative. Women come to work in the factories because their families need or want the income their wages will allow them to contribute to the household. Families who may not approve of the factory lifestyle allow their daughters to go to work when they realize this will increase the family's income. A worker in Indonesia recounted:

When I first started working at Fairchild, I didn't tell my father. He finally found out after a week when my mother explained why I was leaving so early every morning. At first he was upset but then he saw that I was able to bring home some money for food so he let me work.... I would like to move out and contract a room near the factory but my parents won't let me do this. It's just that my house is so crowded — with nine brothers and sisters there are always people around.... My younger sister wants to apply at the factory for a job, but I don't want her to, I like having my own identity.

TENSIONS

The role of income provider is a relatively new one for Southeast Asian women. While women have always shared the work of family enterprises — whether peasant or urban — and supplemented household income by doing cottage craft work, only a small proportion have taken on full-time wage-earning jobs outside the family. Those women who have entered the paid work force have generally been members of the small proletariat taking jobs in such industries as textiles, where they work under sweatshop conditions, or educated women working in clerical or professional positions. The arrival of the electronics industry has dramatically expanded opportunities for young women to play independent economic roles, often at times when their brothers cannot find wage jobs.

While the families welcome their daughters' income, it is often difficult to accept a daughter's greater independence. This tension becomes especially acute when the women push for more freedom or flaunt the alien lifestyle which is so actively encouraged inside the factory. It is particularly severe in Malaysia, where the factory culture is more pronounced than in other countries in the region. The Intel Penang personnel officer complained, "Our major problem is complaints from parents, and brothers in particular, when they see the cultural changes and new lifestyles their daughers and sisters are taking on." In an attempt to overcome parental disapproval, several factories have arranged Parents' Days to "show parents that the working environment is actually very amenable." These events feature tours of the plant and free snacks and activities. Other plants have established factory-run hostels for workers so that parents will not worry about what their daughters do during unsupervised hours. The hostels feature chaperones and strict rules: residents must sign in and out, giving their destination when they leave, and they must return before 11:00 p.m. If they have



An excerpt from **Kommunikator**, *the "human relations publication" of the Motorola Corp. (Malaysia).*

guests, they must provide complete information about them. Workers living in these hostels are quite wary of talking to outsiders. One group with whom I had become friendly would not let me enter for fear of repercussions from the chaperone.

Despite such measures, the tension persists, perhaps most of all for the workers themselves. They have been thrust into a limbo between two worlds, neither of which fully accepts the other. When they take on the styles and mannerisms encouraged in the factories, they may find themselves ostracized by their families and communities. Yet if they do not, they find themselves considered "backward" and perhaps unfit for factory work. One Malaysian worker recounted an experience familiar to many:

When I first came to Penang, I lived in the kampung [*village*] *near the factory because it reminded me of my* kampung *back in Ipoh. But after a couple of months I moved out of the* kampung *and into a boarding house in the town because all the older* kampung *men were bothering me, telling me that I was loose and bad. . .*

The poignancy is heightened when one remembers that most electronics workers will be forced by deteriorating vision to leave their jobs before they are 30.

TIES TO CALIFORNIA

While they seek to become members of a global culture by consuming its products, Asian electronics workers in fact share much more than they know with their California coworkers. Approximately 60,000 assemblers work in the plants of Silicon Valley to begin the semiconductor production process and to test the finished products after Asian assemblers have completed their work. Ninety percent of these American workers are women, and roughly half of them are of Asian and Latin origin, including Filipinas, Koreans, Vietnamese, Mexicans, Azoreans. Unlike their Southeast Asian sisters, many of the women in California plants are single mothers who provide their families' primary support.

Workers in Asia and California are subject to many of the same conditions and problems, including job hazards, high production pressures, coercive discipline and human relations techniques aimed at preventing independent

worker organizing. In California, the hazards arise from the great number of chemicals used in the fabrication of silicon wafers. The pressure to produce is expressed in forced overtime, speed-ups and competition. California executives regularly attend seminars on "How to Make Unions Unnecessary," which simulate organizing drives and discuss likely organizer personality types. It is in such management meetings that the personnel techniques are refined for use in California and export to Southeast Asia.

Women in California are very aware that women in Asia carry out part of the production process, because their employers constantly remind them. Many of the Southeast Asian electronics workers, however, do not realize that women in California do work very similar to their own. The companies use the international division of labor to manipulate and intimidate their workers, rather than providing ways for the workers to develop a feeling of kinship among themselves. California workers are threatened with the loss of their jobs if they organize themselves or make too many demands on their employers: the plant can always shift their work to Asia. For the Asian workers, the immediate threat is not that the plant will move. Rather, they are presented with the productivity records of workers in other subsidiaries and pushed to produce more to keep up with or surpass them. But they do not receive information about workers in other subsidiaries which would help them to identify with them as colleagues or sisters.

DILEMMAS AND CONTRADICTIONS

The semiconductor industry presents its Southeast Asian women workers with short-term dilemmas and long-term contradictions. Jobs which seldom last longer than four years can bring profound changes into their lives for years to come. While the newness of the industry in Southeast Asia means there are relatively few veterans of semiconductor employment, it is essential to consider what will happen to these workers when their time in the electronics plants is over.

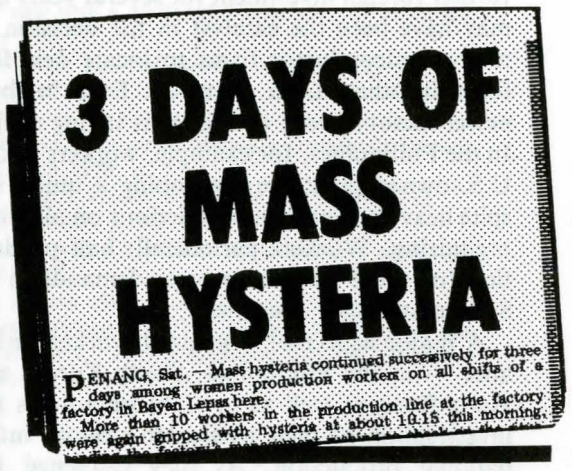
For the short term, the tens of thousands of jobs the electronics industry has brought to each Southeast Asian country have created new economic roles for women, potentially raising their status and undermining the patriarchal structure which often makes families oppressive for women. At the same time, however, by stressing Western versions of feminine passivity, the companies have been able to prevent the workers from realizing their potential for independence.

In Taiwan and Hong Kong, where the industry has offered employment for over a decade, workers complain that their families have pressured them to remain in the factories despite their personal wishes not to. Their complaints also reveal the impact of the factory culture in creating impossible dreams, as in this narrative from a Taiwanese worker:

I'd like to learn singing. I like music. Then I could be a singing star. But my family doesn't agree to that. Right now I'd like to quit this company, but my mother says to stay because the pay at this company is higher.... The manager here is a louse, just like an "elder brother pig." He's always getting fresh with us girls.... Next year for sure I'm going to get work in Taipei.[12]

Particularly common is dissatisfaction because families have become so dependent on their daughters' incomes that they resist the daughters' wishes to marry. After marriage, the women either stop working or use most of their income to set up a new household.

Industry personnel policies which encourage Western manners and consumption habits often make it difficult for women workers to fit into their communities and families. Thus when their periods of employment in the semiconductor factories end, they face serious questions



3 DAYS OF MASS HYSTERIA

PENANG, Sat. — Mass hysteria continued successively for three days among women production workers on all shifts of a factory in Bayan Lepas here.

More than 10 workers in the production line at the factory were again gripped with hysteria at about 10.15 this morning.

Without strikes, without unions, without collective bargaining, Malaysian workers have regularly shut down factories for hours and even days at a time with spontaneous outbreaks of possession by spirits affecting hundreds of workers. "Spirits" provide Malay women with one of their few culturally acceptable forms of social protest. Their culture does not condone expressions of anger and strong emotions by women.

A possessed woman becomes "hysterical," going into contortions and often taking on a totally different voice and personality. In one possession which I witnessed, ten adults were needed to restrain a very slight teenaged girl. In another, a worker who was possessed in her hostel began to shout that she hated being there, hated working in the plant and wanted to go home to her mother. Afterwards, she and others went to great pains to explain that it was not she who was speaking but a spirit who was speaking through her. Hence, she was not responsible for what she had said.

Mass possessions in the factories usually occur during times of high production pressures, changes in the production process or other generally recognized tension. Incidents commonly begin with one worker seeing a spirit in her microscope, often that of her mother. The vision sweeps through the factory floor, and suddenly several hundred women are hysterically weeping and writhing. Though management personnel try to remove the affected women from the floor immediately, the outbreaks frequently close the factory down in a subconscious wildcat strike. One American manager openly acknowledged the connection between possessions and working conditions: "If people believe management cares, there are no problems. Hysteria doesn't occur." Affected workers always receive a paid two-week medical leave in a further, implicit admission that possession is linked to working conditions.

Workers and management alike offer many explanations for the epidemics, usually revolving around unhappy spirits or ghosts. According to one theory, the spirits are ghosts of prisoners of war killed on the factory sites by Japanese during World War II. Management efforts to end the outbreaks have ranged from importing industrial relations experts from New York to hiring local spiritual healers, on a monthly stipend, to exorcise the spirits. But the possessions continue.

about their ability to find other jobs or marry. Church organizers in South Korea, where electronics industries are over ten years old, report that many former electronics workers have no alternative but to become prostitutes to support themselves.

While their new economic roles actually bring women workers into an international system, the companies deliberately work to prevent them from recognizing their own importance. The stress on foreign images of femininity fosters the illusion that consuming Western products makes a woman part of an international culture. The stress on competition and individuality makes it difficult for women to cooperate with each other in the same plant, much less develop links with women working in the same industry in other countries.

The ramifications of the electronics companies' manipulation of their women workers reach into other "female" industries as well. Semiconductor firms have divided their workers from those in other industries by requiring more education as a condition for hiring and creating an image of superiority among them. Throughout Southeast Asia, workers and observers reported that women in other industries view electronics workers with both envy at their style and apparent freedom and contempt of their flaunting of alien lifestyles. Such divisions make it difficult for workers to cross industry lines to organize themselves or even understand their common position as workers and as women. The industries' manipulation is particularly effective in Southeast Asia, because industrial work in general is so new there. Few women have been "toughened" by experience in wage labor, and few have begun to feel the long-term contradictions which their present work implies.

Nonetheless, resistance is beginning. Regular reports of protests, sit-ins, and work stoppages come from established factories in Hong Kong, Taiwan, and South Korea. Worker militancy in Hong Kong during the late 1960s discouraged further foreign investment for several years and may have been the catalyst in the decision of many semiconductor firms to locate new factories in other Asian countries. Even in these newer factory posts, resistance is taking shape. In the Philippines, for example, workers in one U.S.-owned plant are developing a union despite heavy government restrictions on all labor organizing. Workers periodically halt production for short periods to press demands in all Southeast Asian countries.

A major aspect of organized worker resistance — in the Philippines, South Korea, and Hong Kong as well as in California — is the investigation of their particular roles in international production. As they challenge the companies, workers find they must understand this international structure if they are to be successful in organizing across national and eventually industry lines. In one first step toward developing an international labor movement to confront multinational capital in the semiconductor industry, workers in Hong Kong have organized trips to visit workers in the Philippines, Malaysia, Singapore, and Thailand. One woman summed up her trip to the Philippines in early 1978:

The 11-day trip was over, but the sight and sound of the Philippines was embedded in my heart. The Hong Kong workers should learn from them, because generally speaking we were not so aware of fighting for power. This tour has helped me to identify my role.[13]

NOTES

Unless otherwise cited, interview material was obtained during a fact-finding trip to Hong Kong, Malaysia, Singapore, Indonesia and the Philippines from November 1978 to January 1979.

1. Operator's Handbook; Advanced Micro Devices (Philippines), p. 6.

2. Daniel Dhakidae, "If Management Works Well, Then We Don't Need a Labor Union" (interview in Indonesian), *Prisma*, September 1976, p. 45.
3. Interview with a National Semiconductor executive, October 1978.
4. *Wall Street Journal*, September 20, 1972, p. 36.
5. Linda Y. C. Lim, "Women Workers in Multinational Corporations: The Case of the Electronics Industry in Malaysia and Singapore," Michigan Occasional Papers, No. IX, Fall 1978, p. 7.
6. *New Straits Times*, November 27, 1978, p. 32.
7. Lim, op. cit., p. 30.
8. Interview with a National Semiconductor executive, October 1978.
9. *New Nation* (Singapore), January 24, 1975.
10. Enrico Paglaban, "Philippines: Workers in the Export Industry," *Pacific Research*, Vol. IX, No. 3 & 4 (March-June, 1978), p. 18.
11. Lim, op. cit., p. 32.
12. *Voices*, Christian Conference of Asia-Urban-Rural Mission, Japan, October 6, 1978, p. 15.
13. Linda Gale Chen, "The Effect of Industrial Employment and Management Policies on the Lives of Taiwanese Working Women," paper delivered at a conference on "Modern Man and His Industrial Environment," May 13-14, 1978, Taichung, Taiwan, p. 16.

Other sources of important information are:
"Free Trade Zones and Industrialization of Asia," special issue of *AMPO*, Tokyo, 1977.
Silicon Valley: Paradise or Paradox? (Pacific Studies Center, October 1977).
Both are available from SRC.

RACHAEL GROSSMAN has lived in Indonesia and traveled throughout Southeast Asia. She has worked at the Pacific Studies Center researching U.S. corporate involvement in Asia and also helped found an electronics health and safety project in California. She is now a staff member of the Southeast Asia Resource Center.

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