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Japan Report

(FOUO 55/81)



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CONTENTS

SCIENCE AND TECHNOLOGY

Toyota Group Unifies, Prepares for Competition With GM (NIKKEI BIJINESU, 29 Jun 81)	1
U.S.-Soviet Confrontation Over Yamburg Pipeline Project (Susumu Ohashi; TOYO KEIZAI, 1 Aug 81)	23
New Developments in Biotechnological Industry (Various sources, various dates)	27
Maruzen Oil Co Sumitomo Chemical Co Hayashibara Biochemical Laboratories Society for Plant Breeding Technology Yakult Honsha Co	
Titanium Industry Planning for Expansion (Yoshihiro Iinuma; TOYO KEIZAI, 1 Aug 81)	33

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SCIENCE AND TECHNOLOGY

TOYOTA GROUP UNIFIES, PREPARES FOR COMPETITION WITH GM

Tokyo NIKKEI BIJINESU in Japanese No 295, 29 Jun 81 pp 40-50

[Article: "Unification of Toyota Motor and Toyota Sales Is a Gamble"]

[Text] As the worldwide compact car warfare unfurls, the Toyota Group has finally begun a move to intercept GM. Changing its former image as a "Bank of Toyoda," each affiliate of the Group has initiated bold equipment investment.

The changing of the president of Toyota Motor Sales Co Ltd [hereafter, Toyota Sales] is aimed at reinforcement of a sales force that would support its positive measures. But, the possibility of this gamble succeeding is not all that certain.

The cohesiveness of the affiliates is so strong that it is hindering the development of international strategies. Is it possible [for Toyota] to succeed in overseas production in the United States and Europe while solidifying its stronghold at home?

With Shoichiro as the [New] President of Toyota Sales, Toyota Is Ready for Small Car Warfare

Even on a rainy day, from the executive suite of Toyota Sales, one can see in the direction of Suidobashi, the Tokyo office of Toyota Motor which has just undergone a roof-laying ceremony. Indeed, it is within hailing distance. The building is expected to be completed next spring. The executives of Toyota Sales expect much from Shoichiro Toyoda who will become their new president. They are hopeful that "since the distance between the office of Toyota Motor and Toyota Sales will be shortened, the relationship between the two will also be corrected so that if we were to yell we would get an immediate response."

On June 29, Shoichiro Toyoda, the prince of the Toyoda family, became the new president of Toyota Motor Sales, moving laterally from his former position as a vice president of Toyota Motor. The first step toward a "closer relationship" between Toyota Motor and Toyota Sales was thus taken. This drama of change created various speculations and took the insiders and outsiders by surprise since Sadozo Yamamoto, the former president of Toyota Sales, was dismissed after serving

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only one term, or 2 years; it was "as if an aircraft was forced to land while coasting at an altitude of 10,000 meters" (according to an executive of Toyota Motor Sales). President Eiji Toyoda of Toyota Motor emphasizes that the change "was not a matter of dispatching personnel. Sales wanted Shoichiro and we judged that the change would be a plus for the entire Toyota Group." Chairman Masayuki Kato of Toyota Sales also confirms that it was "Sales that initiated the change."

Frustration Due to Decline in Share

The general view of Toyota Motor and Toyota Sales is that "this [change] will improve communication between the two." (Shin'ichi Kanda, vice president of Toyota Motor Sales). The relationship between the two companies has been awkward during the past several years. It was partially due to the fact that Taizo Ishida and Shotaro Kamiya who had been mainstays in the post-war development of both companies resigned from the frontlines and passed away at about the same time. While the rival manufacturer, Nissan Motor Co Ltd, has slightly increased its share of domestic sales by making its "technology" a selling point and has been aiming to restore its 30 percent market share, Toyota has seen its share drop to the 40 percent level after it reached its highest rate of 40.4 percent in 1974. Its share kept declining point by point. Although it recovered slightly in 1978, it again declined so that last year's rate of 37.3 percent was the second lowest in the past 10 years. However, May sales brought the rate up to the 40 percent level for the first time in a long time, indicating a big change.

According to Toyota Motor Sales [the cause of this decline in sales] "comes from the inability [of Toyota] to produce merchandise which can overcome the slack in domestic demand." On the other hand, the frustration of Toyota Motor lies in "the inability of Toyota Sales to catch the market trends as soon as they surface and transmit such data quickly to Toyota Motor." Chairman Shohachi Hanai of Toyota Motor is of the strong opinion that "the present share is not satisfactory" and that [Toyota] "should solidify its management structure by regaining the 40 percent market share."

In addition, in terms of the world market, Japanese auto manufacturers have become the target of criticism since the rapid growth of Japanese cars in the United States and Europe has said to have contributed to the increase in unemployment there. As a result of the settlement of the U.S.-Japanese automobile export issue at the beginning of May, Japan had no choice but to restrict voluntarily its auto exports to the United States from 1.82 million cars in 1980 to 1.68 million in 1981. Japan's auto exports have thereby fallen into an era of decline. Coinciding with this, the "J-car," developed with the full force by the world's largest auto manufacturer, GM, as its "advance scout" in the international small car warfare, appeared on the U.S. market in mid-May and soon its production as the "world car" in GM's overseas subsidiaries will start.

"[The question has been] how would GM and Ford transform themselves by the 1980's. For us to survive we need to strike first. For 3 years beginning in fiscal 1981 we will invest a total of 1 trillion yen for rationalization of equipment and R & D of small cars" (chairman Hanai). This policy applies consistently to such affiliates of Toyota Group as Toyoda Automatic Loom Works Ltd, Toyoda Machine Works Ltd,

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Toyota Auto Body Co Ltd, Aishin Seiki Co Ltd, and Nippondenso Co Ltd; all of them are active in making equipment investment. The 1981 investment plan of Toyota Motor itself is 280 billion yen; however, it is certain that the investment for the entire Group will reach a giant scale of 600 billion yen.

"To See Toyota Motor and Sales on Equal Footing Is a Mistake"

While the affiliates are all involved in reinforcing their structure in preparation for the competition with GM, Toyota Sales cannot sit idly by. It would then seem true that chairman Masayuki Kato of Toyota Sales took the initiative in inviting Shoichiro Toyoda to become the new president by saying "now is a rare opportunity for us to enhance the sense of unity between Toyota Motor and Sales inasmuch as the entire Toyota Group is taking a positive step forward." However, when we re-view the movement of the past 4-5 years, although the core structure comprised of Eiji Toyoda-Masayuki Kato-Shohachi Hanai is solid, the reinforcement of the dominant position of Toyota Motor over Toyota Sales has become even stronger.

There has always been not a few among the executives of Toyota Motor who would openly denigrate Toyota Sales as "a sales department." For example, the percentage of the share held by Toyota Motor, a major shareholder of Toyota Sales, has increased from 38.9 percent in March of 1976 to 44.1 percent in March of 1981. During this period total capital increased from 16.9 billion yen to 23.6 billion yen due to capital increase [of shares] issued at market prices and gratuitous capital increase of premium restoration. In addition, the shares held by affiliates of the Group were transferred to Toyota Motor and a considerable amount of shares were purchased on the open market. The capital assistance from Toyota Motor to Toyota Sales which was not considerable during the Kamiya era increased rapidly in the form of sales commissions as incentives to dealers. This has reached the scale of 50-60 billion yen, resulting in the loss of independent status of Toyota Sales. Although it is said that "[incentives] are appropriated as 'dealers' help,' there is a trend toward reduction of the same so as to maintain order in the market," (Gentaro Tsuji, executive director of Toyota Motor), the normal relationship of this sort would be that once money is offered it talks.

During the era of Ishida-Kamiya, the relationship between Toyota Motor and Toyota Sales was well coordinated like the wheels of an automobile and equality between the two was maintained. The fact that Toyota Sales was given special treatment among the Toyota Group, whose central role is played by Toyota Motor, was due to the presence of Mr Kamiya who was considered "god of sales." When the pressure of Mr Kamiya was eliminated, it was easier for Toyota Motor to say what it wanted to Toyota Sales. The "tragedy" of the former president, Yamamoto, began when he expected an equal relationship [with Toyota Motor] even after Mr Kamiya had passed away. Chairman Hanai affirms that "there is a constant awareness among the executives to make Toyota Sales better and on closer terms with Toyota Motor; however, it is a mistake to feel that the two are on a same footing."

Demerits of Separation Are Surfacing

Within the Group, Hino Motors Ltd and Daihatsu Motor Co Ltd have the position of tie-up companies. Like Toyota, both had separate manufacturing and sales

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divisions, but on July 1st Daihatsu decided to merge them. Originally the divisions were not separate but on the occasion of the tie-up with Toyota in 1967, the two were separated. As a result of this trial and error, Daihatsu has returned to its former structure.

What promoted the merger was the statement that "to increase knock-down exports, there are limits to how much we can rely on sales alone" (Ohara, president of Daihatsu). Inasmuch as Ohara is the product of Toyota, he could not have taken this step without their consent. As for the other tie-up company, Hino Motors, President Seiji Arakawa observes the situation rather boldly as follows: "[The merger] was a result of Daihatsu's special circumstances. Hino has had separate divisions for the past 30 years. This is because the trucks require a sales structure that is closely connected to the users. What can be said is that since Toyota has numerous small dealers, it is not impossible to interpret Daihatsu's [merger of the two divisions] as a kind of a test case."

With the promotion of Shoichiro as the new president of Toyota Sales, President Eiji of Toyota Motor has, at least for now, denied the possibility of a merger between the manufacturing and sales divisions, saying "In the past there were merits in separating the two and it is possible to manage them so as to produce merits in the future." But he does not categorically deny the possibility of a merger: "Should the relationships between the two divisions produce only demerits, then we should not waste our time in merging."

When the sales and manufacturing separated in 1950, it was not the intent of Toyota Motor; it was done in an effort to revitalize Toyota Motor which was on the verge of bankruptcy. The merits of the split were that the sales company could 1) help dealers grow, 2) procure sales capital, and 3) gather data on product development. With this, the manufacturing side could concentrate on production. The fact that Toyota grew to be the most profitable enterprise in Japan attests to the merit of such a split.

Recently, however, demerits have surfaced. Within Sales, there is a voice of criticism: "The two companies cannot coordinate their moves. Increasingly they tend to lose their timing in determining their intents. It is doubtful whether [Sales], interposing itself between the users and dealers on one hand and Toyota Motor on the other, is gathering appropriate market information. Despite the fact that the automobile industry has entered an important phase in world market strategy, as against GM's 'world car,' there is a feeling that [Sales] in the overseas market is too busy trying to sell the cars and has time only for handling product claims. The collection of data for world market strategy is at the moment impossible." In this manner, there are many who would question the role of [an independent] sales company.

The New Structure To Restore the Relationship

As Go Oshima, managing director of Toyota Motor Sales looks back--"among the executives, those who once shared the same messhall are no higher than where I am now"--the age has come in which the majority of the rank-and-file of board and division directors are those who have always been with Toyota Sales. It is said

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that up to 1959-60, [Sales] division directors and assistant directors were temporarily assigned [to Motor] so that exchange between the two was active and there was no problem in understanding each other. It is said that the greatest problem lies in the fact that the first generation of Toyota Sales people retired and the work is now in the hands of those who do not realize the Toyota Motor-Toyota Sales relationship. The prescription is there to remedy this situation: "In order to establish better communications between Toyota Motor and Toyota Sales, we must promote more personnel exchanges." The question is how to enforce it.

The program of personnel exchange is about to be consolidated. In 1978, a mutual dispatch of section managers started. Presently, one person to Toyota Motor and three persons are sent to Toyota Sales. The three dispatched to Toyota Sales are specialists in QC (quality control) and their duty is to instill quality control within Toyota Sales and among its dealers. Also, a joint study program for new employees and new assistant directors started about the same time and this year a similar program for new directors of Toyota Motors and Sales are put into effect. This sudden active exchange of personnel is a reflection of the sense of crisis which Toyota faces in the worldwide small car warfare; unless Toyota Motor and Sales are in unity, this crisis cannot be overcome.

With a return to a low-growth period, the relationship between Motor and Sales became clouded; however, for the time being, the proposed new structure is intended to restore the strained relationship between the two. At present when the management ability of the new president, Shoichiro, is being questioned, the answer to the question of whether the new structure will be a plus or minus for the Toyota Group cannot be given immediately. The sale of automobiles, aside from the capability of top management, is strongly affected by outside factors; therefore, it is also true that among the executives of the Toyota Group there are those who doubt "whether the present situation requires the playing of their trump card [i.e., Shoichiro]." Should demerits increase, then it may be that Toyota Sales will be absorbed by Toyota Motor, without having the opportunity of restoring the reins to the prince.

The highest organ of mutual exchange among the Toyota Group is the "Asa-no-kai" [Morning Group] which is comprised of 14 major companies with Toyota Motor Co Ltd at the center; they include Toyoda Automatic Loom Works Ltd, Aichi Steel Works Ltd, Toyoda Machine Works Ltd, Toyota Auto Body Co Ltd, Toyoda Tsusho Kaisha Ltd, Aishin Seiki Co Ltd, Nippondenso Co Ltd, Toyota Motor Sales Co Ltd, Toyoda Spinning and Weaving Co Ltd, Kanto Auto Works Ltd, Towa Real Estate, Toyoda Central Research Center, and Toyoda Synthetics. There are also the "Kyoho-kai" (172 firms) comprised of parts-related manufacturers, the "Seiho-kai" (we firms), a group of molding and gauge manufacturers, and the "Eiho-kai" (37 firms), a group of facility and construction companies, all of which are cooperative companies of Toyota. In addition, Hino Motors Group and Daihatsu Kogyo Co Ltd are considered as tie-up companies.

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Delayed International Strategy: As a Result of Thorough Efficiency Measures, Toyota Must Now Think Twice About "Cost Hike"

"Toyota Group cannot get bigger than it is now. They say it has no outstanding loans, but that is because it has had no other choice. This has at the same time made it incapable of taking gambles. But it's alright since it has enjoyed the best of life over the past 10 years." Even a taxi company operating in the Mikawa district of the Toyota "castle town" is under the influence of Toyota. I was surprised to hear from the taxi driver such a clearcut analysis of the essential quality of Toyota as that above. It would seem that even the Toyota Group which has established itself on three pillars of management--"people, material, and money"--which succeeded particularly in revolutionizing the awareness of its "people," has a blind spot.

As the international small car warfare intensifies, it is the common view of the executives of the industry that the exports of finished automobiles will become difficult in the future. However, when it comes to export strategies for various European countries and the United States for which two-thirds of exports are now consigned, each company shows different approaches. Presently, Nissan Motor is surging ahead colorfully; it has begun constructing a small truck plant in the United States, and in Europe it plans to establish joint production with Alfa Romeo and produce small cars with Volkswagen. Honda Motor too, is moving toward production of automobiles in the United States.

Toyota Is Opposite of Nissan and Honda

On the other hand, Toyota's move is opposite that of the above two companies. Although last July it lavishly launched a plan to form a joint venture company with Ford, the later negotiations receded greatly from the original plan and it now appears that an immediate solution is unlikely. Although managing director Tsuji of Toyota Motor says, "Indeed Nissan's moves in the past several years have been lavish, but in terms of the overall past overseas strategy, Toyota's were far more advanced," it is not a convincing statement. Furthermore, Toyota is involved in knock-down production in 15 countries including Indonesia, Australia, Thailand, and the Philippines; however, as chairman Kato of Toyota Sales notes, "in all of these, except Brazil, it was with the leadership of Toyota Sales that overseas productions were started"; in other words, in almost no cases was Toyota Motor itself forced to make decisions.

The cause of Toyota's delay in overseas ventures seems, ironically enough, to lie in its production system which is pervaded by utmost devotion to efficiency. Taking Toyota Motor alone, for example, 5 of 10 of its plants are concentrated in Toyoda City where the headquarters are located. At some distance from Toyoda are the newest plants, Iura (in Hekinan City) and Tahara (in Tahara-machi, Atsumi-gun). All of the plants are located in the Mikawa area. Five companies manufacturing automobile-related products, but not Aichi Steel Works, Kanto Auto Works, and Toyoda Synthetics, have their headquarters and main plants in Kariya, a distance of 30-40 minutes by car from Toyoda headquarters.

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If It Doesn't Pay To Build Cars in America

As Taichi Ono, president of Toyoda Spinning & Weaving and Toyoda Synthetics observes, "Nissan missed a chance to make money," the source of Toyota's power is that all affiliates of the Group "lived" together, rubbing each other's shoulder, in a small area and earnestly tackled the problem of cost reduction. Since the first oil shock in 1973, Toyota Motor has, while reducing its own production volume, sent parts and assembly works to all affiliates. Contradicting Ono's statement that "Toyota intentionally promoted the strengthening of its forces and as a result, gained much strength," it became difficult for Toyota to go abroad.

For example, is it possible for Toyota Motor alone to make an advance in the United States? It is said that production cost in Australia is now 2.5 times that of Japan. Even with Nippondenso close by, the production costs are rising. In the United States, a further cost hike is expected. If Toyota were to produce 200,000 cars a year in the United States, it would mean that that much less must be produced at home. This will not only result in reduction in production of Toyota Motor but also those of final assemblers, Toyota Auto Body, Toyoda Automatic Loom Works, Kanto Auto Works, Hino Motors, and Daihatsu.

Furthermore, such parts manufacturers as Aishin Seiki, Nippondenso, Toyoda Machine Works, Toyoda Synthetics, Toyoda Spinning & Weaving must also reduce production. Even Nippondenso, which is one of the more independent members of the Toyota Group is also cautious: "We have no international strategy independent of Toyota Motor" (President Sakan Hirano). The system is so structured that only after having secured a fixed volume of production under the umbrella of Toyota Motor, the affiliates will find other work. It can be said that the structure has become such that reduction of production by Toyota Motor will directly affect the entire Group.

Regarding the negotiations with Ford for a 50/50 joint venture, it was Toyota that threw the first ball. The negotiations, however, have toned down: "In the negotiations we will choose a way which has merit to both parties" (President Eiji Toyoda). How the talks will end is foreseeable. There is the view that "purely in terms of economics, the production in the United States will not pay. The question is whether we can win over the weeping boy [i.e., MITI] and the vassal [GM]" (Chairman Hanai). In this sense, Toyota's move into the United States will not appear as something smart or chic as one would expect from a project that is a part of an international strategy. It will most likely remain a well calculated "Mikawa style" move, designed to save the faces of MITI and GM without suffering any losses.

Priority In Production Technology: Toyota Shows Comprehensive Force but Lacks Universality

"Although car electronics and microcomputers and turbo are considered the most advanced automobile technologies, there are those, not all, who use technology to improve their image and users, too, who pay for these [technologies] as 'car fashion.'" Perhaps overly conscious of Nissan Motor, whose selling point is

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"Technology of Nissan," Executive Director Masatoshi Morita of Toyota Motor thus emphasizes that the mainstream of automobile technology lies elsewhere. However, since Toyota's latest luxury car, "Soara," is a digital car, which is surprising for a conservative car manufacturer such as Toyota, and since it is making sales pitches emphasizing the digital aspect the above statement must be qualified.

Today, [Japan's] automobile technology in competing with GM's strategic small cars, puts great store on the development of engines with high fuel efficiency, FF (front engine and front wheel drive) cars, and full use of car electronics. All of these can become weapons for producing small and lightweight cars. Up to now and worldwide, the ratio of investment in research and development to overall sales was 3 percent; Toyota's ratio, however, "has exceeded 3.5 percent recently" (Executive Director Motita). In fiscal 1981, investment in the development of new products, including safety and energy saving measures, has reached 16 million yen, of the total 28 billion yen set aside for equipment investment. If an equipment investment plan exceeding 30 billion yen a year were to continue for the next 3 years, there is a strong possibility that investment in R & D will soon reach a 5 percent level.

"Branch Factories" Have the Fund Raising Ability

Automobile technology is facing a turning point worldwide. Herin lies the need for large investments in R & D. Executive Director Tsuji analyzes [the American situation] in terms of finances: "When we compare ourselves with GM and Ford, their domestic production rates are high. This is the bottleneck limiting their ability to raise capital. They would be unable to spare much for development purposes." In this respect, Toyota is about to display the Group's full force in technological development as well. It is said that GM's domestic production rate has reached 70 percent. As for Toyota, "if each affiliate of the Group is regarded as a branch factory, its rate will also exceed 60 percent. Since these branch factories have their own fundraising ability, a quick response [to any situation] is possible" (Executive Director Tsuji).

Although the engine proper will be developed by Toyota Motor, since "one-third of all models will be converted to FF system in the next 2-3 years," (Executive Director Tsuji), Aishin Seiki will specialize in the development of transmissions. In addition, Aishin will be responsible for electronic-controls for brakes and the transmission system. Nippondenso is responsible for electronics comprising the core of engine control. As President Hirano of Nippondenso boasts--"In car electronics at least our technology is superior to that of Toyota Motor"--ICs and microcomputers produced by Nippondenso are incorporated into the digital indicators of measuring equipment and used to improve emission controls and fuel efficiency.

Production Technology Based on Reliance on Men

In producing J-cars, GM has introduced not only robots but also Japanese-style production technology. In this way its aim is to reproduce "strong American cars." Executive Director Morita observes that "competition [with America] will not be simply one of development of technology but also of management style in terms of

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technology incorporating production technology, production [personnel], and affiliates of the Group." In this respect, Toyota Motor, which succeeded in restructuring the awareness of its "men" based firmly on "Toyotaism," has an advantage. The superiority of the Toyota Group has been maintained mainly on the basis of its production technology.

However, as the characteristic of the Toyota production system is one of "single nationality type enterprise," limited to a small area of Mikawa, its production technology, too, relies heavily on "men." Accordingly, its weakest point is its lack of universality. Chairman Ono of Toyoda Spinning & Weaving and Toyoda Synthetics admits this defect when he observes, "We probably will not do well in the United States. If we are to move into the United States, we must adopt the production system of the United States." At present, the utilization of robots is limited to painting and welding. Although automation and labor reduction in production of parts and processing are being made, the final assembly still relies a great deal on manpower.

In moving into the United States, it is necessary to consider a production system which is not influenced by the quality of labor. It means that "Toyota must take with it a facility which is superior to that found in Mikawa" (Chairman Kato of Toyota Sales). To a certain extent, this means a conversion to an equipment industry-like manufacturing facility, and there will be a demand for plant engineering technology, in addition to development and production technologies. In this sense, even from the standpoint of technology, Toyota's advancement into the United States is "no easy task"; we can see why it is hesitating.

The Return of the "Toyota Bank": One Trillion Yen To Be Invested in 3 Years; Funds to Be Procured Through Stock Market and Banks

Finally the affiliates of the Toyota Group have the opportunity to spend the great deal of the money they have saved up. Not only that, it would now seem that they have to procure additional large sums of capital from the stock market and banks.

This is because, GM's worldwide small car strategy will be completed in 1983 instead of 1985 as was expected. In response to this [Toyota] had to complete its equipment investment in 3 years instead of 5. Starting with this year's 28 billion yen equipment investment, it will invest a total of 1 trillion yen in 3 years. This equipment investment represents an annual average of more than 30 billion yen, or 3 times the 11 billion yen average of the past 5 years.

At the press conference which took place in mid-June, President Eiji Toyoda of Toyota Motor explained that in preparation for the full-scale small car warfare, and in order to radically increase equipment investment, the company has decided to issue its shares (70 million shares) at the market price; the issue represents the largest one of its kind by a Japanese enterprise. Although he half jokingly called for the cooperation of his audience, he probably showed his true colors. After the first oil shock, the policy was to strengthen the management structure and save as much as possible. There is now a stronger need to go into raising capital, which costs less and is more advantageous.

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"Premature Accounting" Is Subject to Stock Prices

Cash flow (derived from deducting outside expenditures from the total of depreciation and profits) indicates the amount of capital which an enterprise produces through its business activities. In the case of Toyota Motor, for the period of June 1980, its total depreciation was 105.6 billion yen and profits after taxes, 143.5 billion yen; the cash flow after deduction outside expenditures such as dividends, was 219 billion yen. Should this pace continue and equipment investment of more than 300 billion yen a year be made, it would mean that about 100 billion yen annually must be procured from outside sources.

The stock price as of June 1, when Toyota Motor announced the issue of 70 million shares at market price, was 1,130 yen. By mid-June it went up to the 1,400 yen level. Suppose that a share issued at market price is 1,130 yen, the capital gained would then be 79.1 billion yen for 70 billion shares; if 1,400 yen, then the capital gained will reach 98 billion yen and the needed funds (100 billion yen) for this year will almost be met.

According to the rules of the stock market, once shares are issued at market price they cannot be reissued for one full year. In other words, shares can be issued once a year. If the stock price keeps going up in the future, and the shares are issued at market price every year, then Toyota can make a 1 trillion yen equipment investment for 3 years without hardly touching the large liquidity (current savings and short-term securities; 274.1 billion yen at the end of December 1980). It is understandable then that even Eiji Toyoda, the leader of the Group, is concerned with the stock price.

Compete With Productivity All the Way

Since the first oil shock Toyota Motor has been enjoying the reputation as the "Toyota Bank" by rapidly increasing its liquidity. However, as Executive Director Tsuji explains Toyota's policy was a natural one for an enterprise: "Lack of debt and accumulation of equity capital are simply means to an end. Our purpose is to create a structure which is capable of responding to emergencies before they rise."

At the end of the June period, in 1974, Toyota Motor discounted a bill of 10 billion yen and temporarily retracted the "honor" of being a firm without debt. Since then capital has accumulated rapidly and the liquidity has risen by 3.5 times in the 3 years between June 1974 and June 1977. At about the time when the name of "Toyota Bank" was spreading throughout Japan, Chairman Shohachi Hanai (vice president then) was already saying, "Just because our earnings increased through operation of funds, it does not mean that we should simply rejoice. If we can appropriate it skillfully for production investment, we can expect an even higher profit rate." It is in this sense that we can say that an opportunity has at last arrived for Toyota to invest its accumulated capital in what it was originally intended for (production investment).

Of course, if international strategy such as that of constructing a plant in the United States were to be pursued, the amount of investment will multiply. But,

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since Toyota has a reputation for "making things doubly and triply sure," it remains patient for the moment, casting sideway glances as Honda and Nissan build their plants in the United States. As for the issue of establishing a joint venture with Ford, Toyota's position is explained by Eiji Toyoda: "Ford has always been unwilling to do anything overseas unless it can invest 100 percent of the capital. Moreover, (even considering the fact that the venture will be in the United States), they proposed a 50/50 investment. In other words, they threw in the bait that was most difficult for us to swallow. (No negotiations are easy) and there is no telling when they will end." For Toyota, this was an ultimate statement of backdown. One wonders whether it was seriously considering a joint venture.

Concerning the small car warfare with GM, Toyota Motor, convinced that its "first priority is to build cars that can at least beat (GM) cars and thereby solidify its foothold at home" will make its production base in Japan. It is trying to compete with GM using its superior productivity as a weapon. Whereas Nissan, even in the area of production, is trying to extend its frontlines in the fight with GM to overseas markets, Toyota is convinced that it is better to compete using home-ground advantages. No one knows what the outcome will be in 10 years, but at least for the next few years, Toyota's risk is smaller than that of Nissan, since the former will not commit itself to a full-scale overseas investment. This is Toyota's decision even though it is fully aware of "the fear that this [decision] might be a source of trouble in the future" (Chairman Kato of Toyota Sales).

Moratorium on Internationalization

Which is more of a burden, Toyota Motor's 1 trillion yen total investment or GM's approximately 8 trillion yen (\$40 billion) investment? In terms of finance, as mentioned above, Toyota can manage almost two-thirds of the 1 trillion yen by cash flow, and the liquidity at the time of initial investment would be 270 billion yen, which is the equivalent of nearly 30 percent of its total investment amount. On the other hand, based on the figures for December 1980, GM's cash flow is about 500 billion yen and the cash flow difference between the two is as great as the difference between the total investments. Also, GM's liquidity is about 750 billion yen which is less than 10 percent of the total investment amount. Based on above, it would seem that in terms of finance Toyota Motor is superior to GM.

But the fundamental difference between the two is that while GM could for the moment complete its worldwide strategy with this large-scale investment, Toyota has to keep developing its worldwide strategy. Toyota Motor, Sales, and other affiliates of the Group are united in their view that "there will soon come a time when there will be no more free trade and overseas production must be increased." The postponement of overseas ventures in places like the United States is, in a sense, an attempt to buy time. Toyota's strategy, in terms of internationalization, is based on "moratorium management"; in the meantime it can strengthen its management structure. In terms of finance, its goal for now is to further increase its savings while making large-scale investments. There, however, is a trap. If the stock price goes up steadily there will be no problem, but there is the fear that the price will decline and advantageous financial procurement will become impossible. In addition to restricting its exports to Europe and the United States, its burden of depreciation, due to large-scale investments, would increase greatly.

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Both are major factors that threaten earnings. It would appear that the June 1981 period will show a large decline in earnings for the first time in a long time, but if this continues its negative effect on the stock price will be great. Then, if liquidity is diminished or if a loan is made, that would cause further decline in profits in the form of a drop in monetary earnings and outstanding interests. It would be exactly opposite of the "Toyota Bank" days when, with fewer equipment investments and less depreciation burden, Toyota was raking in monetary earnings with an abundant money supply. If this is the case, even Toyota Motor cannot help but face a difficult situation in financing.

How To Make the Most of the Group Force: Danger Lies Behind Intimacy

Chairman Ono of Toyoda Spinning & Weaving and Toyoda Synthetics, the creator of the Toyota's production system, speaks of "areas where Toyota makes money and Nissan loses it." This applies to the parts manufacturers. While Toyota's parts manufacturers are concentrated in Aichi Prefecture, Nissan has its main plant in Kanagawa and others, spread more widely than Toyota, in Tochigi, Yoshiwara (Shizuoka Prefecture), and Kyushu (Fukuoka Prefecture). As far as Nissan parts Manufacturers are concerned, in order for them to make deliveries quickly to the Kyushu plant, they must have a warehouse near their client; packing must be done securely and transportation would be costly. These costs accompanying the delivery of parts are "mostly borne by the parts manufacturer" (an executive of Nissan affiliated parts manufacturer); in Toyota's case the burden would be less.

Unity as a Product of the Age of Management by Reduction of Labor

Of course, Toyota will not allow its parts manufacturers to reap the benefits of low cost delivery; on the contrary they require an even more severe reduction of cost. In concert with production control achieved through the [trade mark ?] system, Toyota affiliated manufacturers are gaining strength by being in step with their parent company. Moreover, since they exchange information on a regular basis at all levels--executive, engineering, clerical, etc.--and at the meetings of the "Asa-no-kai," composed of top personnel of the 14 major companies, all affiliates move in the same direction without questions or discussions: "When another company does something we naturally know that our turn is next" (official of Toyoda Automatic Loom).

A good example of the unity of the Toyota Group is seen in the reduction of debt which took place in all companies during the period of management by reduction of labor. With the first oil shock as the turning point, Toyota Motor's management strategy turned 180 degrees; the previous expansion policy of "3 million annual production" was converted to one of defensive management which aimed at thorough rationalization. This was symbolized by reduction in debt; the total debt of 9 Toyota affiliates (including the amount of discount bills) was nearly 150 billion yen in fiscal 1974, but it was reduced to less than half in 2 years, or 66 billion yen in fiscal 1976.

At about the same time the production volume of Toyota began to increase rapidly, and did so in such a way that exports and domestic sales compensated for each other--when overseas sales were down domestic sales were promoted, and vice versa. The structure of the affiliates of the Group became so that profits could

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be made without saying anything. Then by the second round of this management based on reduction of labor, the Group had in name and in fact become debtless and their goal was set on accumulation of capital in preparation for the future. Since fiscal 1977, the total debt of the nine companies of the Group fell below the liquidity and recorded no actual debt. Among the nine companies, four, including Aishin Seiki, Toyota Auto Body, Toyoda Machine Works, and Toyoda Synthetics had no debt, and Nippondenso and Toyoda Automatic Loom Works chose to carry some debt for policy sake, even though they could repay it anytime. The total liquidity of the 9 companies in fiscal 1979 reached 93.2 billion yen, 5 times greater than their 17.1 billion yen debt.

It can be said that up to fiscal 1979, was a period of accumulating capital for Toyota. Each affiliate managed its extra money supply efficiency in bond markets and others and was thereby able to increase its capital even more. As President Yoshio Nakai of Aishin Seiki admonishes, "The job of the accounting department is not to procure money. Think of it as a sort of production department where money is used to make money." Each affiliate practiced to the letter the famous saying attributed to the accounting department of Toyota Motor that "money is the merchandise of the accounting department." Not only Toyota affiliates but also many other enterprises tried to reduce debts and manage extra capital efficiently during the period of management based on reduction of labor; however, Toyota affiliates were more thorough in their approach. In this manner, Toyota Group became the champion of management based on reduction of labor.

The era of spending money began in fiscal 1980. According to Executive Director Tsuji, "the amount of total equipment investment by respective affiliates of the Group is almost equivalent to that of our company [i.e., Motor]"; the amount of equipment investment is therefore great. "This equipment investment totals 55 billion yen. A 50 billion yen plus pace will continue for 2-3 years" (President Hirano of Nippondenso). Each company is expected to maintain a high level of investment until fiscal 1982 and 1983. In fiscal 1980, too, while liquidity increased as a whole, Aishin Seiki, Toyota Auto Body, and Toyoda Machine Works were already beginning to transfer their liquidity to establish equipment funds. We hear Toyota people saying, "To be without a debt is no honorable thing" (Toyoda Automatic Loom Works), or "In fiscal 1982, we may be in debt for about 10 billion yen" (Toyota Auto Body). The Group has thus abandoned its temporary image as a "bank," and has seriously begun to make production investments, which is how a manufacturer ought to be.

The Attitude Toward Overseas Ventures Is Also "Controlled"

[Toyota's] tendency to "control" is not limited to areas of capital and equipment investment. Concerning the issue of a full-scale advancement in the United States, one executive of a Toyota affiliate says that, "the wage level of UAW (United Auto Workers) is 50 percent higher than that in Japan, and considerably higher than other American unions." Another executive cautions that, "In the United States, there are very high level skilled workers but it is difficult to recruit a large labor force that is above a certain standard," and further opines that, "if on top of this difference in the quality of labor force, we were to add the higher wages of UAW, it would become an obstacle which could not be overcome." Naturally, the opinions of the affiliates concerning the venture in the United States are the same or even more cautious than that of Toyota Motor.

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In this respect, there is a considerable distance between Toyota and Nissan groups. When Nissan Motor decided to move into the United States, an executive of Nissan affiliated parts manufacturer quipped that, "If we could, we would like to go abroad together and cooperate with Nissan. But it's a big problem for our company, since we may die a beggar." In the Nissan Group, therefore, the manufacturers are caught between the concern for their own management and loyalty for the parent company.

The Toyota lineage companies are concentrated in the small Mikawa area and are blood relations of Toyota Motor. On the periphery are the two affiliates, Daihatsu and Hino Motors. If Toyota lineage companies are "inner-circle" daimyo, then the affiliates are "outer daimyo." Although [Daihatsu and Hino] may build their own automobiles and are considered major enterprises with sales of 300 billion yen, they cannot join the "Asa-no-kai"; there is a clear line between the Toyota lineage companies and the affiliates. Their position within the group is lower than the direct affiliates. Even President Ohara of Daihatsu, who originally came from Toyota Motor, admits simply that, "We are an affiliate, not a direct Toyota lineage company. It is natural that there will be differences in the degree of intimacy."

Can Toyota Be a "Responsible" Giant?

On the other hand, Toyota Motor has been buying up the shares of its tie-up companies. In the case of Hino Motors, the shares owned by Toyota Motor have increased gradually and the percentage of Toyota's ownership at the end of March 1981 was 9.8 (9.6 at the end of September 1980). In these purchases, Toyota does not send Hino any advance notices. Hino's response to this is: "We are close, so they do not have to notify us each time," (President Arakawa). Somehow one gets the feeling that Toyota is flexing its muscle. Partly due to overwhelming differences in power, Toyota affiliates and tie-up companies have not been the cause of any disharmony such as the kind we see between Toyota Motor and Toyota Sales. The affiliates, in particular, are, in their closeness to the parent company, trying to conform with Toyota Motor in establishing such specific policies as the rate of equipment investment and even in the way of thinking concerning the issue of internationalization. They have no other choice but to follow Toyota Motor. The fact that the vector is perfectly aligned means that Toyota can display great strength as a group unless the course of direction is mistaken. Thus far, at least it has taken the right course. However, we need further time to judge whether the present leadership is on the right course or not.

Toyota rapidly became a giant and gained strength. In the past several years, because the strength of GM and Ford is declining due to their delayed entry into small car production, Toyota's strength has become even more noticeable. But from the standpoint of Toyota, we could say that it was lucky that small cars were rediscovered thanks to the oil shock and that its competitors failed to enter early. In one sense Toyota became a world power through the grace of others.

This is the age in which free competition has become limited: "The exports of finished cars will become gradually restricted. We must work now in such a way that our successors 10 years from now will have no cause to admonish us" (Chairman Kato of Toyota Motor Sales). As it is, Toyota, in Japan, is criticized by the

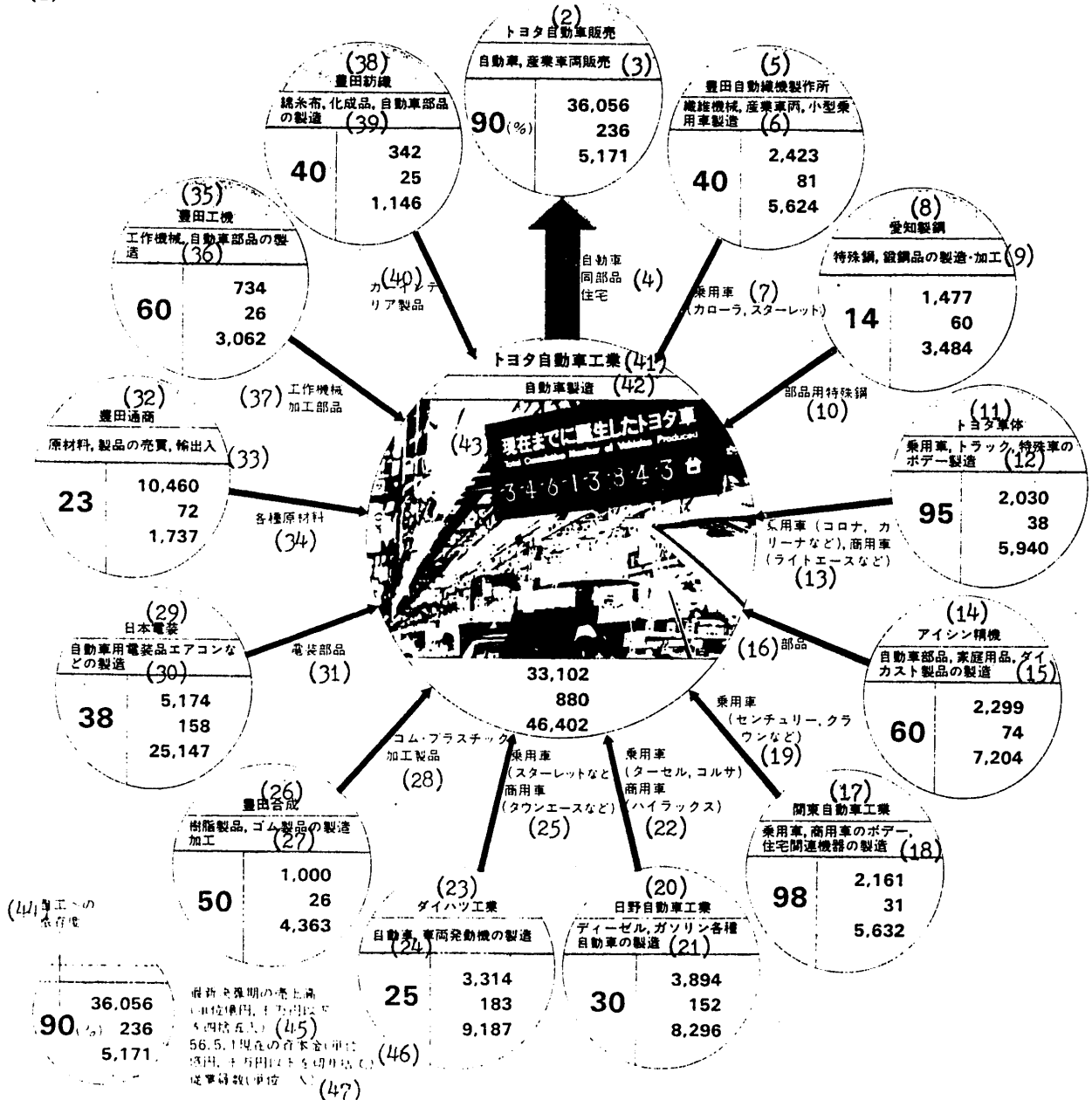
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economic circles for its failure to fulfill social responsibilities befitting a giant corporation. And now the international communities are demanding that Toyota take actions and responsibilities as a giant. This demand will intensify in the future.

Under this situation, the fact that Toyota Sales can have a different feel of things from Toyota Motor and can express its own opinion has a significant meaning. As President Seizo Ezaki of Toyoda Tsusho confesses--"We look at anybody who does business with us as our dear customer. We always adopt a lower posture wherever we go"--the position of a trading firm is quite different from that of a manufacturer who only purchases materials and produces merchandise. Furthermore, in terms of orientation internationally, Toyota Sales is a few steps ahead of Toyota Motor. If the "intimate relationship" is promoted through Toyota Motor applying pressure to Toyota Sales, or if Motor and Sales were to merge with the former taking the leadership, then, Toyota's "check and balance" would be lost. Depending on the degree and content of the intimate relationship, such a relationship can either benefit or damage the entire Toyota in the long run.

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(1) トヨタグループ各社とトヨタ自工の結合度



[Key on following page]

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Key:

- | | |
|--|---|
| <ol style="list-style-type: none"> 1. Degree of Unity Between Toyota Motor and Affiliates of the Toyota Group 2. Toyota Motor Sales Co Ltd 3. Sales of automobiles and industrial vehicles 4. Automobiles, auto parts, housing 5. Toyoda Automatic Loom Works, Ltd. 6. Manufacturing of textile machines, industrial vehicles, small automobiles 7. Automobiles (Collora, Starlet) 8. Aichi Steel Works, Ltd. 9. Manufacturing and processing of special steel and forged steel products 10. Special steel for auto parts 11. Toyota Auto Body Co Ltd 12. Manufacturing of bodies for automobiles, trucks and special vehicles 13. Automobiles (Corona, Carina, etc.) and commercial vehicles (Light Ace, etc.) 14. Aishin Seiki Co Ltd 15. Manufacturing of auto parts, home appliances, diecast products 16. Parts 17. Kanto Auto Works, Ltd 18. Manufacturing of bodies of automobiles and commercial vehicles, and housing related equipment 19. Automobiles (Century. Crown, etc.) 20. Hino Motors, Ltd. 21. Manufacturing of various diesel and gas automobiles 22. Automobiles (Tarcel [?], Corsa [?]); commercial vehicles (Hi-Luxe) | <ol style="list-style-type: none"> 23. Daihatsu Motor Co Ltd 24. Manufacturing of automobiles and vehicle generators 25. Automobiles (Starlet, etc.); commercial vehicles (Town Ace, etc.) 26. Toyoda Gosei [Synthetics] 27. Manufacturing and processing of resin and rubber products 28. Rubber and plastic processed products 29. Nippondenso Co Ltd 30. Manufacturing of automobile electrical parts, air conditioners, etc. 31. Electrical parts 32. Toyoda Tsusho Kaisha, Ltd 33. Sales and purchase, import and export of raw materials and products 34. Various raw materials 35. Toyoda Machine Works, Ltd 36. Manufacturing of machine tools and auto parts 37. Machine tools, processed parts 38. Toyoda Spinning & Weaving Co Ltd 39. Manufacturing of cotton fabric, synthetic products, and auto parts 40. Car interior products 41. Toyota Motor Co Ltd 42. Manufacturing of automobiles 43. Total cumulative Number of Vehicles Produced 44. Degree of dependency on Toyota Motor 45. Sales volume for the latest settlement period (unit: 100 million yen; rounded off to the nearest 100 million) 46. Capital as of May 1, 1981 (unit: 100 million yen; 10 million yen and under disregarded) 47. Number of employees (unit: person) |
|--|---|

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(1) トヨタ自工からグループ各社への役員の流れ

豊田自動織機製作所 (2)
 専 入江敏光 (3) 専 加藤誠之 (6)
 助 豊田英二 (4)
 助 斎藤尚一 (5)

トヨタ自動車販売 (7) 専 大島彌 (16)
 専 加藤誠之 (8) 専 神尾秀雄 (17)
 助 豊田章一郎 (9) 専 藤巻忠正 (18)
 助 大竹道 (10) 助 都築恵一 (19)
 助 神田新市 (11) 助 浦野了 (20)
 助 牧野功 (12) 助 荒島保 (21)
 専 斐瀬和孝 (13) 専 青木孝男 (22)
 専 林幹夫 (14) 専 豊田英二 (23)
 専 伊崎千春 (15) 専 黒田康一郎 (24)

安和製鋼 (25)
 社 坂田東三 (26)
 助 豊田英二 (27)
 専 斎藤尚一 (28)
 専 宮入潔 (29)
 助 高橋一郎 (30)

日本電装 (53)
 専 白井武明 (54) 専 福生清 (61)
 助 平野史 (55) 専 豊田章一郎 (62)
 助 戸田憲吾 (56) 助 鈴木喜 (63)
 助 臼井悟 (57) 専 高橋政春 (64)
 専 深津武利 (58) 助 今井豆 (65)
 専 杉野芳文 (59) 助 花井正八 (66)
 助 山中正 (60) 助 影山勇郎 (67)

豊田紡織 (68)
 専 大野耐一 (69)

関東自動車工業 (70)
 専 堀川達 (71)
 助 林田博臣 (72)
 専 小林透 (73)
 助 森田正俊 (74)
 専 豊田章一郎 (75)
 助 山本重信 (76)

豊田工機 (31)
 専 浅井重光 (32) 専 豊田英二 (33)

トヨタ車体 (34)
 専 藤本俊 (35) 専 岩崎正視 (41)
 専 大野重三 (36)
 専 松井一郎 (37)
 専 佐羽尾剛 (38)
 専 長谷川龍雄 (39)
 専 磯谷真二 (40)

豊田通商 (42)
 専 江崎誠三 (43) 専 中泉末雄 (46)
 専 佐藤俊雄 (44) 専 豊田英二 (47)
 専 小野目実 (45) 専 加藤誠之 (48)

アイシン精機 (49)
 専 小室武 (50) 専 斎藤尚一 (52)
 専 豊田英二 (51)

豊田合成 (77)
 専 大野耐一 (78) 専 山下伊三郎 (84)
 専 木村三郎 (79)
 専 鈴木栄三 (80)
 専 野澤弘 (81)
 助 根本正夫 (82)
 専 斎藤尚一 (83)

日野自動車工業 (85)
 助 佐久間晃 (86) 助 花井正八 (87)

ダイハツ工業 (88)
 専 大原康 (89) 専 岩崎正視 (94)
 専 江口友徳 (90)
 専 高橋淳二 (91)
 助 牧野明光 (92)
 専 安村鴻 (93)

(95) 専 会長 (96) 社 社長 (97) 助 副社長 専 専務
 (99) 専 常務 助 取締役 監 監査役
 (100) (101)

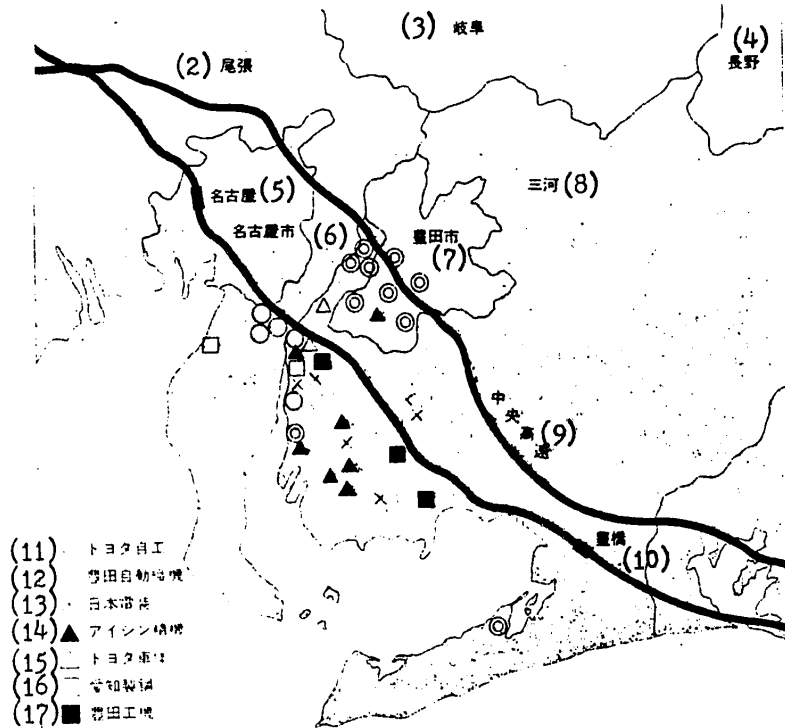
[Key on following page]

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Key:

- | | |
|--|--------------------------------------|
| 1. The flow of executives from
Toyota Motor to the affiliates | 51. (D) Eiji Toyoda |
| 2. Toyota Automatic Loom Works, Ltd | 52. (A) Shoichi Saito |
| 3. (E) Toshimitsu Irie | 53. Nippondenso Co Ltd |
| 4. (D) Eiji Toyoda | 54. (C) Takeaki Shirai |
| 5. (A) Shoichi Saito | 55. (P) Sakan Hirano |
| 6. (A) Masayuki Kato | 56. (V) Kengo Toda |
| 7. Toyota Motor Sales Co Ltd | 57. (E) Satoru Usui |
| 8. (C) Masayuki Kato | 58. (E) Taketoshi Fukatsu |
| 9. (P) Shoichiro Toyoda | 59. (M) Yoshifumi Sugino |
| 10. (V) Susumu Otake | 60. (M) Tadashi Yamanaka |
| 11. (V) Shin'ichi Kanda | 61. (M) Kiyoshi Inao |
| 12. (E) Isao Makino | 62. (D) Shoichiro Toyoda |
| 13. (E) Kozo Minowa | 63. (D) [Yoshi ?] Suzuki |
| 14. (M) Mikio Hayashi | 64. (D) Masaharu Takahashi |
| 15. (M) Chiharu Ino | 65. (D) Wataru Imai |
| 16. (M) Go Oshima | 66. (A) Shohachi Hanai |
| 17. (M) Hideo Kamio | 67. (A) Toshiro Kageyama |
| 18. (D) Gensei [?] Fujimaki | 68. Toyota Spinning & Weaving Co Ltd |
| 19. (D) Keiichi Tsuzuki | 69. (C) Taichi Ono |
| 20. (D) Ryo Urano | 70. Kanto Auto Works, Ltd |
| 21. (D) Tamotsu Arashima | 71. (C) Tatsu Inagawa |
| 22. (D) Takao Aoki | 72. (V) Hiroomi Hayashida |
| 23. (A) Eiji Toyoda | 73. (E) Toru Kobayashi |
| 24. (A) Keiichiro Kuroda | 74. (D) Masatoshi Morita |
| 25. Aichi Steel Works, Ltd | 75. (A) Shoichiro Toyoda |
| 26. (P) Tozo Yabuta | 76. (A) Shigenobu Yamamoto |
| 27. (D) Eiji Toyoda | 77. Toyota Gosei [Synthetics] |
| 28. (A) Shoichi Saito | 78. (C) Taichi Ono |
| 29. (A) Kiyoshi Miyairi | 79. (E) Saburo Kimura |
| 30. (A) Ichiro Takahashi | 80. (M) Eizo Suzuki |
| 31. Toyota Machine Works, Ltd | 81. (M) Horoshi Nozawa |
| 32. (P) Shigemitsu Asai | 82. (D) Masao Nemoto |
| 33. (D) Eiji Toyoda | 83. (A) Shoichi Saito |
| 34. Toyota Auto Body Co Ltd | 84. (A) Isaburo Yamashita |
| 35. (P) Shun Fujimoto | 85. Hino Motors Co Ltd |
| 36. (V) Kenso Ono | 86. (V) Akira Sakuma |
| 37. (E) Ichiro Matusi | 87. (D) Shohachi Hanai |
| 38. (E) Tsuyoshi Sawao | 88. Daihatsu Kogyo Co Ltd |
| 39. (D) Tatsuo Hasegawa | 89. (P) Sakae Ohara |
| 40. (D) Shinji Isotani | 90. (V) [Tomo---?] Eguchi |
| 41. (A) Masanori Iwasaki | 91. (E) Junji Takahashi |
| 42. Toyota Tsusho Kaisha, Ltd | 92. (D) Akemitsu Makino |
| 43. (P) Seizo Esaki | 93. (D) Ko Yasumura |
| 44. (E) Toshio Sato | 94. (A) Masanori Iwasaki |
| 45. (D) Mokuzane Ono | 95. (C) Chairman |
| 46. (D) Matsuo Nakaizumi | 96. (P) President |
| 47. (A) Eiji Toyoda | 97. (V) Vice-president |
| 48. (A) Masayuki Kato | 98. (E) Executive Director |
| 49. Aishin Seiki Co Ltd | 99. (M) Managing Director |
| 50. (E) Takeshi Komuro | 100. (D) Director |
| | 101. (A) Auditor |

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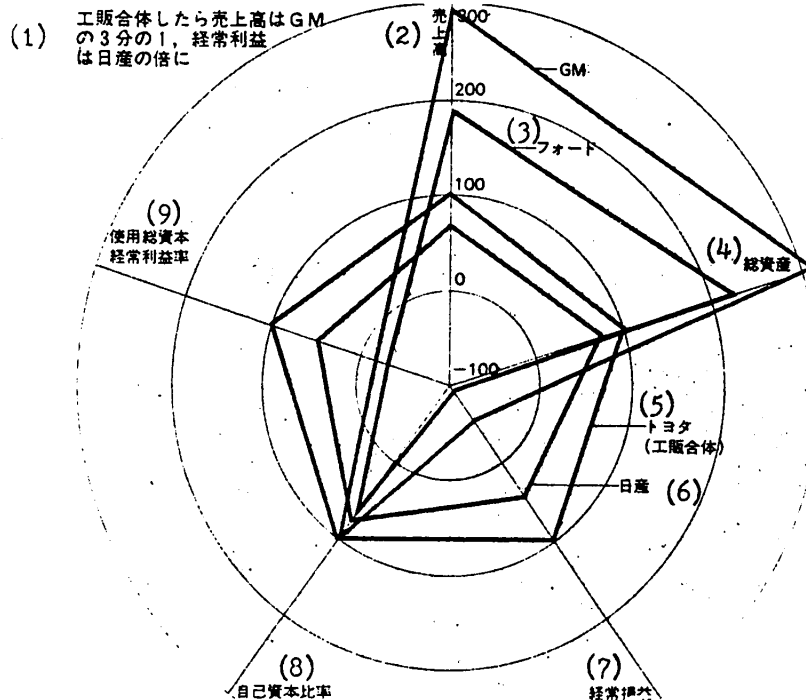
- (11) トヨタ自工
- (12) 豊田自動織機
- (13) 日本電装
- (14) ▲ アイシン精機
- (15) 〃 トヨタ車体
- (16) □ 愛知製鋼
- (17) ■ 豊田工業

Key:

- | | |
|---|--------------------------------------|
| 1. Location of the Plants of the Toyota Group | 9. Chuo Expressway |
| 2. Owari | 10. Toyohashi |
| 3. Gifu | 11. Toyota Motor Co Ltd |
| 4. Nagano | 12. Toyoda Automatic Loom Works, Ltd |
| 5. Nagoya | 13. Nippondenso Co Ltd |
| 6. Nagoya city | 14. Aishin Seiki Co Ltd |
| 7. Toyoda | 15. Toyota Auto Body Co Ltd |
| 8. Mikawa | 16. Aichi Steel Works, Ltd |
| | 17. Toyoda Machine Works, Ltd |

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(11) 工・販合併すれば...

仮にトヨタ自工とトヨタ自販が合併したら、その実力はどの程度のものになるだろうか。連結決算方式で自工、自販を合体させ、収益力や財務内容から、その実力を探ると—。

55年の実績（自工の6月期、自販の3月期を合体させたもの）では、売上高は4兆円大台にあと一步と迫る。日産自動車の2兆7300億円、新日本製鉄の2兆8400億円（いずれも55年3月期）に比べてもひときわ大きい。自工は車の生産で利益をあげ、自販はその販売でもうけている。自販はほかに自動車部品や潤滑油の販売でもかましている。このため、合体すると利益面では売り上げの場合以上に、自工単独より大きく増える。自工単独の経常利益でも2900億円というちょっとした大企業の売上高にも匹敵する水準だが、工・販合体の経常利益は実に4000億円にのぼる。自工、自販の決算期のズレがあるなどで、必ずしも両社が合体したときの実力をそのまま表しているとは言い切れないが、ともかく一般の想像を上回る利益水準になるのも確かだろう。

(10) 注1 日本企業は単独決算、米企業は連結決算255年の為替レートで円換算355年決算が対象
 工・販合体は自工6月、自販3月の決算、日産は3月、GM、フォードは12月

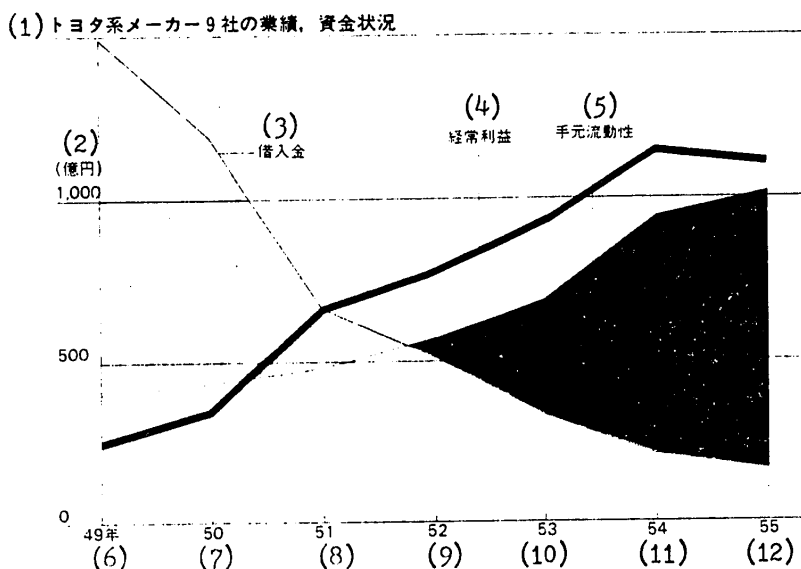
Key:

1. If Toyota Motor and Sales were to merge sales volume will reach 1/3 of that of GM; operating profits will double that of Nissan
2. Sales volume
3. Ford
4. Total assets
5. Toyota (Toyota Motor and Toyota Sales combined)
6. Nissan
7. Operating profit and loss
8. Ratio of equity capital
9. Total capital used; operating profit rate
10. Note: 1) Japanese enterprises are based on independent financial statement, U.S. enterprises on consolidated financial statement; 2) yen conversion based on 1980 exchange rate; 3) the figures are based on 1980 financial statement. The combined figures for Toyota Motor and Toyota Sales are based on June and March fiscal terms, respectively; Nissan is March; GM and Ford are based on December fiscal term.

[Key continued on following page]

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11. Should Toyota Motor and Toyota Sales Merge ---
 Suppose Toyota Motor and Toyota Sales were to merge, what would their combined strength be like. If we were to combine the two on the basis of consolidated financial reporting and look at the resulting earning ability and financial contents, it will be as follows:
 According to the actual results of 1980 (combining Motor's June and Sale's March fiscal terms), the sales volume was just short of 4 trillion yen mark. This is considerably larger than Nissan Motor's 2.73 trillion yen and Nippon Steel Corporation's 2.84 trillion yen (both based on fiscal term March 1980). Toyota Motor makes profit by producing automobiles, Toyota Sales by selling them. In addition, Toyota Sales makes profit by selling auto parts and lubricant oil. For this reason, if they were to merge, their profits will be greater than the sales, i.e., greater than if Toyota Motor were to do it alone. Toyota Motor's operating profits of 290 billion yen alone is equivalent to the sales volume of a relatively large enterprise, but the combined operating profits will indeed soar to 400 billion yen. Since there is a gap between the fiscal terms of the two companies, the figures do not necessarily reflect the actual ability of the two companies when they are merged; however, it is certain that their profit levels would be greater than what is generally expected.



Key:

- | | |
|--|----------|
| 1. Business performance and status of funds of 9 Toyota affiliates | 6. 1974 |
| 2. 100 million yen | 7. 1975 |
| 3. Loan | 8. 1976 |
| 4. Operating profits | 9. 1977 |
| 5. Liquidity | 10. 1978 |
| | 11. 1979 |
| | 12. 1980 |

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SCIENCE AND TECHNOLOGY

U.S.-SOVIET CONFRONTATION OVER YAMBURG PIPELINE PROJECT

Tokyo TOYO KEIZAI in Japanese No 4312, 1 Aug 81 pp 90-91

[Article by Susumu Ohashi, journal reporter]

[Text] Since agreement was reached at the Ottawa summit on strengthening the regulations of COCOM (Coordinating Committee for Export Control), the Japanese attitude toward the Soviet Union's Yamburg project has suddenly drawn attention.

The Yamburg project is the natural gas pipeline construction project which will stretch 5,000 kilometers from the Yamburg gas fields at the northern edge of western Siberia through the center of the Soviet Union and the countries of Eastern Europe to connect with Western Europe.

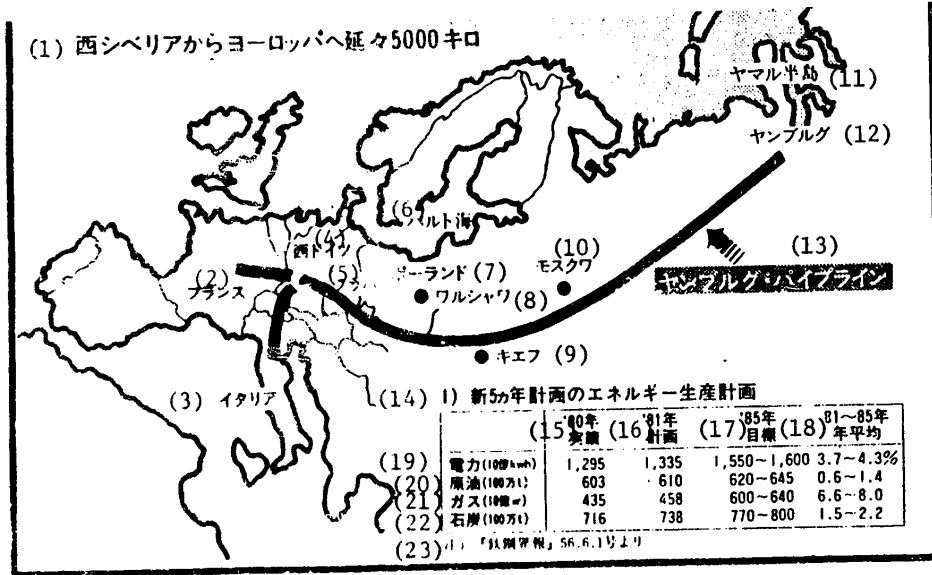
Centerpiece of 5-Year Plan

The announced project relies on the world's largest reserves of natural gas as an energy source. Under the 11th 5-year plan, it is scheduled for completion in 1985. (See table) The production goal for 1985 is 600-640 billion cubic meters of natural gas, an increase of 165-205 billion cubic meters over 1980. This increase will all come from western Siberia. The Yamburg project is the centerpiece, the key point of the 11th 5-year plan.

Extension of the pipeline from inside the Soviet Union to Eastern and Western Europe will alleviate energy problems in Eastern Europe and strengthen its ties with the Soviet Union. By supplying natural gas to West Germany and other West European countries, the Soviet Union will be able to raise funds for construction as well as obtaining foreign currency. At the same time, it intends to maintain relations with Western Europe by means of this natural gas.

The annual flow of natural gas through one pipeline (1,420 mm in diameter with a transport pressure of 75 km/cm²) is reported to be 28 billion cubic meters. If the planned amount of natural gas is produced, it will require six or seven pipelines. Some 12 million tons of pipe alone will be required. At present, 100 kilometers of pipe are being tested for pressure transport to increase transport efficiency. If this is successful, the amount of pipe required may be reduced. However, the experiments will take time and it has been estimated that the Yamburg project will probably be completed behind schedule, by 1988 or 1989 at the earliest.

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Key:

1. 5,000 Kilometers From Western Siberia to Europe
2. France
3. Italy
4. West Germany
5. Prague
6. Baltic Sea
7. Poland
8. Warsaw
9. Kiev
10. Moscow
11. Yamal Peninsula
12. Yamburg
13. Yamburg pipeline
14. Energy Production Plan for New 5-Year Plan
15. Actual results for 1980
16. Plan for 1981
17. Targets for 1985
18. Annual Average for 1981 to 1985
19. Electrical power (1 billion kilowatt hours)
20. Petroleum (1 million tons)
21. Gas (1 billion cubic meters)
22. Coal (1 million tons)
23. Note: data from "Steel World Report," 1 June 1981

In any case, the cost of construction--including pipe (large-diameter pipe), construction equipment, compressors, pipe-laying equipment, etc.--will come to \$13-\$15 billion. The West European countries will benefit by receiving 40 billion cubic meters of natural gas annually, so they have set credit guidelines and are participating actively in negotiations for the Yamburg project.

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Japanese Government Getting Nervous

However, the problem is that the West European countries do not have extra capacity to supply anything, even pipe. For example, part of the pipe used will be coated with polyethylene, for which the West European countries do not have the necessary technology and must depend on Japan for supply. For compressors and pipe-laying equipment, they will have to rely ultimately on companies like GE and Caterpillar in the United States. Success in the Yamburg project would be impossible if all machine and material purchases had to come from Western Europe.

Because of these circumstances, the Soviet Union is feeling out Japan on financial cooperation for \$3 billion in machine and material purchases for items such as pipe.

However, the Japanese (government and Export-Import Bank of Japan) are very nervous about the Yamburg project. This is because of deep concern for the U.S. sanctions against the Soviet Union enacted after the Soviet invasion of Afghanistan.

A compromise settlement was reached in the negotiation for large-diameter pipe sales to the Soviet Union on 10 July after a 6-month marathon negotiation, just before the Japanese negotiating team was to leave Moscow. On the Soviet side, the Import Bureau (of which the state import company is a subsidiary organization) of the Ministry of Foreign Trade wants the pipe no matter what. It came into conflict with the Foreign Exchange Bureau which checks over the financial conditions.

The Japanese side also had difficulty maneuvering because of conflicts between the steel industry which wanted to sell the pipe, the Export-Import Bank which insisted on the OECD interest guidelines (8 percent for 5 years), and the government which was extremely worried about the United States. These were the circumstances that caused the negotiations to take so long.

Ultimately, a bank loan from the Export-Import Bank was not used. The financial arrangements took the form of suppliers credit in which the private sector borrowed the funds and provided credit to the Soviet Union at 7.75 percent for 5 years. An agreement was reached for export of 750,000 tons of pipe. These terms were proposed in negotiations in Tokyo in June (the price, a little less than \$400 million for 750,000 tons, was settled at the end of April). The Soviets gave in to the Japanese demands just as time was running out.

Also, during this year's negotiations for large-diameter pipe, the Soviets revealed their desire to use part of the pipe shipped this year for the Yamburg project. On this point the Japanese Government and the Export-Import Bank held firm, and the Soviets quickly changed the destination of use to a different region. Yamburg is taboo to the Japanese.

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A Modern Version of "Fumie"

The Yamburg negotiations, centering on large-diameter pipe, will reach an important stage next year. This year's negotiations were just a preliminary skirmish. Japanese exports of large-diameter pipe to the Soviet Union are ordinarily 250,000 tons a quarter, or 1 million tons a year. This pace will probably be maintained next year and it is reported that 70 percent of this will be diverted to the Yamburg project. That will amount to 700,000 tons a year, or 3.5 million tons in 5 years.

Now, however, the OECD interest guidelines have been raised 2 percent to 10 percent. In the United States and Europe, this is less than the market levels of interest. However, the Japanese prime rate of 8.5 percent is well below the guideline. Therefore, exports to the Soviet Union using funds from the Export-Import Bank will be impossible.

Also, the adversary stance of the Reagan administration toward the Soviet Union is gaining momentum. We must expect that pressure will be exerted by the United States, directly and indirectly, on Japanese negotiations with the Soviets over the Yamburg project.

The Soviet Union feels strongly that it was roughly handled by the Japanese this year and will come for revenge next year. Japan's strength lies in the fact that the Yamburg project cannot be completed without Japanese cooperation. However, this weapon alone will not be enough in a direct clash with the Soviet Union.

It is impossible to satisfy one side without offending the other. The negotiations over the Yamburg project are likely to be a kind of loyalty test for the Japanese in this era of U.S.-Soviet confrontation.

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SCIENCE AND TECHNOLOGY

NEW DEVELOPMENTS IN BIOTECHNOLOGICAL INDUSTRY

Maruzen Oil Co

Tokyo NIHON KEIZAI SHIMBUN in Japanese 20 Jul 81 p 7

[Text] Maruzen Goes into Construction of Facilities for Biotechnology; Tie-up With American Company

The Maruzen Oil Company has decided to build a biotechnology research laboratory and manufacturing plant in collaboration with Berlinger-Mannheim USA (headquarters in New York City), a major U.S. pharmaceutical manufacturer, as a part of rebuilding its operations. The company has observed the growth of demand in industry for construction related to biotechnology and has begun working in this field to fully apply the engineering technology developed in its oil refinery construction.

A research laboratory for biotechnology must be equipped for strict conditions of air regulation, temperature, humidity, etc. Maruzen Oil will use its design and construction skills developed in building oil refineries in Matsuyama, Chiba, Sakai, etc, working together with its engineering subsidiary, Maruzen Engineering (headquarters in Tokyo), to take orders and construct facilities related to biotechnology. It will obtain all types of engineering information from Berlinger related to pharmaceutical production, the field of biotechnology that will be commercialized soon, and use it to increase its business capacity.

The size of order for each job is rather small at present, "in the 1-billion-yen range, including air regulation equipment," according to a Maruzen spokesman. However, once experience is gained with the building of a research laboratory, Maruzen believes that it will be able to take advantage of business related to plants and equipment generated by biotechnology research with a production scale estimated at 3 trillion yen.

Maruzen Oil will actively utilize its own sales network to market limited enzymes, used for laboratory testing of gene recombination, to prevent problems which could develop later. This enzyme performs the role of "scissors" in gene recombination. Maruzen has also begun import sales of other testing chemicals such as enhanced enzymes and nucleic acids from the U.S. genetic engineering companies, Bethesda and Gennex.

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The customers for these products are university medical departments and private industry research laboratories, precisely the institutions which might order biotechnology-related facilities. Maruzen is vigorously pushing a strategy which combines testing chemical sales and construction orders.

It has already obtained an unofficial order from Kawasaki Medical College (in Kurashiki, Okayama Prefecture) for two gene recombination laboratories and is conducting negotiations with other universities. In addition, it is also working hard to open markets for companies which are interested in biotechnology in such fields as pharmaceuticals, food products, and chemicals.

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Sumitomo Chemical Co

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 22 Jul 81 p 6

[Text] Chemicals, Fibers, Food Products; Sumitomo to Make Major Effort in Genetic Engineering; PIII Facilities To Be Completed Next Month; Special Drug for Pituitary Dwarfism--Domestic Production Research To Be Carried Out

Sumitomo Chemical Industry (Takeshi Tsuchikata, president) will complete installation of PIII experimental equipment for gene recombination in its Osaka manufacturing plant in August, greatly extending its involvement in genetic engineering. In the immediate future, Sumitomo will be conducting research and development in gene recombination, concentrating on the lymphoblast cell interferon (alpha type) technology obtained from the British firm Welcome [phonetic] last year. It is also planning to import a specific drug for pituitary dwarfism from the Kabi [phonetic] company of Sweden beginning in September, and eventually it intends to conduct research in this drug for domestic production.

As industrial interest in biotechnology grew, Sumitomo Chemical built a branch of its Bioscience Research Laboratory (located in Takashi, Takarazuka city, Hyogo Prefecture) in its Osaka plant, a plant specializing in fine chemicals (located in Kasuga Idenaka, Konohana-ku, Osaka) in summer 1975 and is carrying out research closely related to manufacturing operations. In addition, it has attempted to unify its research and development organization by such actions as transferring about 30 researchers from the medical and agricultural chemicals department this spring.

The PIII equipment was built under the strictest standards for private equipment. It is the same equipment used by leading companies in the genetic engineering field such as Mitsubishi Chemical Industries, Meiji Seika, and Aji no Moto. This shows the seriousness of Sumitomo Chemical's involvement in gene recombination.

The company obtained manufacturing technology for lymphoblast cell interferon last year from Welcome [phonetic] and carried out clinical tests through MITI. When the PIII facilities are completed, it will concentrate on this interferon gene recombination technology as its main theme for research and development.

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A specific medicine for pituitary dwarfism developed by the technology of the U.S. firm Genex is a human growth hormone made by recombination of colon bacillus genes. Sumitomo is planning to import this product in the near future and at the same time carry out research aimed at domestic production.

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Hayashibara Biochemical Laboratories

Tokyo NIHON KEIZAI SHIMBUN in Japanese 24 Jul 81 p 8

[Text] Hayashibara Ties Up With West German Aircraft Manufacturer; Interferon Refining Technology

Hayashibara Biochemical Laboratories, the largest manufacturer of interferon (headquarters in Okayama city; president, Takeshi Hayashibara; 1 million yen in capital), announced on the 23d a technological collaboration agreement with the West German aircraft manufacturer Messerschmitt, Borko [phonetic], Bromm (headquarters in Munich; president, Max Steubel) for the refining and separation of various physiologically active substances such as interferon.

Path Leading to Experiments in Space

Messerschmitt participated in the NASA space shuttle program through the intervention of the West German Government. It boasts a high level of technology in the refining of fine substances in outer space. Hayashibara began operating the world's largest interferon mass production facilities in January of this year, and Messerschmitt responded by proposing joint research and development in this field. The collaboration between these two companies is attracting a great deal of attention as an attempt to combine two of the most advanced technologies--aerospace engineering and biotechnology.

The collaboration involves refining and separation of various physiologically active substances such as interferon, mass produced by Hayashibara's unique hamster process (process of growing cells to be used inside the bodies of hamsters) using Messerschmitt's gravity-free space technology. Hayashibara is expecting this process to have the following advantages over the conventional refining process: 1) large reduction in cost, 2) great improvement in precision of separation.

On the basis of this collaboration, Hayashibara will submit samples of its products such as interferon, AHF (antihemophilic factor), and erithropoietine (erithropoiesis acceleration factor) to Messerschmitt. After repeated experiments on the ground, Messerschmitt will carry out actual experimental research in a space laboratory inside the NASA space shuttle.

Messerschmitt is known as the manufacturer of the high-performance (Messerschmitt" fighter aircraft during World War II. At present, about 60 percent of its total sales of 260 billion yen is accounted for by airplane and helicopter production. However, in recent years, the company has moved vigorously into the fields of aerospace technology and medical instruments and has a solid reputation for a superior technological development capability.

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Society for Plant Breeding Technology

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 28 Jul 81 p 1

[Text] Don't Be Late for the Seed Revolution--Research Association Established for Protection and Development of New Seed Products

There is a strong demand for scientific and technological development in such fields as biomass resources and genetic engineering which use plant survival mechanisms and energy to solve energy and food problems. The New Product Protection and Development Research Association (chief director, Tatsuzo Minakami, president of the Japan External Trade Organization) was formed as an organization to promote this type of research and development and protect the results of the research. The membership is composed of important companies from the food industry, agricultural and medical chemicals industry, and petrochemical industry, as well as Diet members, college professor, and lawyers. The association will work actively to study legal and technical problems related to the development of new plant products and disseminate information on systems of protection. This research association established a business office in the Toranomom area of Tokyo (Yuwa No 2 Toranomom Building, telephone number: (03)580-7525) on 1 August and began active operations. In the future, this organization will be incorporated for the purpose of becoming a promotional organization for the creative development of plant breeding technology, similar to the Invention Association organized under the Patent Law.

Resistance to Big Capital from Europe and the United States

Previous Japanese efforts to develop agricultural technology were mainly concentrated in the various testing centers of the Ministry of Agriculture and Forestry and the national universities, so this research was somewhat monopolized by the government. For this reason, the support system for private research and development was insufficient compared to that for industrial fields. Also, when conscientious farmers developed new products, there was no system to protect their rights. A situation continued to prevail in which the new products were soon cultivated by others without permission and the developer had difficulty in keeping his own operation going.

A desire to change this practice was generated by the Seed and Seedlings Law enacted in 1978. Efforts to disseminate information about this system were inadequate and it did not reach the point of assisting technological innovation for development of new products.

In contrast, a technological revolution known as biotechnology, technology using plant survival mechanisms to overcome the energy crisis, occurred in Europe and America. Advanced technologies such as gene recombination and cell fusion were brought into play, and competition for new product development grew. These developments have been called the "seed revolution."

Big capital moved into this seed development competition. The companies involved include not only multinational agricultural firms like Cargill, Continental Grain, Central Soya, DeKalb, Tate and Lyle, and Anderson-Clayton, but also firms like Dupont, Monsanto, Pfizer, Union Carbide, Upjohn, Royal Dutch Shell, and ITT.

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Because of this, a 10-year gap has developed between Japan and the United States and European countries in research and development of new plant types. The situation is said to be close to irreversible.

The new product development research association was established to resolve this crisis and eliminate the technological gap between our country and the United States and Europe. Along with promoting the development of plant breeding technology, the association wants to protect the research results, thus introducing a competitive principle similar to the patent into the field of plant development technology and to create a system in which the vitality of the private sector can be actively utilized.

The association is also looking into agricultural technology cooperation projects--for example, transferring advanced Japanese plant-breeding technology to the developing countries to help solve the North-South problem and resources problems.

The following firms are members of the association: Asahi Chemical Industry, Asahi Breweries, Iseki Agricultural Machinery Manufacturing, SB Food Products, AAP (research company), Kagome, Kikkoman, Kyowa Hakko Kogyo, Kirin Brewery, Kuraray, International Development Center, Computer Age, Suntory, Japan Steel, Three Bond, Dainippon Ink and Chemicals, Takara Shuzo, Takeda Chemical Industries, Teijin, Nippon Create, Nippon Microorganism Resource Laboratory, Furukawa Electric, Mitsui Toatsu Chemicals, Mitsubishi Chemical Industries, Yasuda Fire and Marine Insurance, Yomeishu Manufacturing, Hokkaido Sugar, Musashi Seed Farms. Observers include Sumitomo Bank, Mitsubishi Bank, and the 114th Bank.

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Yakult Honsha Co

Tokyo NIHON KEIZAI SHIMBUN in Japanese 30 Jul 81 p 9

[Text] Yakult Going Into Genetic Engineering in Earnest; Expansion of Central Research Laboratory with New Equipment Such As P3 Facilities; Personnel To Be Recruited Locally and Overseas

Yakult Honsha has decided to enter the genetic engineering field in earnest. The company plans to expand the facilities of its present Central Research Laboratory as early as next year. It will add research facilities for gene recombination (mass production of high value pharmaceuticals by combining human genes with other types of genes with high breeding strength such as colon bacillus genes) and greatly increase the number of personnel, including scouts. In this way, Yakult plans to assault the top level of Japanese industry in the field of adult diseases all at once with such items as anti-cancer agents and thrombus-dissolving agents. Some observers think the company is already developing some products using genetic engineering, and the entrance of Yakult is expected to stimulate genetic engineering competition in such fields as pharmaceuticals, food products, and chemicals.

Attempt at Quick Emergence in Pharmaceutical Field

Yakult Honsha used technology developed for fermented milk beverages to move into the pharmaceutical field in 1975. At present, it has progressed to the point of selling digestive enzymes, medicines for intestinal disorders, agents to strengthen blood vessel walls and arrest blood flow, and liver treatment medicines. It has

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built a Central Research Laboratory in Kunitachi city in the Tokyo metropolitan area, with a total floorspace of 5,000 square meters, and has built up an organization for pharmaceutical research and development. However, the company saw that recent progress in biotechnology was far ahead of its own technology and that its previous research capacity was inadequate, so it decided to embark on a major expansion of its Central Research Laboratory.

Next year work will begin on a new building with a floorspace of 6,600 square meters on the same lot as the present laboratory. It is scheduled for completion in 1983. The main item for the new laboratory is genetic engineering equipment. In addition to a P3 room (facilities to seal out microorganisms), which is indispensable for recombination of human genes, the expansion will include a DNA synthesis laboratory, an animal experiment laboratory, and a safety testing center. Total expenses will be about 3.2 billion yen.

In the field of genetic engineering, development is said to be difficult without superior personnel, so Yakult will step up its efforts to obtain talented people. There are about 50 biotechnology researchers in the Central Research Laboratory right now. The company plans to bring 10 to 20 researchers to Tokyo from its Nishi no Miya laboratory and to scout out first-class scientists for recruitment from Japan and abroad.

In addition, the company has recently begun working to improve the quality of its research personnel. For example, it has sent some of its people to study with Dr Keiro Itakura, a world authority in gene recombination, at the City of Hope Medical Center in the United States.

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TITANIUM INDUSTRY PLANNING FOR EXPANSION

Tokyo TOYO KEIZAI in Japanese No 4312, 1 Aug 81 pp 86-89

[Article by Yoshihiro Iinuma, journal reporter]

[Text] Titanium was discovered in 1790. France was in the midst of the revolution. The economist Adam Smith had just died in Great Britain. And in Japan, Sadanobu Matsudaira was carrying out his Kansei Reform.

The name titanium was taken from the titans in Greek mythology. Exactly as the name implies, titanium is an extremely strong metal. It is very light, with a specific gravity about half that of iron, but it is much stronger than steel. Its strength per unit of weight (relative strength) is the greatest of any metal. In addition, it has a resistance to corrosion 20 to 100 times greater than high-grade stainless steel. Furthermore, it is the fourth most abundant metal element, next to aluminum, iron, and magnesium. There is even some titanium, a little more than 10 percent, in the iron sand of Japan.

Titanium has all the desirable features of a metal. It is strong, light, and does not rust. However, it was late in getting extracted in a pure state. This success was not achieved until the start of the 20th century. Significant production began in 1948, when Dupont commercially produced 10 tons per year.

Subsequently, titanium was favored for such uses as engine parts for jet aircraft. The B-52 bomber, which boasts a speed capable of overtaking the Soviet MIG fighter, is equipped with eight engines having parts made of titanium. Titanium was raised by the cold war. Even today, 70 percent of the demand for titanium by the West is for aircraft, including private aircraft. Titanium has grown to be a "metal of the sky."

Moving to No 2 Position in the World Through Expanded Facilities

Surprisingly, Japan is now the top producer of titanium on the side of the West. Japan, in spite of its small military demand and weak aircraft industry, is superior to the United States in titanium production. When the refining process is finished, the molten titanium solidifies into a form known as sponge titanium. At present, there are only five countries which produce sponge titanium. The greatest amount is produced by the Soviet Union. The figures are never made public, so the actual situation cannot be known, but annual production capacity is estimated to be 40,000-45,000 tons.

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Next is Japan. There are three producers, the two largest being Osaka Titanium Manufacturing and Toho Titanium. Nippon Soda has also resumed production of titanium on a small scale. The present annual production capacity of 26,000 tons will grow to more than 31,000 tons by the end of the year.

America is third. It has three companies with a total annual capacity of a little more than 25,000 tons. In the West, only one other company, ICI of Great Britain, produces titanium, but its facilities are antiquated and it only produces 3,000 tons a year. The only other producing country is China which produces 1,500 to 3,000 tons a year with its inefficient facilities.

Japan emerged as the number one titanium producing country on the side of the West as the result of a rapid plant expansion in the last 2 years. Osaka Titanium and Toho Titanium have both completed a doubling of capacity. Osaka Titanium is also building another new plant and has announced bold medium-range plans for increasing its capacity to 50,000 tons a year. That would make this one company equal in capacity to the Soviet Union.

The two major Japanese companies expanded by responding alertly and actively to the tight worldwide supply and demand situation for titanium.

In 1978 the domestic and international demand for titanium began growing rapidly. In this period, a change was made from the previous Phantom military aircraft to the new types of fighter such as the F-15. For commercial aircraft, the demand accompanying the switch to air buses was greater than expected. Aircraft were made lighter to save energy, and the use of titanium for engine and fuselage parts grew rapidly.

Then in response to the Three-Mile Island accident, the use of titanium in nuclear power plants also increased. There was also a large demand for desalinization equipment.

In the midst of this growing demand, the export of sponge titanium from the Soviet Union, which made up more than half the supply to Europe and was even supplied to America, was suddenly cut off. The reason for the termination is shrouded in secrecy, but it was commonly reported that the Soviets had embarked on the building of an all-titanium submarine. This submarine is said to be an alpha-type submarine with a speed of 40 knots at 1,000 meters depth and is being built in response to advances in U.S. nuclear submarine detection capability.

Whether this is correct or not, the supply and demand for titanium in the West suddenly tightened up because of the cutoff of Soviet exports, and the result was a serious shortage. In extreme cases, the delivery dates for rolled titanium in the form of pipe and plate were delayed by as much as 2 years. It was reported that in the United States more than 100 military aircraft with completed fuselages had to be left outside waiting for engines. There was even a time when the government considered applying preferential procurement rights.

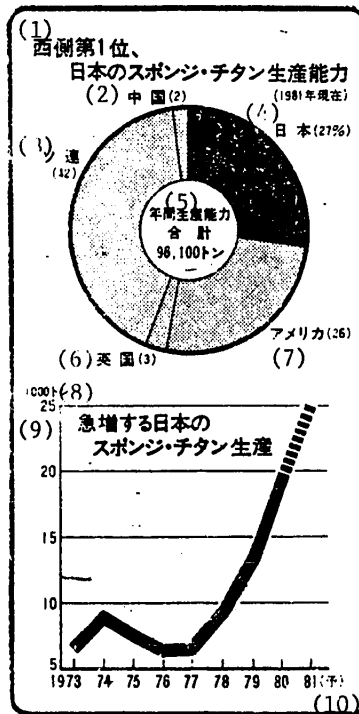
After the Soviet Union disappeared from the market, only Japan remained as a large-scale exporter of titanium. More than half of Japan's titanium production was exported in sponge form. Also, more than half of the rolled titanium was earmarked

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for export. The export rate, including indirect exports built into exported plants, was 90 percent.

Because of the deluge of demand on Japan, the export price of titanium more than doubled from the previous \$3.00 a pound to \$6.50 in 1980 and \$7.50 in 1981. Japan gained the power to determine prices on the sponge market and began to take on the role of a titanium supply base.

1. Japanese Sponge Titanium Production Capacity, No 1 on the Western Side (as of 1981)
2. China (2)
3. Soviet Union (42)
4. Japan (27 percent)
5. Total Annual Production Capacity: 96,100 tons
6. Great Britain (3)
7. American (26)
8. 1,000 tons
9. Rapid Growth of Japanese Sponge Titanium Production
10. (estimate)



Emergence of the B-1 Bomber and Strategic Stockpiling

As a result of the Japanese plant expansion, the supply and demand for titanium has come back into balance. Because of a temporary demand reaction and changes in France's nuclear power policy, the demand appears to be diminishing for the immediate future. However, most observers estimate that in the medium term, the annual growth will continue at about 10 percent. There will be an increased demand in non-aircraft applications such as condensing pipes in nuclear power plants, where titanium is necessary for safety.

Desalinization equipment requires the rustproof feature of titanium. Applications of titanium as a "metal of the sea" will expand in the future in such areas as heat exchangers for heat differential power plants, equipment for mining of manganese nodules, and ships.

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In other fields which require strength and lightness, for example, engine parts designed to make automobiles lighter and more durable, a large potential demand could open up.

The possibility for a large-scale demand has arisen in strategic materials. One example is the U.S. plan for the B-1 bomber and the FB-11. The B-1 program was temporarily abandoned by the Carter administration, but the Reagan administration has announced a policy of renewing this development. The initial plan called for the introduction of 250 B-1 bombers. Since each aircraft requires 200 tons of titanium, there will be a large effect on the market.

In addition, there is the American program for increased strategic stockpiling. Last year the goal for stockpiling of titanium was raised to 195,000 tons. There is a shortage of 160,000 tons in the present stockpile. This plan, like the B-1 plan, may fluctuate with the financial situation, but its development should be observed carefully.

U.S. and European Plans for Plant Expansion Very Cautious

In view of the situation, it is surprising that American and European titanium producers are being very cautious in their plans for expansion.

In America, an expansion of only 10 percent in annual capacity was carried out during the difficult period extending through last year. The only exception was the number three company, Olemett [phonetic], which doubled its capacity from 2,000 to 4,000 tons.

There are only two plans for new activity. One is the electrolysis plan of the Dow-Haumet [phonetic] company. This is a method to replace the conventional reduction method using manganese or sodium with one-step refining of titanium by electrolysis. Commercial production of 5,000 tons is targeted for 1984.

A third program is the international titanium program set up by the Japanese Ishizuka Laboratory in association with the Chinese American scientist Stephen Yi and others. Hiroshi Ishizuka of Ishizuka Laboratory could be called the father of titanium refining technology in Japan. After the war, Osaka Titanium and Toho Titanium began successively to produce titanium and, as an inventor of genius, his help was sought by the management of both companies.

The goal of the international titanium program is to build a 4,500-ton capacity sponge titanium plant in the state of Washington in the United States by 1982. Some believe that Mitsui and Co Ltd, which has a strong relationship with Ishizuka Laboratory, will lend its support to the project.

If these two plans are actually carried out, the U.S. capacity will grow to more than 40,000 tons.

In Europe the activity is much slower. The only project in Britain is a Deeside [phonetic] Titanium project to scrap and build from the obsolete ICI plant to create a plant operating at 5,000 tons a year. The PUK company of France and the Metal Gessellschaft [phonetic] of West Germany have announced a plan to build domestic

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plants with cooperative investment. However, there is no sign of these plans materializing yet.

It seems strange that a country with such a strongly independent spirit as France has depended for so long on the Soviet Union for a strategic material like titanium. This is an example of the complexity of European thinking.

The main reason that European and American firms are so cautious is that the titanium industry has been a very depressed industry until just recently. It is heavily influenced by the ups and downs of the aircraft industry. In America, ten companies have been reduced to three.

The titanium industry has received too many painful shocks from changes in U.S. Government policy such as the shift in strategic thinking from aircraft to missiles, the suspension of the SST development, and the termination of the B-1 program. Because of this, it is difficult for the industry to become enthusiastic even though the Reagan administration is calling for a military buildup.

Furthermore, the lifespan of administrations has been short in the United States in recent years. And each time the administration changes, there has been a tendency to advocate policies extremely different from those of the previous administration. Therefore, the titanium producers are carefully watching the development of the B-1 and stockpiling programs.

Another problem is the amount of investment required. Unlike the Japanese industry, which exports half of its production at the sponge stage, the American companies carry out complete production from sponge to rolled stock. The same scale of expansion at the sponge stage would mean a much greater overall expenditure.

In addition to everything else, there is the basic problem that American management is more afraid of long-term investment than the Japanese.

Becoming a World Supply Base of Titanium As Well As Steel

In this situation, the boldness of Japan alone stands out. In addition to the three titanium companies, Mitsubishi Metal is looking toward entering the sponge market with its own technology. It has already begun trial production of titanium products using metallurgical dust technology. It will probably proceed on the basis of the demand in companies within the Mitsubishi Group such as Mitsubishi Heavy Industries.

There is also vigorous growth at the rolling stage by such companies as Kobe Steel, Nippon Mining, and the Sumitomo Metal group.

It goes without saying that the Japanese practice of active investment is behind these developments. There is also competition developing between groups: the Sumitomo and Kobe Steel group (Osaka Titanium, Sumitomo Metal, Kobe Steel, etc), the Nissan and Mitsui group (Toho Titanium, Nippon Mining, Mitsui and Co, etc), and Mitsubishi, as it plans to enter the market.

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There is a great difference in strategic thinking between Japan and the United States. The Japanese titanium industry has developed on the basis of demand in general private industries such as petroleum and chemical plants and power generation rather than the aircraft industry. Because it has pioneered in titanium applications to compete with aluminum and copper alloys, 80 to 90 percent of Japanese rolled titanium is used for purposes other than aircraft.

Because of this, the concept of expanding applications through mass production and cost reduction has had a prominent place. One thing that especially deserves attention is the great influence exerted by the experience of the Japanese steel industry. The president of Osaka Titanium, which initiated the great expansion of facilities, is Yasufumi Doi, originally from Sumitomo Metal where he experienced the conquering of the world in steel. The titanium industry has been guided by the same thinking as the steel industry. The demand base was expanded by cost reduction. Stability of demand was secured by long-term contracts and a guarantee was provided to the user by maintaining excess supply capacity. The introduction of knowhow such as process control was promoted and a system was established for obtaining profit at 70 percent operation. Operational stability was secured for both maker and user by setting prices according to cost.

The size of general private demand varies greatly with price. The first seawater desalinization plant delivered to Saudi Arabia was built entirely of titanium, using 3,000 tons of sponge titanium. This was because titanium was inexpensive at the time. The production of the second plant began after the jump in price. It was seven times the size of the first plant but only the same amount of titanium was used and copper alloys were used as a substitute for the rest.

The export price of titanium is in the range of 3 million yen per ton. In a dual price structure, the domestic price is 2 million yen per ton, but this is still high. It is necessary to reduce this by 20 to 30 percent in order to expand the general private demand.

The present price level is abnormally high because of the recent stringency in supply and demand, but in the medium term, it will tend to decline. The two major Japanese companies are working to recover their aggressive investment at this high price and are preparing for the coming reduction.

The production of sponge titanium consumes 20,000 kilowatt hours of electricity per ton, more than required for aluminum. This is a disadvantage because of the high cost of electric power in Japan. In order to overcome these adverse conditions, the companies are devoting all their efforts to reducing the amount of power used.

With the exception only of steel, the Japanese raw materials industries have been growing weaker since the oil shock. If the titanium industry of Japan achieves a solid position as the world's supply base, it will be a very special case of industrial conditions.

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