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Japan Report

(FOUO 20/82)

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POLITICAL AND SOCIOLOGICAL

FACTORS AFFECTING SUZUKE REELECTION AS LDP PRESIDENT ANALYZED

Tokyo USHIO in Japanese Mar 82 pp 264-69

[Article by Takao Iwami, MAINICHI SHIMBUN reporter: "Suzuki Regime Agonizes Over Financial Reconstruction Without Tax Increase"]

[Text] Reports of Current Policies

Eventually Komoto will leave the cabinet due to disagreement with Suzuki over economic management policy, which will lead to a political upheaval.

Fukuda Predicts a Major Upheaval

In contrast to last year, which passed peacefully without any major dispute, the forecast of "cloudiness followed by a rainstorm" seems more appropriate for 1982. Since early this year, ominous rumors of a "major upheaval" have been circulating here and there in political circles, which is unusual.

One of the Liberal Democratic Party's (LDP) top leaders, former Prime Minister Fukuda, referring to the upheaval theory said (on 13 January at a general meeting of the Fukuda faction): "A storm is brewing this year. There are rumbles in the skies and we should refrain from rash and impulsive actions. Rather, we should carefully watch the movements in the skies and act accordingly." Meanwhile, the leaders of the various opposition parties are also predicting a major political upheaval. The lineup of sides has gradually become clear. It is safe to say that forces critical of Suzuki within the LDP (the Fukuda, Komoto and Nakasone factions are still observing the situation) and the majority of the opposition parties are anticipating a major turmoil, while the Suzuki-Tanaka coalition hopes to pacify any rumblings.

The outlook among Fukuda faction cadres is that "a major upheaval appears likely, but so far no one is personally trying to ignite a fire. The reason is that there are so many uncertain factors. Nevertheless, conditions are such that, once a fire is lit, it could lead to a major conflagration." And, despite refutations by the Tanaka faction cadres that "although a major upheaval would be unavoidable if the prime minister were to stumble over administrative reform or financial and political policy issues, the prime minister is an old campaigner who would probably ride out the storm;

historically, there has never been a major upheaval during the Year of the Dog," there appear signs of uncertainty. Both sides recognize that the political situation is not lacking in disruptive factors. Moreover, the complexity of the political scene in 1982 probably is due to the fact that a policy confrontation has been joined by a political struggle. It is not merely a factional strife over the power of rule: an issue of policy choice centering on economic management is also closely involved.

First, a look at the makeup of the political struggle shows a gradually developing split into two forces within the LDP over Prime Minister Suzuki's reelection. Suzuki's term of office will expire in late November and he is of course seeking reelection with support from the Tanaka faction.

Prior to the party and cabinet reshuffle at the end of November last year, the relationship between the Tanaka faction, led by former Prime Minister Tanaka, and Suzuki was not exactly smooth. The reason was that in order to keep a balance with the Tanaka-Fukuda forces and maintain equilibrium between Suzuki, Tanaka and Fukuda forces, Suzuki tried to stay neither too close nor too distant from Tanaka. Nor was Tanaka very energetic in his support of Suzuki's reelection.

However, Tanaka needs a stable government and party leadership structure under his control in order to overcome the crisis he faces in the Lockheed trials. On the other hand, Suzuki believes that the full support of the Tanaka faction--the largest LDP faction--is indispensable for his own reelection. As a result, the interests of Suzuki and Tanaka are in complete agreement and the outcome was the appointment of Nikaido as secretary general, as well as the appointments to the party's top positions in favor of the Tanaka faction under Nikaido's leadership. The lineup in preparation for the reelection centering on the Suzuki-Tanaka forces has thus been boldly consolidated.

Of course, the balance between the Suzuki, Tanaka and Fukuda factions has been eroding. The critical posture of the Fukuda faction toward Suzuki has intensified since the November cabinet reshuffle and portends trouble to the point where Fukuda has predicted "a major upheaval." However, the Fukuda forces are clearly no match for the Suzuki-Tanaka coalition from the standpoint of numbers. While the competitive strength of the Tanaka faction in political struggles has already been proven and Suzuki's reelection appears to be on track, it is not that simple. There are several factors which may impede his reelections.

Suzuki Reelection Not On Track

First, the direction of the Nakasone and Komoto factions and the Nakagawa group which follow the three major factions--the Suzuki, Tanaka and Fukuda factions--remains to be seen. Nakasone (Administrative Control Agency director), Komoto (Economic Planning Agency director) and Nakagawa (Science and Technology Agency director) were all reappointed in the November reshuffle and they are thus tied down to the cabinet. Especially Nakasone, who is in charge of promoting administrative reform, has been rendered immobile. If Nakasone

and Komoto pass up the party presidential election late this year, they might have to forfeit their chances in the presidential race for good.

Already a group of new leaders, around 60 years of age, have their sights set on the "second next presidential race," and the view is that after next year there will inevitably be an increasing tendency to shelve Nakagawa.

Especially for Komoto (70 years old), this is the last chance in terms of his age, and a challenge of Suzuki by him this year is considered to be a strong possibility. Komoto's greatest strength lies in his outstanding party support. The breakdown of the approximately 1.1 million registered party members is reported to be as follows: Komoto faction, 400,000; Tanaka faction, 300,000; Suzuki faction, 200,000; Fukuda faction, 100,000; and Nakasone faction, 100,000. The party presidential primary, in which the entire party membership participates, has been weakened by the recent structural reform which stipulates that: 1) a full election will not be held if there are less than three candidates, in which case the party president will be elected by party Diet members; 2) a candidate requires endorsement by 50 or more Diet members. The Komoto faction thus has few opportunities to utilize its superiority in numbers, because at present it is difficult to hypothesize a case where four or more candidates endorsed by 50 or more Diet members can be fielded.

However, hypothetically speaking, if Suzuki, Fukuda, Nakasone and Komoto were to run, Komoto would compete with Suzuki for supremacy in the primary. It is certain that the Komoto faction by its sheer numbers would exert no small influence on a presidential election limited to Diet members. If a unified candidate is fielded by forces seeking to prevent Suzuki's reelection and it results in a "Suzuki versus Komoto" race, Suzuki could not afford to be optimistic, depending on the circumstances surrounding the presidential election.

Second, there is the shadow cast on a Suzuki reelection by the Lockheed case. Of course, Suzuki's reelection is planned "without Tanaka," and Tanaka is gradually being driven to the wall by the Lockheed affair. There is strong conjecture that the ruling on Tanaka in the first trial (Marubeni conduit case) will be delayed until after the party presidential election, but the decision on the bribery recipients through the All-Japan Airways pipeline (Tomizaburo Hashimoto and Takayuki Sato) is scheduled for this spring, while the prosecutor's case against Tanaka will be started around this summer. In each case, political circles will no doubt be agog with excitement concerning "Tanaka's role in the Lockheed scandal," and Suzuki, who is supported by Tanaka, will suffer a decline in his image. It should cast a considerable burden on his preparations for reelection.

The third factor is Suzuki's faux pas regarding policy matters, and this is inevitable as we will explain later, albeit a matter of difference in degree. While there have sometimes been severe years both externally and domestically Suzuki's inflexible "politics of peace" will probably show various signs of unravelling. This will provide opportunities for attack by forces seeking to stop Suzuki.

However, this doesn't mean that the "Suzuki-Tanaka" forces, who are adroit fighters, will observe this situation from the sidelines. Late last year, they made an initial attempt to contain the situation by spreading news of "a cabinet dissolution within the year, plus a general election." Ordinarily, a so-called "dissolution threat" is used by a prime minister as his strongest weapon in manipulating the political situation, but on this occasion the news was spread by the Tanaka faction, which is unusual.

The opposition camp was the first to react to the news. The Japan Socialist Party (JSP) and other parties commenced election preparations, albeit from a prone position. One opposition cadre (secretary general of the Yamaguchi branch of the New Liberal Club) even revised the slogan of "a decisive political showdown in 1983" to publicly proclaim "a decisive political showdown in 1982." The view was seriously expressed that "the election will be disadvantageous to the LDP after Tanaka is indicted in the first trial. A cabinet dissolution will therefore not be possible for some time. For this reason, chances are strong for a dissolution within the year--that is, immediately before or after the LDP presidential election in November."

Meanwhile, an opposing view has been expressed: "Chances are extremely small for a dissolution within the year. There are some in the Fukuda faction who say they will not permit a dissolution and will force a change in government. The possibility of a government change is greater."

In any case, memories are still fresh of the nightmarish joint Upper and Lower House elections the year before last. The spectacular feat of the LDP in turning disaster (intraparty strife and Ohira's sudden demise) into fortune by tripping up the opposition was reportedly schemed by Tanaka, and the political world is wrapped in a kind of fear that "one can never tell what Tanaka might be up to." Therefore, the threat of a cabinet dissolution did have an effect. Moreover, in addition to the reason that a Tanaka conviction would be disadvantageous to the LDP, it is inferred that, if the stop-Suzuki forces should start to move, they would be crushed by a cabinet dissolution. Therefore, the dissolution threat has added realistic significance.

Regarding the dissolution theory, Fukuda stated during his Manila visit (on 17 January): "I believe there will not be any dissolution. There will be various changes in the political situation during the latter half of this year. I don't know exactly how it will change, but there won't be any dissolution, regardless of the nature of the Tanaka court case. It will not be necessary. The LDP holds the power of dissolution. As far as an LDP victory in the election is concerned, it is not clear at this point." He appears resolute in ruling out any dissolution, but his statement that "the LDP holds the power of dissolution" is interesting. Perhaps he meant that he will not leave any dissolution up to the Tanaka faction.

Three days later, on 20 January, Secretary General Nikaido addressed a joint national convention of the LDP's women and youth divisions. He tentatively denied the dissolution theory, saying: "The newspapers are writing about a dissolution in the fall, but the LDP's mission is rather to rack its brains to fulfill its responsibility (to cope with such difficult issues as the

removal of trade frictions)." This probably stemmed from a sense of caution that if the Tanaka faction persists in its forceful tactics at this time, then intraparty elements might be pushed into the anti-Tanaka camp. In any case, the statements by Fukuda and Nikaido on the cabinet dissolution could be interpreted as "light jabs made in the first round."

There is no doubt that with each successive round the exchanges between the two sides will heat up. Unforeseen situations could appear in succession and, while the party presidential primary might be sidetracked, it would be increasingly difficult to hypothesize a smooth Suzuki reelection without a rival candidate.

It is difficult to predict whether the rival candidate will be Komoto, Nakasone or Fukuda himself. It is unlikely that a new leader will suddenly appear, but is cannot be entirely ruled out. In any case, after next spring when the next fiscal budget is established, the tension in political circles will rise, centering on the fate of the Suzuki reelection. One can also expect two or three rumbles of a cabinet dissolution.

Resignations by Komoto and Nakasone Possible

The major reason for the Fukuda faction's view that a Suzuki reelection is in jeopardy is that it sees Suzuki with his back to the wall regarding policy matters. In a speech in Tokyo on 13 January, Fukuda made the following forecast: "If the FY-81 budget should show a broad revenue shortfall, it will directly become a political issue on the basis of economic mismanagement. This will develop into an issue of political concern."

Chairman Takeiiri of Komeito also stated (at the party Central Executive Committee meeting on 11 January): "This year will be a crucial year with a huge load of issues, including trade friction, administrative reform, the treatment of an unbalanced budget and the direction of the Lockheed case. Particularly regarding economic policy, there is concern that there may be a revenue shortfall between May and July, and a potential political upheaval."

As the first example of Suzuki's mismanagement, the revenue shortfall problem has already been pointed out by opposition parties. It is a serious problem which Suzuki cannot consider lightly.

That is, the tax revenue in FY-81 slowed down because of the business recession--especially the stagnation in domestic demand. Even when taking into consideration a future business recovery and full corporate tax revenues in the March accounting settlement, there is a strong possibility that an annual revenue shortfall of some 1 trillion yen is unavoidable. The supplementary issuance of 375 billion yen worth of deficit national bonds late last year as an emergency measure for the supplemental budget has just been subjected to severe criticism as a violation of Suzuki's public commitment. An additional shortfall of approximately 600 billion yen is said to be likely. If this is true, his political responsibility for a "misjudged forecast" will immediately become an issue.

There are rumors that the crisis will be overcome through the resignation of Finance Minister Watanabe, but that will certainly not resolve the issue. Moreover, there is a strong possibility that the tax revenue for FY-82 will fall considerably short of the government's forecast. If the forecasts for both fiscal budgets prove to be in error, the distrust of Suzuki's economic management will surface and the formation of his "financial reconstruction without a tax increase," on which he has staked his political life, will be shaken.

There was a strong premonition of such a turn of events on 20 January during the debate on tax reduction at the government-opposition liaison conference. Excerpts are given here as follows:

Political and Financial Research Council Chairman Hashimoto: "The lowering of income taxes has recently become a hot topic and the question is beginning to be raised among those involved in administrative reform whether administrative reform should be considered 'secondary' or whether more emphasis should be given to the improvement of the economy. The inference here is perhaps to anticipate moves by the opposition."

Prime Minister Suzuki: "No matter how difficult they may be, administrative reform and financial reconstruction are national tasks. If we lose this opportunity, they will become impossible to handle. We cannot afford to pass up this opportunity. In such a situation, it makes sense to consider how we can create an atmosphere conducive to tax reduction, but it would not do to let tax reduction slow down administrative reform."

Economic Planning Agency Director Komoto: "At his press conference in Ise, the prime minister used the apt phrase (regarding tax cuts): 'when prospects for administrative reform and financial reconstruction become definite.' I believe it is better to say 'when their prospects become certain' rather than to say 'we will not reduce taxes until administrative reform is completed.'"

Suzuki: "In any case, the FY-82 budget draft is a joint compilation resulting from coordinated efforts by the government and the oppostion. Therefore, any tampering (revisions for tax reduction purposes) is absolutely out of the question."

Komoto: "If so, ways to increase annual revenues can be found."

In a speech on the same day, Komoto said: "In Japan's tax structure, there is a lack of balance between direct taxes and indirect taxes. The time has come to improve the balance between the two." He thus clarified his stand that a tax increase through indirect taxes should be considered as quickly as possible in order to build a base for income tax reduction. In other words, Komoto's target is an expanded economy from the standpoint of improving business conditions, and he advocates a tax reduction policy in conjunction eith large-scale indirect taxes. If this is difficult, he says, there is no alternative except further the period of financial reconstruction.

On the other hand, Suzuki has made a public commitment for "a financial reconstruction without a tax increase," and he puts a time limit on the

reconstruction period "until FY-84." He has thus adopted the line of a tight economic policy. If he accepts Komoto's contention, Suzuki must be prepared to renege on his public pledge thus putting himself in a dilemma.

Moreover, the five opposition parties and four labor organizations have merged in a joint struggle this year for the first time regarding a 1-trillion-yen tax cut, and they are taking an unprecedentedly strong stand. They appear likely to present an ultimatum, demanding the promise of a drastic tax cut in FY-83, if not in FY-82. As far as the Komoto line is concerned, there is room for adjustment with the opposition's demand, but is is unacceptable to Suzuki, who gives top priority to administrative reform. The opposition would probably attack this intracabinet confrontation as soon as the Diet reopens, and Suzuki might find himself in a quandary.

There is also spreading specualtion within the LDP regarding the Komoto statement that "although they may not immediately commence anti-Suzuki moves, there are people who are so inclined. If the budget for the next fiscal year is accepted, the political situation will also change drastically. The statement was therefore intended to clarify the divergence in the policy line in preparation for such a change." There are not a few who believe that Komoto will eventually leave the cabinet, citing the disunity over economic management as the reason, and that this will serve to ignite the political situtation. It might be said that Komoto holds an important key which could sway the political trend.

The annual revenue shortfall, the policy confrontation between Suzuki and Komoto over a tax cut and the extraordinary administrative investigation hearings are weighing heavily on Suzuki's shoulders. The extraordinary hearings committee, in its reply last summer, appeared ready to demand that Suzuki "reduce taxes, using cuts in annual expenditures as the base, instead of raising taxes and extending the period of financial reconstruction." From the committee's standpoint, such a reply would be consistent with the funadmental concept of essential administrative reform. But to Suzuki it would be close to an impossible task. It is clearly beyond Suzuki's political power. Thus his confrontation with Chairman Doko will become further aggravated. At the same time, the worst possible situation, Doko's resignation as well as Nakasone's resignation, could arise.

There is more. How to cope with trade friction and the issue of rising defense spending. Japan-U.S. relations could become stormy with a single faux pas. Does Suzuki's diplomacy have the ability to overcome these issues? Literally, "a year of tribulation" awaits Suzuki, who has somehow adroitly managed to survive through his "politics of peace," and Tanaka, who has supported him from behind the scenes.

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MILITARY

LDP EYEING MILITARY SATELLITE

OW121355 Tokyo MAINICHI SHIMBUN in Japanese 10 Mar 82 Morning Edition p 2

["Reporter's Box" column: "'Reconnaissance Satellite' Plan Launched"]

[Text] A plan to launch a reconnaissance satellite of Japan's own for military use is under debate in the Liberal Democratic Party. In his so-called theory of national defense at sea, Prime Minister Suzuki calls for arming the country with spines like a hedgehog and repelling external enemies at the water's edge. The satellite plan is, so to speak, to serve as the hedgehog's eye and help discern the accurate military situation from space.

The plan was advocated by Taro Nakayama, who recently assumed the post of chairman of the Liberal Democratic Party's Special Committee on Space Development. Nakayama, formerly director general of the prime minister's office, who touched off a criticism of the Japanese Academic Council, appears to aspire to take the lead of scientists in having a crack at space development.

If the satellite launching plan materializes, Japan will become the third country to possess a "security satellite" after the United States and the Soviet Union. The photo reconnaissance satellite is designed to monitor the Soviet military situation in the Far East by photography. Japan is getting information on Soviet military deployment to the four northern islands from U.S. satellites: But, in case of emergency, borrowed data will not do. If Japan possesses its own satellite, it will be possible to see the development of the situation moment by moment, and even identify the license plates of cars. Hence, Nakayama stresses, "to Japan which arms itself solely for self-defense, the satellite is quite appropriate, in that it will help prevent a war."

The question is: Whether to build it using Japanese technology or to seek U.S. technology? Recently Nakayama visited the United States as a member of the Ezaki mission. During this visit, he consulted with U.S. officials concerned, who rather asked Japan to provide more of its technology for space development in the United States.

It costs about 20 billion yen to launch a satellite, equivalent to the price of two F-15's. At a time when Diet proceedings get entangled over funding for requipping a F-4 phantom on a trial basis, one wonders how this idea of launching a security satellite can possibly materialize. However, Nakayama himself was dead serious when he said, "If we can get U.S. technical cooperation, it will help reduce Japan's trade surplus." He is scheduled to leave for Europe on 12 March as a member of a Japanese mission to find ways of easing trade friction. Will the Diet approve this scientific Dietman's proposal, busy as he is with data control, using personal computers installed in the Dietmen's hall? (Hiroshi)

CSO: 4120/199

ECONOMIC

'ASAHI' ON U.S. CALL FOR OPENING JAPAN'S MARKETS

OW131119 Tokyo ASAHI EVENING NEWS in English 12 Mar 82 p 5

[ASAHI SHIMBUN 11 March Editorial: "U.S.-Japan Trade"]

[Text] The position of the U.S. Government on the "opening of the Japanese market" has been made very much clearer in the hearings that have been held since the beginning of this month in the U.S. Congress and in the meetings of the U.S.-Japan Trade Subcommittee in Tokyo on 9 and 10 March.

The U.S. undersecretary of commerce, Lionel Olmer, told the public hearings in Washington that the closed nature of the Japanese market is a natural consequence of the relationship between Japanese Government and industry, a relationship that results in non-tariff barriers that encourage and protect domestic industries.

The deputy trade representative, David MacDonald, said in the Tokyo meetings that the world believes that the Japanese Government acts to restrict imports. He said that the U.S. expects to see imports of soda ash, paper and pulp, and medical equipment to Japan increase. He went on to say that definite policies should be presented by Japan.

Both the United States and Japan are unhappy about the growing differences in their economic relations. The solution of these differences requires a calm response. Japan should begin to review, as soon as possible, its restrictions on imports and those aspects of its economic system that are perceived as resistant to foreign penetration. Though it may be possible to create an environment more conducive to the activities of foreign enterprises here and to imports, it will be quite difficult to take the "dramatic steps" that the U.S. side expects.

The Trade Subcommittee has decided to hold working level discussions on the issue of import restrictions on 22 agricultural products from next month. In October, consultations will be opened to decide import levels for beef and orange juice. Japan must put its energies into developing a competitive agricultural sector and should try to eliminate import restrictions as far as is possible.

But it must be said that all the restrictions cannot be removed at a stroke, in the manner hoped for by the United States. Agriculture in every country, including the United States, is to some extent protected by governmental policies, and it cannot be treated in the same way as other sectors. So it is important that there should be a place where the experts of each side can thrash these matters out. If the United States is to be made to understand the situation of Japanese agriculture and the efforts that are being made to open the door in this sector, frank explanations have to be given.

The U.S. Commerce Department regards a variety of matters as falling in the category of non-tariff barriers, extending from government monopolies such as that on tobacco to government-assisted projects, activities resembling cartels and even preconceptions of the inferiority of foreign products. These complaints are not all off the mark. For example, Japan should reexamine its government monopoly on tobacco so that imports of foreign tobacco products can grow. Policies for depressed industries and the distribution sector should be pursued in a manner that does not encourage allegations that foreign products are being kept out. Abuses of administrative guidance should be scrupulously controlled in the supervision of the financial, securities and insurance industries.

However, several assertions have been made during the hearings in the U.S. Congress that are based on the mistaken assumption that American standards are standards for other nations as well. Japan must respond to the U.S. demands, but inasmuch as our societies differ in ways that cannot be changed, it is reasonable that certain demands should be rejected.

A domineering attitude toward Japan can be seen in the U.S. Congress, and one-sided pressure on Japan risks arousing anti-American sentiments here. We hope that the U.S. Government recognizes this and acts accordingly.

Arthus Dunkel, director-general of the General Agreement on Tariffs and Trade (GATT), criticized in a recent speech the tendency in Europe and the United States to blame the economic recession on Japan. Dunkel said that "the only permanent solution to the so-called 'Japanese problem' is for the Western economies to raise their productivity to Japanese levels, to accept the challenge." We hope that the Reagan administration listens to these arguments and shows itself more willing to check the reciprocity legislation that is before the U.S. Congress.

CSO: 4120/195

ECONOMIC

AUTOMOBILE PARTS INDUSTRY ACTIVITIES REPORTED

Dull Business, Fierce Competition

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 1 Jan 82 p 12

[Text] The auto parts industry predicts that the 1982 domestic and overseas automobile sales will be about the level of 1981. This forecast is based on the likelihood that the self-imposed export restrictions to the United States will continue in effect into 1982 and that pressure from the EC countries for similar "self-control" will increase. The domestic sales outlook is bleak as well. If there is growth in automobile sales, there will be no increase in orders from finished car manufacturers to the parts makers. It is expected that 1982 will be even more severe than 1981. "When the auto industry was in a high-growth stage, cutting costs by increasing production was possible; in a low-growth phase, effecting cost reductions is quite difficult. In 1982, a business climate even more stringent than 1981 is anticipated, and the parts makers must follow a policy of further belt tightening." (Japan Automobile Parts Industry Association Chairman Shogo Tsuru) The industry, therefore, is calling for extraordinary entrepreneurial efforts.

The biggest reason is that when the finished car manufacturers' production volume is decreased, unless there is efficient production, the merchandise produced will be expensive and the profit base will be lost. It is also fully anticipated that the cost of materials will rise in 1982, and there is a good possibility that, sandwiched in between the cost-down demand from the finished car manufacturers and the rise in the cost of materials, the parts makers' anticipated profits will be lost altogether. Thus, many auto parts makers are considering replacing their machines even though amortization is many years away, if there is efficient equipment to be had. It appears, therefore, that investment will exceed the 1981 figure.

Overseas expansion in the sense of new market development is also likely to be emphasized. This is in response to the southeast Asian countries; move to increase their domestic auto production, as well as an attempt to expand auto parts sales to the United States and developed countries of Europe. "The current state of Japanese business--especially the auto parts business--is characterized by a relatively low ratio of export. This must be given a new turn." (Kinugawa Rubber Industry President: Shojiro Fujita) This view reflects the parts companies' plans to put their overseas strategies into action

in 1982. Speaking of overseas expansion, subsidiary production in the United States is likely to grow in 1982. Overseas production programs by Honda Motor Co., Ltd. and Nissan Motor Co., Ltd. are about to commence. The parts makers that had been shying away from a decision must seriously consider this alternative.

There are many auto parts makers that cannot establish an overseas base because of their business scale and they will most likely try to cultivate either new areas of operation or new products. Of course, the major research and development sectors capable of overseas expansion are planning considerable investment input. Needless to say, they will seek to develop new products that conform to the requirement of less weight put forth by the automobile manufacturers.

Parts makers will try to survive a tougher 1982 with (1) operational rationalization, (2) overseas strategy, and (3) new products development. It is quite probable that as one way to ride through this tough phase, some parts makers would opt to merge.

Manufacturers' Survival Strategy Detailed

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 1 Jan p 8

> [Text] As a result of curbs on exports and decreased domestic demand, the automobile industry which has had continuous high growth is leveling off. Increased production was the source of growth for the auto parts makers and thus, the new year's outlook is not a rosy one. Moving from "the era of competitive high growth to a race for survival era (Japan Automobile Parts Industry Association Chairman: Shogo Tsuru)," the major parts manufacturers are uniformly starting to strengthen their business structures. Review of secondary subcontractors who provide basic strength to the group, strenghtening subsidiary and overseas based operations, re-consolidation of the company's internal labor force and production process, and cultivation of new business by launching other industries are some avenues being explored. In another words, a shape-up strategy for a slower paced era is under way.

Number of Auto Parts Makers to be Whittled Down to Two-Thirds

Last year, the major automobile manufacturers significantly changed their thinking. They clearly set forth a reorganization policy for the auto parts industry which had been left to grow and expand in an unchecked fashion. The representative view set forth was that "in terms of the future, there are too many auto parts makers (finished car manufacturers' primary subcontractors) and that the number would eventually have to be cut to two-thirds." (Toyota Motor Co., Ltd.)

Mitsubishi Auto Industry, Honda Motor Company and others struck with a "one-third cut back of cooperating parts makers." In the name of "requests" for lower costs, increased technological skills and stronger business structures, the finished car manufacturers are applying pressure on the parts makers daily.

The brunt of the pressure from the auto makers is being borne by the major parts manufacturers. How will they relay the message to their sub-contractors? The reorganization of auto industry's pyramidal structure actually refers to the reorganization of the subsidiary and sub-contracting system by the major auto parts manufacturers.

"The finished car manufacturers will pass their losses on to us parts makers on a scale unprecedented heretofore. How will the major parts makers absorb it? A great hurdle has been placed before us--a hurdle that has to be surmounted by secondary sub-contractors as well." (NHK Spring Co., Ltd Chairman: Seishun Fujioka) Leading businesses have begun reviewing their respective operating structures.

The most severely affected are parts makers supplying tuucks. Tokyo Parts Industry Chaiman Karo Shimada says that, "Our firm's outside order ratio is low, but we must reconsolidate sub-contracting procedures and re-examine internal manufacturing and outside order categories." An executive of a certain parts manufacturer said with honesty that, "Almost all those below the secondary sub-contractor level are town factories. Under the small business protection law, they are protected and we cannot press them too hard; but if we ourselves are backed into a corner, we have to shift the loss on to our subordinate partners."

The signs of decline in auto parts manufacturing growth actually became evident a little over a year ago during the latter half of 1980 (October 1980 - March 1981). The Japan Automotive parts Industry Association gathers and tabulates production volume data from approximately 310 member businesses. Since the method of classification was changed in 1980, the operation is behind schedule. But a provisional tabulation of the Kanto and Chubu regions' auto parts manufacturers (equivalent to 95 percent of the total) for 1980 shows that the production total would almost certainly exceed the 5 trillion yen mark. Nevertheless, the production is leveling off trend during the latter half of the year.

That is to say, the trend for the last several years had been a 5 to 10 percent production increase during the latter half of the year, compared to the first half. But in 1980, the Kanto/Chubu regions' tally showed a 0.7 percent decline during the latter half of the year in comparison with the first half. (Automotive Parts Industry Association) Moreover, this survey focused mainly on the primary sub-contractors (from the perspective of finished car manufacturers), and the shifts in production volume of these firms have a high degree of correlation to the domestic four-wheel vehicle production trend. A production increase in 1981 is highly unlikely.

Streamlining Plants

Among the leading parts manufacturers, many have subsidiaries that are really sub-contractors. Akebono Brake Industry has many such subsidiaries, so it cannot simply "cut" its sub-contractors.

In such instances, the firm's own curtailment must be all-out. Atsugi Auto Parts has adopted a policy of dropping seasonal and temporary workers. Automobile Casting, Keihin Precision Machinery, and Riken are building new high efficiency factories or are centralizing work at high efficiency plants in an effort to achieve more efficient production.

Countering the domestic automakers' declining demand, the parts manufacturers are starting to emphasize overseas export of their products. As shown in the attached diagram, auto parts exports increased by a wide margin last year. Though the increase ratio dropped somewhat during the latter half of the year, this trend will undoubtedly continue into 1982. "For a business to exist as an enterprise, growth, either by increased sales or increased profits must be maintained continuously." (Nichitan Bulb President: Sadahide Nagano)

In the meantime, a desire to expand into fields other than automobiles (the so-called non-auto sectors) is also becoming evident. Starting this year, NHK Spring will initiate full-scale production of goods based on the application of urethene synthetic technology to air conditioning related equipment at a specialized plant being constructed in Nagano Prefecture. Teikoku Piston Ring this spring will begin marketing industrial, ceramic covered dessication equipment which employs piston ring technology. Akebono Brake is hoping to extensively market aluminum materials for home interior decoration. Kyowa Alloy is working to develop heat-resistant appliances by recycling emission parts' scrap. As these activities attest, expansion into non-auto sectors is remarkable. In terms of cost factors, the automotive parts manufacturers are seasoned veterans. Thus, these new ventures are beginning to raise cries of a "cost revolution" in non-auto industries.

Even the largest automotive parts maker Nihon Denso expresses its future outlook as follows: "For the next several years, all our energy will be devoted to establishing a 50-percent self-sufficiency ratio in IC's, Then we will develop an electronic equipment business slated for non-auto sectors with the goal of becoming a consolidated electronic equipment manufacturer." (President Fubito Hirano) Making inroads into other industries a tactic begun by "general automotive parts" manufacturers--such as Japan Oil Seal Industry's electronic, chemical operations development plan--is a common formula being followed by many private car parts manufacturers.

(Reporter: Kawabe)

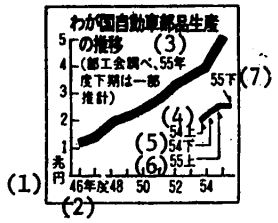

Figure 1 (second column): Japanese Automotive Parts Production in Transition

Key: 1. Trillion yen
2. 1971, 1973, 1975, 1977, 1979
3. (Automotive Parts Industry Association Survey, latter half of 1980 represents a partial figure estimate)
4. 1979 first half
5. 1979 latter half
6. 1980 first half
7. 1980 latter half

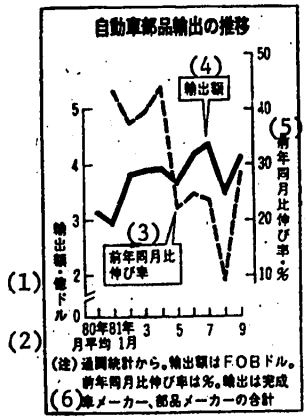

Figure 2 (third and fourth column): Automotive Parts Export in Transition

Key 1. Export amount, 100,000,000 dollars
2. 1980/1981 monthly average January, March, May, July, September
3. Monthly comparison--growth rate relative to previous year same month
4. Export amount
5. Monthly comparison--growth rate relative to previous year same month percentage
6. (Note) from Customs Survey, The export figure is in terms of FOB dollars.
Growth ratio relative to equivalent month/previous year expressed in percent
Export figure represents total for finished car manufacturers and parts makers.

Kayaba Industry Co., Ltd.

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 7 Dec 81 p 8

[Text] Kayaba Industry Co., Ltd. intends to solidify the relative strength of its non-automotive section by direct export of its oil pressure equipment to the United States. There is increased demand from the industrial machinery sector and there is thinking that enlargement of the automotive sector is not appropriate in the light of friction between the United States and Japan over auto exportation. The plan is to increase the current ratio of non-automotive direct export to the United States (30 percent) to about 40 percent.

Kayaba is a major manufacturer of automotive oil pressure shock absorbers. Its chief direct export item to the United States is this product. The product is sold in the U.S. open market and its sale has been growing at a considerable pace. The sale is expected to increase at approximately 30 percent per annum and the outlook is that the sales will reach the 10 million dollar base for the first time this year. The company resolved, however, that it was not advisable to rely exclusively on the automotive section.

U.S.-Japan Trade Conflict

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 10 Dec 81 p 8

[Text] Japan-U.S. Trade Facilitation Commission (TFC) will redeliberate the question of importation of U.S. made automotive parts at an executive level session this week. It was disclosed on 9 December that the United States is very dissatisfied with the "Japanese finished car manufacturers' parts procurement stance which is the chief inhibitor in expanding importation of U.S.-made parts." The Ministry of International Trade and Industry's response was that "a concrete instance ought to be cited to illustrate this accusation. Otherwise, it is difficult to judge if indeed the fault is the Japanese car manufacturers'." The matter will be attended to at the executive session.

Importation of U.S.-made automotive parts totaled 140 million dollars in 1979. In 1980, the contractual amount was 200 million dollars and the prediction is that the actual import figure will be around 170 million dollars. However, the "Automotive Parts Purchasing Mission" indicated to the U.S. side, when it visited the said country in September of last year, that if possible, Japan would like to import 300 million dollars worth in 1981.

The MITI assesses the lack of growth in U.S.-made automotive parts importation to be the result of: (1) strong dollar trend during the year seen as a whole; (2) reduction in the relative purchase ratio of parts for private cars slated for the U.S. market as a result of automobile export restriction to the United States; and (3) decrease in automobile sales in Japan.

Meanwhile, the Japanese automobile industry's argument is that, "in terms of quality, price and delivery schedule, there is absolutely no reason why we

have to buy American products," and that it is unfair to have the responsibility for lack of import growth shifted onto the Japanese automobile manufacturers' shoulders under the pretext of the latter's uncooperative purchasing stance."

According to MITI, the United States is seeking increased importation of the following automotive parts: turbo-charger, catalytic agent, lights and so on. The (Automobile Section) would "like to hear in concrete terms as to which of the acquisition policies of the Japanese manufacturers (finished car makers)--that is, which American automotive parts--that the United States is dissatisfied with; and then work out a counter-measure."

MITI, however, would like to avoid being pinned down to concrete figures such as the 1981 target amount (300 million dollars).

Industry to Diversify

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 12 Dec 81 p 1

[Text] Automotive parts makers are engaged in a flurry of activities in an effort to "get out of automotive ties." In response to the rapid decrease in automobile sales, the parts makers are beginning to modify their total dependence on automobiles and armed with their strongest weapon--their cost management know-how--they are recharting their course to electronics, industrial machinery and/or precision instrument sectors. The automotive parts industry is a 4 trillion yen business concern and the industry's dash toward other fields will cause formation of new multiplex markets as well as create competition and friction in the existing sectors.

The largest member of the automotive parts industry--Nihon Denso (Toyota Motor Company Group)--has just initiated a plan for a significantly increased production of automotive LSI (Large Scale Integration circuits). This is seen by some as the cornerstone upon which the company is planning an entry into the semi-conductor field in the future. This move is already regarded by semi-conductor manufacturers as well as automotive parts makers as a threat.

Koito Works, an automotive lamp maker (Toyota Group) and Japan Oil Seal (Independent), a seal maker, have set out to manufacture and distribute print wiring boards [haisen kiban]. Koito is already producing komaku [transliteration] IC (Integration Circuitry) and has begun preparing for production of electronic parts in the United States in cooperation with the Heller Corporation of West Germany. Through its subsidiary--Japan Mectron--Japan Oil Seal is scheduled to enter a joint venture with the U.S. and West German parts manufacturers in the print wiring board field. Koito and Japan Oil Seal both intend to sell print wiring boards not only to auto manufacturers but to camera, watch and other precision instrument businesses as well.

The top manufacturer of automotive fasteners--Niccolo (Independent)--is emphasizing fasteners for electronic machines and is scheduled to begin taking orders in the United States in the near future. Aside from the electronics

field, Kayaba Industry (Nissan Motors Group)--a major oil pressure shock absorber maker--is concentrating on oil pressure equipment for industrial machines. It will formalize its export to the United States, and in conjunction with this operation, the firm will invest substantially in the firm's facilities. Tokyo Welding Factory (Isuzu Motors Group)--a medium size welding plant--has begun producing ashimawari [transliteration] parts for construction machines and has signed a long-term contract to supply the world's largest construction machinery maker--Catepillar Tractors of the United States. Bustling activities such as described above are beginning to surface everywhere.

Nissan Motor Co., Ltd.

Tokyo NIHON KEIZAI SHIMBUN in Japanese 15 Dec 81 p 8

[Text] In order to streamline parts production format, the Nissan Motor Company began reviewing the division of tasks set up among its affiliated parts manufacturers. This is because the company had concluded that in order to meet the intensified new model automobile development and cost-reduction competition, efficient grouping among the vast number of parts makers and restructuring of manufacturing processes of major auto parts are needed. In promoting the FF (frontal engine, front wheel drive) for compact vehicles, Nissan has first of all demanded that Kokusan Metal Industry and Tachikawa Spring Company create a new parts assembly line. Meanwhile, Atsugi Automotive Parts which may lose work volume as a result of installation of FF is hastening to select new parts that it can manufacture.

Nissan disclosed that it had dispatched new commissions to Kokusan Metal and Tachikawa Spring and ordered items which neither of the firms had handled heretofore. Nissan commissioned Kokusan Metal to produce a finished lock mechanism for car handles. Kokusan Metal is a specialty maker which manufactures door handles and automobile keys. Up to now, Kokusan Metal manufactured the key portion and the structural components of related lock mechanisms. These then were sent to Kanto Precision Instruments and assembled into finished parts. The transport cost between the two firms was one cause of the high cost. The gist of the current order was to let Kokusan Metal handle the entire process from parts manufacture to assembly of the completed merchandise so as to reduce the merchandise flow cost.

Nissan also requested Tachikawa Spring to deliver completed automobile seats. Traditionally, Tachikawa manufactured spring and the seat's structural framework; these then were purchased by the completed seat maker--Ikeda Bussan (Main Office: Yokohama) and finished, then delivered to various Nissan auto plants. But automobile seats are bulky items and their transport is one of the most costly among automotive parts.

Having decided to carry the manufacturing process all the way to completed seats, all of Tachikawa Spring's finished seats will be applied to Nissan's Murayama Plant (Musashi Murayama City, Tokyo) which is located relatively near

Tachikawa Factory. Meanwhile, Ikeda Bussan will "specialize" for Nissan's Suwama (Suwama, Kanagawa Prefecture) and Oihama (Yokosuka, Kanagawa Prefecture) Plants. In this fashion, a new division of labor assignments among manufacturers delivering to Nissan has been formulated.

Nissan is rapidly switching from FR (frontal engine, rear drive) format to FF format. In this type of switch-over, the most damage is sustained by the manufacturer whose propeller shaft production volume would decline drastically. In the case of the Nissan Group, Atsugi Automotive Parts is the firm most adversely affected. Atsugi Parts is anticipating approximately 99 billion yen in sales this year. The reduced propeller shaft production in 3 years will amount to 10 billion yen per year.

In order to "cover [ease]" this drastic decline, Nissan assigned the manufacture of compressors for automobile air conditioning units to Atsugi Parts. It is said that Nissan has also entered the final selection process with the view to adding the FF running gear parts to Atsugi's list of manufacture items.

11460
CSO: 4105/40

ECONOMIC

STEELMAKERS PLAN TO EXPAND FACILITIES

OW120623 Tokyo NIHON KEIZAI SHIMBUN in Japanese 9 Mar 82 Morning Edition p 7

[Excerpts] Despite signs of a slowdown in the export of seamless steel pipes, Nippon Kokan and other major steel pipe companies have set about expanding their facilities. Nippon Kokan, Nippon Steel Corp and Kawaskai Steel Corp are planning to move up completion dates for their expansion projects now underway while Sumitomo Metal Industries, Ltd, a top seamless steel pipe manufacturer, is to further extend its expansion program. The steelmakers believe that the oversupply--forecast for the second half of this year and next year--will only be a temporary phenomenon and that the steel pipes trade--mainly in high-class products for oil wells--will become a seller's market by around 1985. This race for seamless steel pipe facilities is likely to continue for some time both at home and abroad.

Against the background of an oil development boom in the United States, seamless steel pipes used for such development projects have been in short supply in recent years, and this situation has served as a treasure chest for Japan's four major steel pipe companies. The facilities expansion projects now underway by the four companies are aimed at coping with the future situation, the four companies plan to build facilities with an annual combined capacity of more than 1.3 million tons with investments of about 250 billion yen. When completed, Japan's seamless steel pipe production capacity will increase from the present 4.2 million tons a year to 5.5 million tons.

Nippon Kokan, which is building a seamless steel pipe plant with an annual capacity of 600,000 tons at its Keihin ironworks, plans to move up the date for its completion by about 3 months from the original September 1983. Nippon Steel Corp, which is adding a plant with an annual capacity of 420,000 tons to its Yahata ironworks, wants to advance its completion, set for March 1983, by a month. Kawasaki Steel Corp, which has nearly completed the second reinforcement plan on its Chita works, wants to begin the third plan in February, instead of the originally scheduled March 1983. Meanwhile, Sumitomo Metal Industries, which had originally planned to reinforce its Kainan steel piple plant with an annual rolling capacity of 600,000 tons and a refining capacity of 240,000 tons, appears to have modified its plan and will increase the refining capacity to a level close to the rolling capacity.

Against the background of these bullish plans are the following factors:

1. Conditions for oil development have become increasingly severe making it inevitable to drill for oil in deep soil, remote areas, seabeds and in corrosive gas environments; therefore, there is strong demand for high-class oil well pipes that can withstand such conditions.

2. Before oversupply becomes a serious problem, companies must expand their markets by boosting their capacities.

3. If the Reagan administration decontrols the gas price, the oil development fever will be rekindled resulting in the scarcity of steel pipes by around 1985.

CSO: 4120/195

ECONOMIC

COUNTRY MUST FIND PERMANENT U.S. TRADE MEASURES

OW101221 Tokyo THE DAILY YOMIURI in English 9 Mar 82 p 4

[Article by Washington correspondent Konoe Kawagishi]

[Text] Japan is now facing its third big wave of American pressure, the first being by four American battleships to open its ports more than a century ago and the second being the Pacific War. This time, Japan is requested to whether to open its market to American goods totally and unconditionably. [Sentence as published]. What the U.S. actually wants Japan to do seems to have been unveiled at the Senate Banking Committee meeting on 4 February. Considering what was discussed at the Senate Committee meeting and what had been said by U.S. Government leaders since the beginning of this year, the trade friction this time is completely different from the previous trade disputes between Japan and the U.S. in terms of its nature and scale.

Firstly, the dispute today is not over certain items such as textiles, color television sets or automobiles as was in the past.

Secondly, the U.S. is now not only defending its market by limiting Japan's exports to it, but is in on the offense in demanding that Japan open its market totally to foreign goods, including service industries and investment.

Thirdly, the most important demand is for a drastic change in Japanese traditional customs and practices, such as the Liberal Democratic Party's [LDP] heavy dependence upon farmers' votes as well as of Japanese business practices.

The U.S. knows that the major obstacle to the import of more American agricultural products to Japan is the opposition from Japanese farmers.

Masumi Esaki, chairman of the LDP Special External Economic Committee and the head of a recent Japanese mission to the U.S. said that the Japanese market is now as open as that of other Western nations after Japan had advanced by 2 years the planned tariff cuts and decided to remove nontariff barriers on 67 items. Esaki also asserted that what was left now is only the difference in custom and social setup between the two countries, including language barriers.

What the U.S. is demanding is just what Esaki asserted, however.

U.S. Secretary of Commerce Malcolm Baldrige said that the problems pending today were Japanese customs, traditional market systems and psychological barriers.

The U.S. side is fully aware of the tendency among the Japanese to live and love foreign goods. The problem is the system of Japanese distribution that keeps the prices of foreign goods higher, by taking advantage of this tendency. Officials of the U.S. Government agencies concerned with trade and commerce said that for example, the prices of American automobiles and cosmetics are twice as high in Japan as in the U.S.

The practice of strong combination among industrial groups in Japan, such as buying goods, even at higher prices, from makers within the same industrial group, is another target of American criticism. In a sense, the U.S. is now demanding a change within Japanese business society, or change in the mind of individual Japanese people who tend to close the door to the world outside.

The immediate reason for the U.S. to make such a strong demand on Japan is its trade deficit with Japan of $18 billion last year. Baldrige said that the deficit could be improved by $8 billion to $5 billion within 5 years if the Japanese market was totally opened to U.S. goods.

Also behind the scenes of the U.S. demand is the economic depression in the U.S. as shown in the record number of unemployed--10 million people--and a move to make Japan a scapegoat among U.S. congressional and labor groups.

Also seen in the strong criticism against Japan by the entire American establishment, including the government, industry and the congress, is an apparent plan to threaten and weaken Japanese strategy in the "future industries" such as computers, communications, industrial robots and biotechnology.

The U.S. appeared to have determined not to repeat the same mistake it made in the case of automobile industry in which Japan closed its market to foreign cars until it was full of domestically made cars. The Japanese auto industry took the strategy of exporting its products to foreign markets only after its own market was completely dominated by Japanese cars. In this sense, the U.S. demand on Japan today matches President Reagan's economic strategy, that is to rehabilitate the U.S. economy by revitalizing private industries.

Japan should be fully aware that patch-up measures or minor remedies case-by-case are no longer good to overcome today's trade friction between the two countries, as had been the case in past economic disputes. Without a bold determination to break through the "closeness" of the economic, political and social setup within the country, Japan will never be able to overcome today's pressure to open its market to both U.S. and other foreign products. And Japan would also probably be unable to find the positive aspects of opening itself to foreign trade this time, as it found twice in the past--the four American battleships a century ago and World War II.

CSO: 4120/195

SCIENCE AND TECHNOLOGY

'MAINICHI' ON CRISIS FACING LAW OF SEA CONFERENCE

OW141105 Tokyo MAINICHI SHIMBUN in Japanese 9 Mar 82 Morning Edition p 5

[Editorial: "Is It All Right to Break Up the Law of the Sea Conference?"]

[Text] Is a new international constitution of the sea, "treaty on the new law of the sea," only a dream after all? The third UN Conference on the Law of the Sea, which has been debating for more than 8 years, was to hold its 11th meeting in New York on 8 March, but the U.S. Reagan administration's "policy" concerning seabed development, which was submitted to the conference, prompts our pessimism.

The U.S. Government's attitude toward the question of seabed development since the Reagan administration's inauguration shows a big departure from that of the preceding administrations--the attitude of seeking a compromise with developing nations. The United States now puts its national interest above anything else. One of its expressions is found in moves to conclude monopolistic mutual treaties with the United Kingdom, France and West Germany, which came to light last month. A "policy concerning major problems of the draft law of the sea," reportedly distributed to all countries this time, stipulates this attitude taken by the Reagan administration.

The U.S. policy calls for guaranteeing the participation of the United States and other advanced industrial nations in the composition of the highest executive body for development, the International Seabed Agency Council, with the United States serving as a permanent council member. Regarding decisionmaking, it also calls for the introduction of the method used at general meetings of the International Monetary Fund (IMF), where a weighted voting method in proportion to the amount of funds contributed is used. In addition, it alleges that development technologies reportedly possessed by only the United States at present should not be forcibly transferred to the proposed International Development Corporation. All this constitutes a grave challenge to the consensus in the informal draft at the law of the sea conference that had been formed step by step since its inauguration in December 1973.

Certainly, manganese nodules, the reason for seabed development, contain large quantities of manganese, nickel, copper, cobalt and other precious mineral resources of strategic value; therefore, their mining is an important matter

of national interest to the United States. Furthermore, since the United States has both the money and technology needed for seabed development, it is possible for the United States to carry out development independently if its demand is not met.

The new policy spelled out by the Reagan administration even shows a little of this intimidation to the conference. However, if the U.S. Government persists in this attitude, the law of the sea conference will undoubtedly come to a breaking point, with its serious effect rebounding not only on order on the seas but on the North-South issue as well. The conference is faced with a dire crisis.

CSO: 4120/197

'ASAHI' LAUDS REVISED JAPAN-AUSTRALIA NUCLEAR PACT

OW151253 Tokyo ASAHI EVENING NEWS in English 13 Mar 82 p 5

[Editorial of ASAHI SHIMBUN 12 March: "Japan-Australia Nuclear Accord"]

[Text] The revised agreement on nuclear energy, on which Japan and Australia had been negotiating since 1978, has been signed. It is valid for 30 years, with provision for its extension after that period. The government intends to ask the current Diet to ratify the agreement.

When the agreement is implemented, not only will the pipeline of energy resource cooperation between Japan and Australia be considerably widened, but the already very stable Japan-Australia relations will be further strengthened by yet another governmental agreement.

The revised agreement includes a "comprehensive prior approval formula" under which post-notification is adequate when the transfer and reprocessing of Australian uranium are carried out in Japanese facilities of previously designated scope. Through the adoption of this clause, the revised agreement can be said to provide an important diplomatic foothold for the nuclear energy policy of Japan, which is trying to make nuclear energy a semi-domestic energy.

The central problem in revising the agreement lay in how to reconcile, on the one hand, the Australian demand for followup restrictions on the use of its uranium aimed at preventing the proliferation of nuclear weapons, and on the other hand, the Japanese demand for the rationalization of restrictions on the transfer and reprocessing of uranium and the simplification of procedures.

In the current nuclear energy agreements that Japan has signed with the United States and with Canada, an individual approval system is in effect. According to this system approval must be obtained from the source country each time uranium is transferred or reprocessed. Not only are the negotiations and procedures complicated, but Japan's use of nuclear energy can have major restrictions imposed on it as a result of changes in the policies of the source country or in the international situation.

During the Carter administration, the United States adopted the policy of indefinitely postponing reprocessing by other countries and imposing restrictions on the development and commercialization of the fast breeder reactor. It refused to agree to reprocessing by Japan.

Japan presently depends on Australia for about 11 percent of its uranium. The Ranger mine, being mined by a joint venture in which Japanese electric power companies have invested, began production in the fall of 1981. When the revised agreement with its more liberal transfer and processing clause is implemented, dependence on Australian uranium is expected to increase.

We sincerely hope that such circumstances will strengthen Japan's position in the current negotiations with the United States and Canada which are seeking long-term agreements based on the Japan-Australia formula.

Currently, Japan purchases natural uranium (yellow cake) and has it converted and enriched in Canada, the United States and France. Reprocessing is entrusted in most part to Britain and France. Eventually, however, Japan intends to do most of the converting and enrichment, and all of the reprocessing, domestically.

Consequently, all the various facilities in operation within Japan as well as the facilities which Japan is utilizing in other countries are included in the list of designated facilities. The second reprocessing plant, which aims at starting operations in 1990, is also included in the list of designated facilities, but further discussions are to be held when operations are scheduled to begin.

A time will eventually arrive when the nuclear energy industry of Japan will be developed as an export industry. When Japan signs nuclear energy agreements with South Korea, China, Southeast Asian countries, Mexico and other Central and South American countries, what restrictions should Japan impose as a technology supplier committed to the nonproliferation of nuclear weapons? Serious consideration of the question should begin immediately.

In deliberating the agreement in the Diet, these points should be studied from diverse, long-term viewpoints. Thorough discussions are essential.

After signing the agreement, Foreign Minister Yoshio Sakurauchi issued a statement saying the agreement is a constructive contribution to international cooperation, and will serve to maintain and strengthen the nonproliferation treaty and the safeguards set down by the International Atomic Energy Agency.

Japan, whose dependence on nuclear energy is high, must take the lead in the research of systematic and technical safeguards based on international cooperation. The world's future depends on our ability to prevent the proliferation of nuclear weapons. Japan must utilize the revised Japan-Australia nuclear energy agreement to work toward this goal.

CSO: 4120/198

SCIENCE AND TECHNOLOGY

DELAYS IN 57 POWER GENERATION PROJECTS REPORTED

OW121148 Tokyo MAINICHI DAILY NEWS in English 10 Mar 82 p 6

[Text] The government has decided to postpone the construction of 57 nonoil power development projects, such as nuclear and hydroelectric power-stations, for up to more than 4 years, it was learned Tuesday. The decision is expected to have considerable impact on the nation's economic activities, as the power industry is one of the largest investors in this country.

The postponement has been necessitated by the worldwide recession and a decline in energy consumption. Consequently, only a slow increase is expected in the demand for power, forcing a downward revision of the government's earlier program of power development.

According to the government's new plan, almost all development projects will be delayed in comparison with the old program.

Industrial observers said the same day that the postponement decision will further dampen the national economy, already hovering at a low level.

The electric power industry envisages plant and equipment investments amounting to 3.5 trillion yen for the current fiscal year, the observers pointed out. The sum is equivalent to roughly 10 percent of the nation's total private investments.

A slowdown in investment activities by the industry will not only affect the economies of the local communities chosen for the development projects, but also might lead to an unfavorable influence on the world economy, they reasoned.

CSO: 4120/198

SCIENCE AND TECHNOLOGY

FUJITSU DEVELOPS 8,000 GATE ARRAY FOR SEMICONDUCTORS

Tokyo DENPA SHIMBUN in Japanese 10 Feb 82 p 1

[Text] Fujitsu Limited announced on the 9th that it has developed and will begin taking orders for 8,000 gate arrays using CMOS]complementary metal oxide semiconductor] technology. A gate array allows the large-scale integration of circuits required by the user within a short period; this is a promising product which is expected to find a large market within the semiconductor industry. Both Hitachi Ltd and Toshiba Corp are expected to announce large gate arrays at the International Solid State Circuit Conference (ISSCC) which is to begin on the 10th in the United States; these announcements are likely to further stimulate development of the gate array market from now on.

The 8,000 gate arrays developed by Fujitsu are called the MB66000 series, and are characterized by the world's highest level of integration and high-speed operation, comparable to that of ECL [emitter coupled logic] chips--2.5 ns per gate delay time. The series was developed over 14 weeks at a cost of 13 million yen. The sample price is 65,000 yen, and the minimum order is 200 units.

Because they have 8,000 gates, these arrays will have capabilities comparable to those of a general purpose microprocessor. Fujitsu anticipates demand for use as small computer CPU's (central processing units) or control circuits for peripheral equipment, and is prepared to accept orders from both the Japanese and U.S. markets.

Gate arrays can be configured with digital circuits or other frequently used circuit blocks as ordered by the user, and can be put to use in computers quickly with only the final wiring. Short delivery times and response to diversified demand for small quantities will facilitate the design of non-standard electronic devices with specialized characteristics. This is a promising product of a type which is expected to constitute over half of all semiconductors in 5 or 6 years.

Fujitsu is the first Japanese company to announce an array of 8,000 gates, but Oki Electric Industry Co, Toshiba, Hitachi and Nippon Electric Corp all entered the gate array market last year, and foreign ventures like Interdesign (agent: Microtech), AMI Japan and Japan Texas Instruments have also put their effort into developing this market.

According to the manufacturers involved, gate arrays can be applied in a broad range of consumer and production equipment, including computer equipment, office computers, personal computers, VTR [videotape recorder] cameras, stereos, and VTR sets.

Gate arrays can be used not only to replace standard IC's [integrated circuits], but also to replace microprocessors; they have also been used recently to partially revise and improve the capabilities of office and personal computers almost as soon as they have come onto the market.

Rapid growth is expected in the market for gate arrays, and the expansion of their functions seen in Fujitsu's announcement of a product with 8,000 gates is expected to have an impact which will change the design concepts of existing electronic equipment. This will be a great tool in responding to the demands of the new era of small quantities, diverse functions and short delivery times.

It can be noted that Japanese semiconductor companies have put more effort into gate arrays than have U.S. manufacturers, and for that reason it is generally predicted that Japan will have a larger market than the United States. And because intricate operations are required for gate arrays. It has been called a product for the Japanese; those involved hope that the use of gate arrays will give rise to many creative new electronic devices.

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CSO: 4106/71

SCIENCE AND TECHNOLOGY

JAPAN TO DEVELOP 5TH GENERATION COMPUTER

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 4 Jan 82 p 13

[Text] A project to develop "thinking computers" that can see, hear and talk will finally commence this year. In the FY-82 budget proposal, the government allocated development expenses of 426 million yen for a "5th Generation Computer" to the Ministry of International Trade and Industry. MITI decided to promote research by the joint efforts of universities and private corporations under the leadership of the General Electronic Technology Research Institute of the Agency of Industrial Science and Technology, and has started a study for the promotion of the project. Corporate participants are likely to establish a technology research association or a research foundation to take part in research and development. Also, MITI is speeding up its efforts to include foreign computer makers in the project to avoid the unnecessary trouble of rekindling the "Japan, Inc." theory overseas since the method of development takes the form of a public-private joint venture.

The first generation computer which performed calculations and data processing used vacuum tubes. The second generation used transistors, the third generation adopted IC's and the fourth generation employed super LSI's as progress was made. Currently top is the 3.5th generation computer which uses a 64 kilobit element, the first of the super LSI's, as a part in the memory cell.

Conventionally, larger capacity and higher speed have been achieved by improving performance of the elements, but the basic computer architecture, in which a job was handled in order of the programs given by man, remained the same. However, in the nineties, a "thinking computer" is expected to be introduced which will be immensely different from the past history of the progress of the computers. Research and development of this 5th generation computer has begun in various nations.

Nonetheless, the development targets for a 5th generation "thinking computer" have not been definitely formulated even in foreign countries. Japan must set a target and proceed with development independently. Since the importance of information machinery and equipment such as computers will certainly increase in the future, Japan should not be left behind in development in order to facilitate the continuous growth of Japanese industries internationally. However, the development of a 5th generation computer involves large risks because it is a challenge in an unknown realm. Therefore, MITI decided to promote development entirely by "research commission fees" paid by the government.

Presently in the computer field, research on elements such as the Josephson element and the Hemto [phonetic] element from gallium arsenic that can work 10-100 times faster than conventional ones is being undertaken in Japan and other nations. Some may call a computer which incorporates this super high-speed element a fifth generation computer, however, the fifth generation computer that MITI is pursuing is not simply faster in speed but is capable of parallel computation, a computation system called "data flow." Peripheral equipment includes a voice recognition device that correctly recognizes the human voice, an association and memory device, a reasoning device and a sentence recognition device. The computer is also equipped with learning ability. In short, the more the computer does the work, the higher the throughput rises.

According to MITI, what is important to a "thinking computer" is architecture and software and elements which can be in the form of conventional silicon, gallium-arsenic or Josephson types. Based upon this conviction, MITI is not going to include the development of elements in the 5th Generation Computer Development Project.

The blueprint drawn by MITI allows 10 years for the total project, allocating 3 years for the first term, 4 years for the second and 3 years for the 3rd. Since it is absolutely a shot in the dark, a budget of 10 billion yen is estimated for the initial 3 years. MITI is planning to decide on the size of budget for the second and the third terms after reviewing progress in the first term.

It is said that the computer, after completion of the "thinking computer," will change from a conventional "cold blooded" machine which can only be handled by professionals to a "warm-hearted" computer which will show compassion to amateurs. This change will be feasible because fifth generation computers think and reason by themselves without elaborate instructions from an operator, and instructions can be given in the form of "natural language" as in conversation. Amateurs need not strive to learn computer program language. Also, they say that computers will contain remarkably extensive knowledge from law to even dwarf-tree culture and will be helpful in any subject. Development of computers such as these will broaden the scope of the market dramatically and open an era when computers will be popularly used in industry and society.

Commentary: Government Takes Initiative in Allocation of "Commission Fees"

The Ministry of Finance and the Ministry of International Trade and Industry reached an agreement to allocate research expenses to private corporations as "commission fees." Research and development will be carried out under the budget of the Machinery and Information Industry Bureau of MITI. The same bureau handled the super LSI development, a national project, in the past, and it is currently undertaking the development of a 4th-generation computer. Until now, research has been conducted under the "subsidy" system under which the Government subsidizes two-thirds to three-quarters of the research expenses. However, it has been decided that the project at this time will be placed under "commission fees" which will be paid 100 percent by the Government.

At first glance, "commission fees" may sound very convenient to corporations, but "commission fees" implies that the Government contracts out projects that it should

do by itself, to the private sector. The resulting patent rights and copyrights (circuit diagrams) will naturally be snapped up as national property. In contrast, "subsidies" allow the private sector to take the initiative and the companies which achieved development to hold the patent rights. The view is that MITI strategically adopted these "commission fees" that the Government can hold the leadership in the project, and promptly act to meet circumstance when foreign corporations not in the project pressure the Government to disclose fifth generation computer patents and thus avoid international friction.

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SCIENCE AND TECHNOLOGY

TEST STAGE OF HIGH SPEED LINEAR MOTORCAR DESCRIBED

Tokyo SHUKAN TOYO KEIZAI in Japanese 6 Feb 82 pp 76-81

[Article: "500 Km/Hour Very High Speed Express Targeted"]

[Excerpt] Test runs on the dream very high speed ground transport locomotive "the magnetic levitation linear motorcar" are being conducted at the 4-kilometer test track at the National Railway Levitation Railroad Test Center at Himukai-shi in Miyazaki Prefecture. The targeted speed is 500 km/hour. A major change in transport system is expected if this project becomes practical. If rail travel between Tokyo and Osaka is reduced to 1 hour, air travel between these two cities will probably be reduced to zero.

The targeted speed of 500 km/hour has already been attained on the 7-kilometer overall length experimental line, where a run of 504 km/hour was attained on 12 December 1979 and also a run of 517 km/hour on 22 December of the same year, and both runs were stable. The experimental vehicle which recorded these runs was the ML-500.

Now, speaking from an extreme viewpoint, there are no limits to the speed which can be attained by a linear motorcar. On the other hand, the horsepower has to be increased tremendously to reach the faster speeds. This is because the resistance of air to this vehicle increases roughly in proportion to the square of the speed. Assigning the arbitrary value of 1 to the air resistance at a speed of 500 km/hour, this value will increase sharply to 4 at 1,000 km/hour and to 25 at 5,000 km/hour. This is why the National Railway arrived at a tentative figure of 500 km/hour from the standpoint of economics and the actual distances involved.

If it were possible to operate the linear motorcar within a vacuum, air resistance effects would be eliminated, and speeds of 20,000 km/hour would be possible. An idea is being spawned in the United States to develop a transcontinental railroad that would span the country from Los Angeles to New York in 21 minutes. This would involve the construction of an underground vacuum tube through which a linear motorcar would travel at speeds greater than 10,000 km/hour.

Speed of 10,000 Km/Hour Possible

As the next step, the National Railway developed manned type connected experimental motorcars and initiated test runs last fall. Already the following conclusions have been drawn: 1) the basic technological problems have been resolved, 2) there is little sway, and the riding comfort is better than that of the Shinkansen [present fast express], and 3) energy consumption is intermediate between that of a regular passenger train and the Shinkansen, a passenger load three times that of a jumbo jet is possible, and a speed twice that of the Shinkansen can be attained.

What should be pointed out here is that the Shinkansen does not require energy to be supported on the rails over which it travels, while airplanes and levitation mode linear motorcars require energy to sustain their lift off the ground as they travel.

There are three requirements that need to be fulfilled for the vehicle to travel over this "railroad": 1) the vehicle must be supported vertically, 2) the vehicle must be guided over the track, and 3) the vehicle has to be propelled and stopped. The usual railway has the rails taking over all three functions. Now, as the speed exceeds 350 km/hour, friction between the wheels and the rails diminishes, and the force which the power wheels apply against the tracks becomes weaker.

As shown in the illustration, the linear motorcar uses the repelling force or attractive force of the magnets installed along the guideway to put functions 1), 2), and 3) or functions 2) and 3) (when magnetic levitation is not employed) into effect, so that there are no limits to its speed or its hill climbing ability.

When traveling in a state of levitation, energy is consumed to support the motorcar above ground, but noise is limited to the sound of the vehicle cutting through the air and is no serious problem. There is no frictional wear on the wheels or the guideway, maintenance is minimal, and life is prolonged. These are major merits.

The National Railway initiated studies on the linear motorcar 2 years before the inauguration of the Shinkansen runs, and has accumulated developmental results for more than 10 years with its single-minded effort on the levitation railroad; its technological level in this particular area is tops in the world.

The levitation mode can be of two types: repulsion or attraction. The National Railway has adopted the repulsion type, and in particular the mainstream type of inductive repulsion. In addition, the feature here is the use of superconducting magnets.

The development of small, light, and high-performance adiabatic containers was needed in order to assemble compact and highly efficient superconducting magnets. The targeted goal was successfully realized with the cooperative eforst of Toshiba, Hitachi, and Mitsubishi Electric. The spinoff effects of

this development are very large. This is because superconducting magnets are very useful in the area of advanced technologies: to advance the cause of MHD power generation, nuclear fusion, superconducting power generators, power storage, and superconducting ships.

Stabilized Levitation Travel

There are the flat section and the side wall sections on both sides of the U-shaped cross-section guideway. Two series of independent levitation coils are arrayed to the left and right of the flat section at fixed intervals in the direction of travel.

When the superconducting magnet attached to the chassis glides over these levitation coils at high speed, inductive current is generated in the levitation coils, and the levitation coils themselves become electromagnets in the mode that is employed. The magnetic force of the coils which have become magnetized and the superconducting magnets mutually repel each other to force the superconducting magnet upward, as a result of which the chassis of the motorcar is levitated about 10 cm.

Now, this levitation force is small at a speed of 50-100 kilometers/hour, so that it is necessary to lower auxiliary wheels in order for the motorcar to run. The merit of the levitation mode is that when the height of the levitated chassis is too low, the repulsion force between magnets becomes extremely large and forces the chassis upward while, conversely, when the chassis rises too high, the repulsive force weakens and gravity lowers the chassis. In other words, a stabilized levitation state is realized without the need for a special device to control the height of levitation.

Because an induction current proportional to the speed of the superconducting magnets which pass over the levitation coils is generated in these coils, the height of levitation increases the greater the speed and decreases the slower the speed. At the same time, the adjustment of the position and strength of the magnets on the chassis can be used to vary the levitation height.

The National Railway has established 10 centimeters as the average height of the levitation coils from the ground. This height allows a margin by which there is essentially no effect of minor discrepancies in height and alignment, and maintenance is also minimized.

The coils consist of numerous windings of aluminum wire coated with synthetic resin which are affixed to the ground side.

Strengthened Reutilization of Energy

What is called a superconducting magnet here refers to a magnet made of material such as niobium-tantalum alloy which has electrical resistance from zero down close to -273°C (absolute zero) which is formed into coils to comprise magnets. Because these coils have no electrical resistance, once a current is introduced, it will flow forever, and no electrical power is consumed. It is just as though a super-high-strength permanent magnet were employed.

Liquid helium is used in order to maintain these coils at very low temperatures, and a system has been developed in which the helium, which gasifies once it has performed its cooling function, is once again liquefied and reused, and this is one of the National Railway's successful developments. This system was utilized to develop a light, small cooling unit whose development was announced about 4 years ago.

There are some test calculations which estimate the demand of the high-cost "superconducting magnets" which are the crux of the levitation railroad targeted for 500 km/hour operation.

Assuming that an express of 16 vehicles plies the route between Tokyo and Osaka, taking 1 hour to traverse the distance, and that trains are dispatched at 5 minute intervals, at any given time there will be a total of 24 express trains on the tracks for a total of 384 vehicles. Further assuming that each vehicle is equipped with eight superconducting magnets, the total will be 3,072 magnets. This number will be even greater taking into account standby vehicles and vehicles under inspection or repair.

The Approaching Linear Motorcar Age

The National Railway Levitation Railroad Test Center at Himukai city receives many foreign visitors who are railway specialists; this site is presently the Mecca of levitation railroad experts from all over the world. It is only very recently that the advantages of the superconducting magnet for a levitation railroad has been recognized.

It is possible that the United States and the United Kingdom, with strong leanings toward the levitation railroad, and West Germany, which is conducting its own experiments along this line, will import this superconducting magnet once the National Railway is able to enter mass production and lower the cost.

The linear motor is the prime moving force which propels the vehicles with the superconducting magnets. An AC motor is provided with a rotating section (rotor) and a fixed section (stator) where current is supplied from outside to create the rotating magnetic field. The outer circumferential surface of the rotor supported by a shaft maintains a fixed distance from the inner circumferential surface of the stator.

The linear motor maintains these cylindrical outer and inner surfaces in parallel array while extracting force in a straight line (linear) direction. This motor is arrayed so that the two parallel planes maintain a fixed distance from each other while they mutually work together to produce linear movement. Now, by placing one member on the ground and the other on the vehicle, a starting force is created to propel the vehicle. The gears and wheels used in trains of the past are no longer necessary.

Linear motors can be grossly classified into linear synchronous motors (LSM) and linear induction motors (LIM).

The levitation mode railway systems which are being researched and developed throughout the world include two types: a combination of induction repulsion (ED) levitation and LSM propulsion and magnetic attraction (EM) levitation combined with LIM propulsion. The former is the type in which the National Railway is leading the way with the use of superconducting magnets. The make-up of this LSM is as follows.

Cooling Facility Is the Key

Driving coils are installed on the inside of the two side walls of the guideway at a height corresponding to the height of the pole faces of the superconducting magnets installed on the vehicle. These driving coils are linked together and play the role of the stator of an LSM. The stator is on the primary side, which is the side from which current is supplied from the outside. The superconducting magnets on the vehicle are placed on both sides so that the N pole and S pole are arrayed in an alternate manner corresponding to the driving coils on the inner walls of the guideway. It is clear from this that the superconducting magnets placed on the vehicle are used for the two functions of levitating the vehicle and guiding and driving the vehicle.

How are these vehicles driven? First of all, the position and speed of the express are automatically detected at a central command center, and the center is in full command of operating the express just as though it were in the driver's seat. It uses this information to control the supply of current and its frequency to the drive coils placed on the walls on both sides of the guideway.

This then generates the power to propel the express at a given speed by operating the N and S poles of the superconducting magnets on the express. The current supplied is limited to the number of coils proportional to the length of the express, and there is no wasted current.

This LSM system also has the advantage that when the brakes are applied, there is a power generation control by which the kinetic energy of the express is conversely converted to electrical energy and recovered. In addition, there is no limit to the speed of a ground-based primary type system.

The operational tests which the National Railway has been conducting at Himukai city since last fall using a two-car system has achieved a measure of success, and these tests will be continued. An item of note in this present series of tests is the new type cooling and liquefaction unit for liquid helium that is carried aboard the MLU001-3 for cooling the superconducting magnets.

Liquid helium vaporizes at -269°C. In other words, the liquid helium vaporizes immediately after it cools the superconducting magnet to -270°C. In the case of the ML-500, which has posted a speed of 517 km/hour, the helium which vaporized was allowed to escape into the atmosphere, but this vaporized helium must be recovered and reliquefied when the economics of the system and the practical utility are considered.

This is why the MLU001-1 was provided with a specially developed small, light-weight cooling and liquefying facility. The MLU001-1 was provided with one cooling and liquefaction facility and one compressor for the four superconducting magnets, but the MLU001-3 has been provided with four very light, small cooling and liquefaction units and one compressor for its four superconducting magnets.

Economics To Match That of the Shinkansen

The efficiency of equipment improves with increasing size, but the losses increase in an ultracold equipment system as the distribution lines become longer. The use of four cooling and liquefaction units has the merit of facilitating placement design and cutting down on the use of distribution lines.

The final decision as to what distribution mode will be adopted will be decided after actual tests. The fact that these tests have come to the present stage is an indication that the experiments are approaching the final stage. It appears that unless lightweight, miniaturized, and high-efficiency equipment for vehicle board use is developed, a high performance and economic linear motor cannot be developed.

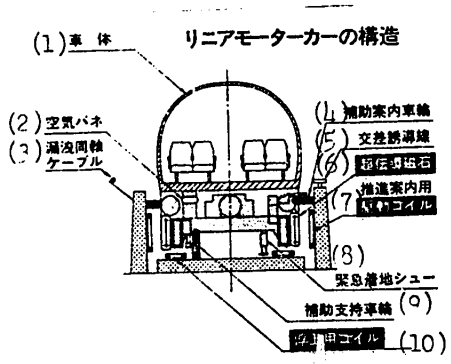
Test runs with three cars in series are under way this year, and the guideway is now a 7-kilometer-long U-shaped affair.

Now, a separate 40-kilometer-long experimental line is needed in order to test the practical aspects of a 500 kilometer train. When one travels at 500 km/hour, he covers 17 kilometers in 2 minutes. Once the operating characteristics, safety, reliability, riding feel, and wear of the express on this experimental line have been established, the decision as to its practicability should be possible.

In any event, it will be at least in the 1990 decade when a Tokyo to Osaka line will become a reality. On the other hand, there seems to be some data available on the economics of this new line based on the data accumulated to date on the Shinkansen and the experience and results accumulated at the experimental center. That is to say, comparison of economics with the Shinkansen show that construction costs including the cost of vehicles will be roughly 20 percent more than for the Shinkansen, but when the overall cost including operating costs are considered, the two systems are roughly equal.

What can be stated with assurance is that the "ED'LSM" is suitable only to runs such as the Tokyo-Nagoya-Osaka interval where there is great need for fast travel requiring not more than 30 minutes, because the high construction costs would not warrant the construction otherwise.

Construction of Linear Motor



Key to Figure:

1. Vehicle body
2. Air spring
3. Leak coaxial cable
4. Auxiliary guide sheel
5. Differential induction line
6. Superconducting magnet
7. Thrust and guide use driving coil
8. Emergency landing shoe
9. Auxiliary support wheel
10. Levitation coil

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SCIENCE AND TECHNOLOGY

TREND TOWARD WIDESPREAD FACTORY USE OF FMS DESCRIBED

Entire Machine Industry

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 1 Jan 82 p 6

[Text] Plans to construct advanced factories having FMS (flexible manufacturing systems), which is being called the trump card of the production revolution in the machine industry of the 1980's, have spread suddenly like wildfire. As responses to the increasing tendency for industry to automate the process for producing limited quantitites of a diverse number of items, these plans represent the effort on the part of machine tool manufacturers to make production more rational and economical and also to sell the developed systems to industry. A tendency also has appeared to construct FMS factories not only domestically, but overeeas as well. The machine industry has moved into the "FMS age" in earnest.

Medium and Small Enterprises Also Want Them

Industry attention is being focused on FMS, a system which combines computer-driven NC (numerically controlled) machine tools and industrial robots, because it will achieve high productivity through its reciprocal capabilities--flexibility and automation. These capabilities will permit the production of many items on the same line of a multiple-item, limited-quantity production process, which has been the goal of rationalization.

Toshiba Corporation launched a 3-year FMS plan in FY-81. The plan calls for the investment of 50 billion yen over the 3-year period, the introduction of FMS on 35 production lines, including the company's main divisions--home appliances, heavy electrical machinery, semiconductors, and computers--and the reduction of the work force on these lines from 2,500 to 500 people. Matsushita Electric Industrial Co Ltd, in order to further the automation of factories under its 10-year plan, has begun to introduce FMS which can produce efficiently a limited quantity of a number of items without human hands. The aim is to create a system which will produce a profit even after the production volume of a certain item has dropped 60 percent; as Matsushita President Yamashita says, the company "is moving quickly to establish an all-weather production system."

NTN Toyo Bearing Co Ltd, which produces some 3,000 kinds of bearing products per month, ranging from those with an internal diameter of 5 mm to those with

an external diameter of 4,000 mm, is planning to introduce FMS to its Yawana factory in Mie Prefecture. Tokyo Keiki Co Ltd is planning to invest around 500 million yen per annum to introduce FMS into its hydraulic machines division, and Kobe Steel Ltd has decided to introduce FMS into its compressor factory.

This activity is not limited only to the major manufacturers, for the wave of change involving FMS has spread to medium and small manufacturers as well. Such firms as Kenseisha (home office: Tokyo; president: Gunji Mizutani; capitalization: 45 million yen), which manufactures precision parts for video tape recorders and the like, and Takai Precision Tools (home office: Fujisawa city in Kanagawa Prefecture; president: Kansho Takai; capitalization: 50 million yen), which manufactures miniature bearings, are also burning with the desire to change their production processes over to FMS.

Because the FMS wave has begun to spread throughout industry, the machine industry, which is the source of FMS machinery, is prepared to take the lead in changing to FMS, declaring that "after OA (office automation) comes FA (factory automation)," and that "this year is the takeoff year for FMS."

A Succession of FMS Factories Make Their Appearance

It was Fujitsu Fanuc Ltd which began the trend toward FMS factories in Japan's machine tool industry. At the beginning of last year, it built its Fuji factory, a true FMS factory where "robots build robots," at the foot of Mt Fuji with an investment of 8 billion yen. Yamazaki Machinery Works Ltd, the leading manufacturer of machine tools, completed last autumn, at an investment of 3 billion yen, an FMS factory at its main factory, which became the world's most advanced automated factory. As if in hot pursuit of these two companies, all the other machine tool manufacturers have set out to construct FMS factories, too. This year, the curtain on the FMS factory age seems to have been raised all at once.

The first off the line is the leading manufacturer of NC lathes, Mori Precision Tool Co. This company is in the process of building a second factory at the site of its main Iga factory in Mie Prefecture which will contain a large-scale FMS. The factory will consist of an automated warehouse, automated conveyor system, and computers centering around MC (machine centers); the automated warehouse alone will be on the scale of 3,300 square meters. The company's executive director, Konan Mori, boasts that "when this is completed in the spring, it will be the largest FMS factory in Japan."

The Amada group is also enthusiastic about FMS. Planning to invest 10 billion yen over a 3-year period, it has set out to rationalize the production system of its subsidiary companies, Wasino Machine Co Ltd and Sonoke Manufacturing Co Ltd. Furthermore, Okamoto Machine Tool Works Ltd has also introduced FMS into its new factory in Annaka city, Gumma Prefecture, which will begin operations in the spring of this year. Also, Tsugami Corporation Ltd has developed a plan to change its Shinshu factory in Saku city, Nagano Prefecture, over to FMS. The following all have plans to construct FMS factories: Makino Milling Machine Co Ltd, Kitamura Machinery Co Ltd (home office: Takaoka City,

Toyama Prefecture; president: Konosuke Kitamura; capitalization 130 million yen); Yasuda Industry Co Ltd (home office: Satosho town, Okayama Prefecture; president: Korehiko Yasuda; capitalization: 45 million yen); Nakamura-tome Precision Industry Co Ltd (home office: Tsurugimachi, Ishikawa Prefecture; president: Tomeo Nakamura; capitalization: 150 million yen). Hitachi Seiki Co Ltd, as well, is hurrying to change its major Abiko factory (Abiko city, Chiba Prefecture) over to FMS.

Of those mentioned above, Nakamura-tome Precision Industry Co has put 500 million yen into the construction of "Japan's first" user-oriented FMS factory by September of this year. Specifically, this factory will not manufacture parts for the company's own NC lathes; rather, the company has come up with a unique strategy of manufacturing over 270 types of machine tools, offering the acquired production knowhow and other production system data to tool manufacturers, and then hoping that this will lead to increased sales of its own NC lathes and MC.

The pioneering companies, Fanuc and Yamazaki Machinery Works, are, of course, not about to be left behind. In order to outdistance the late-starting manufacturers, these two companies are building FMS factories abroad in an effort to solidify their positions as FMS manufacturers. Fujitsu Fanuc is building an automated factory in Luxembourg which will produce 50 NC tape automatic manufacturing devices per month with a work force, including the president, of only three people. This factory will begin operations this spring.

Yamazaki Machinery Works, on the other hand, has revealed a plan to build the first FMS factory in the United States. At present, the company is producing NC lathes in Florence, Kentucky, but it will also build an FMS factory by the end of this year. Yamazaki's president, Shoko Yamazake, said that "with an investment of around 3 billion yen, we will build an automated factory on the same scale as the FMS factory which has begun operating within our headquarters factory."

"Mini-FMS" Also Active

Under these circumstances, the movement to push the sales of "mini-FMS," which are meant for medium and small enterpirses, has grown lively as well. Wasino Machine Co has developed a mini-FMS factory, called "PAP," which can efficiently produce machine parts, and the company has begun to accept orders. Because this machine manufacturing system is equipped with some 10 machine tools, 7 robots, conveyors, parts supply devices, and the like, it is said that this system by itself will be a small machine-manufacturing factory. Also, Fanuc plans to exhibit for the first time, at the International Machine Tool Exhibition in Osaka this autumn, a "mini-FMS" which combines NC machine tools and robots with an automated conveyor and an automated warehouse and which is run by computers.

The comcept of FMS originaed in Great Britain, but in terms of putting the concept into actual use, Japan leads the United States and Europe by several steps. For this reason, Japan's exports of FMS should begin in earnest this this year. Just recently, Hitachi Seiki struck up a deal with Bulgaria for

an FMS plant consisting of 30 MC's at a total cost of 3 billion yen. In addition, Yamazaki Machinery Works, which received an order from the American press manufacturer Cincinnati Inc for a 1-billion yen system, is now negotiating with Westinghouse Electric for the export of a large-scale FMS. As the president of Yamazaki said: "This year, Japan is moving out to become the world's supplier of FMS."

Fuji, Fujitsu Group Joint Venture

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 6 Jan 82 p 1

[Text] Three companies from the former Furukawa group--Fuji Electric Co Ltd, Fujitsu, and Fujitsu Fanuc--have agreed to establish a system for the joint production and sale of FMS (flexible manufacturing system), which is said to represent the production revolution of the 1980's. An FMS, which combines computer-driven industrial robots and NC (numerically controlled) machine tools, such as MC (machining centers), is an automated system which can efficiently produce limited quantities of diverse items without the use of human hands. For this reason, it is attracting considerable attention as the cutting edge of FA (factory automation). It is the aim of these three companies to combine their special machines and knowhow in order to respond to the "FMS age" which is spreading throughout industry.

"Three Generations" Reunite

These three companies represent three generations--Fuji Electric, an old firm of the former Furukawa group, is the father, Fujitsu the son, and Fujitsu Fanuc the grandson. Of these, however, both Fujitsu and Fujitsu Fanuc are leading growth firms with a strong sense of independence, the former in computers and the latter in NC devices. It is very unusual for three generations of companies to reunite and collaborate like this on the advanced technology FMS.

At a summit meeting held late last year. Fuji Electric Vice President Terahisa Kiyomizu, Fujitsu President Takushin Yamamoto, and Fujitsu Fanuc President Seiuemon Inaba agreed in principle to form an "FA alliance."

The essentials of the cooperative agreement were: (1) Fujitsu Fanuc would handle sales, and the alliance would utilize the combined structure of the three companies to respond actively to the movement toward FA which had begun to spread throughout industry both at home and abroad, mainly in the machine, electronic, and electrical appliance sectors, and to develop strategic products for the 1980's; and (2) Fuji Electric would take charge of monitoring devices, including automated conveyor and warehouse systems and display devices; Fujitsu Fanuc would handle industrial robots and NC machine tools; and Fujitsu would be responsible for the computers controlling the entire system.

For this reason, by the end of March, Fujitsu Fanuc, which is responsible for the engineering sector, will establish a Systems Engineering Office within the the Technology Research Institute being constructed at its Fuji factory in Yamanashi Prefecture. In addition to setting up a sales system for the FMS,

Fujitsu Fanuc, with the cooperation of Fujitsu and Fuji Electric, is going to exhibit and demonstrate an FMS model at the International Machine Tool Exhibition which will be held in Osaka this autumn.

Along with the pioneer group of Fanuc and its allies, major electronics and electrical appliance manufacturers, such as Mitsubishi Electric and Matsushita Electric Industrial Co, and machine tool manufacturers, such as Amada and Yamazaki Machinery Works (home office: Aichi Prefecture; president: Shoko Yamazaki; capitalization: 1 billion yen) are entering the FMS field one after another. As a result of this trend, the forecast is for the sales war to grow even more intense. Therefore, the struggle for leadership in the field of FMS will grow white hot with the formation of this united front among the three Fuji companies of the former Furukawa group.

FMS Wave Spreading

Fujitsu Fanuc President Inaba has said that "this year is the first year in the spread of FMS." He based his statement on the fact that automated factories with FMS are about to appear in large numbers in the advanced production sites of industry.

Toshibe Corporation, for example, launched a 3-year FMS project in FY-81. This plan calls for the investment of 50 billion yen over the 3-year period; the introduction of FMS on at least 35 production lines in the company's leading divisions, such as household appliances, heavy electric machinery, semiconductors, and computers; and the reduction of the work force on these lines from 2,500 to 500 people. In addition to leaders of the machine tool industry, such as Mori Precision Tool Co, Okamoto Machine Tool Works, Yasuda Industry Co, and Nakamura-tome Precision Industry, other companies like Nikkiso Co Ltd, Nihon Seiko, Toyo Kogyo, and Yamaha Motor Co also are moving to erect FMS factories.

It is not only the major companies which are doing this. The FMS wave has begun to spread to medium and small enterprises as well. Behind this development is the fact that industry, with its call for strengthening international competitiveness, has entered headlong into the race to rationalize production so as to reduce costs and raise productivity. With the passing of the OA (office automation) revolution, which swept through the office management sector, the FA (factory automation) revolution now seems to be overtaking the production site. Fujitsu President Yamamoto has said that "FMS will be the new market for computers.

Under these circumstances, the "three former Furukawa companies" had this market in mind when they joined forces. Thus, Fujitsu Fanuc President Inaba, whose company will play a central role in this collaboration, is enthusiastic about "selling FMS, which will be the carrier of FA to the industry of the world." It looks like the struggle for leadership in the FMS market--the growth market of the 1980's--will center around these "three former Furukawa companies."

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SCIENCE AND TECHNOLOGY

RELAXATION OF RECOMBINANT DNA GUIDELINES RECOMMENDED

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 14 Jan 82 p 4

[Text] Toward Drastic Relaxation of Recombinant DNA Guidelines To Equal the Euro-American Level--Interim Report of the Science Council

"The subcommittee to evaluate experimental guidelines for recombinant DNA" (chief investigator: Professor T. Iino, Faculty of Science, Tokyo University) of the Science Council of the Ministry of Education has been working on a revision of the Japanese recombinant DNA (deoxyribonucleic acid) experimental guidelines, which are said to be the most stringent regulations in the world. It compiled a revision proposal (interim report) and released its contents to the general public on the 13th. On the premise of the current state of DNA experiments that virtually no unforeseeable risks exist in recombinant DNA experiments, the contents of the revision proposal aim at allowing experiments at ordinary microbiology experimental facilities (P_1 level), with the exception of cases using DNA from Pasteurella pestis, pathogenic dysentery bacteria, pathogenic viruses from Lhasa fever, yellow fever, Korean hemorrhagic fever, etc, the dissemination of organisms with recombined DNA in nature, or the innoculation of animals or plants. It will revise the current guidelines in all aspects which are based on the apprehension that recombinant DNA experiments hold unforeseeable great danger. This revision proposal will now seek opinions from specialists, and following final revision in the Science Council, it will be enforced following a public announcement by the Minister of Education. The Council for Science and Technology (prime minister's advisory organ), which decides on the "guidelines" for the Japanese recombinant DNA experiments, is also expected to go along with the revision, and the prospect is to enforce it as early as the beginning of 1982.

Recombinant DNA experiments not only enable mass production of beneficial pharmaceuticals such as interferon and insulin, they can be applied even in areas of foods and energy, and this technology is awaited as ushering in the 21st century. However, it was suspected that it might create unforeseeable organisms and bring danger to mankind.

For this reason, the necessity for self-discipline and voluntary regulations for recombinant DNA experiments were proposed. The United States formulated experimental guidelines (NIH guidelines, the U.S. National Institutes of Health) in 1976 which emphasized experimental regulations and an assurance

of safety and began research, followed by various European countries that established experimental guidelines one after another.

The current Japanese guidelines were formulated in April 1979 through Ministry of Education involvement referring to the experimental guidelines of the United States, and the guidelines for Japan as a whole have been in force since August 1979.

However, subsequently, the expectation of the hazards of recombinant DNA experiments has been greatly diminished from what was initially expected: e.g., E. coli in which carcinogenic polioma viral DNA was spliced showed no carcinogenicity; recombinant DNA experiments between heterogenous organisms (shotgun experiments) did not show unexpected, unkown risks; and recombinant DNA experiments using genes of higher animals demonstrated virtually no unexpected risk.

For this reason, revisions to relax the regulations have been made several times in European countries and the United States, and three times in Japan. In comparison with the European and American guidelines that reflected the current state of these DNA experiments, the Japanese revisions consisted merely of the addition of yeast and Bacillus subtilis to the host-vector system or an increase in the number of microorganisms whose DNA's can be used to 284 strains, and they remained the most stringent guidelines in the world.

This revision aims at updating the guidelines to the equivalent of the European and American level. Due to the fact that most recombinant DNA experiments are safe, it will become possible to conduct the majority of recombinant DNA experiments in Japan also by using P_1 level experimental facility and organisms having low viability in nature, that is, a B_1 biological containment level. In other words, regarding the DNA donors to be used, P_1 level will suffice for practically all cells from primates, mammals, birds, poikilothermal vertebrates, invertebrates, and plant cells, and a special experimental facility of P_2 level is necessary for only some of them. Compared to the current guidelines that require P_4 and P_3 facilities in using primate cells, the revision will relax the rules two or three steps. In addition, the plan includes: 1) elucidation of the definition of recombinant DNA experiments, 2) revision of procedures for assuring experimental safety, 3) revision of the purpose of biological containment, and 4) handling regulations for recombined organisms and clarification of the responsibilities of those engaged in experiments in health management.

However, when the culture scale of the recombined organisms is more than 20 liters, or when conducting experiments with pathogenic microorganisms, infectious materials, etc, individual inquiry is to be made, as before, to determine the safety. Also, when developing a new host-vector system, the regulations are the same as before, requiring a safety check in the facility with a high degree of safety.

Proposed Revision of Containment Methods

DNA Donors	Current Guidelines	Proposed Revision
Primates	P_4 B_1, P_3 B_2	P_2 B_1, P_1 B_2
Mammals other than primates, birds, poikilothermal vertebrates	P_3 B_1, P_2 B_2	
Invertebrates, Plants	P_2 B_1, P_1 B_2	P_1 B_1, P_1 B_2
	Individual certification	Individual certification
Lower eukaryotes, prokaryotes, bacteriophage	P_1 B_1, P_1 B_2	P_3 B_1, P_2 B_2 P_2 B_1, P_1 B_2 P_1 B_1, P_1 B_2

P_1, P_2, P_3, P_4 (physical containment levels: P_1 level is an ordinary biological experimental facility; P_4 level is a special experimental facility that completely contains the experimenter and the recombinant organisms)

B_1, B_2 (biological containment levels: B_1 level uses a host-vector system with low viability in nature; B_2 level uses a host-vector system with lower viability than that of B_1 level)

Host is a microorganism that mass produces the DNA, and vector is a carrier of DNA.

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SCIENCE AND TECHNOLOGY

RECENT BIOTECHNOLOGY R&D REPORTED

Artificial DNA

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 5 Jan 82 p 1

[Article: "A Five-Firm Joint Venture for Domestic Production of 'Artificial DNA'; 2-Year Plan for Development of Basic Technology"]

[Text] Five firms, Ajinomoto, Wakinaga Yakuhin, Yamasa Shoyu, Yuki Gosei Yakuhin Kogyo, and Toyo Soda Manufacturing Co, Ltd, will jointly embark on the development of "artificial DNA" which is indispensable for research and can also be used as a substitute for recombinant DNA (deoxyribonucleic acid), a technology that will open the 21st century. As a research team of MITI, they will participate in a large-scale project "DNA extraction, analysis, and synthesis technology development" started by the Council for Science and Technology. For the time being, their goal in the 2-year plan is to work for the establishment of necessary basic manufacturing technology. They will develop four kinds of artificial DNA's [components] (nucleotides = chemical substances), adenine, cytosine, guanine and thymine, as well as trimers (trimers of artificial DNA [components]). In the scheme of technological development, Yamasa and Yuki Gosei Yakuhin will commercially distribute developed artificial DNA, and Ajinomoto will use it in the mass production of amino acids, while Wakinaga Yakuhin will use it for pharmaceutical development. In Japan, artificial DNA's are produced only on an experimental basis, and, thus, currently foreign products are being used for domestic consumption. Consequently, if the five firms succeed in developing artificial DNA, Japanese genetic engineering and its industrial applications will make rapid progress.

Natural DNA comprises four kinds of DNA [components], adenine, cytosine, guanine, and thymine, and these four kinds of DNA [components] are linked in chain form in the genes. On the other hand, artificial DNA has a structure similar to the natural DNA and is manufactured artificially by means of synthetic chemistry. For example, useful substances such as interferon and insulin are also derived from these four kinds of DNA [components].

For this reason, when it becomes possible to manufacture these four kinds of DNA [components] artificially, useful substances can be made by combining them.

The five firms will try to develop manufacturing technology that can produce these basic four kinds of DNA [components] efficiently and in high purity by means of synthetic chemistry. In addition, they are also aiming to develop manufacturing

techniques for trimers, combinations of three artificial DNA [components]. For example, a trimer consisting of cytosine, adenine and thymine can constitute an amino acid called valine. Sixty-four kinds of trimers can be made from these 4 basic DNA's, and 61 of them constitute 20 different amino acids.

According to the plan, Ajinomoto will develop trimers to produce amino acids such as leicine, isoleicine, and alanine; Wakinaga Yakuhin, serine and glutamine; Yamasa, tyrocine, lysine, and arginine; Yuki Gosei Yakuhin, threonine, glycine, and cysteine; and Toyo Soda, phenylalanine, histidine, and aspartic acid.

After the manufacturing techniques for these trimers are established, the DNA's for producing interferon and insulin can be readily manufactured, and various recombinant DNA research will be possible. Consequently, the artificial DNA's to be developed by the five firms will also become the material for recombinant DNA.

Currently, the artificial DNA's used in Japan as material are mostly imported from the United States and Europe. The four kinds of DNA [components] cost as much as 100,000 yen per 1 unit (milligram unit). Trimers cost 200,000 yen to 300,000 yen, and a substance with 18 artificial DNA's [components] linked together cost as much as 500,000 yen. To make useful DNA's consisting of these materials will cost several million yen, and in the case of a small research laboratory, the annual research budget will disappear just by purchasing these materials.

Costliness of materials has been a big obstacle in Japanese recombinant DNA research and commercialization.

If the five firms are successful in research and large-scale production, a supply structure for artificial DNA will be in order also in Japan at the same level as in the United States and Europe. The project of the Council for Science and Technology will begin its full-scale activities beginning in FY 1982, and the first plan will be completed in FY 1983.

STA's Holonic Function Research

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 7 Jan 82 p 13

[Article: "Creating Artificial Biological Function as One of the Series of STA's Creative Technology Systems; New Information Processing Techniques Also Sought"]

[Text] The Science and Technology Agency (STA) has decided to embark on research to artificially create a biologically unique function called "holonic function" as one of the series of projects in the creative science and technology promotion program. The object of the research is to analyze such biologically unique high level functions as those of nodes that convert chemical energy directly into mechanical energy, or those of nerves that transmit stimuli to the brain, and to combine the individual elements into an artificial system. Focus is also on the biological exchange of information between cells and organs in order to look into the possibility of new information processing. According to STA, details of this

research project and the selection of leaders will be confirmed by this summer and research will begin in the fall and continue for 5 years till 1986.

The "holonic function" consists of the mutual cooperation of constituent elements (holons) such as protein molecules or cells. In the case of a living body, numerous cells that constitute various organs cooperate and demonstrate the unique functions of respective organs. The research to be undertaken in the creative science and technology promotion program attempts to create an artificial function resembling a living body by simulating such biological characteristics and arranging individual elements in sequence and harmony. Specifically, they are attempting to create a mechanism resembling muscles, weak signal transmission systems similar to nerves, etc. For example, from this research one can expect to create a new type of engine with less energy consumption or a new communication circuit with low noise and high efficiency, etc. In addition, while pursuing such artificial biological functions, the possibility of applications in other fields or industry will also be sought.

According to STA, at the stage of the preliminary budget request, research on "biological information" aiming at elucidation and application of the mechanism of various types of biological information exchange was also included, in addition to "research on holonic functions" as a new project in the creative science and technology promotion program. However, in the government budget proposal, only the "holonic function" was approved in the end. However, STA regards research on biological information exchange just as important as "research on holonic functions," and is studying the possibility of undertaking biological information exchanges as well within the research project on holonic function.

STA plans to decide on the research goals and details of the project by about July-August and to work on the selection of research leaders along the way. The plan is to place three research groups of "energy exchange," "stimuli transmission," and "functional control" comprised of researchers invited from various fields of biology, physics, chemistry, engineering, etc., under the project leaders. They plan to start research in October.

In the FY 1982 government budget proposal, "research on holonic functions" has an appropriation of about 100 million yen, and the total budget for 5 years is expected to be approximately 2 billion yen. The creative science and technology promotion program started in FY 1981, and research on four projects, including "superfine particles," has already begun. With the addition of "research on holonic functions" beginning in 1982, there will be five projects in progress.

Interferon Mass Production

Tokyo NIHON KEIZAI SHIMBUN in Japanese 20 Jan 82 p 8

[Text] Takeda Chemical Industries, Ltd. and Nippon Roche (Tokyo main office) have respectively completed their facilities which will enable them to produce 1 trillion units of α (alpha) interferon (virus-inhibiting factor) per month. This has

made it possible for 5,000 cancer patients to receive a mass dosage treatment at the Japanese standard. Samples have been sent to the U.S. Roche for the final test and there have been no problems so far. They plan to use domestic interferon in the second clinical trial which begins in the fall.

Supply for 5,000 Patients Between the Two Firms

The supply volume of the two firms is distinctly greater than that of other domestic producers, and it is almost equal to the U.S. level. The mass production capability of the gene splicing technique has been demonstrated anew. It is good news for clinicians who would not try the drug as much as they wished because of the absolute quantity available in the past.

Japan, the United States and European countries are promoting the development of interferon because of the expectation that interferons may be effective against intractable viral diseases such as influenza, hepatitis B, as well as various cancers. In the past, the absolute quantity obtained through the method of extracting interferon from body cells such as lymphocytes, fibroblasts, etc. was too small to carry out clinical trials to the fullest, and, therefore, not much progress was made.

The Takeda-Roche group completed its plans, respectively, after importing the technology from the U.S. Roche. Takeda invested 500 million yen and Nippon Roche 1 billion yen into their plants. Each has the capacity to manufacture 1 trillion units per month, and a supply of 2 trillion units is possible between the two firms.

The two firms have sent the extracted interferon to U.S. Roche, which is speeding up animal experiments in order to confirm safety as well as pharmacological, beneficial effects. So far, the animal experiments conducted in Japan have gone successfully, and no problems have been reported by U.S. Roche, either. Consequently, they are expecting to use it in the second round of clinical trials in Japan.

It is said that 300 to 400 million units of interferon are necessary per one cancer patient, and at this dosage, 5,000 patients per month will be able to receive it. Even by adopting the mass dosage technique of administering 1.5 billion units per person, which is showing a high success rate in the United States, the drug is still available for more than 1,300 patients. Thus, a way to expand clinical experiments is now open.

In Japan, Sumitomo Chemical Co, Ltd., the Green Cross Corporation and Toray Industries, Inc. are already conducting clinical trials. However, production seems to be limited to several hundred billion units per month in each case, and the supply volume cannot be enlarged at will because of the body cell-derived technique. Using the gene splicing technique, U.S. Roche began clinical trials last year and leads the world. It is also reported that they are already equipped with a system to supply 4 trillion units per month.

The volume of production by Takeda-Roche group is comparable to that of the United States in view of the U.S.-Japan population ratio, and it will undoubtedly add momentum to interferon research and development.

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SCIENCE AND TECHNOLOGY

BRIEFS

NEW METEOROLOGICAL SATELLITE--Tokyo, 17 Mar (JIJI PRESS)--Japan will launch a new geostationary meteorological satellite, called GMS-3, by N-11 rocket in fiscal 1984 to replace the present "Himawari (Sunflower) II," the Space Development Council decided Wednesday. The council also decided that Japanese space engineers will start in fiscal 1983 preliminary designing of the nation's third telecommunications satellite, dubbed CS-3, to be lofted by the next-generation large rocket H-1. The council, chaired by Director-General Ichiro Nakagawa of the Science and Technology Agency, works out Japan's space development program every year, taking into account the domestic and international situation. [Text] [OW171445 Tokyo JIJI in English 1433 GMT 17 Mar 82]

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